Final Integrated Natural Resources Management Plan (INRMP) Burlington Air National Guard Base

December 2018

Prepared for:

Air National Guard
3501 Fetchet Avenue
Joint Base Andrews, MD 20762

Vermont Air National Guard
Burlington Air National Guard Base
106 NCO Drive
South Burlington, VT 05403

Under Cooperative Agreement With:
Department of the Army
Corps of Engineers, Omaha District
1616 Capital Avenue
Omaha, NE 68102

Cooperative Agreement:
W9128F-16-2-0021-0008

Prepared by:

Texas A&M Natural Resources Institute
578 John Kimbrough Boulevard
2260 TAMU
College Station, TX 77843

SIGNATURE PAGE

The Burlington Air National Guard Base (ANGB) Integrated Natural Resources Management Plan (INRMP) has been prepared for the 158 Fighter Wing (FW) to manage significant natural resources in support of the military mission. Significant natural resources include the presence of federal and state listed species, the presence of Waters of the United States including wetlands, and frontage on the Winooski River. The Burlington ANGB INRMP meets the intent of the Sikes Act (16 USC § 670a–670l, 74 Stat. 1052).

To the extent that resources permit, the US Fish and Wildlife Service (USFWS), Vermont Fish and Wildlife Department (VFWD), and the Vermont Air National Guard (VTANG) by signature of their agency representative, do hereby enter into a cooperative agreement for the conservation, protection, and management of natural resources present on Burlington ANGB. The agreement may be modified and amended by mutual agreement of the authorized representatives of the 3 agencies. This agreement will become effective upon the date of the last signatory and shall continue in full force for a period of 5 years or until terminated by written notice to the other parties, in whole or in part, by any of the parties signing the agreement.

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

Approving Officials:

12 Dec 2018
Date

David A. Smith, Colonel
Vermont Air National Guard
Commander, 158 Fighter Wing

14 Dec 2018
Date

Tom Chapman
US Fish and Wildlife Service
Supervisor, New England Field Office

Mark S Scott

12/4/18
Date

Mark Scott
Vermont Fish and Wildlife Department
Wildlife Division Director

ANNUAL REVIEW DOCUMENTS

This page is used to certify the annual review and coordination of the Burlington ANGB INRMP.

With the signature below, this document acknowledges that the annual review and coordination of the INRMP has occurred for the specified year.

Year: 2019

RICE.ADAM.THOMAS.1080500706 Digitally signed by RICE.ADAM.THOMAS.1080500706 Date: 2019.11.26 12:21:06 -05'00'

26 November 2019

[ADAM T. RICE, Colonel, Vice Commander, for]
Burlington ANGB Commander

Date

Eric Y. Denlitth

11/20/2019

[ ]
US Fish and Wildlife Service Acting For
Thomas R. Chapman, Supervisor, New England Field Office

Date

[ ]
Vermont Fish and Wildlife Department

Date

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26 November 2019

[ADAM T. RICE, Colonel, Vice Commander, for]
Burlington ANGB Commander

Date

[ ]
US Fish and Wildlife Service

Date

Mark S Scott

11/14/19

[ ]
Vermont Fish and Wildlife Department

Date

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Year: 2020

SHEVCHIK.DAVID.WILLIAM.1007778429 Digitally signed by SHEVCHIK.DAVID.WILLIAM.1007778429 Date: 2020.12.29 15:17:27 -05'00'

[David W. Shevchik] Date
Commander, 158th Fighter Wing

THOMAS CHAPMAN Digitally signed by THOMAS CHAPMAN Date: 2020.12.04 14:38:44 -05'00'

[Thomas R. Chapman, Supervisor, New England Field Office] Date
US Fish and Wildlife Service

[ ] Date
Vermont Fish and Wildlife Department

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

Approving Officials:

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David W. Shevchik, Colonel — Date
Vermont Air National Guard
Commander, 158 Fighter Wing

Tom Chapman — Date
US Fish and Wildlife Service
Supervisor, New England Field Office

12/1/20

Mark E Scott

Mark Scott — Date
Vermont Fish and Wildlife Department
Wildlife Division Director

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Year: 2021

FINNEGAN.DANIEL.PATRICK.1007518290 Digitally signed by FINNEGAN.DANIEL.PATRICK.1007518290 Date: 2021.12.02 17:49:42 -05'00'

David W. Shevchik, Colonel] Date
Vermont Air National Guard
Commander, 158 Fighter Wing

AUDREY MAYER Digitally signed by AUDREY MAYER Date: 2021.11.02 09:14:59 -04'00'

Audrey Mayer] Date
US Fish and Wildlife Service
Supervisor, New England Field Office

Mark E Scott 11/10/2021

Mark Scott] Date
Vermont Fish and Wildlife Department
Wildlife Division Director

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Year: 2022

[ ]	Date
Burlington ANGB Commander	
[ ]	Date
US Fish and Wildlife Service	
[ ]	Date
Vermont Fish and Wildlife Department	

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ACRONYMS

°F	degrees Fahrenheit
AFI	Air Force Instruction
ANG	Air National Guard
ANGB	Air National Guard Base
BA	Biological Assessment
BASH	Bird/Wildlife Aircraft Strike Hazard
BCI	Bat Conservation International
BGEPA	Bald and Golden Eagle Protection Act
BHWG	Bird Hazard Working Group
BMP	Best Management Practice
BTV	Burlington International Airport
CCRPC	Chittenden County Regional Planning Commission
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CWA	Clean Water Act
DEPARC	Defense Environmental Programs Annual Report to Congress
DoD	Department of Defense
DoDI	Department of Defense Instruction
DoDM	Department of Defense Manual
DUSD	Deputy Under Secretary of Defense
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EO	Executive Order
ERP	Environmental Restoration Program
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FY	Fiscal Year
GIS	Geographic Information Systems
IICEP	Interagency and Intergovernmental Coordination for Environmental Planning
INRMP	Integrated Natural Resources Management Plan
IPM	Integrated Pest Management
MBTA	Migratory Bird Treaty Act
MOA	Memorandums of Agreement
MOU	Memorandums of Understanding
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NGB	National Guard Bureau
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NWS	National Weather Service
OPR	Office of Primary Responsibility
SGCN	Species of Greatest Conservation Need

SWPPP	Storm Water Pollution Prevention Plan
USACE	US Army Corps of Engineers
USAF	US Air Force
USC	US Code
USDA	US Department of Agriculture
USDA-WS	US Department of Agriculture – Wildlife Services
USEPA	US Environmental Protection Agency
USFS	US Department of Agriculture Forest Service
USFWS	US Fish and Wildlife Service
VSA	Vermont Statutes Annotated
VSWI	Vermont Significant Wetlands Inventory
VTANG	Vermont Air National Guard
VTANR	Vermont Agency of Natural Resources
VTDEC	Vermont Department of Environmental Conservation
VFWD	Vermont Fish and Wildlife Department
WAP	Wildlife Action Plan
WHMP	Wildlife Hazard Management Plan

1.0 EXECUTIVE SUMMARY

The Sikes Act Improvement Act of 1997, 16 US Code (USC) § 670a et seq., as amended, (herein referred to as the Sikes Act) requires federal military installations with significant natural resources to develop a long-range INRMP and implement cooperative agreements with other agencies. The Sikes Act is implemented through Department of Defense (DoD) and US Air Force (USAF) Instructions and Manuals. The conservation measures discussed in the INRMP help manage water resources, reduce bird/wildlife aircraft strike hazard (BASH) risk, manage federal and state-listed species, and sustain natural resources. The Burlington ANGB INRMP is intended to be in support of and consistent with the intent of the Sikes Act.

The Burlington ANGB INRMP is the primary guidance document and tool for managing natural resources. Burlington ANGB is composed of approximately 281 acres over 2 parcels, all owned by the City of Burlington. All facilities are ultimately under the command of the Vermont Air National Guard (VTANG) with the primary purpose to provide the USAF with combat ready personnel and equipment for utilization during times of war or national emergency, and to provide assistance to the State of Vermont for use during local and statewide disasters or emergencies. Burlington ANGB, due to its geographic location and the nature of the facility, contains diverse habitats and species that require natural resources management. The natural resources management on Burlington ANGB must be conducted in a way that provides for sustainable land use, complies with applicable environmental laws and regulations, real estate leases and licenses, and provides for no net loss in the capability to support the military mission. The INRMP provides a structure and plan to manage natural resources more effectively and ensure that VTANG facilities remain available to support the installation's military mission into the future.

Specific goals in the Burlington ANGB INRMP are supported by its objectives and work plans, as well as management strategies and specific actions. Goals and objectives are listed in **Section 8**, and projects and activities are summarized in **Section 9**. The Burlington ANGB INRMP provides a description of the installation, the military mission, the environment on the installation, and specific plans and strategies for natural resource management designed for sustainable military training. The implementation of the Burlington ANGB INRMP will ensure the successful accomplishment of the military mission while promoting adaptive management that sustains ecosystem and biological integrity, and provides for multiple uses of natural resources. It also will ensure that management efforts of the VTANG at these facilities is consistent and integrated with as little redundancy as possible.

2.0 GENERAL INFORMATION

2.1 Purpose and Scope

The INRMP is the primary guidance document and tool for natural resource management at Burlington ANGB that provides for sustainable, healthy ecosystems, complies with applicable environmental laws and regulations, real estate leases and licenses, and provides for "no net loss" in the capability of installation lands to support the military mission. The Installation Commander can use this INRMP to manage natural resources more effectively to ensure that

installation lands remain available and in good condition to support the installation's military mission over the long term.

The Burlington ANGB INRMP is consistent with the Sikes Act as required by the DoD, USAF, and the National Guard Bureau (NGB). It was developed as a result of the presence of federal and state-listed endangered and threatened species, and regulated water resources. A multiple-use approach is implemented to allow for the presence of mission-oriented activities, as well as protecting environmental quality through the efficient management of natural resources.

2.2 Management Philosophy

2.2.1 Ecosystem Management

Natural resources at Burlington ANGB are managed with an ecosystem management approach as directed by AFI 32-7064 and DoDI 4715.03. Ecosystem management is defined as management to conserve major ecological services and restore natural resources while meeting the socioeconomic, political and cultural needs of current and future generations. The goal of ecosystem management on military lands is to ensure that military lands support present and future test and training requirements while conserving, improving, and enhancing ecosystem integrity. The ecosystem management program for Burlington ANGB incorporates these elements as described in **Table 1**.

Biodiversity is the degree of variation of life within a given ecosystem, region, or even the entire planet. The DoD's challenge is to manage for biodiversity in a way that supports the military mission. Specific management practices identified in the Burlington ANGB INRMP have been developed to enhance and maintain biological diversity within the installation's ecosystems. Ecosystem management includes biodiversity conservation and invasive species control as integral parts of ecosystem management. Air National Guard (ANG) installations maintain or reestablish viable populations of all native species when practical and consistent with the military mission. ANG installations also identify the presence of exotic and invasive species, and implement programs to control and/or eradicate those species. Finally, when feasible, ANG installations develop joint control strategies with other federal, state, and local cooperating agencies and adjacent landowners to increase the effectiveness of control measures and for the benefits illustrated in **Figure 1**.

Table 1. Elements and Principles of Ecosystem Management	
DoDI 4715.03 Elements	
1	Avoid single-species management and implement an ecosystem-based multiple species management approach, insofar as that is consistent with the requirements of the Endangered Species Act (ESA)
2	Use an adaptive management approach to manage natural resources such as climate change
3	Evaluate and engage in the formation of local or regional partnerships that benefit the goals and objectives of the INRMP
4	Use the best available scientific information in decision-making and adaptive management techniques in natural resource management
5	Foster long-term sustainability of ecosystem services
AFI 32-7064 Principles	
1	Maintain or restore native ecosystem types across their natural range
2	Maintain or restore ecological processes such as wildland fire and other disturbance regimes where practical and consistent with the military mission
3	Maintain or restore the hydrological processes in streams, floodplains, and wetlands when feasible
4	Use regional approaches to implement ecosystem management on an installation by collaboration with other DoD components as well as other federal, state and local agencies, and adjoining property owners
5	Provide for outdoor recreation, agricultural production, harvesting of forest products, and other practical utilization of the land and its resources, provided that such use does not inflict long-term ecosystem damage or negatively impact the ANG mission

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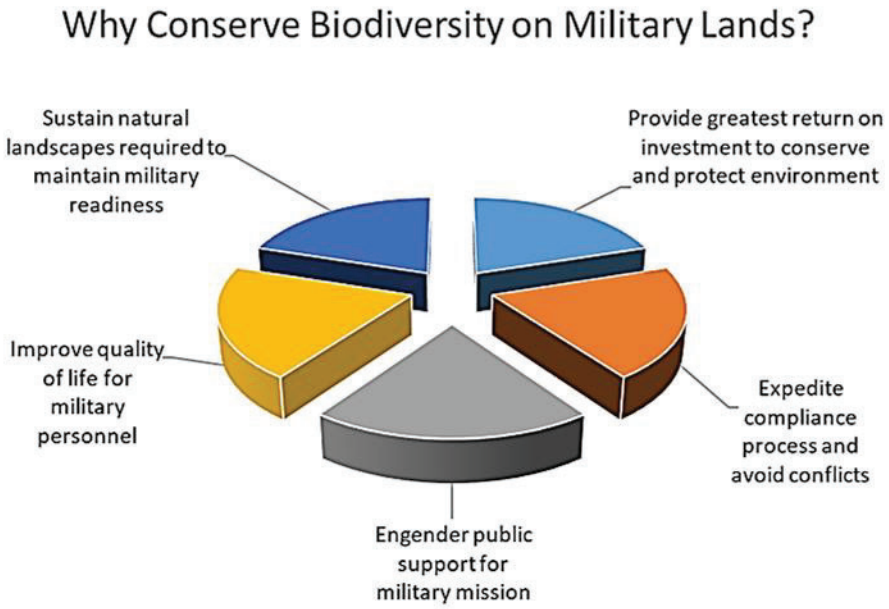

Figure 1. Why conserve biodiversity on Military Lands
**Adapted from Keystone Center, 1996.*

2.3 Authority

2.3.1 Natural Resources Law, Regulations & Policy

The ANG, USFWS and VFWD determined an INRMP was required for Burlington ANGB due to the presence of significant natural resources thereby necessitating conservation and management.

DoDI 4715.03, *Natural Resources Conservation Program*, identifies the DoD policies and procedures concerning natural resources management and INRMP reviews, public comment, and endangered species consultation. INRMPs are required to be jointly reviewed by the USFWS, state fish and wildlife agency, and ANG installation for operation and effect on a regular basis, but not less often than every 5 years. Minor updates and continued implementation of an existing INRMP do not require need for public comment. Major revisions to an INRMP require an opportunity for public review. The degree of endangered species consultation when updating or revising an INRMP depends upon specific projects identified in the INRMP and the amount of past consultation. Most updates and revisions will not require formal consultation. ESA Section 7 consultation is required for INRMPs that contain projects that may affect federally-listed species or designated critical habitat. The need for such consultation should become apparent during the review for operation and effect, and implemented if necessary as part of an INRMP revision.

2.3.2 National Environmental Policy Act Compliance

The Environmental Impact Analysis Process (EIAP) is the process by which federal agencies facilitate compliance with environmental regulations. The primary legislation affecting these agencies' decision-making process is the National Environmental Policy Act of 1969 (NEPA; 42 USC § 4321 *et seq*.). NEPA requires that any organization using federal monies, proposing work on federal lands, or requiring a federal permit consider potential environmental consequences of proposed actions. The law's intent is to protect, restore, or enhance the environment through well-informed decisions.

The Council on Environmental Quality (CEQ) was established under NEPA for the purpose of implementing and overseeing federal policies as they relate to this process. The adoption of an INRMP can be considered a major federal action as defined by Section 1508.18 of the CEQ regulations. This requires an analysis of potential environmental impacts for the implementation of an INRMP, although a complete Environmental Assessment (EA) is not necessarily required as individual actions and projects undergo their own NEPA analysis.

CEQ regulations require intergovernmental notifications prior to making any detailed statement of environmental impacts. Through the Interagency and Intergovernmental Coordination for Environmental Planning (IICEP) process, Burlington ANGB notifies relevant federal, state, and local agencies and allows them sufficient time to make known their environmental concerns specific to a Proposed Action. Comments and concerns submitted by these agencies during the IICEP process are subsequently incorporated into the analysis of potential environmental impacts. This coordination fulfills requirements under Executive Order (EO) 12372, Intergovernmental Review of Federal Programs, and AFI 32-7061, *Environmental Impact Analysis Process*. Furthermore, public participation in decision making on new proposals is required. Consideration of the views and information of all interested persons promotes open communication and enables better decision-making. Agencies, organizations, and members of the public with a potential

interest in the Proposed Action, including minority, low-income, disadvantaged, and Native American groups, are urged to participate.

The EIAP for the implementation of Burlington ANGB's first INRMP (September 2013) was conducted in accordance with NEPA, CEQ *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* (40 Code of Federal Regulations [CFR] § 1500-1508), and 32 CFR Part 989. The EIAP and decision-making process for the Proposed Action (implementation of the 2013 Burlington ANGB INRMP) involved an examination of all environmental issues pertinent to the action proposed. Impact evaluations of the 2013 Burlington ANGB INRMP determined that no significant environmental impacts would result from implementation of the Proposed Action or any identified alternative. This determination was based on thorough review and analysis of existing resource information, and coordination with knowledgeable, responsible personnel from the VTANG and other relevant local, state, and federal agencies. The EIAP for the implementation of the 2013 Burlington ANGB INRMP does not include an analysis of effects for individual actions or projects. Individual actions or projects that have the potential to impact the environment will be analyzed separately in accordance with the NEPA process. A new EIAP is not required for this INRMP update.

If a future action or project has the potential to impact the environment, the initial step in compliance with NEPA is to complete USAF Form 813 "Request for Environmental Impact Analysis". The form is prepared to aid in the development of the assessment, providing information on the proposed action and its alternatives, purpose, and potential environmental effects. This allows the proponent to identify potential environmental impacts early and facilitates making a determination about whether an EA or an Environmental Impact Statement (EIS) might be required for a specific action. Some sections are prepared by the proponent and other sections are prepared by the Environmental Management Office. If the action is not covered by a categorical exclusion, then an EA is prepared to determine if there are potential significant impacts. If potential significant impacts are identified, either while completing USAF Form 813 or during the EA, then an EIS is prepared. The majority of natural resources management actions in this INRMP are covered by categorical exclusions.

2.3.3 Responsibilities

The updated Burlington ANGB INRMP has been organized to ensure the implementation of year-round, cost-effective management activities and projects that meet the requirements of the installation. Various personnel and organizations within the VTANG responsible for the implementation of this INRMP are described in the following subsections.

2.3.3.1 Installation Commander

The Installation Commander oversees the installation and is responsible for ensuring the goals and objectives of the INRMP are implemented to the fullest extent practicable based on funding and manpower availability. The Installation Commander is the official signatory for the Burlington ANGB INRMP.

2.3.3.2 ANG NGB/A4AM Natural Resources Program Manager

The ANG NGB/A4AM Natural Resources Program Manager (ANG NR Program Manager) is the technical point of contact on all natural resource related activities for the ANG. The ANG NR Program Manager tracks DoD and USAF policies and approves funding for projects identified as

a priority in the Burlington ANGB INRMP. The development of projects included in the INRMP and any deviations from those projects will be submitted to the ANG NR Program Manager for review. Decisions resulting from those reviews will be a cooperative effort between the ANG NR Program Manager and the EM and/or the installation's Natural Resources Manager when, applicable.

2.3.3.3 Environmental Management Office

The Environmental Management Office plans, budgets, approves, and oversees all environmental activities performed on the installation and is responsible for ensuring that activities associated with the implementation of this INRMP adhere to applicable federal, state, local, and USAF environmental regulations and guidelines. The Environmental Management Office should independently review deviation from the projects proposed in this INRMP. Persons responsible for implementation of the INRMP are required to attend the Civil Engineer Corps Officers School (CECOS) DoD Natural Resources Compliance course (http://www.netc.navy.mil/centers/csfe/cecos/CourseDetail2.htm#tab25).

2.3.3.4 Environmental Manager

The EM is responsible for ensuring activities associated with the implementation of the INRMP adhere to applicable federal, state, local, and USAF environmental regulations and policies. Projects proposed in the Burlington ANGB INRMP are reviewed by the EM and the ANG NR Program Manager.

2.3.3.5 Base Civil Engineer

The Base Civil Engineer (CE) plans, budgets, approves, and oversees all maintenance and construction activities performed on the installation. All maintenance and construction-related projects or management activities proposed in this INRMP should be approved by the Base CE to ensure that (1) funding is available and (2) these projects are complementary to the installation's comprehensive planning processes.

2.3.3.6 Legal Office

The Legal Office is responsible for ensuring the implementation of the management objectives contained within the Burlington ANGB INRMP meet all regulatory and statutory requirements that pertain to natural resources management. The Legal Office will review any future natural resources management proposals and alert the installation Commander and EM should there be any regulatory conflicts or shortfalls. In addition, the legal office will keep participating INRMP parties informed of any new statutes or regulations that might affect natural resources management.

2.3.3.7 Flight Safety Office

The Burlington ANGB Flight Safety Office is responsible for development, implementation and management of the ANG BASH Program. The Safety Office also ensures that bird/wildlife strikes resulting from aircraft assigned to transient units at Burlington ANGB are accurately documented and reported to the EM and the USAF BASH Team. In addition, the Safety Office participates in the Burlington ANGB Bird Hazard Working Group (BHWG), which conducts meetings to evaluate and refine strategies for the reduction of BASH risk on Burlington ANGB. The Safety

Office is responsible for coordinating with and providing required information on BASH activities with the EM.

2.3.3.8 Wing Safety Office

The Wing Safety Office, in conjunction with the EM, is responsible for implementing all activities presented in this IRNMP that pertain to the BASH Reduction Program. The Wing Safety Office also ensures that bird/wildlife strikes that occur with aircraft assigned to units at Burlington ANGB are accurately documented and reported to the USAF BASH Team. In addition, the Wing Safety Office ensures that the BHWG conducts meetings on the reduction of the BASH threat on the installation.

2.3.3.9 Airfield Management

Airfield Management is responsible for ensuring that the airfield is acceptable and appropriated for flight activity.

2.3.3.10 Operation and Management

Operations and Maintenance personnel are responsible for all grounds maintenance activities on the installation. In addition, this office will ensure completion of the habitat management protocols established in this INRMP taking into account mission requirements, natural resource management goals, and regulatory compliance requirements. The Operations and Maintenance personnel will also periodically review grounds maintenance equipment to determine if new or additional equipment is needed for the proper maintenance of the installation's landscapes.

2.3.3.11 US Department of Agriculture – Wildlife Services

US Department of Agriculture – Wildlife Services (USDA-WS) is responsible for monitoring hazardous wildlife that have the potential to create an aircraft strike hazard. USDA-WS personnel support activities that pertain to the BASH Program and are responsible for wildlife depredation requirements within the airfield, as well as dispersal/harassment, capture and translocation, trapping and removal, surveillance and monitoring, and depredation permit acquisition.

2.3.3.12 Pest Management

The Installation Pest Management Coordinator is responsible for the protection of real estate, control of potential disease vectors or animals of other medical importance, control of undesirable or nuisance plants and animals (including insects), and prevention of damage to natural resources. Pest management personnel utilize Integrated Pest Management (IPM) approaches and are responsible for the implementation of the IPM Plan. Pest Management is responsible for coordinating with USDA-WS and for all the depredation activities. Pest Management also coordinates with USDA-WS regarding required permitting and for permit clarification when required, while keeping the INRMP Working Group appraised of proposed modifications or changes to permits, as they occur or are proposed.

2.3.3.13 US Fish and Wildlife Service

The USFWS is a signatory of the INRMP and provides input regarding natural resource projects and operational component plans. The USFWS alerts the EM and/or the ANG NR Program Manager whenever new species added to the federal threatened and endangered species lists have

the potential for inhabiting Burlington ANGB. In addition, the USFWS, when feasible, will support ANG wildlife and vegetation surveys conducted at the VTANG properties.

2.3.3.14 Vermont Fish and Wildlife Department

The VFWD is a signatory of the INRMP and provides input regarding natural resource projects and operational component plans. The VFWD alerts the EM and/or the ANG NR Program Manager whenever new species added to the state threatened and endangered species lists have the potential for inhabiting Burlington ANGB. In addition, the VFWD, when feasible, will support ANG wildlife and vegetation surveys conducted at the VTANG properties.

2.3.3.15 Public Affairs Office

The Public Affairs Office is responsible for the coordination of public access for events at Burlington ANGB. The Public Affairs Office serves as the point-of-contact to interface between the Commander and civilian groups interested in the installations for environmental, educational, or other purposes.

2.4 Integration with Other Plans

By its nature, an INRMP is multidisciplinary and provides the summary for natural resources at a specific installation. As a result, information from an INRMP is incorporated into other plans and other plans are written to support the INRMP. The Burlington ANGB INRMP plans include the following:

- BASH Hazard Reduction Plan – provides summary of the BASH program on Burlington ANGB, including techniques, processes, responsibilities, and management recommendations (VTANG 2012).
- IPM Plan for Burlington ANGB – plan for management of pest species to minimize impact to mission, natural resources, and the environment (VTANG 2009a).
- Storm Water Pollution Prevention Plan (SWPPP) for Burlington ANGB – plan for prevention and management of stormwater (VTANG 2017b).

In addition, this INRMP is also integrated with the following plans from other agencies.

- Wildlife Hazard Management Plan (WHMP) for Burlington International Airport (BTV) – provides summary of the wildlife hazard management program (similar to BASH) on the adjacent airport (BTV 2015).

3.0 INSTALLATION OVERVIEW

3.1 Location and Area

The VTANG manages the 158 Fighter Wing which is located in Chittenden County, Vermont approximately 3.5 miles east of Lake Champlain (**Figure 2 and 3**). The facility is adjacent to BTV and is a joint user of the runways and air traffic control tower. Burlington ANGB comprises approximately 281 acres, including the developed parcel and the former Shelburne Shipyard

property (i.e. the area between the Winooski River and the developed installation), which are leased from the City of Burlington (**Figure 4**).

Figure 2. Burlington ANGB Regional Map

Figure 3. Burlington ANGB Vicinity Map

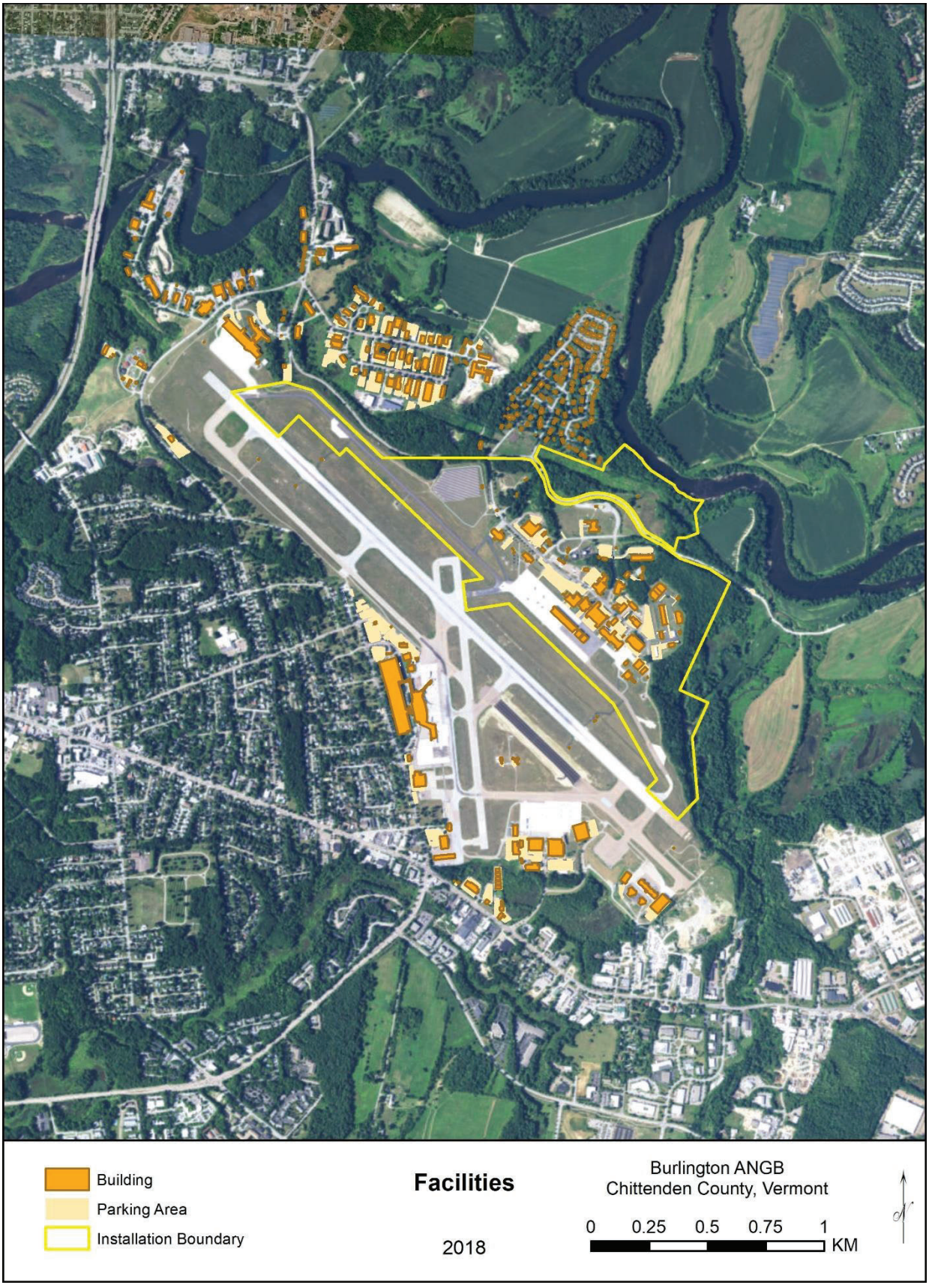

Figure 4. Burlington ANGB Facilities Map

3.2 Installation History

Property records maintained by the VTANG indicate the properties comprising the BTV facility were purchased from a variety of property owners beginning in 1931 and extending through the middle 1970s (VTANG 2009b). The origin of Burlington ANGB dates to August 1946 when the 134 Fighter Squadron was established and federally recognized (VTANG 2007). Located at what is now known as BTV, the squadron flew three T-6 trainers, a C-47, and an L-5. The primary mission of the unit was air defense with a secondary mission of ground attack (VTANG 2012).

3.3 Military Missions

Generally, the ANG mission is two-fold with federal and state components. The federal mission is to maintain well-trained, well-equipped units available for prompt mobilization during war and to provide assistance during national emergencies (e.g. natural disasters or civil disturbances). During peacetime, combat-ready units and support units are assigned to USAF major commands to carry out missions compatible with training, mobilization readiness, humanitarian, and contingency operations. When units are not mobilized, they report to the Governor of their respective state. The state mission is to provide protection of life, property, and preserve peace, order, and public safety.

The current mission of Burlington ANGB is to maintain the highest caliber of trained personnel and equipment to accomplish the USAF mission of 'Fly, Fight, and Win'. Specifically, Burlington ANGB supports and mobilizes combat ready F-16 aircraft and contingent elements in response to wartime and peacetime as directed under state and federal authority. In December 2013, the USAF announced that Burlington ANGB will be the first National Guard unit to house the new F-35 fighter planes. The F-35 is set to arrive in September 2019 and will not materially change natural resource implications.

3.4 Surrounding Communities

Land use in Chittenden County is dominated by residential and natural resource-related uses (Chittenden County Regional Planning Commission [CCRPC] 2006). Remaining land use categories include Institutional, Infrastructure, Industrial, Business, and Waste-Related. These uses include manufacturing facilities for all types of products including high-tech and value-added, as well as wholesale trade, warehouses, storage facilities, construction contractors, and solid waste facilities (CCRPC 2006). The population of Chittenden County in 2011 was estimated at 157,491, representing a population increase of 7.45% since 2000 (US Census Bureau 2012).

3.5 Local and Regional Natural Areas

The Winooski Valley Park District is located in the immediate vicinity of Burlington ANGB with a number of individual parks bordering the Winooski River. These parks include Muddy Brook Park, Woodside Park, Winooski Gorge, Valley Ridge, and Winooski Nature Trail.

4.0 PHYSICAL ENVIRONMENT

4.1 Climate

The climate of Chittenden County is generally warm in the summer and below freezing in the winter. Between the years 1980 and 2017 the warmest month was July with an average maximum temperature of 81.2 degrees Fahrenheit (°F). During this same period, the month of January was the coldest with an average minimum temperature of 11.0°F. The annual average rainfall in Chittenden County is approximately 37 inches with monthly average rainfall fairly consistent throughout the year. The annual average snowfall is approximately 80 inches with the vast majority of snowfall occurring during the months November through April (National Weather Service [NWS] 2014).

In consideration of future climate resiliency scenarios at Burlington ANGB, climate is predicted to grow considerably warmer and wetter during this century. Overall with the projected increase in rainfall and temperature, the resources most likely to be impacted by climate change are water resources, listed species, invasive species, and vegetation. Models all indicate some shift in growing season over the next century though due to the proximity to Lake Champlain, local changes may differ from overall regional changes and are harder to predict (The Nature Conservancy 2012).

4.2 Landforms

Burlington ANGB is located in the Champlain Lowlands physiographic province that spans Vermont's western border (Griffith et al. 2009). The topography visible today is the remnant of mountain building and erosion from glaciers that long ago passed through the valley and scoured the surface of the mountains. This area is characterized by rolling hills and gently tilted strata (Doolan 1996). Topography at Burlington ANGB is generally flat above the Winooski River. However, a northeast trending escarpment featuring 20 to 80 feet of topographic relief toward the Winooski River is present along the north and northeast boundary of the installation. The topography over the installation gently slopes from the southwest to the northeast with elevation over the majority of the installation ranging from 255 to 335 feet above mean sea level (VTANG 2004, 2006, and 2010a; **Figure 5**).

4.3 Geology and Soils

Burlington ANGB overlies the Bascom Formation, which occurs in narrow north to south trending ridges and is composed of metamorphosed shale, sandstone, dolostone, and limestone. Depth to bedrock varies throughout the region, ranging from 0 to 475 feet (VTANG 1995).

Burlington ANGB is underlain primarily by the Adams and Windsor loamy sands, which cover a majority of the installation (Natural Resources Conservation Service [NRCS] 2012). This soil association is characterized as level too steep with excessively drained sandy soils and low available water capacity (Allen 1989). For locations and brief descriptions of soil series on Burlington ANGB, see **Figure 6**).

4.4 Hydrology

Burlington ANGB is located within the Winooski River Watershed and Muddy Brook Watershed, with the majority of the installation draining into the Winooski River. Burlington ANGB is located approximately 3.5 miles east of Lake Champlain and just west of Muddy Brook and Allen Brook south of the Winooski River (VTANG 2010, ANG 2014). There are 2 major sets of drainage systems on Burlington ANGB with a total of 33 streams, all under US Army Corps of Engineers (USACE) jurisdiction and some under Vermont Department of Environmental Conservation (VTDEC) jurisdiction. In total there are 9 wetlands (7.5 acres) and 2 vernal pools on Burlington ANGB. (ANG 2014; **Figure 7**).

Burlington ANGB wetland

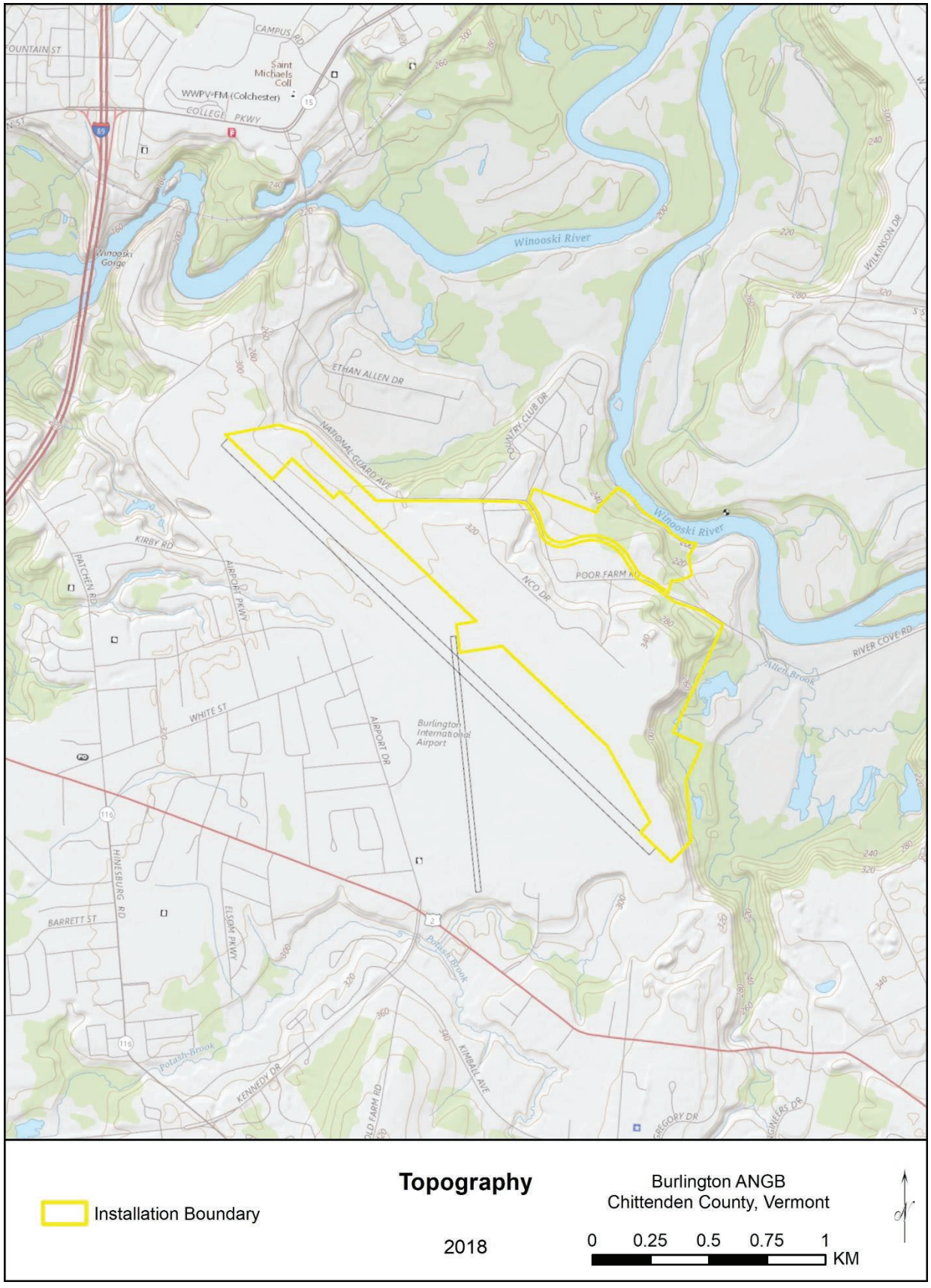

Figure 5. Burlington ANGB Topography Map

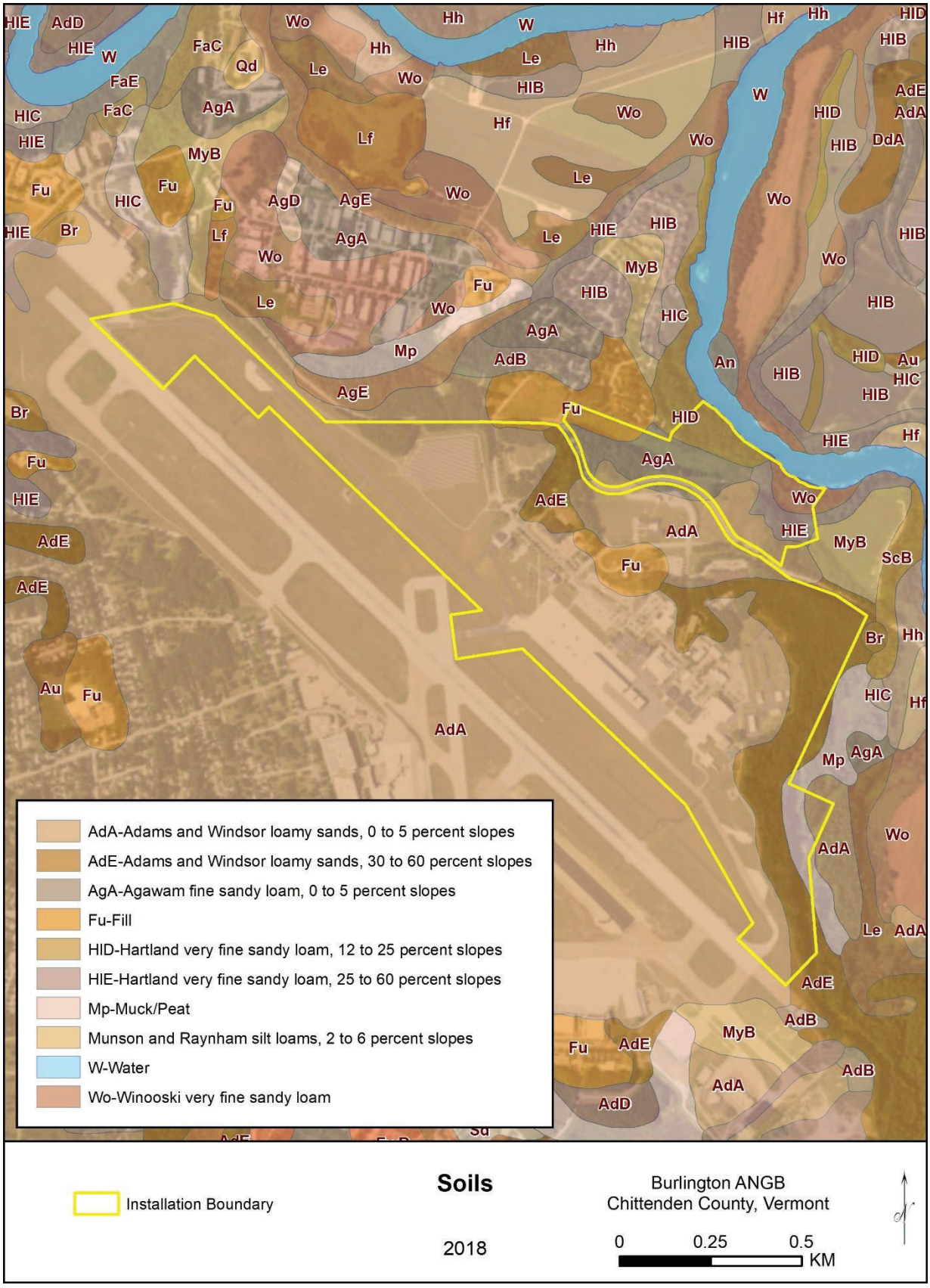

Figure 6. Burlington ANGB Soils Map

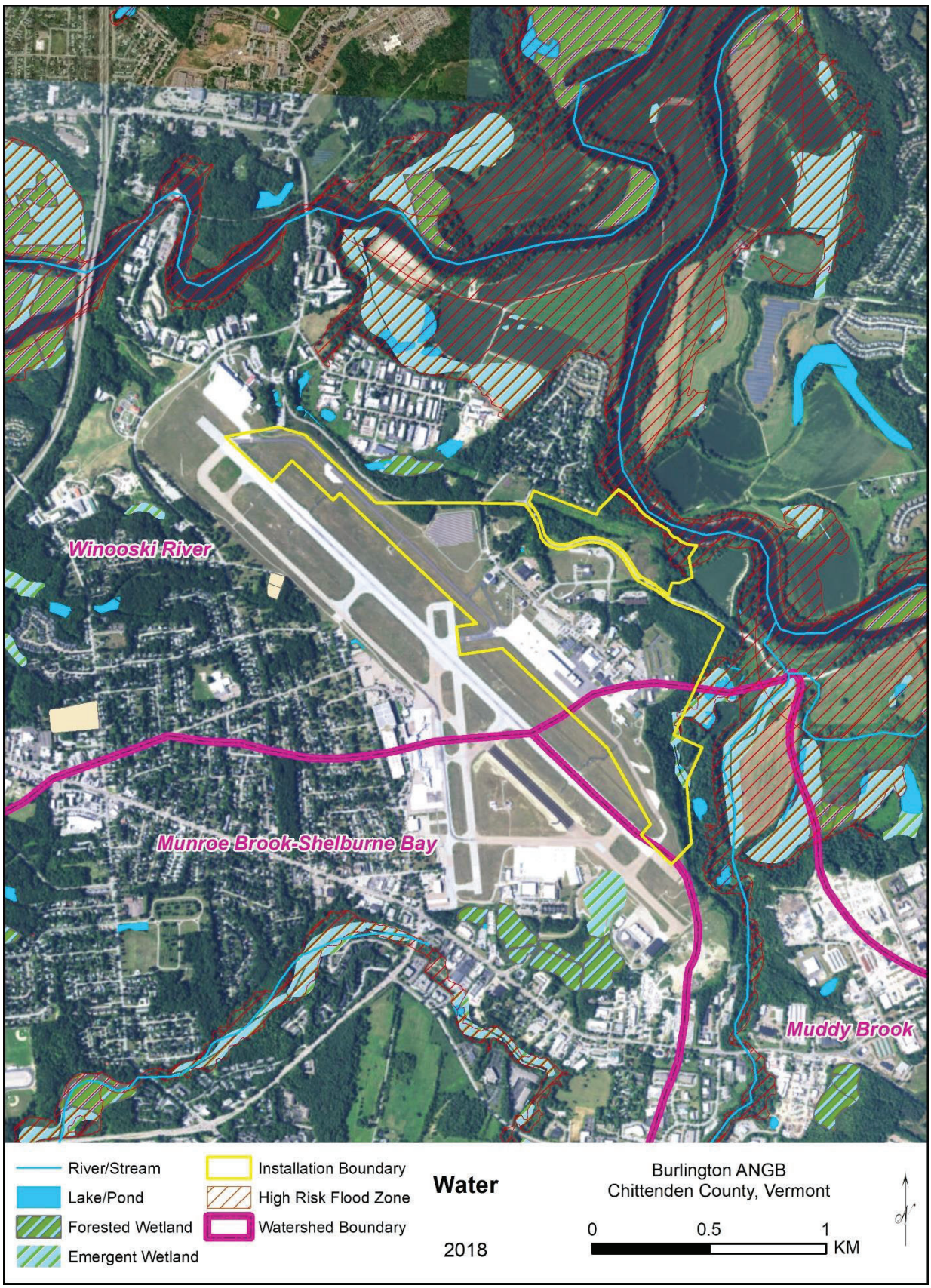

Figure 7. Burlington ANGB Water Resources Map

5.0 ECOSYSTEMS AND THE BIOTIC ENVIRONMENT

5.1 Ecosystem Classification

Burlington ANGB is in the Laurentian Mixed Forest Province as described by Bailey et al. (1995). The Laurentian Mixed Forest Province generally has low relief with rolling hills occurring in many places. Lakes, poorly drained depressions, moraine hills, drumlins, eskers, outwash plains, and other glacial features are characteristic of the area which once was entirely covered by glaciers during parts of the Pleistocene Epoch. This province lies between the boreal forest and broadleaf deciduous forest zones and is therefore transitional in terms of the dominate vegetation type.

5.2 Vegetation

5.2.1 Historic Vegetative Cover

This installation occurs in the Champlain Lowlands which includes areas of mixed deciduous and evergreen forests. Typical species includes red maple, beech, hemlock, swamp white oak, bur oak, white oak, ash, shagbark hickory, black oak, red oak, white pine, pitch pine, silver maple, green ash, sensitive fern, yellow birch, sugar maple, hemlock, northern white cedar, red pine, and hophornbeam (Griffith et al 2009).

5.2.2 Current Vegetative Cover

A vegetation survey was completed for Burlington ANGB to document the presence and extent of the vegetative communities and other land characteristics (ANG 2016). The survey concluded that Burlington ANGB includes a total of 6 natural vegetative communities (47 acres), 1 semi-natural community (20 acres), and 2 anthropomorphic communities (47 acres). **Table 2** lists all vascular plant species found at Burlington ANGB.

Burlington ANGB forested area

Natural Communities: The 6 natural communities include 1 type of cool temperate forest and 5 types of wetland-related vegetation.

- Cool Temperate Forest:
  - White Pine – Hemlock Dry – Mesic Coniferous Forest
  - White Pine – Red Oak – Black Oak Forest
- Wetland Related Vegetation
  - Silver Maple Floodplain Levee Forest
  - Northeastern Maple – Ash Swamp
  - Hardwood – Conifer Seepage Forest
  - Golden-saxifrage Forested Seep
  - Gray Alder Swamp

Semi-Natural Community: The semi-natural community is a mixed hardwood-conifer forest.

Anthropomorphic Communities: The anthropomorphic communities include turf lawn and maintained landscaping areas around buildings and other mowed/maintained fields. A significant portion of Burlington ANGB is impervious cover (81 acres).

Table 2. Vascular Plant Species at Burlington ANGB

Scientific Name	Common Name	Scientific Name	Common Name
Acalypha rhomboidea	common threeseed mercury	*Lolium perrene*	perennial ryegrass
Acer negundo	box elder	*Lonicera morrowii*	Morrow's honeysuckle
Acer pennsylvanicum	striped maple	*Ludwigia palustris*	swamp seedbox
Acer rubrum	red maple	*Lycopus uniflorus*	northern bugleweed
Acer saccharinum	silver maple	*Lysimachia nummularia*	moneywort
Acer saccharum	sugar maple	*Lysimachia terrestris*	swamp candles
Acer spicatum	mountain maple	*Maianthemum canadense*	false lily-of-the-valley
Achillea millefolium	common yarrow	*Maianthemum racemosum*	false Solomon's-seal
Alnus incana	speckled alder	*Matteuccia struthiopteris*	ostrich fern
Ambrosia artemisiifolia	common ragweed	*Medeola virginiana*	Indian cucumber
Amelanchier arborea	downy service-berry	*Mimulus ringens*	Allegheny monkeyflower
Amphicarpaea bracteata	American hog-peanut	*Mitchella repens*	partridgeberry
Alisma subcordatum	water plantain	*Myosotis scorpioides*	true forget-me-not
Aralia nudicaulis	wild sarsaparilla	*Oclemena acuminate*	white whorled aster
Arctium minus	common burdock	*Oenothera biennis*	common evening-primrose
Arisaema triphyllum	jack-in-the-pulpit	*Onoclea sensibilis*	sensitive fern
Asclepias incarnata	swamp milkweed	*Osmunda cinnamomea*	cinnamon fern
Asclepias syriaca	common milkweed	*Osmunda claytoniana*	interrupted fern
Athyrium filix-femina	lady fern	*Osmunda regalis*	royal fern
Betula alleghaniensis	yellow birch	*Ostrya virginiana*	hop hornbeam
Betula nigra	river birch	*Oxalis stricta*	wood sorrel
Betula papyrifera	paper birch	*Parathelypteris noveboracensis*	New York fern
Betula populifolia	gray birch	*Parthenocissus quinquefolia*	Virginia creeper
Bidens cernua	nodding bur-marigold	*Penthorum sedoides*	ditch stonecrop
Bidens connata	purple-stem beggar-ticks	*Persicaria lapathifolia*	dock-leaved smartweed
Bidens frondosa	devil's beggar-ticks	*Persicaria maculosa*	lady's-thumb
Brachyelytrum erectum	bearded shorthusk	*Persicaria pensylvanica*	pinkweed
Caltha palustris	marsh marigold	*Persicaria sagittata*	arrow-leaf tear-thumb
Cardamine pensylvanica	Pennsylvania bittercress	*Phalaris arundinacea*	reed canary grass
Carex annectens	yellowfruit sedge	*Phegopteris connectilis*	long beechfern

Table 2. Vascular Plant Species at Burlington ANGB			
Scientific Name	**Common Name**	**Scientific Name**	**Common Name**
Carex blanda	eastern woodland sedge	*Phleum pratense*	timothy
Carex comosa	bearded sedge	*Photinia melanocarpa*	black chokeberry
Carex crinita	fringed sedge	*Phragmites australis*	common reed
Carex intumescens	greater bladder sedge	*Pilea pumila*	clearweed
Carex lupulina	hop sedge	*Pinus resinosa*	red pine (planted stands)
Carex lurida	sallow sedge	*Pinus strobes*	eastern white pine
Carpinus caroliniana	American hornbeam	*Plantago lanceolata*	English plantain
Celastrus orbiculatus	oriental bittersweet	*Plantago major*	common plantain
Celtis occidentalis	common hackberry	*Polygonum cuspidatum*	Japanese knotweed
Cephalanthus occidentalis	common buttonbush	*Polystichum acrostichoides*	Christmas fern
Chamaesyce glyptosperma	ribseed sandmat	*Potentilla recta*	rough-fruited cinquefoil
Chelidonium majus	celadine	*Potentilla simplex*	common cinquefoil
Chelone glabra	white turtle-head	*Populus deltoides*	eastern cottonwood
Cinna latifolia	slender wood-reed	*Populus grandidentata*	bigtooth aspen
Circaea canadensis	broad-leaf enchanter's nightshade	*Populus tremuloides*	quaking aspen
Cirsium arvense	Canada thistle	*Prenanthes trifoliolata*	Gall-of-the-earth
Cirsium vulgare	bull thistle	*Prunella vulgaris*	Self-heal
Clematis virginiana	virgin's-bower	*Prunus serotina*	black cherry
Comptonia peregrina	sweet-fern	*Prunus virginiana*	choke cherry
Convallaria majalis	lily-of-the-valley	*Pteridium aquilinum*	bracken fern
Cornus alba	red-osier dogwood	*Quercus alba*	white oak
Cornus alternifolia	Alternate-leaf dogwood	*Quercus coccinea*	scarlet oak
Cornus amomum	silky dogwood	*Quercus rubra*	northern red oak
Corylus cornuta	beaked hazelnut	*Quercus velutina*	black oak
Crataegus punctata	Dotted hawthorn	*Rhamnus cathartica*	common buckthorn
Cuscuta gronovii	common dodder	*Rhus typhina*	staghorn sumac
Cypripedium acaule	pink lady's-slipper	*Ribes americanum*	wild black currant
Daucus carota	Queen Anne's lace	*Robinia pseudoacacia*	black locust
Dactylis glomerata	orchard grass	*Rosa multiflora*	multiflora rose
Dennstaedtia punctilobula	hay-scented fern	*Rubus allegheniensis*	Allegheny blackberry
Dichanthelium clandestinum	deer-tongue witchgrass	*Rubus idaeus*	common red raspberry
Dirca palustris	leatherwood	*Rubus odoratus*	purple-flowering raspberry
Doellingeria umbellata	flat-topped white aster	*Rumex orbiculatus*	greater water dock
Dulichium arundinaceum	three-way sedge	*Sambucus nigra*	American elderberry
Dryopteris cristata	crested shield fern	*Sassafras albidum*	sassafras
Dryopteris intermedia	evergreen woodfern	*Scirpus atrovirens*	dark-green bulrush
Dryopteris marginalis	marginal fern	*Scirpus cyperinus*	wool-grass
Echinochloa crus-galli	large barnyard grass	*Silene cucubalus*	bladder campion
Echinocystis lobata	Wild cucumber	*Solanum dulcamara*	climbing nightshade
Eleocharis obtusa	blunt spikerush	*Solidago caesia*	blue-stem goldenrod
Elymus canadensis	nodding wild-rye	*Solidago canadensis*	Canada goldenrod
Epifagus virginiana	beech-drops	*Solidago flexicaulis*	zigzag goldenrod
Epilobium coloratum	narrow-leaved willow-herb	*Solidago rugosa*	wrinkled goldenrod
Epilobium hirsutum	hairy willow-herb	*Sparganium americanum*	American bur-reed
Equisetum arvense	field horsetail	*Sphagnum* sp.	sphagnum moss
Equisetum hyemale	tall scouring rush	*Spiraea alba*	broad-leaved meadowsweet
Eragrostis spectabilis	purple lovegrass	*Stellaria graminea*	Lesser stitchwort
Erigeron anuus	daisy felabane	*Symphyotrichum ericoides*	white heath aster
Eupatorium perfoliatum	common boneset	*Symphyotrichum novae-angliae*	New England aster
Eurybia schreberi	Schreber's aster	*Thalictrum polygamum*	tall meadow rue

Table 2. Vascular Plant Species at Burlington ANGB			
Scientific Name	**Common Name**	**Scientific Name**	**Common Name**
Fagus grandifolia	American beech	*Thelypteris palustris*	marsh fern
Festuca sp.	fescue	*Tiarella cordifolia*	foam flower
Fraxinus americana	white ash	*Tilia americana*	American basswood
Fraxinus pennsylvanica	green ash	*Toxicodendron radicans*	poison ivy
Galeopsis tetrahit	hemp-nettle	*Trientalis borealis*	starflower
Galium triflorum	sweet-scented bedstraw	*Trifolium pratense*	red clover
Gaultheria procumbens	teaberry	*Trifolium repens*	white clover
Gaylussacia baccata	Black huckleberry	*Tsuga canadensis*	hemlock
Gentiana clausa	bottle gentian	*Tussilago farfara*	colts-foot
Glyceria melicaria	slender manna-grass	*Typha angustifolia*	narrow-leaf cattail
Glyceria striata	fowl manna-grass	*Typha latifolia*	broad-leaf cattail
Hamamelis virginiana	witch hazel	*Ulmus americana*	American elm
Helianthus divaricatus	woodland sunflower	*Urtica dioica*	stinging nettle
Impatiens capensis	jewelweed	*Vaccinium angustifolium*	late low-bush blueberry
Juglans cinerea	butternut	*Vaccinium pallidum*	Blue Ridge blueberry
Juncus effusus	soft rush	*Verbascum thapsus*	common mullein
Juncus tenuis	slender rush	*Verbena hastata*	blue vervain
Juniperus virginiana	eastern red-cedar	*Veronica americana*	American brooklime
Lapsana communis	nipplewort	*Viburnum acerifolium*	maple-leaf viburnum
Leersia oryzoides	rice cutgrass	*Viburnum lantanoides*	Hobble-bush
Leersia virginica	white-grass	*Vicia cracca*	cow vetch
Linaria canadensis	blue toadflax	*Vitis riparia*	riverbank grape
LInaria vulgaris	Butter and eggs	*Xanthium strumarium*	rough cocklebur
Sources: ANG 2011, VTANG 2010, ANG 2014, ANG 2016			

5.3 Fish and Wildlife

Burlington ANGB and adjacent BTV provide very limited wildlife habitat. Because the installation has been disturbed and the majority of the area is covered with manicured, non-native grasses, wildlife species found on the installation are mostly limited to those that have adapted to high levels of human activity and disturbance. While habitat within the installation boundaries is relatively limited, the land adjacent to the northeast side of the installation is managed as a private wildlife refuge. This area is one of the largest remaining parcels of prime wildlife habitat in the area and includes the valley of Muddy Brook where it opens into the larger Winooski River bottomlands (VTANG 2007).

Bird and mammal surveys were performed as part of the Wildlife Hazard Assessment (WHA) at BTV (USDA-WS 2011). Since the WHA, USDA-WS has performed regular surveillance and control measures at BTV and Burlington ANGB (USDA, personal communication, 2018). Bat surveys conducted at Burlington ANGB in 2010 confirmed the presence of 5 bat species with mist nets (big brown bat [*Eptesicus fuscus*], silver-haired bat [*Lasionycteris noctivagans*], eastern red bat [*Lasiurus borealis*], hoary bat [*Lasiurus cinereus*], eastern small-footed bat [*Myotis leibii*], little brown bat [*Myotis lucifugus*]) and an additional 2 bat species with acoustic monitoring (northern long-eared bat [*Myotis septentrionalis*], Indiana bat [*Myotis sodalist*]), both of which are federally listed (ANG 2011). Surveys repeated in 2016 confirmed these species, including the 2 federally listed species, were still found within the boundaries of the installation (VTANG 2017a).

Bird, mammal, and herpetofauna species recorded in or in the vicinity of Burlington ANGB are reported in **Tables 3-5**.

Table 3. Bird Species in the Vicinity of Burlington ANGB

Scientific Name	Common Name	Scientific Name	Common Name
*Accipiter striatus**	sharp-shinned hawk	*Gallinago gallinago*	common snipe
Actitis macularia	spotted sandpiper	*Gallinula chloropus*	common moorhen
*Agelaius phoneiceus**	red-winged blackbird	*Gavia immer*	common loon
Aix sponsa	wood duck	*Geothlypis trichas*	common yellowthroat
Anas acuta	northern pintail	*Haliaeetus leucocephalus*	bald eagle
Anas americana	American widgeon	*Hirundo rustica**	barn swallow
Anas clypeata	northern shoveler	*Hylocichla mustelina*	wood thrush
Anas crecca	green-winged teal	*Icterus galbula*	northern oriole
Anas discors	blue-winged teal	*Ixobrychus exilis*	least bittern
*Anas platyrhynchos**	mallard	*Junco hyemalis*	dark-eyed junco
Anas rubripes	black duck	*Lanius ludovicianus*	loggerhead shrike
Anas strepera	gadwall	*Larus argentatus**	herring gull
Anthus rubescens	American pipit	*Larus delawarensis**	ring-billed gull
Archilochus colubris	ruby-throated hummingbird	*Larus marinus**	great black-backed gull
Ardea herodias	great blue heron	*Lophodytes cucullatus*	hooded merganser
Aythya affinis	lesser scaup	*Meleagris gallopavo**	wild turkey
Aythya collaris	ring-necked duck	*Melospiza georgiana*	swamp sparrow
Aythya marila	greater scaup	*Meospiza melodia*	song sparrow
Aythya valisineria	canvasback	*Mergus merganser**	common merganser
Baeolophus bicolor	tufted titmouse	*Mniotilta varia*	black-and-white warbler
Bombycilla cedrorum	cedar waxwing	*Molothrus ater*	brown-headed cowbird
Bonasa umbellus	ruffed grouse	*Myiarchus crinitus*	great crested flycatcher
Botaurus lentiginosus	American bittern	*Nycticorax nycticorax*	black-crowned night heron
*Branta canadensis**	Canada goose	*Pandion haliaetus*	osprey
Bubo virginianus	great horned owl	*Parula americana*	northern parula
Bucephala albeola	bufflehead	*Passer domesticus**	house sparrow
Bucephala clangula	common goldeneye	*Passerculus sandwichensis*	savannah sparrow
*Buteo jamaicensis**	red-tailed hawk	*Phalacrocorax auritus*	double-crested cormorant
Buteo lagopus	rough-legged hawk	*Phalacrocorax auritus**	double-crested cormorant
*Buteo platypterus**	broad-winged hawk	*Pheucticus ludovicianus*	rose-breasted grosbeak
Butorides striatus	green heron	*Picoides pubescens*	downy woodpecker
Calidris pusilla	semipalmated sandpiper	*Picoides villosus*	hairy woodpecker
Caprimulgus vociferus	whip-poor-will	*Pipilo erythrophthalamus*	eastern towhee
Cardinalis cardinalis	northern cardinal	*Plectrophenax nivalis**	snow bunting
*Carduelis tristis**	American goldfinch	*Pluvialis dominica*	American golden-plover
Carpodacus mexicanus	house finch	*Podilymbus podiceps*	pied-billed grebe
*Cathartes aura**	turkey vulture	*Poecile atricapilla*	black-capped chickadee
Catharus fuscescens	veery	*Polioptila caerulea*	blue-gray gnatcatcher
Catharus guttatus	hermit thrush	*Progne subis*	Purple martin
Catharus ustulatus	Swainson's thrush	*Quiscalus quiscula**	common grackle
Certhia americana	brown creeper	*Rallus limicola*	Virginia rail
Ceryle alcyon	belted kingfisher	*Regulus calendula*	ruby-crowned kinglet
Chaetura pelagica	chimney swift	*Riparia riparia*	bank swallow
Charadrius semipalmatus	semipalmated plover	*Sayornis phoebe*	eastern phoebe
*Charadrius vociferous**	killdeer	*Scolopax minor*	American woodcock
Chen caerulescens	snow goose	*Seiurus aurocaphilla*	ovenbird

Table 3. Bird Species in the Vicinity of Burlington ANGB			
Scientific Name	**Common Name**	**Scientific Name**	**Common Name**
Chlidonia niger	black tern	*Seiurus motacilla*	Louisiana waterthrush
Chordeiles minor	common nighthawk	*Seiurus noveboracensis*	northern waterthrush
*Circus cyaneus**	northern harrier	*Setophaga caerulescens*	black-throated blue warbler
Cistothorus palustris	marsh wren	*Setophaga pensylvanica*	chestnut-sided warbler
Coccothraustes vespertinus	evening grosbeak	*Setophaga petechial*	yellow warbler
Colaptes auratus	northern flicker	*Setophaga ruticilla*	American redstart
*Columba livia**	rock dove	*Sialia sialis*	eastern bluebird
Contopus cooperi	olive-sided flycatcher	*Sitta carolinensis*	white-breasted nuthatch
Contopus virens	eastern wood pewee	*Sphyrapicus varius*	yellow-bellied sapsucker
*Corvus brachyrhynchos**	American crow	*Spizella arborea*	American tree sparrow
*Corvus corax**	northern raven	*Spizella passerine**	chipping sparrow
Cyanocitta cristata	blue jay	*Spizella pusilla*	field sparrow
Cygnus columbianus	tundra swan	*Stelgidopteryx serripennis*	northern rough-winged swallow
Dendroica coronata	yellow-rumped warbler	*Sterna hirundo*	common gull
Dendroica petechia	yellow warbler	*Strix varia*	barred screech owl
Dendroica pinus	pine warbler	*Sturnella magna*	eastern meadowlark
Dendroica striata	blackpoll warbler	*Sturnus vulgaris**	European starling
Dendroica virens	black-throated green warbler	*Tachycineata bicolor**	tree swallow
*Dolichonyx oryzivorus**	bobolink	*Toxostoma rufum*	brown thrasher
Dryocopus pileatus	pileated woodpecker	*Tringa melanoleuca*	greater yellowlegs
Dumatella carolinensis	gray catbird	*Troglodytes aedon*	house wren
*Egretta thula**	snowy egret	*Troglodytes hiemalis*	winter wren
Empidonax alnorum	alder flycatcher	*Turdus migratorius**	American robin
Empidonax minimus	least flycatcher	*Tyrannus tyrannus**	eastern kingbird
Empidonax traillii	willow flycatcher	*Vireo flaviforns*	yellow-throated vireo
*Eremophila alpestris**	horned lark	*Vireo gilvus*	warbling vireo
Eugphagus carolinus	rusty blackbird	*Vireo olivaceus*	red-eyed vireo
Falco peregrinus	peregrine falcon	*Zenaida macroura**	mourning dove
*Falco sparverius**	American kestrel	*Zonotrichia albicollis*	white-throated sparrow
Fulica americana	American coot		

Source: VTANG 2012, USDA-WS 2011, ANG 2014, ANG 2016, Federal Aviation Administration [FAA] 2018
* Documented on BTV during the Wildlife Hazard Assessment (USDA-WS 2011).

Table 4. Mammal Species in the Vicinity of Burlington ANGB			
Scientific Name	**Common Name**	**Scientific Name**	**Common Name**
Alces alces	moose	*Myotis lucifugus*	Little brown bat
Blarina brevicauda	short-tail shrew	*Myotis sodalis*	Indiana bat
Canis latrans	coyote	*Odantra zibethicus*	muskrat
Castor canadensis	beaver	*Odocoileus virginianus*	white tailed deer
Clethrionomys gapperi	red-backed vole	*Pekania pennant*	fisher
Didelphis virginiana	opossum	*Peromyscus leucopus*	white-footed mouse
Eptesicus fuscus	big brown bat	*Peromyscus maniculatus*	deer mouse
Erethizon dorsatum	North American porcupine	*Procyon lotor*	raccoon
Lasionycteris noctivagans	silver-haired bat	*Ratus norvegicus*	Norway rat
Lasiurus borealis	eastern red bat	*Sciurus carolinensis*	gray squirrel
Lasiurus cinereus	hoary bat	*Sorex palustris*	Northern water shrew
Lontra Canadensis	North American river otter	*Sylvilagus floridanus*	eastern cottontail
Lynx rufus	bobcat	*Tamias striatus*	eastern chipmunk
Marmota monax	woodchuck	*Tamiasciurus hudsonicus*	American red squirrel
Mephitis mephitis	striped skunk	*Urocyon cinereoargenteus*	Grey fox
Microtus pennsylvanicus	meadow vole	*Ursus americanus*	American black bear
Mustela vision	American mink	*Vulpes fulva*	red fox
Myotis leibii	eastern small-footed bat		
Sources: Draft Water Resources Report (ANG 2014), ANG 2011, USDA-WS 2011, ANG 2016, FAA 2018			

Table 5. Herpetofauna Species at Burlington ANGB	
Scientific Name	**Common Name**
Amphibians	
*Anaxyrus americanus**	American toad
*Hyla versicolor**	gray treefrog
Lithobates clamitans	green frog
Lithobates sylvaticus	wood frog
Sources: Eiseman 2005, Draft Water Resources Report (ANG 2014), ANG 2016 * Documented in the immediate vicinity of the Installation at Muddy Brook Park during a Natural Resource Inventory (Eiseman 2005).	

5.4 Threatened and Endangered Species and Species of Concern

Historically, no federally or state-listed plant or wildlife species were documented on the installation (Shippee 2008). However, following the results of the most recent bat survey at least 2 state-listed bats and 2 federally endangered bat have been documented on Burlington ANGB (ANG 2011). In addition, bald eagles (ANG 2014) common nighthawks (FAA 2018), and whip-poor-wills (VTANG 2012) have since been documented on Burlington ANGB or neighboring BTV. Further, there are at least 27 additional state-threatened species and 42 species of SGCN that are known to occur within the vicinity of the installation (Marshall 2012).

Priority species were identified based on their regulatory status, known occurrence on or near Burlington ANGB, or likely occurrence on Burlington ANGB. There are 8 priority listed wildlife species including 4 mammals and 4 birds.

Priority Listed Wildlife Species

- Federally and state endangered Indiana bat (*Myotis sodalis*)

- Federally protected and state endangered bald eagle (*Haliaeetus leucocephalus*)
- Federally threatened and state endangered northern long-eared bat (*Myotis septentrionalis*)
- State endangered little brown bat (*Myotis lucifugus*)
- State threatened eastern small-footed bat (*Myotis leibii*)
- State endangered common nighthawk (*Chordeiles minor*)
- State threatened eastern whip-poor-will (*Caprimulgus vociferus*)
- State threatened grasshopper sparrow (*Ammodramus savannarum*)

The eastern sand darter (*Ammocrypta pellucida*) while documented in the Winooski River (Marshall 2012), does not occur on Burlington ANGB nor any of the adjacent tributaries that flow through Burlington ANGB property. For this reason, it was not included as a priority listed wildlife species.

5.5 Waters of the US, Wetlands, and Floodplains

Burlington ANGB is located within the Richelieu River Basin with watersheds on the installation ultimately draining into Lake Champlain (**Figure 2**). Burlington ANGB is located approximately 3.5 miles east of Lake Champlain and just west of Muddy Brook and Allen Brook south of the Winooski River (VTANG 2010, ANG 2014). There are 2 major sets of drainage systems on Burlington ANGB with a total of 33 streams, all under USACE jurisdiction and some under VTDEC jurisdiction. There are a total of 9 wetlands (7.5 acres) and 2 vernal pools on Burlington ANGB (ANG 2014).

Groundwater in the vicinity of the installation occurs under unconfined conditions as well as under semi-confined or artesian conditions within the fractured bedrock (VTANG 2010). Water table elevations and, consequently, flow directions in surficial deposits vary greatly in the vicinity of the installation due to the complex nature of the deposits. However, regional bedrock groundwater flow trends in a north to northwest direction toward the Winooski River under the installation at varying depths (VTANG 2010).

Burlington ANGB is located within Zone X, an area of minimal flooding outside the 100-year and 500-year floodplains (FEMA 2011). The only exceptions are the 100-year floodplain that just crosses the installation boundary along the Winooski River in the area north of National Guard Avenue and along the eastern boundary associated with Muddy Brook and Wetland W2 (FEMA 2011).

5.6 Other Natural Resource Information

As directed by EO 11989, Off Road Vehicles on public Lands, outlines the use of any off-road vehicles (ORV), including mountain bikes, will be allowed only after thoroughly analyzing the impact of such use on soils, archeological sites, wildlife, water quality, and other ecosystem attributes. MEANG will periodically monitor and evaluate for damage in any areas designated for ORV use.

6.0 MISSION IMPACTS ON NATURAL RESOURCES

6.1 Natural Resources Needed to Support the Military Mission

The VTANG requires operational areas that support flying operations and training with the surrounding areas serving as a buffer to reduce BASH risk and provide support facilities and functions. Degradation of natural resources can result in unintended impacts to the military mission, impaired readiness, and funds spent on natural resources crisis management and interventions rather than the military mission. The VTANG needs the land and its natural resources to function together in a healthy ecosystem to support the military mission. Management activities in this INRMP are designed to support the desired habitats and ecosystem functions.

6.2 Natural Resources Constraints to Mission and Mission Planning

The most significant natural resources constraints on Burlington ANGB are related to wetlands, water quality protection, reducing BASH risk, and protecting federally and state-listed threatened and endangered species. Any new activities or infrastructure could be limited in areas where federally or state-listed species are found to be present in the future. In December 2013, the USAF announced that Burlington ANGB will be the first National Guard unit to house the new F-35 fighter planes. The beddown and operation of F-35 at Burlington ANGB would have relatively few direct impacts on natural resources. While noise from an individual single event from the F-35 would be higher than F-16 aircraft, the number of times that an individual animal would be exposed and the area that would be affected would decrease. Subsequent construction activities at Burlington ANGB would be confined to the installation's existing footprint and will consist of internal alterations of existing structures on the installation. Therefore, there would be no adverse impacts to wetlands and other freshwater communities, vegetation, terrestrial wildlife, or associated habitat on the installation (USAF 2013). The base is expected to receive the F-35 in September 2019.

The primary sustainability challenges on Burlington ANGB, as it is currently used and projected to be used in the near future, are the ability to (1) manage federally and state listed species without impacting the mission, (2) protect ground and surface waters (3) manage BASH risk. The following natural resources management issues have been identified as having the potential to impact the military mission:

- Lack of information about species present, particularly listed species

If the mission changes significantly, the sustainability challenges could increase. Additional infrastructure development or a significant increase in on-the-ground training could pose challenges for the long-term sustainability of Burlington ANGB if the constraints of the site are not taken into account.

<u>Land Use</u>

Burlington ANGB is located immediately adjacent to the BTV and is used primarily by the 158 FW. Buildings and facilities on the base date from post-World War II to the present, and include 11 structures constructed between 1947 and 1989 (VTANG 2009b). The remaining structures were built after 1989 and include administrative buildings, warehouses, munitions storage, and other miscellaneous structures.

Current Major Impacts

There are 4 primary areas of potential impacts to natural resources from the military mission of Burlington ANGB:

- Wetland management;
- Impacts to groundwater and water quality in the Winooski River;
- Impacts to migratory birds (however, impacts to migratory birds are managed through a variety of BASH-related measures and are generally minimal at Burlington ANGB); and
- Impacts to federally and state-listed species, in particular bats.

Potential Future Impacts

There are no known projected changes in mission or potential impacts

7.0 NATURAL RESOURCES PROGRAM MANAGEMENT

7.1 Natural Resources Program Management

The guiding philosophy of the Burlington ANGB INRMP is to take an ecosystems approach to managing natural resources. Ecosystem management is based on clearly stated goals and objectives, and associated activities and projects. The Burlington ANGB INRMP identifies goals and objectives, and presents the means to accomplish them, as well as the methodologies to monitor results.

7.2 Fish and Wildlife Management

Wildlife management involves manipulating various aspects of an ecosystem to benefit chosen wildlife species. Management of habitats generally is focused to benefit native species, particularly listed species and game species. For example, a portion of the eastern edge of Burlington ANGB is designated as white-tailed deer wintering habitat. The VTANG will manage the wildlife and its habitat at Burlington ANGB by implementing the strategies listed below:

- Limit the amount of pesticides used for invasive species control, and use mechanical methods whenever possible.
- Maintain grass heights between 7-14 inches in open fields during the growing season to discourage assembly of small, flocking birds.
- Provide for wildlife movement between natural areas where possible.
- Follow the management strategies for reducing BASH risk.
- Maintain existing deer wintering habitat following VFWD's Management Guide for Deer Wintering Areas in Vermont (Reay et al. 1990). This includes limiting motorized vehicle activity from December 15 to April 15, restricting domestic dog activity, and minimizing trail clearing and maintenance.
- Limit disturbance of forested areas when feasible from April 1 to November 1 to protect migratory birds and bats.

Fish and wildlife management at Burlington ANGB will focus on maintaining existing natural habitat favorable for existent species in an integrated manner consistent with the military mission, and all applicable laws and regulations. In addition to general fish and wildlife management, there are additional management needs associated with minimizing BASH-related risk at Burlington ANGB because the military mission involves flight operations.

7.2.1 Federal Wildlife Policies and Regulations

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) prohibits, unless permitted by regulations, the pursuit, hunting, take, capture, killing or attempting to take, capture, kill, or possess any migratory bird included in the MBTA, including any part, nest, or egg of any such bird (16 USC § 703). The DoD has a Memorandum of Understanding (MOU) with the USFWS pursuant to EO 13186 Responsibilities of Federal Agencies to Protect Migratory Birds, which outlines a collaborative approach to promote the conservation of migratory bird populations. This MOU specifically pertains to natural resource management activities, including, but not limited to, habitat management, erosion control, forestry activities, invasive weed management, and prescribed burning. It also pertains to installation support functions, operation of industrial activities, construction and demolition activities, and hazardous waste cleanup. In February 2007, the USFWS finalized regulations for issuing incidental take permits to the DoD. If any of the Armed Forces determine that a proposed or an ongoing military readiness activity may result in a significant adverse effect on a population of migratory bird species, then they must confer and cooperate with the USFWS to develop appropriate and reasonable conservation measures to minimize or mitigate identified significant adverse effects (50 CFR Part 21).

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (BGEPA; 16 USC 668-668c), enacted in 1940 and amended several times since then, prohibits anyone, without a permit issued by the Secretary of the Interior, from “taking” bald eagles, including their parts, nests, or eggs. The Act provides criminal penalties for persons who “take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle ... [or any golden eagle], alive or dead, or any part, nest, or egg thereof.”

In addition to immediate impacts, this definition also covers impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, and causes injury, death, or nest abandonment.

Partners in Flight

The DoD Partners in Flight (PIF) program consists of natural resources personnel from military installations across the United States working collaboratively with partners throughout the Americas to conserve migratory and resident birds and their habitats on DoD lands. PIF sustains and enhances the military mission through proactive, habitat-based conservation and management strategies that maintain healthy landscapes and training lands. Additionally, PIF works beyond installation boundaries to facilitate cooperative partnerships, determine the current status of bird populations, and prevent the listing of additional birds as threatened or endangered. DoD PIF provides a scientific basis for maximizing the effectiveness of resource management, enhancing

the biological integrity of DoD lands, and ensuring continued use of these lands to fulfill military training requirements.

Pollinator Conservation

DoD has emphasized the importance of pollinator conservation to the military services by developing partnerships to support their conservation. DoD has MOUs with Bat Conservation International (BCI) and Pollinator Partnership (P2) and has developed the USAF Pollinator Conservation Reference Guide (March 2018). The MOU with BCI "establishes a policy of cooperation and coordination between DoD and BCI to identify, document and maintain bat populations and their habitats on DoD installations" (signed Oct 2006, renewed Dec. 2011). The MOU with P2 is "to establish a framework for cooperative programs that promote the conservation and management of pollinators, their habitats and associated ecosystems" (signed February 9, 2015).The MOU states that this framework is important to "ensure that pollinator management activities are incorporated where practicable, into INRMPs and practices." Conservation of pollinators by USAF alone or in collaboration with groups such as BCI and P2 supports these DoD initiatives.

Some areas of ANG installations are more suitable for pollinator habitat conservation due to current use and/or habitat condition. For example conservation on unimproved (natural) areas, buffers, recreation areas, rights-of-way, golf courses, and landscaped areas may be more compatible with mission requirements than other areas. These areas should be a priority for implementing pollinator habitat improvements and using land management practices in ways beneficial to pollinators.

The USAF Pollinator Conservation Reference Guide provides specific pollinator conservation measures which can be implemented by the USAF. The USAF Pollinator Conservation Reference Guide was finalized March 2018, and is available on USFWS and AFCEC eDASH Natural Resources website. The USAF Pollinator Reference Guide, developed by the USFWS, establishes guidance as a National Pollinator Conservation Strategy on lands owned by the USAF. It supplements existing policy and instructions to guide USAF actions to contribute to pollinator conservation under Presidential Memo and Federal Pollinator Health Strategy. Further, it provides Technical Guides as reference materials for pollinators of conservation concern (listed species, birds of conservation concern, bees and monarch butterflies), and native plant recommendations specific to ecoregions.

7.2.2 Hazardous Wildlife and Wildlife Diseases

Other than those that present a BASH risk, there are few hazardous wildlife species at Burlington ANGB. Future hazardous wildlife problems will be evaluated in conjunction with USDA-WS personnel, if appropriate. Any solutions to hazardous wildlife problems will follow the IPM Plan, BTV WHMP, and BASH Plan.

Diseases affecting fish and wildlife may occur on the installation. Any large-scale fish and wildlife deaths and unnatural behavior occurring on the installation will be reported, recorded and investigated, in conjunction with USFWS, USDA-WS and VFWD personnel, if appropriate.

7.2.3 Management of Threatened and Endangered Species and Habitats

This section presents information about the management of priority species located, or may be located, at Burlington ANGB, along with requirements and strategies for their management. As additional surveys and natural resources management activities are conducted, it is possible other species may be added in the future. Currently, there are 8 priority species.

7.2.3.1 Federally Special Status Wildlife Species

The VTANG is required to manage for federally listed species. There are 3 federally protected priority species at Burlington ANGB and their management strategies are listed below.

Indiana bat
Photo by USFWS

Indiana bat: Indiana bats were documented during acoustic surveys on Burlington ANGB (ANG 2011, VTANG 2017a). Indiana bat maternity colonies typically occupy multiple roost trees in riparian, bottomland, and upland forests during the summer. Roost trees generally have exfoliating bark and have a southeast or south-southwest solar exposure and an open canopy. To maintain suitable habitat for the Indiana bat and minimize impacts, the following management strategies are recommended by VFWD (VFWD 2008):

- Conduct additional mist net surveys to confirm presence of Indiana bats, in conjunction with identifying maternity roosts.
- Maintain and enhance roost trees. Keep all trees with diameters over 8 inches that are dead or dying, or that have loose bark under which bats might roost. Remove individual or groups of trees adjacent to potential roost trees to allow for solar radiation if deemed necessary in consultations with USFWS and Vermont Agency of Natural Resources (VTANR).
- Restrict lumber harvesting to when bats are hibernating, between 1 November and 1 April, unless potential roost trees are identified and left uncut.
- Minimize or avoid forestland conversion to maintain foraging habitat and forest connectivity between woodlots.
- Keep forested buffers at least 25 feet wide along streams, ponds, lakes, and wetlands.

Management Recommendations: Prior to conducting activities within the forested portions of Burlington ANGB, the VTANG will review and implement the appropriate forest management guidelines to ensure no incidental take or adverse effects to Indiana bats, and coordinate with a forester familiar with Indiana bat guidelines, if necessary. Coordination with VFWD could facilitate identifying roost locations in the area and provide more concrete management recommendations. Prior to conducting activities that may affect the Indiana bat (e.g. tree removal), coordination with USFWS on section 7 consultation will be initiated.

Northern long-eared bat: Northern long-eared bats were documented during acoustic and mist net surveys on Burlington ANGB (ANG 2011, VTANG 2017a). Northern long-eared bats spend winter hibernating in caves and mines. During the summer, bats roost singly or in colonies

underneath bark, in cavities or in crevices of both live trees and dead trees (USFWS 2015). To maintain suitable habitat for the Indiana bat and minimize impacts, the following management strategies are recommended:

- Protect large diameter snags in early stages of decay where they do not pose a safety hazard, particularly in the areas currently forested.
- Maintain forests with a diverse range of tree sizes and age classes.
- Reduce the use of pesticides in potential bat foraging areas.
- Maintain vegetation and reduce bank erosion to surface water features, which serve as critical foraging areas.
- Tree removals should occur between 1 November and 1 April when bats are not present.

Northern long-eared bat
Photo by USFWS

Management Recommendations: Prior to conducting activities within the forested portions of Burlington ANGB, the VTANG will review and implement the appropriate forest management guidelines to ensure no incidental take or adverse effects to northern long-eared bats occur and coordinate with a forester familiar with northern long-eared bat guidelines, if necessary. Coordination with VFWD could facilitate identifying roost locations in the area and provide more concrete management recommendations. Prior to conducting activities that may affect the northern long-eared bat (e.g. tree removal), coordination with USFWS on section 7 consultation will be initiated. For this species, the Online Northern Long-Eared Bat 4(d) Rule Determination Key (https://www.fws.gov/Midwest/endangered/mammals/nleb/determination_key_instructions_nleb.html) can be used to complete consultation.

Bald Eagle: Bald eagles, recently delisted under the ESA, remain protected under the BGEPA. Bald eagles have been documented on Burlington ANGB, although no nests are known, and individuals may use the installation in a transient manner or for foraging. The following management strategies for bald eagles are recommended:

- Encounters with bald eagles should be avoided.
- Modifications to aerial structures and electrical transmission lines should incorporate proven design techniques that discourage bald eagle use, and eliminate or reduce bald eagle hazards.
- Limit use of pesticides as described in the IPM Plan, in order to limit indirect impacts to eagles.
- Limited activity near active nests.

Bald eagle
Photo by USFWS

7.2.3.2 State Special Status Species

Vermont state law provides for the protection of native threatened and endangered species (VT STAT ANN Title 10 [Chapter 123]). In addition to those species already discussed above under federally listed species, there are 5 state listed priority wildlife species. The 5 state-listed priority wildlife species and their management strategies are listed below. Any assistance provided by USDA-WS will be in cooperation with the VFWD and follow guidelines pertaining to best management practices for all bat species. It has been documented at BTV that bat species pose aircraft strike risk and there have been multiple bat strikes at BTV in past years.

Little brown bat: Both males and pregnant female little brown bats have been documented on Burlington ANGB (ANG 2011, VTANG 2017a). Roosting habitat consists of cavity trees and dead snags. The following management strategies for the little brown bat are recommended:

Little brown bat
Photo by USFWS

- Conduct additional survey to determine location of roosting areas.
- Protect large diameter snags, where they do not pose a safety hazard, particularly in the areas currently forested.
- Maintain forests with a diverse range of tree sizes and age classes.
- Maintain riparian and wetland buffers which serve as foraging habitat.
- Reduce the use of pesticides in potential bat foraging areas.
- Remove trees between 1 November and 1 April when bats are not present.

Eastern small-footed bat: Eastern small-footed bat has been documented on Burlington ANGB (ANG 2011, VTANG 2017a). No roosting habitat (e.g. cliffs, talus slopes) occurs on Burlington ANGB for the eastern small-footed bat, but foraging habitat appears to be present. The following management strategies for eastern small-footed bat are recommended:

Eastern small-footed bat
Photo by USFWS

- Maintain existing forest and its connectivity with other forests nearby.
- Maintain existing riparian and wetland buffers, which serve as foraging habitat.
- Reduce the use of pesticides in potential bat foraging areas.

Common nighthawk: Common nighthawks have been documented during BASH surveys on Burlington ANGB (VTANG 2012). Common nighthawks have also been struck on 2 occasions by aircraft utilizing the runways at BTV (FAA 2018). The undeveloped areas on Burlington ANGB are primarily forest so suitable habitat is limited. The following management strategies for common nighthawk are recommended (VCE 2013a, NYSDEC 2013):

Common nighthawk
Photo by MDFW

- Maintain suitable open habitat.
- Airfield areas are maintained to minimize BASH risk and, therefore, will not be managed as potential common nighthawk habitat without prior coordination with BASH, USDA-WS, and BTV personnel.
- Limit use of pesticides as described in the IPM Plan in order to limit indirect impacts to common nighthawks.


Eastern whip-poor-will
Photo by MDFW

Eastern whip-poor-will: Eastern whip-poor-wills have been documented during BASH surveys on Burlington ANGB (VTANG 2012) though a more recent survey conducted before tree removal did not detect any individuals. The undeveloped areas on Burlington ANGB are primarily forest, so there is suitable habitat on site. The following management strategies for eastern whip-poor-will are recommended (VCE 2013b):

- Maintain suitable open woodland habitat.
- Airfield areas are maintained to minimize BASH risk and, therefore, will not be managed as potential eastern whip-poor-will habitat without prior coordination with BASH, USDA-WS, and BTV personnel.
- Limit use of pesticides as described in the IPM Plan, in order to limit indirect impacts to eastern whip-poor-wills.


Grasshopper sparrow
Photo by USFS

Grasshopper sparrow: Grasshopper sparrows have not been identified during BASH or wildlife hazard surveys on Burlington ANGB (USDA-WS 2011, VTANG 2012). The undeveloped areas on Burlington ANGB are primarily forest, so suitable habitat is limited. However, they have been documented approximately 1 mile from the installation and there are grassland areas maintained for a variety of purposes, including the airfield. The following management strategies for grasshopper sparrows are recommended if the species is documented on site:

- Maintain suitable grassland habitat with low shrubs.
- In non-airfield areas, delay mowing until mid-July to limit disturbance to nesting birds if documented on site and when feasible. There are limited, very small grassland areas north of the airfield.
- Airfield areas are maintained to minimize BASH risk and, therefore, will not be managed as potential grasshopper sparrow habitat without prior coordination with BASH, USDA-WS, and BTV personnel.

7.2.3.3 Management Strategies for Special Status Species

The following general guidelines will be followed to facilitate the military mission and natural resources management objectives while minimizing BASH risk and negative impacts on listed species and their habitats.

- Continue supporting BASH program to minimize take of listed species.
- Update biological inventories regularly as the occurrence of listed species is subject to change over time as a result of either recruitment, responses to management activities, identification of additional protected species, or the change in status of species currently present at Burlington ANGB.
- Generally maintain existing forested areas and minimize disturbance in riparian and wetland buffers, as well as seeps and wetlands.
- Coordinate with other organizations and agencies to monitor for white nose syndrome, as appropriate.

7.3 Water and Wetland Resource Protection

In general, water resources will be managed through conservation and impact avoidance. The following guidelines will be implemented to ensure compliance and to protect and enhance water resources at Burlington ANGB.

- Consult with the 158 FW/EMO prior to initiating projects with the potential to disturb water resources.
- Apply for an appropriate permit when regulated waters, including wetlands and associated buffers, will be impacted.
- Restrict vehicles from known wetland areas, riparian and wetland buffers, and other water resources.
- Restrict vehicles from within 50 feet of water resources, except where established crossings and roads exist, by flagging buffers or some other visual delineation when there is risk of vehicles not using roads and crossings.
- Maintain buffers around water resources, including a minimum 100 foot vegetated buffer along the Winooski River.
- Implement management controls to limit unavoidable erosion with buffers.
- Avoid disturbance of wetlands and aquatic habitats where practicable.
- Manage invasive species to promote desirable native species.
- Use black ash (*Fraxinus nigra*) during wetland mitigation, enhancement, and restoration projects, when applicable.
- Plan development to avoid wetland and floodplain impacts to the maximum extent possible, and mitigate unavoidable impacts on wetland and floodplain functions.
- Review operations and maintenance programs potentially impacting water resources and develop procedures and guidelines to avoid the loss of function.

7.3.1 Regulatory and Permitting

The USACE regulates the discharge of dredged or fill material into waters of the US, including wetlands, under Section 404 of the Clean Water Act (CWA). Even an inadvertent encroachment into Waters of the US including wetlands resulting in a displacement or movement of soil or fill material has the potential to be viewed as a violation of the CWA if an appropriate permit has not been issued by the USACE. Waters of the US including wetlands are defined under 33 CFR Part 328.3(a) and referred to as Jurisdictional Waters. Jurisdictional Waters may include coastal and inland waters, lakes, rivers, ponds, streams, intermittent streams, vernal pools, wetlands, and other waters, that if degraded or destroyed could affect interstate commerce.

A jurisdictional determination is made based on multiple criteria, but the relationship of the wetland to other waters of the US is important. Management of wetlands on federal lands and military installations is further governed by EO 11990 and DoDI 4715.03, respectively. Under those instructions, wetlands are required to be managed for no net loss on federal lands, including military installations. In support of these policies, long and short-term adverse impacts associated with the destruction or modification of wetlands and support of new construction in wetlands must be avoided to the maximum extent possible.

According to the US Environmental Protection Agency (USEPA) regulations issued under Section 404(b)(1) of the CWA, permitting of fill activities will not be approved unless the following conditions are met: no practicable, less environmentally damaging alternative to the

action exists; the activity does not cause or contribute to violations of state water quality standards (or compliance under Section 401 of the CWA); the activity does not jeopardize listed species or sensitive cultural resources (33 CFR Part 320.3 [e] and [g]); the activity does not contribute to significant degradation of waters of the US; and all practicable and appropriate steps have been taken to minimize potential adverse impacts to the aquatic ecosystem (40 CFR Part 230.10).

Section 401 of the CWA gives the State of Vermont the authority to regulate, through the state water quality certification program, proposed federally-permitted activities resulting in a discharge to water bodies, including wetlands. The state may issue certification, with or without conditions, or deny certification for activities that may result in a discharge to water bodies. In Vermont, the VTDEC is responsible for issuing Section 401 Water Quality Certification.

In 1986, the Vermont Legislature passed an act (10 VSA § 905 [a][7-9]) that allowed for state and local protection of wetlands in Vermont. Vermont Wetland Rules [Vt. Code R. 12 004 056]) were initially adopted by the Vermont Water Resources Board, which was replaced by the Water Resources Panel in 2004. In 2010, the Water Resources Panel passed new Vermont Wetland Rules pursuant to 10 VSA § 6025[d][5]. This statute limits the applicability of these rules to those wetlands which are so significant that they merit protection. The Vermont Wetland Rules identify and protect 10 functions and values of "significant" wetlands and establish a 3-tier wetland classification system to identify such wetlands. The first 2 classes of wetlands (Class I and Class II) are considered significant and protected under the state wetland rules, along with their buffer zones (generally 100-foot for Class I and 50-foot for Class II). The Vermont Significant Wetlands Inventory (VSWI) maps show an approximate location of many significant wetlands but has been minimally updated since its development in the 1990s. In addition to the VSWI mapped wetlands, the following wetlands are presumed to have function and value in Vermont:

- Wetlands contiguous or connected to a VSWI mapped wetland or the same type and size as a mapped wetland (0.5 acre or larger).
- Wetlands 0.5 acres or less adjacent to a stream or other surface water body, vernal pools, unique wetlands (e.g. bogs, fens), headwaters above 2,500 feet in elevation, or adjacent to impaired waters.

Class III wetlands are wetlands which do not provide significant function and value according to the Vermont Wetland Rules. These wetlands are not protected by the Vermont Wetland Rules and a Vermont Wetland Permit is not required for projects in Class III wetlands. Class III wetlands may, however, be protected by other federal, state or local laws and regulations, including those administered by USACE. The Secretary of the VTANR (or his/her representative) makes formal determinations regarding the classification of wetlands as Class II or Class III. Designation of wetlands as Class I requires rulemaking by the Water Resources Panel. Activity in a Class I or Class II wetland or its associated buffer zone is prohibited unless it is an allowed use or authorized by a permit, conditional use determination, or order issued by the Secretary.

While there is not significant acreage of FEMA-designated floodplain on Burlington ANGB, floodplains are protected under 24 Vermont Statutes Annotated (VSA) § 4424 and EO 11988 – Floodplain Management. The purpose of EO 11988 is to reduce the risk of flood loss, minimize the impacts of flooding, and restore and preserve the natural and beneficial values of floodplains when acquiring, managing, or disposing of federal lands. Any development within a special flood

hazard area, including construction, fill, or other alterations will require a state flood hazard area permit from VTANR.

Permitting

The following activities within regulated wetlands or their buffers, and other waters of the US or State require a permit in Vermont: placement of fill material; dredging or removal of soil or minerals; construction, operation or maintenance of any use or development; and discharge of stormwater into a wetland. As discussed above, the USACE and VTDEC have regulatory authority over jurisdictional waters of the US, and Class I and II wetlands and their associated buffers (generally 100-foot for Class I and 50-foot for Class II) in the state of Vermont. In Vermont, the USACE issues Individual permits and a General Permit that covers many routine or minor projects. All nationwide permits (NWPs) have been suspended in New England. The VTDEC issues general and individual 401 Water Quality Certification for federally permitted activities, Title 10 state permits for stream alterations and crossings within watercourses with a drainage area greater than 10 square miles or any designated outstanding resource water, and general and individual wetland state permits for impacts to Class I and Class II wetlands and their buffers (generally 100-foot for Class I and 50-foot for Class II).

If impacts to FEMA floodplains are unavoidable, then the VTANG must obtain a flood hazard area development permit from the VTANR prior to initiating work within a floodplain.

Permitting requirements vary depending on type, location, and extent of disturbance. Prior to initiating projects or activities (e.g. dredging, filling, work in and around a stream) occurring within or with the potential to affect a floodplain, wetland or other water body, the appropriate agencies (USACE, VTANR, or VTDEC) should be consulted to determine permitting requirements.

As a result of a recent USEPA ruling and in compliance with the provisions of the Federal Water Pollution Control Act as amended (33 USC § 1251), Vermont has issued a new Pesticide General Permit through the VTDEC's National Pollutant Discharge Elimination System (NPDES) Program. Existing state permits still apply for pesticide application in accordance with Vermont's Aquatic Nuisance Law (10 VSA. § 1455). The NPDES Pesticide General Permit pertains to pesticide applications on or near waters of the State of Vermont. This newly issued permit is consistent with the USEPA pesticide general permit requirements, which are published under 40 CFR Part 122. It is applicable to all persons who discharge pesticides to Waters of the State from the application of biological pesticides or chemical pesticides, which leave a residue of the pesticide or its degredates. A Notice of Intent must be submitted to VTDEC by any decision maker with an eligible discharge into an Outstanding Resource Water, pest control entities, any agency for which pest management for land stewardship is an integral part of the organization's operations, and entities exceeding annual treatment level thresholds. For plants and animal spraying, the threshold is ≥ 20 linear miles or 80 acres. In addition to the NPDES permit, the VTDEC issues a state permit for activities used to control nuisance aquatic plants, insects, or other aquatic life including lamprey in waters of the State of Vermont.

7.3.2 Vegetation Buffers

Vegetated buffers are also referred to as riparian management zones, riparian buffers, wetland buffers, lake buffers, buffer strips, filter strips or streamside management areas. Buffers can take

many forms and may vary in size and function vary depending on the upland land use and the type of water resource being protected. They can either be grassland or forest and may or may not be mowed and maintained occasionally. One of the primary purposes of a vegetated buffer is for water quality protection by providing vegetation to interrupt water flow and to trap and filter out suspended sediments, nutrients, chemicals, and other polluting agents before they reach the body of water. Vegetated buffers should be maintained along all perennial and intermittent streams, wetlands, lakes, or ponds where nearby management activities result in surface/soil disturbance, earth changes, and where erosion and sediment transport occurs during rain events. Maintaining the forest cover around small water resources is important for preventing sedimentation and impacts to water quality.

As a result of the small water features throughout the forested areas and the area of the installation adjacent to the Winooski River, the VTANG will maintain riparian buffers around water resources, whenever possible, to reduce the influx of sedimentation and other materials into the water resources in compliance with the CWA and in support of the Winooski River Basin Water Quality Management Plan (VTANR 2012). In general, riparian buffers in Vermont should be a minimum 50 feet wide with increasing buffers in steeper terrain (VTANR 2002a, 2002b, 2005). There is also a River Corridor Management Program within VTANR mandated by state law to protect rivers and their buffers. For airfield management to reduce BASH risk, water resources in the airfield and its critical zone do not have vegetated buffers, although there may be turf grass around some features.

7.4 Grounds Maintenance

Given that large parts of Burlington ANGB are landscaped, the management and design of those areas have significant implications for water quality, BASH risk and native species. The following recommended landscaping practices should benefit the environment and generate long-term savings in cost and maintenance time. In particular, the use of native plants not only protects biodiversity and provides wildlife habitat, but it can also reduce demands for fertilizer, pesticides, and irrigation and their associated costs.General recommendations to promote environmentally beneficial landscaping include:

- Design landscaping to be suitable to the specific site and appropriate for the use and operation of the facility.
- Implement water-efficient practices, use efficient irrigation systems and recycled water, and use landscaping to conserve energy.
- Limit turf areas where practical to reduce water use and maintenance requirements.
- Use wood mulch instead of rock mulch when practical.
- Prevent expansion of nonnative plants into native plant areas by using regionally native plants for landscaping where practicable.
- Reuse landscape trimmings on site as appropriate (e.g. mulch).
- Do not use seed-bearing or fruiting plants that provide food for wildlife and wildlife habitat in areas near airfields.

All invasive plants identified in Vermont's WAP and noxious weeds listed for Vermont are not acceptable for landscaping planting within Burlington ANGB. All non-native grasses (except those used for lawns) are also not acceptable for landscape planting.

In addition to more general landscaping practices, the use of green infrastructure or low impact development techniques can reduce the risk of negatively impacting water quality on-site or in the Winooski River. These practices often include the use of native plants and provide some wildlife habitat as well. The South Burlington Low Impact Development Guidance Manual (SBSU 2009) also provides details on specific Best Management Practices (BMPs).

7.5 Forest Management

Although the area is limited, Burlington ANGB has an intact northern hardwood forest with diverse tree species, which provides potential habitat for many plant and wildlife species. In addition, much of the area to the northeast of Burlington ANGB is part of the Winooski Valley Park District and is managed as forest. One of the primary concerns with forest management in Vermont is invasive plant species. A number of invasive species can impact the understory and wetlands, resulting in adverse effects on native and rare species.

Forest pest and diseases can also cause significant management issues; some are native species and some are not. Currently, there are no known forest pests or diseases present on Burlington ANGB. Common forest pests and diseases in the Burlington area includes the emerald ash borer, Dutch elm disease, and beech bark disease. Hemlock wooly adelgid is currently in southern Vermont. Burlington ANGB will consult VTANR foresters if forest pests require treatment or preventive measures.

7.6 Soil Conservation and Sediment Management

Two main types of soil erosion exist: wind erosion and water erosion. Neither wind nor water erosion are a significant issue at Burlington ANGB. Several factors affect water erosion. These factors include rainfall, slope steepness and length, soil texture or erodibility, cover protecting the soil, and special practices such as terracing or planting on the contour. Sediment resulting from erosion affects surface water quality and aquatic organisms. Any changes in vegetation cover or land management that increase the risk of water erosion could impact water quality in the Winooski River and a number of rare and listed species documented there.

Stormwater runoff is produced when rainfall during a storm exceeds the infiltration capacity of the soil or encounters an impervious surface. Stormwater runoff can be a significant source of pollutants as well as sediments to surface waters, especially in areas with impervious surface cover or where groundcover has been disturbed. Sources of stormwater runoff and pollution could originate from operational, maintenance, and/or administrative areas within Burlington ANGB. Additionally, stormwater runoff from impervious surfaces has a high potential to carry pollutants into wetlands, surface waters, and groundwater. Impervious surfaces at Burlington ANGB include roads, parking lots, taxiways, sidewalks, and buildings. Water quality also may be negatively impacted by disturbances causing increased sedimentation to wetlands and stream channels. Burlington ANGB, however, has a number of stormwater controls already in place, which greatly reduces runoff and increases infiltration through a controlled environment before the stormwater enters either surface or groundwater.

Although water quality monitoring is not generally required, it is a good way to measure ecosystem health. At Burlington ANGB, there is some regular water quality monitoring as a result of the Environmental Restoration Program (ERP) program. To protect water quality, the VTANG already implements the following strategies:

- Maintain vegetation buffers around water resources, especially rivers and Class II wetlands as required by Vermont law and rules.
- Adhere to BMPs for construction and industrial activities as described in applicable manuals, plans and permits.
- Minimize the amount of impervious surfaces in newly developed areas.
- Minimize the use of pesticides.
- Revegetate barren ground.
- Monitor surface water quality.
- Prevent surface water pollution by ensuring environmental plans (e.g. SWPPP) are followed.

7.7 Outdoor Recreation, Public Access, and Public Outreach

Currently there are no public access programs at Burlington ANGB. However, Burlington ANGB does participate in the STARBASE program and occasionally conducts air shows. Public outreach activities associated with the Environmental Restoration Program (ERP) also occur, due to the presence of sites along the boundary of the facility. Personnel from 158 FW/CES and 158 FW/SE at Burlington ANGB are also involved with various regional planning efforts.

7.8 Geographic Information Systems (GIS)

GIS is used to manage and catalog information acquired in natural resources research. GIS assists in planning by charting areas of environmental concern and providing a baseline for analyzing the potential impacts of any proposed natural resources management action. Managers can implement the capabilities of GIS to watershed, wetlands, wildlife, and various other natural resource management applications. GIS needs and requirements will be addressed through the ANG GeoBase Program.

7.9 Other Plans

7.9.1 Integrated Pest Management Plan

Burlington ANGB has an IPM Program implemented by the Civil Engineering Squadron Facilities Manager. IPM is the use of multiple techniques in a compatible manner to avoid damage and minimize adverse environmental affects while obtaining control of target pests. The goal of IPM is to utilize non-chemical procedures to control pests, including invasive, exotic plant and animal species. Typically a combination of the following IPM techniques is required to resolve a problem on a sustained basis:

- Mechanical control, which alters environments in which pests live, traps or removes pests (e.g. glue boards and live-traps) from where they are not wanted, or excludes pests from where they are not wanted (e.g. screening, fencing).
- Cultural control, which manipulates environmental conditions to suppress or eliminate pests (e.g. removal of food scraps or spreading manure on fields).
- Biological control, which uses predators, parasites, or disease organisms to control pests.
- Chemical control, which relies on pesticides to kill pests and/or undesirable species of plants.

The IPM Plan includes pest identification and management requirements, outlines the resources necessary for surveillance and control, and describes the administrative, safety, and environmental requirements of the program (VTANG 2009a). This plan serves as a tool to reduce pesticide use, enhance environmental protection, and maximize the use of IPM techniques safely. It is the policy of the VTANG to minimize the use of all pesticides at the installation.

7.9.2 Invasive Species

A comprehensive list of invasive species can be found in Vermont's WAP (VFWD 2015). The VTDEC is responsible to managing aquatic invasive species. The Vermont Department of Forests, Parks, and Recreation is responsible for managing terrestrial invasive species. The Vermont Agency of Agriculture is responsible for maintaining and enforcing the noxious weed list and quarantine.

Table 6 describes priority invasive species for Burlington ANGB. Priority Invasive species were determined based on likely control of the species and the current or potential impacts to native plants and wildlife. A species was identified as high priority if control (or even eradication on site) is feasible and the impacts from the species are currently, or have potential to be, significant. In other words, treatment should occur as soon as possible. A species was identified as a low priority species if it would very difficult to achieve control of the species and the current or potential impacts are relatively low. In other words, the species should be monitoring occasionally but no treatment is recommended at this time. A species identified as a medium priority species would be either feasible to control or have significant impacts (but not both). In other words, treatment should occur when an opportunity arises, such as in conjunction with another project or as part of a larger event, and the populations should be monitored for expansion.

Table 6. Priority Invasive Plant Species at Burlington ANGB

Scientific Name	Common Name	Priority	Documented On-Site
Celastrus orbiculatus	Oriental bittersweet	High	New
Cirsium arvense	Canada thistle	Currently medium, potential to spread	New
Cirsium vulgare	Bull thistle	Medium	New
Linaria vulgaris	Butter and eggs	Low	New
Lonicera morrowii	Morrow's honeysuckle	Low	Previous
Phalaris arundinacea	reed canary grass	Currently medium, potential to spread	Previous
Phragmites australis	common reed	Currently low, potential to spread	Previous
Polygonum cuspidatum	Japanese knotweed	Currently low, potential to spread	New
Rhamnus cathartica	common buckthorn	Currently low, potential to spread	Previous
Robinia pseudoacacia	black locust	Low	Previous
Rosa multiflora	multiflora rose	Currently low, potential to spread	New
Verbascum thapsus	common mullein	Low	New
Vicia cracca	bird vetch	Low	New

Sources: VTDEC 2004; VFWD 2015; USDA 2012; ANG 2016

Priority:
Low = watch species to watch but do not require immediate treatment
Low, with potential to spread = species to watch carefully due to risk of spread but do not require immediate treatment
Medium = species for which treatment should occur if the opportunity presents
Medium, with potential to spread = species for which treatment should occur if the opportunity presents
High = species for which treatment should occur as soon as possible

Documented On-Site:
Previous = documented in ANG 2011 or ANG 2014, as well as during this project.
New = documented for the first time during the 2016 Vegetation Survey (ANG 2016)

Management Strategies

Invasive, non-native species and noxious weeds have the capability to significantly impact native vegetation and wildlife. A key element of INRMP implementation is to ensure no net loss of military training capability. Management of undesirable species is necessary to maintain military lands and facilities in usable condition. In addition, uncontrolled animal pests can become health hazards, which could threaten the military mission.

The task of controlling invasive and exotic species and noxious weeds is often expensive, lengthy, and risky because total eradication is required to prevent reestablishment. Prevention is the best approach. However, in accordance with laws and regulations pertaining to the management of these species, the VTANG will work to both prevent the introduction of these species and take measures to control them in an economically and environmentally sound manner. General management strategies are as follows:

- Implement BMPs to minimize land disturbances that favor invasion of non-native species and re-vegetate disturbed areas with native species.
- Native rock and soil material should be used instead of non-indigenous rock or soil when practical for maintenance or construction projects.
- Utilize mulches from Burlington ANGB or certified-weed free sources to facilitate the establishment of native ground cover on impoverished soils.
- Maintain biodiversity and undisturbed habitat to maximize resilience to and competition with invasive species.

- Control invasive and exotic species and noxious weeds through early detection, isolation of infested areas, and control of individual plants with physical, chemical or mechanical means, depending on the species.
- Favor basal application and spot treatment and avoid aerial or broadcast application of pesticides to prevent adverse impacts to native plants and wildlife.
- Do not use invasive, non-native species in landscaping.
- Continue to reseed exposed soils using a certified weed-free native grass mix.
- Educate site users.

The use of chemicals to control invasive and exotic species can hinder an installation's efforts to reduce usage of pesticides. Therefore, it is important to prevent the initial spread of invasive and exotic species and address the spread of such species as early as possible. The Burlington ANGB Environmental Management Office should evaluate the threat of invasive species as well as the environmental impacts. Permitting requirements of pesticide usage (if applicable) prior to implementing any eradication and/or control program falls under the management responsibility of the Civil Engineer Squadron Facilities Manager.

7.9.3 Stormwater Management

Stormwater management is important at Burlington ANGB, given the extent of development, nearness to the Winooski River, and the potentially significant effects of erosion on water quality. The Vermont Standards and Specifications for Erosion Prevention and Sediment Control (VTDEC 2006) and the Vermont Stormwater Management Manual: Volume I - Stormwater Treatment Standards and Volume II – Technical Guidance (VTANR 2002a and VTANR 2002b) are all sources for stormwater standards and BMPs. The USEPA Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act (USEPA 2009) as well as the South Burlington Low Impact Development Guidance Manual (South Burlington Stormwater Utility [SBSU] 2009) provide details on specific BMPs. In addition to compliance with requirements associated with the Energy Independence and Security Act as well as the existing SWPPP activities, construction or other land-disturbing activity that creates a minimum of 1-acre of soil disturbance must be permitted by the VTDEC under the NPDES permit program. The NPDES permit establishes the required erosion control and revegetation standards.

7.9.4 Bird/Wildlife Aircraft Strike Hazard (BASH)

As users of the BTV runways, the VTANG implements a BASH Plan (VTANG 2012) and supports implementation of BTV's WHMP (BTV 2015). The BASH Plan has established specific procedures intended to reduce known and future hazards from birds, including the development of a BHWG. The BHWG is chaired by the Vice Commander and is responsible for developing, implementing, and updating the BASH Plan and reviewing BASH incidents. At Burlington ANGB, BASH projects and activities are led by the Safety Office, implemented by USDA-WS, and are in coordination with the Environmental Office. The BASH plan was reviewed and approved in October 2018.

Wildlife management and control measures include a number of dispersal methods available to Burlington ANGB, USDA-WS, and airport personnel on an as-needed basis. Active harassment activities include a combination of frightening devices which are used whenever birds are present on the airfield or in the surrounding area. In addition to active harassment, BASH management

techniques include rodent control and depredation. USDA-WS personnel also utilize capture, band, and translocation techniques for hazardous raptors, falcons, and owls on the facility. Management of habitat, however, is the most effective and cost-efficient form of minimizing BASH risk. Habitat management serves as the foundation of all other wildlife hazard mitigation efforts on the airfield. A USFWS depredation permit, in accordance with 50 CFR part 13 and part 21.41, number MB701358-0 is on file with BTV Operations, as well as in the BTV WHMP. Burlington ANGB Airfield Management are authorized under this permit to perform depredation under direct supervision of Burlington International Airport's Wildlife Coordinator and are formally designated as a permit sub-permittee.

Birds can be encountered at altitudes of 30,000 feet and higher. However, most birds fly closer to ground level, and more than 95% of all reported incidents in which an USAF aircraft has struck a bird have been below 3,000 feet above ground level. Approximately half of these bird strikes occur in an airfield environment. Strike rates rise significantly as altitude decreases, which is partly due to the greater number of low-altitude missions, but mostly because birds are commonly active nearer to the ground. Any gain in altitude represents a substantially reduced threat of a bird-aircraft strike. The potential exists for future bird strikes at Burlington ANGB, but there are many management strategies and protocols being implemented by VTANG, USDA-WS, and BTV. The strategies include:

- Prohibiting feeding or attracting birds or wildlife.
- Maintaining uniform grass height between 7 – 14 inches on the airfield.
- Controlling broad leaved weeds.
- Planting areas of bare ground with grass.
- Removal of all trees in the airfield operating area.
- Avoiding landscaping that would attract wildlife on the airfield.
- Minimizing habitat edges, or transitions (ecotones), on the airfield.
- Removing dead vegetation and animals.
- Controlling pests.
- Maintaining drainage ditches and eliminating standing water.
- Maintaining fencing to recommended standards.
- Hazardous bird/mammal harassment, dispersal, and removal.
- Raptor, falcon, and owl capture and translocation.
- Continued surveillance, monitoring, and inspections.
- Wildlife strike reporting.
- Using appropriate vegetation for erosion control.
- Using anti-perching devices where appropriate.
- Eliminating roosting areas.
- Bird-proofing buildings and other structures.

In general, most bird strikes at Burlington ANGB and BTV occur in late summer and fall, with American kestrels and ring-billed gulls being the most frequently struck species at BTV (FAA 2018, USDA-WS 2011, VTANG 2012). Blackbirds and European starlings, ring-billed gulls, Canada geese, American crows, American kestrels, red-tailed hawks, horned larks, snow buntings, red fox, skunks, white-tailed deer and Eastern cottontails are generally the most abundant hazardous wildlife observed at BTV according to the BTV WHA and recent surveillance and control measures performed on site by USDA-WS (USDA-WS 2011; USDA,

personal communication, 2018). The highest risk species observed at BTV are American crows, gulls, American kestrels, red-tailed hawks, pigeons, horned larks and snow buntings. Other potential high risk species at BTV include waterfowl and raptors/falcons (USDA-WS 2011; USDA, personal communication, 2018).

7.9.5 Burlington International Airport Wildlife Hazard Management Plan

BTV's WHMP establishes the responsibilities, policies, resources, and procedures that will reduce wildlife hazards. This plan includes discussions on management actions, control measures, laws and regulations, resources, and training (BTV 2015).

8.0 MANAGEMENT GOALS AND OBJECTIVES

Goals and objectives provide the framework for natural resources management programs. Goals provide a general guiding direction for each technical area and objectives are more specific actions that facilitate achieving those goals. The objectives then drive the development of specific activities and projects. Management goals and objectives for the Burlington ANGB INRMP were developed through a thorough evaluation of the natural resources present on the instillation in accordance with AFI 32-7064 and the principles of adaptive ecosystem management by an interdisciplinary team of biologists, planners, and environmental scientists. Goals and objectives should be revised over time to reflect evolving environmental conditions, adaptive management, and the completion of tasks as the INRMP is implemented.

GOAL – Natural Resources Program Management (PM): Manage natural resources in a manner that is compatible with, and supports the military mission while complying with applicable federal and state laws and USAF regulations and policies.

- OBJECTIVE PM1: Initiate and/or continue programs and projects that enhance the land and military mission, and result in no net loss of land availability.
- OBJECTIVE PM2: Use adaptive, ecosystem management as the primary natural resources management paradigm.
- OBJECTIVE PM3: Continue internal environmental awareness activities to minimize impacts to natural resources from VTANG and visiting personnel.
- OBJECTIVE PM4: Continue public outreach in coordination with other regional entities as appropriate.
- OBJECTIVE PM5: Continue to cooperate with other agencies and local landowners on regional land and natural resources management efforts.
- OBJECTIVE PM6: Maintain and improve GIS data and access to that data by VTANG personnel.

GOAL – Soil Conservation and Sediment Management (SO): Manage soil to minimize sediment loss and erosion, while protecting water quality.

- OBJECTIVE SO1: Manage slopes to minimize erosion and sediment loss.
- OBJECTIVE SO2: Maintain existing stormwater controls and manage stormwater runoff in order to reduce erosion, encourage infiltration upstream of major water bodies, and reduce nutrients before runoff enters major water bodies.

OBJECTIVE SO3: Minimize nonpoint source pollution through implementation of BMPs, following existing spill prevention and hazardous materials management protocols, and education.

GOAL – Water Resource Protection (WA): Manage water resources so they remain resilient and with no net loss of acreage or functions and values.

OBJECTIVE WA1: Minimize impacts to water resources and comply with all laws and regulations pertaining to wetlands, streams, floodplains and regulated water bodies.

OBJECTIVE WA2: Maintain or enhance vegetated buffers around water resources, including buffers at least 50 feet wide around rivers and Class II wetlands.

OBJECTIVE WA3: Implement management measures to reduce impacts to water quality in major water bodies.

GOAL – Vegetative Monitoring (VE): Manage vegetation to promote native species using cost effective and sustainable methods.

OBJECTIVE VE1: Maintain intact, healthy habitat and enhance or restore degraded habitat without increasing BASH risk.

OBJECTIVE VE2: Maximize native plants and avoid invasive non-native plants in landscaping and other areas.

OBJECTIVE VE3: Maintain forested areas and ensure other management activities do not cause impacts to deer wintering habitat, nesting migratory birds, or listed species (bats, in particular).

GOAL – Fish and Wildlife Monitoring (FW): Maintain fish and wildlife populations while minimizing potential impacts to the military mission.

OBJECTIVE FW1: Minimize BASH risk by deterring hazardous birds and other wildlife from the airfield and its critical zone.

OBJECTIVE FW2: Maintain populations of wildlife away from the airfield on Burlington ANGB by minimizing impacts to and by providing healthy, diverse habitat types and corridors for wildlife movement between those habitats.

OBJECTIVE FW3: Maintain existing forested areas to protect critical wildlife habitat and rare species.

GOAL – Threatened and Endangered Species (TE): Manage threatened and endangered listed species using an ecosystem approach, while supporting the military mission.

OBJECTIVE TE1: Manage for listed bat species, including federal and state-listed species, by following forest management guidelines and protecting water resources.

OBJECTIVE TE2: Manage for state-listed plant species by protecting seeps and forested wetlands and controlling invasive species, as well as minimizing disturbance in forested areas.

OBJECTIVE TE3: Manage for grassland-dependent state-listed birds by maintaining existing grasslands.

OBJECTIVE TE4: Minimize impacts to state-listed species, in particular fish and mussels, in the Winooski River by maintaining buffers around water resources and implementing stormwater management program.

OBJECTIVE TE5: Survey specifically for potential listed species, as well as monitor for these species during other natural resources activities.

OBJECTIVE TE6: Manage construction and military activities that have potential to impact listed species by following guidelines and obtaining appropriate permits, as required.

GOAL – Invasive Species (IN): Minimize impacts of invasive and pest species, by utilizing an IPM approach while minimizing use of chemicals to manage those species.

OBJECTIVE IN1: Prevent the spread of invasive aquatic species by ensuring all equipment (e.g. vehicles and clothing) is clean before and after use.

OBJECTIVE IN2: Manage terrestrial invasive species by maintaining existing native vegetation, monitoring invasive species density and spread, and implementing control efforts when needed.

OBJECTIVE IN3: Monitor for forests pests and consult with local foresters if needed.

9.0 ANNUAL WORK PLANS

The INRMP Annual Work Plans contain projects listed by fiscal year (FY). For each project, a specific timeframe for implementation is provided (as applicable), as well as the office of primary responsibility (OPR), funding source, and priority for implementation (**Tables 7-10**). Priorities are defined as follows:

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

Table 7. Work Plans FY 2019			
Project	**OPR**	**Funding Source**	**Priority Level**
Prepare budget to implement the natural resources management program			1
Complete annual review of INRMP			1
Survey Wetlands and other Waters of the US to update mapping and delineations			1
Conduct wildlife surveys with an emphasis on federally-listed, state-listed, and rare species			1
Conduct plant surveys with an emphasis on federally-listed, state-listed, and rare species			1
Conduct an invasive plant species survey			1
Monitor for presence of bat species, especially listed species, using acoustic monitoring			1
Provide environmental and natural resources training to Burlington ANGB personnel			1
Evaluate effectiveness of erosion and sediment control measures			1
Monitor at-risk construction sites to ensure erosion and sediment control measures are effective			1
158 FW/EMO will review activities for potential to impact water resources			1
If an activity will impact a wetland or other water resource, coordination with USACE will be completed and mitigation options identified			1
When new activities are undertaken at Burlington ANGB, a review for impacts to listed species and their habitat should be conducted by 158 FW/EMO and ANG NGB/A4AM to determine if there are potential impacts and identify options to minimize impacts			1
Use native plant species and materials for landscaping activities			1
Coordinate with VTANR state foresters to monitor for forest pests			1
Ensure that all equipment used in ponds or streams is clean before entering the water and clean when leaving the water to prevent the spread of invasive aquatic species, as required by Vermont law			1
Monitor regularly for new invasive species or sudden increases in density of existing invasive species			1
Conduct any tree management to minimize impacts to migratory birds, bats, and wintering deer			1
Support BASH Office, as needed			1
Monitor status of priority invasive species			1
Implement control projects for hazardous and invasive species, possibly in conjunction with local government and non-profits			1
Reduce coverage of invasive plants			1
Implement forest management projects necessary to maintain forest health and diverse age structure to support listed species			1
Implement management necessary to control forest pests, in particular non-native pests, and to mitigate damage			2

Table 8. Work Plans FY 2020			
Project	**OPR**	**Funding Source**	**Priority Level**
Prepare budget to implement the natural resources management program			1
Complete annual review of INRMP			1
Conduct wildlife survey(s) with an emphasis on rare, and federal and state-listed species			1
Provide environmental and natural resources training to Burlington ANGB personnel			1
Evaluate effectiveness of erosion and sediment control measures			1
Monitor at-risk construction sites to ensure erosion and sediment control measures are effective			1
158 FW/EMO will review activities for potential to impact water resources			1
If an activity will impact a wetland or other water resource, coordination with USACE will be completed and mitigation options identified			1
When new activities are undertaken at Burlington ANGB, a review for impacts to listed species and their habitat should be conducted by 158 FW/EMO and ANG NGB/A4AM to determine if there are potential impacts and identify options to minimize impacts			1
Use native plant species and materials for landscaping activities			1
Coordinate with VTANR state foresters to monitor for forest pests			1
Ensure that all equipment used in ponds or streams is clean before entering the water and clean when leaving the water to prevent the spread of invasive aquatic species, as required by Vermont law			1
Monitor regularly for new invasive species or sudden increases in density of existing invasive species			1
Conduct any tree management to minimize impacts to migratory birds, bats, and wintering deer			1
Support BASH Office, as needed			1
Monitor status of priority invasive species			1
Implement control projects for hazardous and invasive species, possibly in conjunction with local government and non-profits			1
Reduce coverage of invasive plants			1
Implement forest management projects necessary to maintain forest health and diverse age structure to support listed species			1
Implement management necessary to control forest pests, in particular non-native pests, and to mitigate damage			2

Table 9. Work Plans FY 2021			
Project	**OPR**	**Funding Source**	**Priority Level**
Prepare budget to implement the natural resources management program			1
Complete annual review of INRMP			1
Monitor for presence of bat species, especially listed species, using acoustic monitoring			1
Provide environmental and natural resources training to Burlington ANGB personnel			1
Evaluate effectiveness of erosion and sediment control measures			1
Monitor at-risk construction sites to ensure erosion and sediment control measures are effective			1
158 FW/EMO will review activities for potential to impact water resources			1
If an activity will impact a wetland or other water resource, coordination with USACE will be completed and mitigation options identified			1
When new activities are undertaken at Burlington ANGB, a review for impacts to listed species and their habitat should be conducted by 158 FW/EMO and ANG NGB/A4AM to determine if there are potential impacts and identify options to minimize impacts			1
Use native plant species and materials for landscaping activities			1
Coordinate with VTANR state foresters to monitor for forest pests			1
Ensure that all equipment used in ponds or streams is clean before entering the water and clean when leaving the water to prevent the spread of invasive aquatic species, as required by Vermont law			1
Monitor regularly for new invasive species or sudden increases in density of existing invasive species			1
Conduct any tree management to minimize impacts to migratory birds, bats, and wintering deer			1
Support BASH Office, as needed			1
Monitor status of priority invasive species			1
Implement control projects for hazardous and invasive species, possibly in conjunction with local government and non-profits			1
Reduce coverage of invasive plants			1
Implement forest management projects necessary to maintain forest health and diverse age structure to support listed species			1
Implement management necessary to control forest pests, in particular non-native pests, and to mitigate damage			2

Table 10. Work Plans FY 2022			
Project	**OPR**	**Funding Source**	**Priority Level**
Prepare budget to implement the natural resources management program			1
Complete annual review of INRMP			1
Monitor for presence of bat species, especially listed species, using mist netting and employ radio-telemetry to determine if bats are roosting on the installation			1
Provide environmental and natural resources training to Burlington ANGB personnel			1
Evaluate effectiveness of erosion and sediment control measures			1
Monitor at-risk construction sites to ensure erosion and sediment control measures are effective			1
158 FW/EMO will review activities for potential to impact water resources			1
If an activity will impact a wetland or other water resource, coordination with USACE will be completed and mitigation options identified			1
When new activities are undertaken at Burlington ANGB, a review for impacts to listed species and their habitat should be conducted by 158 FW/EMO and ANG NGB/A4AM to determine if there are potential impacts and identify options to minimize impacts			1
Use native plant species and materials for landscaping activities			1
Coordinate with VTANR state foresters to monitor for forest pests			1
Ensure that all equipment used in ponds or streams is clean before entering the water and clean when leaving the water to prevent the spread of invasive aquatic species, as required by Vermont law			1
Monitor regularly for new invasive species or sudden increases in density of existing invasive species			1
Conduct any tree management to minimize impacts to migratory birds, bats, and wintering deer			1
Support BASH Office, as needed			1
Monitor status of priority invasive species			1
Implement control projects for hazardous and invasive species, possibly in conjunction with local government and non-profits			1
Reduce coverage of invasive plants			1
Implement forest management projects necessary to maintain forest health and diverse age structure to support listed species			1
Implement management necessary to control forest pests, in particular non-native pests, and to mitigate damage			2

10.0 INRMP IMPLEMENTATION, UPDATE, AND REVISION PROCESS

10.1 INRMP Implementation

In accordance with AFI 32-7064, an INRMP is considered implemented if an installation:

- Actively requests, receives, and uses funds for "must fund" projects and activities as defined by Chapter 4 of AFI 32-7001 (Environmental Quality Programming and Budgeting).
- Executes all "must fund" projects and activities in accordance with specific time frames identified in the INRMP.
- Prepares the INRMP in cooperation with appropriate stakeholders. Notifies stakeholders when a new or revised INRMP will be prepared, and solicits participation and input to the INRMP development and review process.
- Ensures that sufficient numbers of professionally trained natural resources management personnel are available to perform the tasks required by the INRMP.
- Ensures INRMP has been approved in writing by the appropriate representative from each cooperating agency within the past 5 years.
- Reviews the INRMP annually and coordinates annually with cooperating agencies.
- Establish and maintain regular communications with the appropriate federal and state agencies for the region where the installation is located.
- Documents specific INRMP action accomplishments undertaken each year.
- Ensures INRMP updates and reviews are conducted in cooperation with the USFWS, VFWD, and National Oceanic and Atmospheric Administration (NOAA), where applicable
- Ensures the INRMP implements ecosystem management on ANG installations by setting goals for attaining a desired land condition.

Natural resource and land use management issues are not the only factors contributing to the development and implementation of the INRMP. Facility management and other seemingly unrelated issues affect implementation. It is important to the implementation of this INRMP that Burlington ANGB personnel take ownership of the INRMP to provide the necessary resources (e.g. personnel and equipment), and to utilize the appropriate funding allocated by the ANG NGB/A4AM to enact the INRMP. It is extremely important that the INRMP Working Group continue to participate in the implementation of this INRMP. The INRMP Working Group is made up of the key Burlington ANGB personnel, and has an oversight role to ensure the effective implementation of this INRMP. Top and middle-level management representation, as well as representation from several individuals with day-to-day on-site experience will provide the INRMP Working Group with the leadership and structure necessary for the successful implementation of this INRMP.

10.1.1 Monitoring INRMP Implementation

10.1.1.1 Burlington ANGB INRMP Implementation Analysis

The Burlington ANGB INRMP implementation will be monitored for meeting the legal requirements of the Sikes Act as well as for other mission and biological measures of effectiveness. The ultimate successful implementation of this INRMP is realized in no net loss in the capability of the VTANG training lands to support the military mission while at the same time providing effective natural resources management.

In order to monitor and evaluate the effectiveness of the INRMP implementation the following will be reviewed as applicable and discussed within the context of the annual review and/or a formal review of operation and effect:

- Impacts to/from the military mission;
- Conservation program budget;
- Staff requirements;
- Program and project implementation;
- Trends in species and habitat diversity as evidenced by recurring biological surveys, land use changes, and opinions of natural resource experts;
- Compliance with regulatory requirements; and,
- Feedback from military trainers, the USFWS, the VFWD, and others.

Some of these areas may not be looked at every year due to lack of data or pertinent information. The effectiveness of this INRMP as a mission enabling conservation tool will be decided by mutual agreement of the USFWS, the VFWD, and Burlington ANGB during annual reviews and/or reviews for operation and effect.

10.1.1.2 USAF and DoD INRMP Implementation Monitoring

The USAF uses the Defense Environmental Programs Annual Report to Congress (DEPARC) to monitor Sikes Act compliance. DEPARC is the automated system used to collect installation environmental information for reporting to DoD and Congress. Established to fulfill an annual requirement to report the status of DoD's Environmental Quality program to Congress, DEPARC collects information on enforcement actions, inspections and other performance measures for high-level reports and quarterly reviews. DEPARC also helps the USAF track fulfillment of DoD Measures of Merit requirements. The Deputy under Secretary of Defense's (DUSD) Updated Guidance for Implementation of the Sikes Act also includes an updated Conservation Metrics for Preparing and Implementing INRMPs section. Progress toward meeting these measures of merit is reported in the annual report to Congress.

10.1.2 Priorities and Scheduling

The Office of Management and Budget considers funding for the preparation and implementation of this INRMP, as required by the Sikes Act, to be a high priority. However, the reality is that not all of the projects and programs identified in this INRMP will receive immediate funding. Therefore, projects need to be funded consistent with timely execution to meet future deadlines. Projects are generally prioritized with respect to compliance. Highest priority projects are projects related to recurring or current compliance, and these are generally scheduled earliest. The prioritization of the projects is based on need, legal drivers, and ability to further implement the INRMP.

Current compliance includes projects and activities needed because an installation is currently or will be out of compliance if projects or activities are not implemented in the current program year. Examples include:

- Environmental analyses, monitoring, and studies required to assess and mitigate potential effects of the military mission on conservation resources;
- Planning documents;

- Baseline inventories and surveys of natural and cultural resources (historical and archaeological sites);
- Biological Assessments (BAs), surveys, or habitat protection for a specific listed species;
- Mitigation to meet existing regulatory permit conditions or written agreements.
- Wetland delineations in support of subsequent jurisdictional determinations;
- Efforts to achieve compliance with requirements that have deadlines that have already passed; and,
- Initial documenting and cataloging of archaeological materials.

Maintenance requirements include those projects and activities needed that are not currently out of compliance but shall be out of compliance if projects or activities are not implemented in time to meet an established deadline beyond the current program year. Examples include:

- Compliance with future requirements that have deadlines;
- Conservation and GIS mapping to be in compliance;
- Efforts undertaken in accordance with non-deadline specific compliance requirements of leadership initiatives;
- Wetlands enhancement, in order to achieve the EO for no net loss or to achieve enhancement of existing degraded wetlands; and,
- Public education programs that educate the public on the importance of protecting natural resources.

Lower priority projects include those that enhance conservation resources of the installation mission, or are needed to address overall environmental goals and objectives, but are not specifically required under regulation or EO, and are not of an immediate nature. These projects are generally funded after those of higher priority are funded. Examples include:

- Community outreach activities, such as Earth Day and Historic Preservation Week activities;
- Educational and public awareness projects, such as interpretive displays, oral histories, nature trails, wildlife checklists, and conservation teaching materials;
- BAs, biological surveys, or habitat protection for a non-listed species;
- Restoration or enhancement of cultural or natural resources when no specific compliance requirement dictates a course or timing of action; and
- Management and execution of volunteer and partnership programs.

10.1.3 Funding

Implementation of this INRMP is subject to the availability of annual funding. Funding sources for specific projects can be grouped into 3 main categories by source: federal ANG NGB funds, other federal funds, and non-federal funds. When projects identified in the plan are not implemented due to lack of funding, or other compelling circumstances, the installation will review the goals and objectives of this INRMP to determine whether adjustments are necessary. Funding options include:

- The Legacy Resource Management Program provides financial assistance to DoD efforts to conserve natural and cultural resources on federal lands. Legacy projects could include regional ecosystem management initiatives, habitat preservation efforts, archeological investigations, invasive species control, and/or flora or fauna surveys. Project proposals are submitted to the Legacy program during their annual funding cycle.

- There are also grant and assistance programs administered by other federal agencies that could be accessed for natural resources management at Burlington ANGB. Examples include funds associated with the CWA and endangered species.
- Other non-federal funding sources that could be considered include The Public Lands Day Program, which coordinates volunteers to improve the public lands they use for recreation, education, and enjoyment, and the National Environmental Education and Training Foundation, which manages, coordinates, and generates financial support for the program.
- Burlington ANGB may also consider entering into cooperative or mutual aid agreements with states, local governments, non-governmental organizations, and other individuals.

10.1.4 Cooperative Agreements

The DoD and subcommand entities have MOU, Memorandums of Agreement (MOA), and other cooperative agreements with other federal agencies, conservation and special interest groups, and various state agencies in order to provide assistance with natural resources management at installations across the US. Generally, these agreements allow installations and agencies or conservation and special interest groups to obtain mutual conservation objectives. The DoD agreements applicable to Burlington ANGB include:

- MOU between DoD and USFWS/International Fund for Animal Welfare (IFAW) to promote the conservation of migratory birds (2011).
- MOU between DoD and USFWS/IFWA for a Cooperative Integrated Natural Resource Program associated with the ecosystem-based management of fish, wildlife, and plant resources on military lands (2006).
- MOU between the DoD and USEPA to form a working partnership to promote environmental stewardship by adopting IPM strategies to reduce the potential risks to human health and the environment associated with pesticides (2012).
- MOA for federal Neotropical Migratory Bird Conservation Program and addendum (Partners in Flight-Aves De Las Americas) among DoD, through each of the Military Services, and over 110 other federal and state agencies and non-governmental organizations (1991).
- MOU between the DoD and Ducks Unlimited, Inc. to provide a foundation for cooperative development of selected wetlands and associated uplands in order to maintain and increase waterfowl populations and to fulfill the objectives of the North American Waterfowl Management Plan, within the context of DoD's environmental security and military missions (2006).
- MOU between DoD and NRCS to promote cooperative conservation where appropriate (2006).
- MOU with Watchable Wildlife Incorporated (2002).
- MOU between the DoD and BCI to identify, document and maintain bat populations and habitats on DoD installations (2011).
- Cooperative Agreement between DoD and The Nature Conservancy to work cooperatively in areas of mutual interest (2010).
- Cooperative Agreement between VTANG and USDA-WS (2013).
- Interagency Agreement (2010) and MOU (2009) between USAF and US Forest Service (USFS) to enhance cooperation and improve public service, and management of natural and cultural resources on lands managed by the USAF and the USFS.

- MOA (2003) between FAA, USAF, US Army, US EPA, USFWS, and USDA to address aircraft-wildlife strikes.

10.1.5 Consultations Requirements

The VTANG has multiple natural resources consultation requirements in addition to the INRMP development and review requirements as identified in the Sikes Act. Federally listed species management requires ESA Section 7 consultation with the USFWS. ESA section 7 consultation is required anytime an activity may affect a federally listed species. This includes both activities intended to manage for federally listed species and activities that have another purpose. State-listed species management, as well as game species management, requires consultation with VFWD. Actions that fall under the jurisdiction of Section 404 or 401 of the CWA necessitate permitting from VTDEC, while Section 404 actions necessitate permitting from the USACE, New England District.

10.2 Annual INRMP Review and Coordination Requirements

Per DoD policy, Burlington ANGB will review the INRMP annually in cooperation with the USFWS and VFWD. On an annual basis, the EMO will correspond via e-mail with the USFWS New England Field Office and the VFWD to provide opportunity for annual review of prior year INRMP implementation and discuss implementation of upcoming programs and projects. The annual review signature page will serve as verification of this annual review.

At this annual meeting the need for updates or revisions will be discussed. If updates are needed, Burlington ANGB will initiate the updates and after agreement of all 3 parties they will be added to the INRMP. If it is determined that major changes are needed, all 3 parties will provide input and an INRMP revision will be initiated with Burlington ANGB acting as the lead coordinating agency. The annual meeting will be used to expedite the more formal review for operation and effect and if all parties agree and document their mutual agreement, it can fulfill the requirement to review the INRMP for operation and effect.

If not already determined in previous annual meetings, by the fourth year annual review a determination will be made jointly to continue implementation of the existing INRMP with updates or to proceed with a revision. If the parties feel that the annual reviews have not been sufficient to evaluate operation and effect and they cannot determine if the INRMP implementation should continue or be revised, a formal review for operation and effect will be initiated. The determination on how to proceed with INRMP implementation or revision will be made after the parties have had time to complete this review.

As part of the annual review, Burlington ANGB will specifically:

- Invite feedback from USFWS and VFWD on the effectiveness of the INRMP;
- Inform USFWS and VFWD which INRMP projects and activities are required to meet current natural resources compliance needs; and,
- Document specific INRMP action accomplishments from the previous year.

10.3 INRMP Update, and Revision Process

10.3.1 Review for Operation and Effect

Not less than every 5 years, the INRMP will be reviewed for operation and effect to determine if the INRMP is being implemented as required by the Sikes Act and contributing to the management of natural resources at Burlington ANGB. The review will be conducted by the 3 cooperating parties to include the Commander responsible for the INRMP, the Supervisor of the USFWS New England Field Office, and Secretary of the VFWD. While these are the responsible parties, technical representatives generally are the personnel who actually conduct the review.

The review for operation and effect will either conclude that the INRMP is meeting the intent of the Sikes Act and only needs an update and implementation can continue; or that it is not effective in meeting the intent of the Sikes Act and it must be revised. The conclusion of the review will be documented in a jointly executed memorandum, meeting minutes, or in some way that reflects mutual agreement.

If only updates are needed, they will be completed in a manner agreed to by all parties. The updated INRMP will be reviewed by the local USFWS New England Field Office and VFWD Secretary. Once concurrence letters or signatures are received from the Supervisor of the USFWS New England Field Office and the VFWD Commissioner, the update of the INRMP will be complete and implementation will continue. Generally, the environmental impact analysis will continue to be applicable to updated INRMPs, and a new analysis will not be required.

If a review of operation and effect concludes that an INRMP must be revised, there is no set time to complete the revision. The existing INRMP remains in effect until the revision is complete and USFWS and VFWD concurrence on the revised INRMP is received. Burlington ANGB will endeavor to complete such revisions within 18 months depending upon funding availability. Revisions to the INRMP will go through a detailed review process similar to development of the initial INRMP to ensure Burlington ANGB's military mission, USFWS, and VFWD concerns are adequately addressed, and the INRMP meets the intent of the Sikes Act.

11.0 APPENDICES

APPENDIX A. REFERENCES

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APPENDIX B. LAW, REGULATIONS, POLICIES, AND EXECUTIVE ORDERS

Federal Laws

American Indian Religious Freedom Act of 1978 (Public Law 95-341; 42 USC §1196) – requires the US, where appropriate, to protect and preserve religious rights of the American Indian, Eskimo, Aleut, and Native Hawaiians, including but not limited to access to sites, use and possession of sacred objects, and the freedom to worship through ceremonials and traditional rites.

Animal Damage Control Act of 1931 (7 USC §426 et seq.) – provides broad authority for investigation, demonstrations and control of mammalian predators, rodents and birds.

Anti-Deficiency Act of 1982 (31 USC §1341 et seq.) - provides that no federal official or employee may obligate the government for the expenditure of funds before funds have been authorized and appropriated by Congress for that purpose.

American Antiquities Act of 1906 (Public Law 59-209; 16 USC §431-433) – authorizes the President to designate historic and natural resources of national significance, located on federal lands, as National Monuments for the purpose of protecting items of archeological significance.

Archeological and Historical Preservation Act of 1974 (Public Law 95-96; 16 USC §469 et seq.) – provides for the preservation of historical and archeological data, including relics and specimens, threatened by federally funded or assisted construction projects.

Archeological Resources Protection Act of 1979 (16 USC §470 et seq.) – prohibits the excavation or removal from federal or Indian lands any archeological resources without a permit.

Bald Eagle Protection Act of 1940 (Public Law 87-884; 16 USC §668a-d) – prohibits the taking or harming (i.e. harassment, sale, or transportation) of bald eagles or golden eagles, including their eggs, nests, or young, without appropriate permit.

Clean Air Act of 1970 (42 USC §7401 et seq.) – regulates air emissions from stationary, area, and mobile sources. This law authorizes the USEPA to establish National Ambient Air Quality Standards (NAAQS) to protect public health and the environment.

Clean Water Act of 1972 (Public Law 92-500; 33 USC §1251 et seq.) – aims to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. Under Section 401, states have authority to review federal permits that may result in a discharge to wetlands or water bodies under state jurisdiction. Under section 404, a program is established to regulate the discharge of dredged or fill material into the Nation's waters, including wetlands.

Coastal Zone Management Act of 1972 (Public Law 92-583; 16 USC §1451 et seq.) – provides incentives for coastal states to develop coastal zone management programs. Federal actions that impact the coastal zone must be consistent to the maximum extent practicable with the state program.

Conservation and Rehabilitation Program on Military and Public Lands (Public Law 93-452; 16 USC §670 et seq.) – provides for fish and wildlife habitat improvements, range rehabilitation, and control of off-road vehicles on federal lands.

Conservation Programs on Military Reservations (Public Law 90-465; 16 USC §670 et seq.) – Requires each military department to manage natural resources and to ensure that services are provided which are necessary for management of fish and wildlife resources on each Installation; to provide their personnel with professional training in fish and wildlife management; and to give priority to contracting work with federal and state agencies that

have responsibility for conservation or management of fish and wildlife. In addition it authorizes cooperative agreements (with states, local governments, non-governmental organizations, and individuals) which call for each party to provide matching funds or services to carry out natural resources projects or initiatives.

Endangered Species Act of 1973, as amended (16 USC §1531 et seq.) – provides for the identification and protection of threatened and endangered plants and animals, including their critical habitats. Requires federal agencies to conserve threatened and endangered species and cooperate with state and local authorities to resolve water resources issues in concert with the conservation of threatened and endangered species. This law establishes a consultation process involving federal agencies to facilitate avoidance of agency action that would adversely affect species or habitat. Further, it prohibits all persons subject to US jurisdiction from taking, including any harm or harassment, endangered species.

Federal Insecticide, Fungicide, and Rodenticide Act of 1947 (Public Law 92-516; 7 USC §136 et seq.) – governs the use and application of pesticides in natural resource management programs. This law provides the principal means for preventing environmental pollution from pesticides through product registration and applicator certification.

Federal Land Policy and Management Act of 1976 (43 USC §1701) – establishes public land policy and guidelines for its administration and provides for the management, protection, development, and enhancement of the public lands.

Federal Noxious Weed Act of 1974 (Public Law 93-629; 7 USC §2801) – provides for the control and eradication of noxious weeds and their regulation in interstate and foreign commerce.

Fish and Wildlife Conservation Act of 1980 (Public Law 96-366; 16 USC §2901 et seq.) – encourages management of non-game species and provides for conservation, protection, restoration, and propagation of certain species, including migratory birds threatened with extinction.

Fish and Wildlife Coordination Act of 1934 (16 USC §661 et seq.) – provides a mechanism for wildlife conservation to receive equal consideration and coordinate with water-resource development programs.

Land and Water Conservation Act of 1965 (16 USC §4601 et seq.) – assists in preserving, developing, and assuring accessibility to outdoor recreation resources.

Migratory Bird Conservation Act of 1929 (16 USC §715 et seq.) – establishes a Migratory Bird Conservation Commission to approve areas recommended by the Secretary of the Interior for acquisition with Migratory Bird Conservation Funds.

Migratory Bird Treaty Act of 1918 (Public Law 65-186; 16 USC §703 et seq.) – provides for regulations to control taking of migratory birds, their nests, eggs, parts, or products without the appropriate permit and provides enforcement authority and penalties for violations.

National Environmental Policy Act of 1969 (Public Law 91-190; 42 USC §4321 et seq.) – mandates federal agencies to consider and document environmental impacts of proposed actions and legislation. In addition it mandates preparation of comprehensive environmental impact statements where proposed action is “major” and significantly affects the quality of the human environment.

Native American Graves Protection and Repatriation Act of 1990 (Public Law 101-601; 25 USC §§3001-3013) – addresses the recovery, treatment, and repatriation of Native American and Native Hawaiian cultural items by federal agencies and museums. It includes provisions for data gathering, reporting, consultation, and issuance of permits.

Resource Conservation and Recovery Act of 1976 (42 USC §6901 et seq.) – establishes a comprehensive program which manages solid and hazardous waste. Subtitle C, Hazardous Waste Management, sets up a framework for managing hazardous waste from its initial generation to its final disposal. Waste pesticides and equipment/containers contaminated by pesticides are included under hazardous waste management requirements.

Sikes Act Improvement Act of 1997 (Public Law 105-85; 16 USC §670a et seq.) – amends the Sikes Act of 1960 to mandate the development of an INRMP through cooperation with the Department of the Interior (through the USFWS), DoD, and each state fish and wildlife agency for each military installation supporting natural resources.

Soil Conservation Act of 1935 (16 USC §590a et seq.) – provides for soil conservation practices on federal lands.

Federal Regulations

40 CFR 1500-1508 –CEQ Regulations on Implementing NEPA Procedures
40 CFR 6 – USEPA Regulations on Implementation of NEPA Procedures
40 CFR 162 – USEPA Regulations on Insecticide, Fungicide, and Rodenticide Use
15 CFR 930 – Federal Consistency with Approved Coastal Management Programs
50 CFR 17 – USFWS list of Endangered and Threatened Wildlife
50 CFR 10.13 – List of Migratory Birds
32 CFR 190 – Natural Resources Management Program

Federal Executive Orders (EOs)

Environmental Safeguard for Activities for Animal Damage Control on Federal Lands (EO 11870) - restricts the use of chemical toxicants for mammal and bird control.

Exotic Organisms (EO 11987) – restricts federal agencies in the use of exotic plant species in any landscape and erosion control measures.

Energy Efficiencies and Water Conservation at Federal Facilities (EO 12902) – federal agency use of energy and water resources is directed towards the goals of increased conservation and efficiency.

Floodplain Management (EO 11988) – specifies that agencies shall encourage and provide appropriate guidance to applicant to evaluate the effects of their proposals in floodplains prior to submitting applications. This includes wetlands that are within the 100-year floodplain and especially discourages filling.

Off-Road Vehicles on Public Lands (EO 11989) – The respective agency shall determines that the use of off-road vehicles will cause or is causing considerable adverse effects on the soil, vegetation, wildlife, wildlife habitat or cultural or historic resources of particular areas or trails of the public lands, immediately close such areas or trails to the type of off-road vehicle causing such effects, until such time as he determines that such adverse effects have been eliminated and that measures have been implemented to prevent future recurrence.

Greening the Government through Leadership in Environmental Management (EO 13148) – requires the head of each federal agency to be responsible for ensuring that all necessary actions are taken to integrate environmental accountability into agency day-to-day decision making and long-term planning processes across all agency missions, activities, and functions.

Indian Sacred Sites (EO 13007) – provides for the protection of and access to Indian sacred sites.

Invasive Species (EO 13112) – directs federal agencies to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause.

Protection and Enhancement of Environmental Quality (EO 11514) – provides for environmental protection of federal lands and enforces requirements of NEPA.

Protection of Wetlands (EO 11990) – directs all federal agencies to take action to minimize the destruction loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands. This applies to the acquisition, management, and disposal of federal lands and facilities; to construction or improvements undertaken, financed, or assisted by the federal government; and to the conduct of federal activities and programs which affect land use.

Responsibilities of Federal Entities to Protect Migratory Birds (EO 13186) – directs all federal agencies taking actions that have a potential to negatively affect migratory bird populations to develop and implement a MOU with the USFWS by January 2003 that shall promote the conservation of migratory bird populations.

DoDI, AFI, & Air Force Pamphlets (PAM)

DoDI 4715.03 – Natural Resources Conservation Program
DoDI 4165.57 – Air Installations Compatible Use Zones
DoDI 4150.07 – Pest Management Program
DoDI 6055.06 – Fire and Emergency Services Program
AFI 32-7064 – Integrated Natural Resources Management
AFI 32-1053 – Integrated Pest Management Program
AFI 32-7062 – Air Force Comprehensive Planning
AFI 32-7065 – Cultural Resources Management
AFPAM 91-212 – BASH Techniques

Department of Defense Memoranda

Memorandum, Assistant Deputy Under Secretary of Defense (Environment, Safety and Occupational Health), 20 Sept 11, Subject: *Interim Policy on Management of White Nose Syndrome in Bats.*

Memorandum, Assistant Deputy Under Secretary of Defense (Environment, Safety and Occupational Health), 3 Apr 07, Subject: *Guidance to Implement the Memorandum of Understanding to Promote the Conservation of Migratory Birds.*

Memorandum, Assistant Deputy Under Secretary of Defense (Environment, Safety and Occupational Health), 14 Aug 06, Subject: *Integrated Natural Resource Management Plan (INRMP) Template*

Memorandum, Assistant Deputy Under Secretary of Defense (Environment, Safety and Occupational Health), 17 May 05, Subject: *Implementation of Sikes Act Improvement Amendments: Supplemental Guidance concerning Leased Lands*

Memorandum, Assistant Deputy Under Secretary of Defense (Environment, Safety and Occupational Health), 1 Nov 04, Subject: *Implementation of Sikes Act Improvement Amendments: Supplemental Guidance concerning INRMP Reviews*

Memorandum, Deputy Under Secretary of Defense (Installations and Environment), 10 Oct 02, Subject: *Implementation of Sikes Act Improvement Act: Updated Guidance*

Memorandum, Assistant Deputy Under Secretary of Defense (Environment), 5 Aug 02, Subject: *Access to Outdoor Recreation Programs on Military Installations for Persons with Disabilities.*

Memorandum, Assistant Secretary of Army (Environment, Safety and Occupational Health), Deputy Assistant Secretary of the Navy (Environment), Deputy Assistant Secretary of the Air Force (Environment, Safety and Occupational Health), 20 Sep 11, Subject: *Interim Policy on Management of White Nose Syndrome in Bats.*

State Statutes

Vermont Statutes – Title 6: Agriculture

Title 6, Agriculture, is organized into Parts which include Pest and Plant Diseases, Livestock Disease Control, Milk and Milk Products, Bees, Commercial Slaughter of Livestock, Nurseries and Nursery Stock, and Vermont Agricultural Products. The relevant Chapters within these Parts are listed below.

Part 4 – Pests and Plant Diseases

Chapter 81: Insecticides, Fungicides, and Rodenticides (§§ 911 – 929)
Chapter 87: Control of Pesticides (§§ 1101 – 1112)

Vermont Statutes – Title 10: Conservation and Development (also referred to as Act 250)

Title 10, Conservation and Development, is organized into Parts, which include Development of Resources, Soil and Water Conservation and Flood Control, Forests and Parks, Fish and Wildlife Conservation, Land Use and Development, and Uniform Environmental Law Enforcement. The relevant Chapters within these Parts are listed below.

Part 1 – Development of Resources

Chapter 23: Air Pollution Control (§§ 551 – 579)

Part 2 – Soil and Water Conservation and Flood Control

Chapter 31: Soil Conservation Act (§§ 701 – 748)
Chapter 32: Flood Hazard Areas (§§ 751 – 753)
Chapter 34: Conservation and Preservation Rights and Interests (§§ 821 – 823)
Chapter 35: Drainage of Low Lands (§§ 851 – 865)
Chapter 37: Wetlands Protection and Water Resources Management (§§ 90 – 921)
Chapter 39: Watershed Protection and Flood Prevention (§§ 951 – 961)
Chapter 41: Regulation of Stream Flow (§§ 1001 – 1032)
Chapter 47: Water Pollution Control (§§ 1250 – 1386)
Chapter 48: Groundwater Protection (§§ 1421 – 1427)
Chapter 49: Protection of Navigable Waters and Shorelines (§§ 1421 – 1427)
Chapter 50: Aquatic Nuisance Control (§§ 1451 – 1460)
Chapter 59: Underground and Aboveground Liquid Storage Tanks (§§ 1921 – 1944)
Chapter 61: Potable Water Supply and Wastewater System Permit (§§ 1971 – 1980)

Part 4 – Fish and Wildlife Conservation

Chapter 109: Penalties and Enforcement (§§ 4501 – 4577)
Chapter 111: Fish (§§ 4601 – 4616)
Chapter 113: Game (§§ 4701 – 4909)
Chapter 123: Protection of Endangered Species (§§ 5401 – 5410)

Part 5 – Land Use and Development

Chapter 151: State Land use and Development Plans (§§ 6001 – 6101)

Chapter 159: Waste Management (§§ 6601 – 6656)
Chapter 165: General Permit Authority (§§ 7500 – 7505)
Part 6 – Uniform Environmental Law Enforcement
Chapter 201: Administrative Environmental Law Enforcement (§§ 8001 – 8019)

Vermont Statutes – Title 25: Navigation and Waters
Title 25, Conservation and Development, is organized into Chapters including, operation of vessels, general provisions relating to rivers and streams, floating lumber, and motorboats. The relevant Chapters within this title are listed below.
Chapter 3: General Provisions Relating to Rivers and Streams (§§ 141 – 146)

Vermont Department of Fish and Wildlife Regulations
Below is a summary of the applicable VFWD Regulations.
10 V.S.A. App. § 10: Vermont Endangered and Threatened Species Rule
10 V.S.A. App. § 25: Nongame Wildlife Species

Vermont Department of Environmental Conservation Environmental Protection Rules
Below is a summary of the applicable VT DEC Environmental Protection Rules.
Chapter 5: Air Pollution Control Regulations
Chapter 7: Hazardous Waste Management Regulations
Chapter 14: Indirect Discharge Rules
Chapter 13: Water Pollution Control Permit Regulations
Chapter 18: Stormwater Management Rule – Stormwater for Unimpaired Water
Chapter 22: Stormwater for Impaired Water
Chapter 12: Groundwater Protection Rule and Strategy

Vermont Agency of Natural Resources Board Rules
Below is a summary of the applicable Natural Resources Board Rules, pursuant to 10 V.S.A 151.
Vt. Code R. 12 004 052 Vermont Water Quality Standards
Vt. Code R. 12 004 056: Vermont Wetland Rules