DRAFT INTEGRATED LETTER REPORT AND PROGRAMMATIC ENVIRONMENTAL ASSESSMENT

Federal Participation in Expansion of the Aquatic Plant Control Program in the State of Vermont

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Prepared by: **New York District**
United States Army Corps of Engineers
Jacob K. Javits Federal Building
26 Federal Plaza
New York, New York 10278

U.S. ARMY

US Army Corps of Engineers

VERMONT
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

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EXECUTIVE SUMMARY

This Draft Integrated Letter Report and Programmatic Environmental Assessment (ILR/PEA) presents the results of environmental and economic impact evaluations performed by the U.S. Army Corps of Engineers (USACE), New York District (District) to determine Federal government participation in the expansion of the existing State of Vermont Aquatic Plant Control Program (APCP). The ongoing APCP is managed by the Vermont Department of Environmental Conservation (VTDEC) and includes aquatic invasive plant species (AIPS) control activities in the Lake Champlain Basin. It is subject to 50 percent cost sharing with the USACE.

This ILR/PEA analyzes two alternatives related to the current APCP which is managed by the VTDEC. Alternative 1 is the No Action Alternative. Alternative 2 is the Expanded APCP Cost Sharing Program, wherein the Federal government would cost share (50 percent) in an expanded APCP with VTDEC. Federal government participation in cost sharing would allow for a more robust APCP throughout the State of Vermont and would increase the likelihood of preventing the spread of AIPS and reducing associated impacts.

USACE has determined that there is a Federal interest in partnering with the State of Vermont to cost share in an expanded APCP. The projected annual costs of an expanded APCP are estimated at $2,700,000, with a Federal government cost-share of $1,350,000. The potential costs of infestation and associated impacts exceeds the estimated annual costs associated with treatment. Therefore, Alternative 2 is the selected alternative and will be referred to as the proposed action hereinafter.

Under the proposed action, Federal government cost sharing would be extended to APCP measures throughout Vermont. These measures include mechanical control, watercraft inspection and decontamination, early detection and rapid response (EDRR), and public awareness and education.

Without implementation of these measures, AIPS infestations will continue and expand throughout Vermont. Such infestations cause impacts to navigation, irrigation, and drainage; limit water-related recreational activities; reduce fish and wildlife habitat; degrade aquatic ecosystems and water quality; decrease near-water land values; threaten public health; and increase operation and maintenance costs associated with water-related infrastructure.

Considering the APCP is already ongoing in the Lake Champlain Basin and is managed by the VTDEC in accordance with all laws, regulations, and permits, environmental effects associated with the Program are generally well understood. Overall, direct and indirect environmental effects of the expanded APCP are beneficial, with adverse direct and indirect environmental effects being less than significant. Federal participation in the expansion of the APCP is not anticipated to be controversial, and because Federal participation can be terminated at any time, there is minimal risk to the Federal government entering this partnership.

Annual funding for the expanded APCP will be separate from the existing Lake Champlain Basin APCP and will not affect funding availability for that program.

TABLE OF CONTENTS

LIST OF IN-TEXT TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ATTACHED TABLES

ACRONYMS AND ABBREVIATIONS

AIPS	Aquatic Invasive Plant Species
ANC	Aquatic Nuisance Control
ANSTF	Aquatic Nuisance Species Task Force
APCP	Aquatic Plant Control Program
APE	Area of Potential Effect
BCR	Benefit-Cost Ratio
CFR	Code of Federal Regulations
CPI	Consumer Price Index
CVR	Code of Vermont Rules
District	New York District
DoD	United States Department of Defense
DoDI	Department of Defense Instruction
EA	Environmental Assessment
EDRR	Early Detection and Rapid Response
EFH	Essential Fish Habitat
EOP	Environmental Operating Procedures
ER	Engineering Regulation
ERDC	Engineer Research and Development Center
ESA	Endangered Species Act
F	Fahrenheit
FONSI	Finding of No Significant Impact
FWCA	Federal Wildlife Conservation Act
GIS	Geographic Information Systems
GPM	Gallons per Minute
HAPC	Habitat Areas of Particular Concern
IPaC	Information for Planning and Consultation
LCBP	Lake Champlain Basin Program
ILR	Integrated Letter Report
MBTA	Migratory Bird Treaty Act
MGD	Million Gallons per Day
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
NEANS	Northeast Aquatic Nuisance Species
NED	National Economic Development
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NHL	National Historic Landmark
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollution Discharge Elimination System
NRHP	National Register of Historic Places
ORC	Online Resource Center
PDU	Prescription Dose Unit
PFAS	Per- and Polyfluoroalkyl Substances
PL	Public Law
PPA	Project Partnership Agreement
PPB	Parts Per Billion
PPM	Parts Per Million
PRD	Protected Resource Division
SAV	Submerged Aquatic Vegetation

SHPO	State Historic Preservation Office
SOW	Statement of Work
SRHP	State Register of Historic Places
TNC	The Nature Conservancy
US	Unites States
USACE	United States Army Corps of Engineers
USC	United States Code
USEIA	Unite States Energy Information Administration
USIC	United States Inflation Calculator
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
VAAFM	Vermont Agency of Agriculture, Food & Markets
VDHP	Vermont Division of Historic Preservation
VFWD	Vermont Fish & Wildlife Department
VSA	Vermont Statutes Annotated
VT	Vermont
VTANR	Vermont Agency of Natural Resources
VTDEC	Vermont Department of Environmental Conservations
WIIN	Water Infrastructure Improvements for the Nation
WRDA	Water Resources Development Act
WRRDA	Water Resources Reform and Development Act

SECTION 1 – INTRODUCTION

This Integrated Letter Report and Programmatic Environmental Assessment (ILR/PEA) presents the results of environmental and economic impact evaluations performed by the U.S. Army Corps of Engineers (USACE), New York District (District) to determine Federal government participation in the expansion of the existing State of Vermont Aquatic Plant Control Program (APCP). The ongoing APCP is managed by the Vermont Department of Environmental Conservation (VTDEC) and includes AIPS control activities in the Lake Champlain Basin. The program is subject to 50 percent cost sharing with USACE. Under the proposed action, Federal government cost sharing would be extended to APCP measures throughout the State of Vermont. These measures include mechanical control, watercraft inspection and decontamination, early detection and rapid response (EDRR), and public awareness and education. This ILR/Programmatic EA documents the environmental, planning, and economic considerations used to support and develop the concluding recommendations. It also documents the coordination and evaluations performed for the proposed Federal action to comply with Title 33 Code of Federal Regulations (CFR) Part 230, 2020 Procedures for Implementing the National Environmental Policy Act (NEPA), and Engineering Regulation (ER) 200-2-2, Procedures for Implementing NEPA.

The programmatic scope of this ILR/PEA allows for necessary minor changes in the proposed action to be implemented in response to changing physical and environmental conditions and changes in State and Federal laws over time, including changes to program authorities.

This ILR/PEA includes an evaluation of the potential environmental effects of cost-sharing in the expanded APCP throughout the State of Vermont. Based on the evaluation of environmental effects presented in this report, the District has prepared a Draft Finding of No Significant Impact (FONSI). Pending agency and public review of the Draft ILR/PEA, the FONSI will be finalized and signed for inclusion in the final report.

1.1 AUTHORITY AND GUIDANCE

The proposed project would be implemented under the authority of Section 104 of the River and Harbor Act (RHA) of 1958 (Public Law [PL] 85-500), as amended. This is codified at 33 United States Code (USC) § 610. Other relevant USACE Policy and Guidance is listed below:

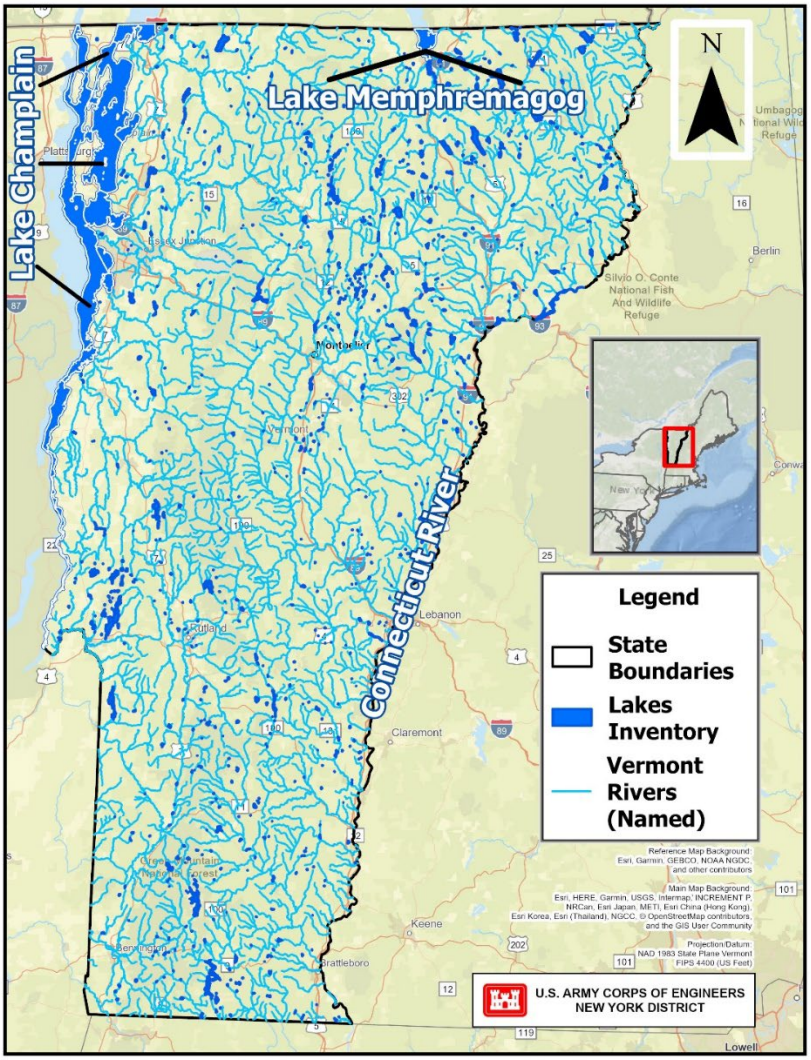
- Department of Army, Office of the Assistant Secretary, Civil Works, Policy Memo., U.S. Army Corps of Engineers Invasive Species Policy (21 February 2023)
- Section 103(c)(6) of the WRDA of 1986 (PL 99-662)
- Executive Order 13751, Safeguarding the Nation from the Impacts of Invasive Species
- ER 1105-2-103, Chapter 6

1.2 STUDY AREA

The study area consists of Federal, State and local government owned waterbodies, their immediate shorelines and vehicle access points, and reservoirs of cooperating water-related infrastructure facilities (e.g., hydroelectric generation) within the State of Vermont. It also includes the approximately 255-mile length of the Connecticut River serving as the boundary between Vermont and New Hampshire.

A map of the general study area is included below as Figure 1-1.

Figure 1-1. State of Vermont Waterbodies



1.3 PURPOSE AND NEED

The purpose of the proposed action is to increase the effectiveness of future and ongoing AIPS control measures in the State of Vermont by cost sharing expanded measures with the VTDEC. The risk of the spread of AIPS is high, and the introduction and further establishment of AIPS has the potential to hamper navigation, irrigation, and drainage; limit water-related recreational activities; reduce fish and wildlife habitat; degrade aquatic ecosystems and water quality; decrease near-water land values; threaten public health; and increase operation and maintenance costs associated with water-related infrastructure. Expansion of the APCP is needed to ensure there are minimal opportunities for AIPS to spread throughout the State and that any existing AIPS can be treated effectively limiting further negative impacts.

SECTION 2 – BACKGROUND

The State of Vermont contains many lakes, rivers, and other waterbodies that support a variety of recreational, commercial, navigational, public, and environmental uses. As such, the waterbodies of the State are at particular risk of AIPS infestation and associated negative impacts due to frequent boating traffic and the potential for boats to spread AIPS between waterbodies. VTDEC is the State agency tasked with preserving Vermont's natural resources and accordingly manages the State's APCP with the goal of preserving the natural balance of plants in the aquatic environment.

Infestations of AIPS in Vermont date back to the 1940s and 1950s, when water chestnut and yellow floating heart were first identified in Southern Lake Champlain. The two species were presumed to have infiltrated the waterbody through the Champlain Canal. A water chestnut control program was implemented in the 1950s and proved successful as only eight bushels of chestnut were hand pulled in 1967. However, the program was terminated in 1971 and water chestnut populations increased. On the northern portion of Lake Champlain, AIPS infestations date back to the early 1960s when Eurasian watermilfoil was identified in St. Albans Bay. Since that time Eurasian watermilfoil populations have spread to many nearby lakes (USACE, 1981, pp. 4-1 - 4-3).

To address AIPS issues, the Department of the Army and the State of Vermont entered into an Aquatic Plant Control Agreement on May 13, 1983, to cooperate in the implementation of a cost-shared APCP for the Lake Champlain Basin. The principal objective of the program was to provide and maintain access in high public use and navigational areas, including marinas, yacht clubs, commercial docks, boat ramps, private dockage serving shoreline communities, and public swimming areas or similar identifiable water-contact-related areas serving the public. Aquatic plant control in Lake Champlain and the surrounding basin was accomplished through hand harvesting plants and the use of mechanical devices (e.g., harvesters, suction devices, or cutters) among other measures. Based on studies of submerged aquatic plants and potential control methods identified, hand harvesting and mechanical harvesting were found to be the most appropriate practices within the Lake Champlain Basin. Surveys and investigations were also conducted to determine the presence and spread of submerged aquatic plants in the Lake Champlain Basin. Public notification activities were carried out to inform government officials, the media, and the general public of program activities and other related topics of interest. Such activities have included seminars and the preparation and distribution of educational materials. A general public education and outreach program was also conducted to enhance spread prevention (VTDEC, 2024a).

During the first ten years of operation, the APCP concentrated on work only in Lake Champlain. However, during that time invasive aquatic plants continued to spread throughout the Lake Champlain Basin. Addressing the problem from a basin-wide perspective was crucial for running a successful program. In 1994, the Vermont APCP was expanded to the entire Lake Champlain Basin to address other waterbodies with infestations of Eurasian watermilfoil and water chestnut within the watershed (VTDEC, 2024a).

Currently, the threat of AIPS exists throughout the State of Vermont and is not limited to the Lake Champlain Basin, which has historically been managed under the cost-shared APCP. In 2007, Eurasian watermilfoil was identified in the Connecticut River, and in 2018, Starry stonewort was identified in Lake Memphremagog and Lake Derby. These discoveries are of particular concern to Vermont as these waterbodies have the capacity to further spread AIPS throughout the State. The Connecticut River runs the entire length of Vermont and is fed by many tributaries, all of which are vulnerable to AIPS proliferation from the main stem. Lake

Memphremagog is subject to significant boating activity, with many boats being used in other Vermont lakes, causing Lake Memphremagog to act as a vector for AIPS spread (VTDEC, 2024a).

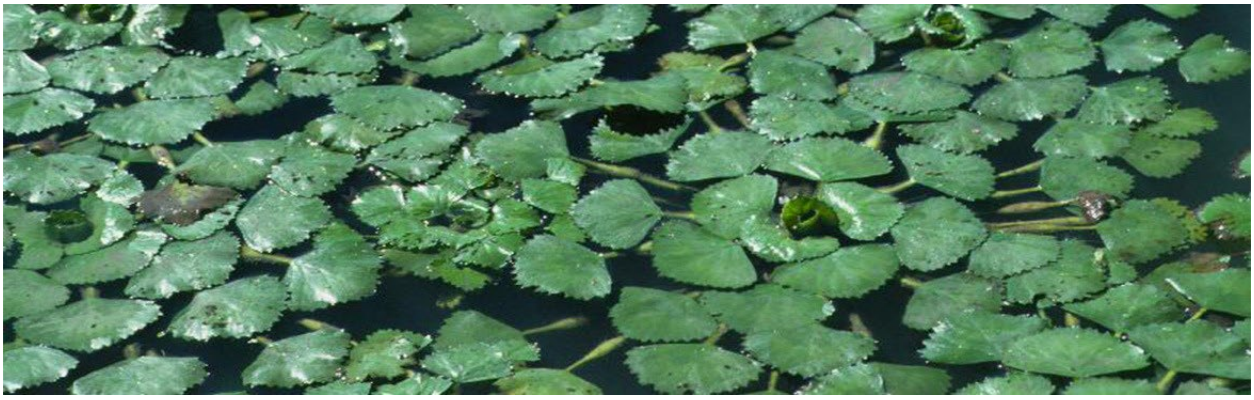
Aquatic invasive plant infestations grow prolifically and once established hamper navigation, irrigation, and drainage; limit water-related recreational activities; reduce fish and wildlife habitat; degrade aquatic ecosystems and water quality; decrease near-water land values; threaten public health; and increase operation and maintenance costs associated with water-related infrastructure. As such, prevention of the spread of AIPS throughout the State of Vermont is a priority.

2.1 CURRENT PROBLEM AQUATIC PLANT SPECIES

The following Subsections describe non-native plants currently encountered in the State of Vermont. The list of invasive species in Vermont is evolving as additional non-native plants are discovered.

2.1.1 Water Chestnut

Figure 2-1. Photograph of Water Chestnut



Source: (VTDEC, 2024b)

Water chestnut is a rooted aquatic plant with feathery submersed leaves that form whorls around the stem. Its leaves are glossy, green, and triangular with toothed edges that form floating rosettes at the end of the stem. Water chestnut flowers are white and have four petals that typically bloom in July in Vermont. The fruit is a hard nut with four sharp spines that are tipped with barbed hooks. Water chestnut spreads prolifically; each plant may have 10 to 15 rosettes that can each produce up to 20 fruits (VTDEC, 2024b).

Water chestnut is most commonly found within freshwater lakes, ponds and in portions of streams with slower velocities where it roots in soft substrate such as mud or silt. Occurring in water depths up to sixteen feet, it forms dense mats that have little nutritional or habitat value to fish and waterfowl. These mats limit light penetration and shade and crowd out native plants. When the plants decompose in the fall, they reduce the amount of dissolved oxygen in the water, often resulting in fish and other plant die offs. The dense mats also inhibit boating, fishing, and swimming. The sharp spines of the fruit can result in injuries to people walking or swimming in infested areas as well (VTDEC, 2024b).

This species was transported from the Hudson River in New York northward through the barge canal system to southern Lake Champlain, where by 1980 it had infested several hundred

acres. Surveys conducted by the VTDEC at the end of 2016 documented that on the Vermont side of the lake, the northernmost confirmed location is in Missisquoi Bay in Highgate, Vermont. The northernmost confirmed location of water chestnut in the New York waters of Lake Champlain is in Bulwagga Bay in Willsboro, New York (VTDEC, 2024a). It is also found in the Richelieu River of the Canadian Province of Quebec. As of 2023, water chestnut presence was confirmed in 44 waterbodies throughout the State of Vermont, including the Connecticut River (VTDEC, 2023a).

2.1.2 Eurasian Watermilfoil

Figure 2-2. Photograph of Eurasian Watermilfoil

Source: (Evans, 2024)

Eurasian watermilfoil is a submersed, rooted perennial plant with smooth, slender red-brown to white-pink stems ranging from 6 to 20 feet long which branch several times near the surface. The leaves are olive-green, less than 2 inches long, soft, deeply divided, and feather like. Leaf whorls are arranged along the stems in whorls of 3 to 6 (usually 4) leaves; whorl nodes are about 3/8 inches apart. The plant flowers on an emersed spike held erect above the water. Flowers are reddish; arranged in 4-flowered whorls along the spike. The plant spreads prolifically through stem fragments that are produced both naturally (when stem sections detach from the plant at abscission sites) and as a result of mechanical breakage (when plants come into contact with boat motors, intense wave action, or some other physical force) (USACE, 2024a).

Eurasian watermilfoil can tolerate a wide range of water quality parameters (e.g. pH) and can be found in fresh to brackish lakes, ponds and portions of rivers with slow currents. Typically found in water depths ranging from three to ten feet, it can grow in depths up to thirty-three feet. Preferred substrates include mud, silt and sand. Its tolerance of lower temperatures allows it to start growing earlier than other vegetation and form canopies that block light, which inhibits the growth of native plants and can lead to their displacement. It can also reduce the abundance and diversity of invertebrates (Evans, 2024).

Eurasian watermilfoil was first documented in Lake Champlain's St. Albans Bay in 1962. Since that time, it has become a severe nuisance in many waterbodies throughout the State (VTDEC, 2024a). As of 2023, Eurasian watermilfoil presence was confirmed in 105 waterbodies in Vermont, including the Connecticut River (VTDEC, 2023a).

2.1.3 Starry Stonewort

Figure 2-3. Photograph of Starry Stonewort

Source: (Grazio, 2015)

Starry stonewort is a large, grass-like species of algae that is light green throughout the growing season and has five to eight branchlets, or leaves, arranged in whorls around the stem. Both branchlets and stem are very thin. Starry stonewort is anchored by clear filaments called rhizoids. The rhizoids produce small, white, star-shaped bulbils (small bulblike structures), which are the easiest way to identify the plant (Grazio, 2015).

Starry stonewort is commonly found in the shallows (up to 2 ft) of freshwater to brackish lakes, ponds or slow-moving rivers with fine substrates consisting of as silt, sand and/or detritus. It grows rapidly and forms dense mats that can displace native plants and accumulate toxic substances known as phytotoxins that make the sediment inhospitable for other plant growth. Starry stonewort also degrades fish spawning habitat and can impede their movement. If the mats reach the water surface, starry stonewort can interfere with swimming, fishing, and boating as well (Grazio, 2015).

In 2015 and 2018, starry stonewort presence was first confirmed in Lake Memphremagog and Lake Derby, respectively. As of 2023, starry stonewort remained present in both lakes (VTDEC, 2024a).

2.1.4 European Frogbit

Figure 2-4. Photograph of European Frogbit

Source: (Mehrhoff, 2024)

European frogbit is a free-floating plant that has green, heart-shaped, leathery leaves with dark purple-red, spongy undersides. The plant is found in calm waters including marshes, ponds, and slow-moving rivers and has complex root systems but rarely uses them to anchor to the bottom. The roots tangle with other vegetation, which along with the rosettes that the leaves form, create dense mats. Plants have a single, 3-petalled white flower with a yellow center that blooms in summer (Mehrhoff, 2024).

Dense growths of European frogbit impact native plants and animals as well as human activity. European frogbit populations can quickly increase in size through vegetative reproduction forming thick mats that prevent light and nutrients from reaching submerged plants. In shallower waters, European frogbit can even crowd out native vegetation. These dense mats of interlocking plants also inhibit movement of large fish and diving ducks and impede recreational activities like swimming, fishing, and boating. In the fall when the plants die off, oxygen levels in the water decrease, which can result in the deaths of fish and native vegetation (Mehrhoff, 2024).

As of 2023, European frogbit presence was confirmed in 21 waterbodies in Vermont (VTDEC, 2023a).

2.1.5 Others

Other invasive plant species currently found in Vermont include (VTDEC, 2024c):

- Brittle naiad
- Curly-leaf pondweed
- Flowering rush
- Phragmites
- Purple loosestrife
- Variable-leaved watermilfoil
- Yellow flag iris
- Yellow floating heart

2.2 POTENTIAL PROBLEM AQUATIC PLANT SPECIES

This Subsection describes non-native plants with the potential to impact Vermont that have not yet been identified in the State. The list of potential problem species will grow as additional non-native plants are discovered.

2.2.1 Hydrilla

Hydrilla is rooted with long stems that branch at the surface where growth becomes horizontal and dense mats form. This species can establish in a variety of substrates, including silt, sand and rock, and grows in water depths from a few inches up to 35 ft. It has small, pointed leaves which are arranged in whorls of 4 to 8. Leaves have serrated margins and may have one or more sharp teeth under the midrib. Flowers are attached by threadlike stalks attached at leaf axils near the stem tips and are solitary, tiny, white, and float on the surface. Hydrilla can reproduce through fragmentation as well as subterranean turions (tubers), which are yellowish, potato-like, and attached to the root tips in the hydrosoil. A single tuber can grow to produce more than 600 new tubers per square foot (USACE, 2024a, p. 5). Hydrilla is of particular concern in the Connecticut River where populations are already established in downstream Massachusetts and Connecticut.

2.2.2 Giant Salvinia

Giant salvinia is a free-floating aquatic fern with leaves 0.5 to 1.5 inches long that exhibits variation in form and structure depending on habitat conditions such as space and nutrient availability. Young plants have smaller leaves that lie flat on the water surface. As plants mature and aggregate into mats, leaves are folded and compressed into upright chains. Giant salvinia grows rapidly to cover the surface of lakes and streams and under ideal growing conditions can double its mass and coverage in 5-7 days. It spreads aggressively by vegetative fragments and infestations are particularly damaging due to the high rate of plant proliferation (USACE, 2024a, p. 4). Currently, Giant salvinia has not been detected on the eastern portion of the United States (US) north of Virginia; however, due to its high ability to spread it is still considered a threat (USDA, 2000).

2.2.3 Water Hyacinth

Water hyacinth is a perennial free-floating plant with long dark roots. Leaves are formed in rosettes; petioles reach lengths of 12 inches or more, and are spongy, usually inflated, or bulbous, especially near the base. Leaf blades are rounded or broadly elliptic, glossy green, and up to 6 inches wide. Flowers are showy spikes above the rosettes, reaching lengths of 12 inches long, lavender-blue with a yellow blotch, and up to 2 inches wide, with 6 petals and 6 stamens. The plant varies in size from a few inches to over three feet tall. Water hyacinth spreads rapidly by producing stolons or “daughter” plants (USACE, 2024a, p. 4). Water hyacinth has been detected in Connecticut and the Great Lakes region of New York (NOAA, 2018a).

2.2.4 Brazilian Elodea

Brazilian elodea is a rooted or free floating submersed perennial aquatic plant with small leaves (1.5 inches long and 1/8 inches wide). Leaves are lance-shaped with minute teeth along the edges and arranged in whorls around the stem. Plants can grow nine to 15 feet tall and upon reaching the surface of the water, the leafy branches create dense mats. Flowers are small, about one inch wide, and white with three petals. They grow on short stalks above the water and bloom in spring and summer. Seeds production is not known to occur in the United States populations, it spreads primarily by vegetative fragmentation (USACE, 2024a, p. 5). Brazilian elodea has been detected in recent years in Massachusetts and New York, with historical detections in New Hampshire and Vermont dating back to 2001 and 1913, respectively (NOAA, 2018b).

2.2.5 Others

Other non-native plants with the potential to impact Vermont that have not yet been identified in the State include (VTDEC, 2024c):

- European water clover
- Fanwort
- Hygrophila
- Parrot feather
- Water lettuce
- Water soldier
- Water wheel

Vermont Agency of Agriculture, Food, & Markets (VAAFM) produces a designated noxious weed list located in Code of Vermont Rules (CVR) 20-031-021. This list is not specific to AIPS, although it does designate several of the AIPS species discussed above (VAAFM, 2012).

Similarly, VAAFM also produces a designated plant pests list which includes several of the AIPS listed above (VAAFM, 2024). Management of all listed species, along with any future identified invasive aquatic plants, is included in the APCP.

2.3 NATIONAL AND REGIONAL RESPONSE

Since the first discoveries of AIPS in Vermont in the 1940s and 1950s, it became clear that a coordinated effort both nationally and regionally was required to best address AIPS associated threats. Accordingly, Federal, State, and local governments; resource agencies; non-government organizations; and other groups/entities have helped to coordinate efforts throughout the nation and region.

2.3.1 USACE Policy

In February 2023, a USACE policy memorandum updated USACE invasive species policy, which complements the National Invasive Species Act, various executive orders, and the National Invasive Species Management Plan (USACE, 2023). The policy memorandum acknowledges that preventing the introduction, controlling the spread, and eradication of invasive species into the United States and onto USACE lands and waters requires continuous collaboration across USACE and with Federal, Tribal, State, and local governments, non-government organizations, and partners. This policy lists a variety of coordinated efforts to address this goal including the Aquatic Plant Control Program (33 USC § 610).

2.3.1.1 Watercraft Inspection Station & Decontamination Program

The Water Resources Reform and Development Act (WRRDA) of 2014 amended Section 104 of the RHA of 1958 to authorize USACE to use cost share agreements with states to fund the construction, management, and operation of watercraft inspection and decontamination stations in the Columbia River Basin. Under subsequent amendments, Congress:

- Expanded USACE authorization to include five additional river basins in the western U.S. and watersheds that adjoin the U.S.- Canada border; and
- made USACE responsible for ensuring these stations are placed at locations with the highest likelihood of preventing the introduction or spread of aquatic invasive species.

To carry out its responsibilities, USACE created the Watercraft Inspection and Decontamination Program. Under the program, USACE does not itself build or operate watercraft inspection and decontamination stations; instead, it reimburses participating states for 50 percent of costs incurred under the cost share agreements (USACE, 2024b).

2.3.2 Vermont Policy

The State of Vermont has numerous laws and regulations relating to aquatic plant control in the State. Most notable is the Aquatic Nuisance Control Program which is discussed in 10 Vermont Statutes Annotated (VSA) § 1453 and coordinates management activities associated with both aquatic invasive and nuisance species; works with local, State, and Federal partners to obtain and provide funds for control projects; and provides education and outreach to reduce the threat and spread of AIPS. The Aquatic Nuisance Control statute also provides the framework for

regulations on aquatic nuisance control management activities and permits as per 10 VSA § 1455 (VTDEC, 2024d).

The goals of the Vermont Aquatic Nuisance Control Program include:

1. To prevent the infestation and proliferation of invasive species in the State that result in negative environmental impacts, including habitat loss and a reduction in native biodiversity along with adverse social and economic impacts and impacts to the public health and safety;
2. To initiate quickly a response to contain and control a new aquatic species introduction before it can spread, which is critical to reduce future management costs and protect the integrity of Vermont's ecosystems;
3. To detect infestations of new aquatic species early and act upon them swiftly to minimize economic, social, and ecological impacts as well as to increase the probability of a successful eradication effort (VTDEC, 2024e).

Other Vermont laws and regulations include:

2.3.2.1 Transport of Aquatic Plants and Aquatic Nuisance Species (10 VSA § 1454)

This law prohibits the transportation of aquatic plants, aquatic plant parts, and aquatic nuisance species to or from any Vermont water. In 2010, the law was changed to include all aquatic plants as compared to the previous ban on only Eurasian watermilfoil and water chestnut (VTDEC, 2024f). This law also requires inspections of vessels when entering or exiting a waterbody (VTDEC, 2024e).

2.3.2.2 Aquatic Nuisance Control Permit (10 VSA § 1455)

Vermont issues permits pursuant to 10 VSA § 1455 to control nuisance aquatic plants, insects, or other aquatic life in waters of the State of Vermont. Permits are issued by the VTDEC (VTDEC, 2024e).

2.3.2.3 Emergency Response General Permit

The Secretary of the Agency of Natural Resources has emergency permitting authority aimed at initiating a rapid response to a new invasive species invasion. An emergency rapid response general permit for both chemical and non-chemical methods with coverage is available to the commissioners of the Vermont Department of Environmental Conservation and the Vermont Department of Fish & Wildlife (VTDEC, 2024e).

2.3.2.4 Use of Public Waters (10 VSA § 1424)

The Vermont Use of Public Water Rules Section 4.1 authorizes the Secretary of the Agency of Natural Resources to identify areas of public waters as temporarily closed to all persons, vessels or both in order to prevent, control or contain the spread of aquatic nuisance infestations (VTDEC, 2024e).

2.3.3 Aquatic Nuisance Species Task Force

The Aquatic Nuisance Species Task Force (ANSTF) was established by the Nonindigenous Aquatic Nuisance Species Prevention and Control Act of 1990 (PL 101-636). The ANSTF is an interagency organization co-chaired by U.S. Fish and Wildlife Service (USFWS) and National Oceanic and Atmospheric Administration (NOAA) (USFWS, 2024a). Activities of the ANSTF

include aquatic nuisance species prevention, research, and control; public and stakeholder education; and state coordination efforts (USFWS, 2024b). The ANSTF works with six regional panels: Western, Great Lakes, Northeast, Mississippi River Basin, Mid-Atlantic, and Gulf and South Atlantic. The mission of the Northeast Aquatic Nuisance Species (NEANS) Panel is to "protect the marine and freshwater resources of the Northeast from invasive aquatic nuisance species through commitment and cohesive coordinated action" (NEANS, 2024a).

2.3.3.1 Northeast Aquatic Nuisance Species Panel

The NEANS Panel includes member states Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, and New York. Due to the bi-national significance of waters included within these jurisdictions, the NEANS Panel also includes the freshwater and marine resources of the Canadian provinces of Quebec, New Brunswick, and Nova Scotia. Federal and provincial governments of Canada, as well as other relevant stakeholders participate as full members of the Panel, ensuring appropriate representation (NEANS, 2024b)

The NEANS Panel member states, in cooperation with other states, coordinate efforts and make decisions as part of this regional strategy, while operating within the scope of their specific budgets and statutory authorities.

2.3.4 Invasive Species Leadership Team

The Invasive Species Leadership Team was established by a USACE Civil Works and Contingency Operations Memorandum dated 13 July 2005. Its intent is to provide oversight of the USACE Invasive Species Program. The Invasive Species Leadership Team provides direction to achieve goals and objectives that complement the National Invasive Species Management Plan and the Aquatic Nuisance Species Task Force Strategic Plan and that are applicable to USACE Civil Works programs and projects. The Invasive Species Leadership Team provides support for the exchange and sharing of information, as well as support to develop and provide strategic recommendations to USACE and the U.S. Army Engineer Research and Development Center (NRM Gateway, 2024a).

2.3.5 Lake Champlain Basin Program

The Lake Champlain Basin Program (LCBP) coordinates and funds efforts that benefit the Lake Champlain Basin's water quality, fisheries, wetlands, wildlife, recreation, and cultural resources, in partnership with government agencies from New York, Vermont, and Québec, private organizations, local communities, and individuals. These efforts include aquatic invasive plant removal within certain areas of the Lake Champlain Basin (LCBP, 2024).

2.3.6 Connecticut River Hydrilla Control Research

The USACE, and its Engineer Research and Development Center's (ERDC) Aquatic Plant Control Research Program, is leading a demonstration project to determine the effectiveness of herbicides registered for aquatic use by the United States Environmental Protection Agency (USEPA) to safely reduce and control the spread of the Connecticut River hydrilla. The project will investigate hydrilla's growth patterns, water exchange dynamics in the Connecticut River, and evaluate herbicide efficacy in laboratory conditions in 2023 to guide operational scale field demonstrations of herbicide efficacy in 2024 (USACE, 2024c).

2.4 EXISTING VERMONT AQUATIC PLANT CONTROL PROGRAM

Vermont already has an APCP within the Lake Champlain Basin that is subject to 50 percent cost sharing with the Federal government. This cost-shared APCP uses measures including mechanical control, watercraft inspection and decontamination stations, early detection and rapid response, and public awareness and education. Some of these measures are implemented in other areas of Vermont, outside of the Lake Champlain Basin. However, their implementation is typically less robust, due to the absence of Federal cost-sharing.

2.4.1 Mechanical Control

2.4.1.1 Mechanical Harvesting

Mechanical harvesting uses devices and machines to harvest the targeted AIPS. Mechanical devices can include floating booms, underwater cutters, hydro-rakes, rotavators, suction harvesters and mechanical harvesters.

2.4.1.2 Hand Harvesting

Aquatic plant growth in areas inaccessible by other methods may be hand-pulled. Hand-pulling may also be conducted in areas where it is more practical, in terms of cost, efficiency, and effectiveness, than other control methods.

2.4.1.3 Benthic Matting

Benthic matting includes installation of a barrier at the bottom of a waterbody with the intent of blocking sunlight from reaching the water's sediment layer and making sediments inhospitable for plant growth. Benthic matting is mainly implemented around docks and marinas.

2.4.2 Watercraft Inspection & Decontamination Stations

2.4.2.1 Vermont Public Access Greeter Program

For the Vermont Public Access Greeter Program, paid public access monitors are staffed at public access points on various waterbodies. Greeters inspect intercepted watercraft and remove identified aquatic invasive species. Greeters also provide waterbody users with information about aquatic invasive species.

Through the program, VTDEC provides support for citizen scientists, paid municipal staff, and volunteers during the field season, including on-line training sessions, in-person workshops, and one-on-one training opportunities.

2.4.2.2 Decontamination

Certain Vermont Public Access Greeter Program stations include decontamination stations consisting of hot water high-pressure washers used for removing identified AIPS from intercepted watercraft. The Lake Champlain Basin Program also operates a cooperative boat wash program within the Lake Champlain Basin.

2.4.3 Early Detection and Rapid Response

2.4.3.1 Early Detection Monitoring

Early detection monitoring can include a variety of approaches, but the most frequent approach is to physically search for AIPS in areas judged at high risk of infestation. This includes shoreline and dock surveys for invasive aquatic plants, snorkel surveys, as well as boat-based surveys. Survey tools include nets, rakes, and other hand tools. Early detection is focused on searching for the presence of AIPS before the species become established and begin reproducing.

2.4.3.2 Drone Surveys

Drone surveys are conducted over certain waterbodies, such as Lake Champlain, to identify infestations before they can establish in an area and reproduce. Implementation of drone surveys has historically been limited to the Lake Champlain Basin with the support of Federal cost-sharing.

2.4.3.3 Chemical Control

Although chemical control is not used by VTDEC as a routine measure for dealing with AIPS, VTDEC has the ability to issue permits for pesticide use related to aquatic invasive species, particularly in a rapid response capability. A summary of previously permitted herbicidal treatments dating back to 2000 is included below:

Table 2-1. Historically Used Herbicides

Herbicide Product	Herbicide Concentration Range	Chemical	Treatment Type
ProcellaCOR	1 – 4.167 PDU	Florpyrauxifen-benzyl	Spot
Renovate 3	0.75 – 2.5 ppm	Triclopyr, triethylamine salt	Spot
Renovate OTF			
Sonar A.S.	5 – 8 ppb	Fluridone	Whole Lake

ProcellaCOR was first permitted for use in 2019 and has been the only aquatic herbicide permitted for use by VTDEC since 2020. As such, ProcellaCOR is used more often than any other herbicide for treating invasive aquatic plants in Vermont and is typically the only herbicide considered for use during permit application review.

2.4.4 Public Awareness and Education

2.4.4.1 Vermont Invasive Patrollers

The Vermont Invasive Patrollers (VIP) program was established by the VTDEC in 2007 to focus on early detection of all known and potential AIPS. Though VIPs are trained to identify both aquatic invasive plants and animals established in Vermont or nearby states that pose the greatest threat to Vermont's waterbodies, their survey efforts emphasize identifying AIPS. The

program provides a series of workshops to educate lakeshore residents, who can then coordinate with VTDEC. This program has not been cost-shared through the existing APCP.

2.4.4.2 Outreach

VTDEC works to promote public awareness of the existence and risks associated with aquatic invasive plants. Public outreach includes ad campaigns aimed at keeping boats free from AIPS. To reach the target audience, signs are placed at boat ramps and other strategic places, along with stocked brochure boxes. A common outreach slogan is “Clean, Drain, Dry.” VTDEC also supports public workshops to increase aquatic invasive species awareness in local communities. These outreach efforts have not been cost-shared through the existing APCP.

2.4.5 Current Costs

The costs for implementation of the cost-shared APCP in the Lake Champlain Basin were approximately $1,000,000 every year 2014 to 2020 and have slightly increased since. The most recent budget, for 2024, was $1,300,000. The $1,300,000 was cost shared 50 percent by the Federal government and 50% by the non-Federal sponsor, totaling $650,000 to each.

SECTION 3 – PLAN FORMULATION

Development of this report generally followed the USACE six-step planning process. This process identifies and responds to problems and opportunities associated with the objective, as well as specified State and local concerns. The process provides a flexible, systematic, and rational framework to make determinations and decisions at each step based on constraints, objectives, and assumptions. This allows the interested public and decision-makers to be fully aware of the basic assumptions employed, the data and information analyzed, the areas of risk and uncertainty, and the significant implications of each plan that is considered.

The six main steps of the USACE planning process are as follows:

1. Identifying problems and opportunities
2. Inventorying and forecasting conditions
3. Formulating alternative plans
4. Evaluating alternative plans
5. Comparing alternative plans
6. Selecting a plan

3.1 PROBLEMS

The spread of invasive aquatic plants causes a multitude of problems within the State of Vermont. Non-native aquatic plant species are not as susceptible to the natural population controls that impact native aquatic plant species; accordingly, when an invasive non-native plant is introduced, they often outcompete native aquatic plant species for habitat and nutrients. Floating and submerged plants, as well as shoreline and wetland invasive species have proliferated throughout the State and currently impact many waterbodies. These problems can be divided into three categories: Infrastructure Impacts, Health and Safety Impacts, and Environmental Impacts, and are summarized below.

3.1.1 Infrastructure Impacts

- Floating rafts of aquatic invasive plants impede the operation of fish ladders, thus impacting the ability of certain fish species to migrate past dams to their spawning grounds.
- Floating rafts of aquatic invasive plants can block critical water intake infrastructure associated with hydroelectric plants, leading to temporary shutdowns in operations and costly annual maintenance.
- Dense infestations aquatic invasive plants negatively impact navigation by restricting narrow channels, inundating shallow waters, and contributing to sedimentation in shallow channels.
- Aquatic invasive plants clog water intake pipes, reducing the reliability and quality of drinking water for a significant portion of Vermont's population.
- Invasive aquatic plants interfere with boat propellers, swimming, and fishing, thus reducing recreational opportunities along waterbodies.

3.1.2 Health and Safety Impacts

- Certain invasive plants, such as water chestnut, contain sharp spines on their fruit which can injure people swimming or walking in impacted areas.

- Certain invasive aquatic plants can harbor disease and cause illness.

3.1.3 Environmental Impacts

- Invasive aquatic plant infestations convert diverse native plant communities into monocultures that reduce suitable habitat for native flora and fauna.
- Invasive aquatic plants often outcompete native aquatic plant species for habitat and nutrients due to their ability to rapidly take up nutrients and proliferate.
- Habitat structures are often altered due to the presence of dense mats of invasive aquatic plant infestations.
- Decomposition of invasive aquatic plant mats can result in depleted oxygen and liberated nutrients, producing algae blooms that deplete dissolved oxygen further and can result in large fish kills. These harmful algal blooms can also release toxins into the ecosystem.
- Water quality is degraded by the presence of invasive aquatic plants due to reduced light penetrations and altered nutrient cycles.

3.2 OPPORTUNITIES

Invasive aquatic plant control is likely to provide a benefit to aquatic species by restoring native vegetation, maintaining suitable habitat, and restoring ecosystem and shoreline function. The project's reduction of invasive aquatic plants would benefit the ecosystem, resident and transient wildlife, and the public by providing more resilient/reliable infrastructure, expanding and improving the quality of recreational opportunities, and diversifying ecosystems.

3.3 PLANNING OBJECTIVES AND CONSTRAINTS

3.3.1 Planning Objectives

The overall planning objectives of this project are to:

- Increase the effectiveness of future and ongoing AIPS control measures in the State of Vermont
- Reduce the negative impacts of AIPS to the ecology and infrastructure within the project area, and
- Reduce the probability of AIPS spread, both naturally and by boat/boat trailer, through waterbodies.

3.3.2 Planning Constraints

Planning constraints are resource, legal, or policy considerations that limit the range or type of actions that could be implemented to meet planning objectives. The following constraints were identified for this evaluation:

- Comply with Federal, State, and local laws, regulations, and policies.
- Implement the program consistent with authorizing legislation and guidance.
- Avoid adverse effects on Threatened and Endangered Species.
- Avoid adverse impacts on water quality.

3.4 MEASURES

Subsections 3.4 through 3.6 describe potential measures and alternatives developed to be implemented under an expanded cost-shared program to augment and/or improve AIPS prevention and control activities. This report does not attempt to precisely define the future program and assumes optimization would occur annually at the State level. Instead of attempting to define an optimal set of conditions, this report assumes that providing Federal funding to assist the State program would result in an increase in investment and effectiveness of the overall program, as well as decrease the risk of further infestations and spreading of AIPS. The measures discussed below were developed in cooperation with VTDEC.

3.4.1 Mechanical Control

Mechanical control methods include hand pulling, raking, and large-scale cutting of nuisance macrophytes. Dragging chains, wires or bedsprings through the water can be primitive, but effective, means of mechanically controlling vegetation.

Nuisance plants can also be removed by hand pulling, raking or forking with crews operating out of canoes, kayaks, rowboats, airboats or wading. Generally, pulled weeds are loaded into boats and removed to disposal sites. Mechanical harvesters are also available for the large-scale cutting of dense infestations. These harvesting machines range from boats mounted with sickle-bar mowers to elaborate, specially designed devices costing tens of thousands of dollars, which simultaneously cut and remove the plants from the water (USACE, 1981, pp. 5-9 - 5-10).

3.4.2 Watercraft Inspection and Decontamination Stations

This measure would augment the APCP by allowing VTDEC and USACE to expand the network of watercraft inspection and decontamination stations to reduce the risk of AIPS being spread into, out of, and within the State of Vermont.

3.4.2.1 USACE Watercraft Inspection and Decontamination Program

WRRDA 2014 amended Section 104 of the RHA of 1958 to authorize USACE to use cost share agreements with states to fund the construction, management, and operation of watercraft inspection and decontamination stations in the Columbia River Basin. Under subsequent amendments, Congress expanded USACE's authorization to include five river basins in the western U.S. and watersheds that adjoin the U.S.-Canada Border. This amendment also made USACE responsible for ensuring these stations are placed at locations with the highest likelihood of preventing the introduction or spread of aquatic invasive species. To fulfill these responsibilities, USACE created the Watercraft Inspection and Decontamination Program. Under the program, USACE does not itself build or operate watercraft inspection and decontamination stations, but instead reimburses participating states for 50 percent of costs incurred under cost share agreements.

Within this USACE program, Vermont is one of ten states included in the U.S.-Canada Border Authority states group. All ten of these states are authorized to receive federal funding for the construction, management, and operation of watercraft inspection and decontamination stations, but are not yet active in the program. Activating the State of Vermont as part of the USACE Watercraft Inspection and Decontamination Program would be a key part of this measure in the expanded APCP (NRM Gateway, 2024b).

3.4.3 Early Detection and Rapid Response

This group of measures would expand on the existing program by helping to find and eradicate AIPS before they spread further and negatively impact other waterbodies in Vermont.

3.4.3.1 Chemical

Although chemical control is not currently used by VTDEC as a routine measure for dealing with AIPS, VTDEC has the ability to issue permits for pesticide use related to aquatic invasive species, particularly in a rapid response capability. Large infestations can be treated quickly by applying aquatic pesticides in either a spray or granular form from small boats with handpumps or from airboats, helicopters or fixed wing aircraft. Treatment is usually recommended for late spring or early summer when the plants are young and susceptible. The herbicides are effective either immediately on contact or through systemic action (USACE, 1981, pp. 5-7).

A multitude of USEPA approved pesticides could be used for the control of aquatic plant species. Only three pesticides have been used by the State since 2000 (ProcellaCOR, Renovate, and Sonar A.S.). However, for the purposes of this report, all approved pesticides are being included in the event of any policy changes where the State has deemed it necessary to expand their use as part of a rapid response protocol. Similarly, if other chemical treatment options are identified in the future, they may also be considered.

3.4.3.2 Monitoring

This measure would augment the future program by leveraging both Vermont and USACE efforts to engage in monitoring activities to support early detection, population extent or dynamics, infestation impacts, or risk assessments of AIPS.

3.4.3.3 Drone Surveys

Drone surveys have been used in a limited capacity to detect and monitor aquatic invasive plant infestations in Lake Champlain. The inclusion of this measure in the future State-wide program would be beneficial as part of an early detection and rapid response plan for many of the larger waterbodies in Vermont.

Applicable permits limit the location and height of drone flights as deemed necessary to protect nesting bird species and any other identified resources.

3.4.3.4 eDNA Monitoring

In environmental deoxyribonucleic acid (eDNA) monitoring, biologists collect subsamples from surface tows at high-risk sampling sites into standardized eDNA collection vials. The eDNA subsamples are processed to detect presence of AIPS DNA particles in the subsampled water, with the intent to increase efficiency and more rapid turn-around of results to improve response and reaction timing if results indicate the presence of AIPS DNA.

3.4.3.5 Surveying and Mapping

VTDEC has recently become more involved in surveying and mapping using geographical information system (GIS). Inclusion of this measure in a cost-shared expanded program would be beneficial for keeping current data on aquatic invasive plant infestations throughout the State and to prevent further spreading, as well as monitoring any geographical changes.

3.4.4 Public Awareness and Education

This measure would increase public awareness and education efforts, which could include ad campaigns, communication with commercial boat haulers and marinas, and the addition of permanent signs at locations where inspection stations are routinely established each year. Informing the public of the risks of AIPS can increase their involvement in prevention efforts and potentially decrease the numbers of infested boats that enter or travel within the State of Vermont.

3.4.4.1 Vermont Invasive Patrollers

The VIP program was established by the VTDEC in 2007 to focus on early detection of all known and potential AIPS. VIPs emphasize aquatic invasive plant identification in their surveying efforts and are trained to identify both aquatic invasive plants and animals that are either established in Vermont or in nearby states and pose the greatest threat to Vermont's waterbodies. The program is operated through a series of workshops educating lakeshore residents who can then coordinate with VTDEC.

3.4.5 Biological Control

Biological or natural control employs living organisms to control nuisance species. Manipulation of predator-prey relationships, introduction of pathogens and use of allelopathic relationships can result in control. Pathogens used as control agents include viruses, rusts, smuts and other aquatic fungi. Herbivorous animals such as nutria and waterfowl, and invertebrates like snails, crayfish, and insects are also used as biological control agents (USACE, 1981, pp. 5-2).

3.5 MEASURES SCREENING

Table 3-1 shows how each of the measures identified for this report was screened by the individual planning objectives. All measures met at least one of the identified objectives for the project. Because of this, no measure was screened out based on these factors.

Table 3-2 shows how each of the measures was screened against the planning constraints. All measures, except for Measure 7 (Biological Control), were determined to be within bounds of the identified planning constraints and were therefore retained. Biological Control was the only measure screened out based on the likelihood of the introduced agents being non-native, and therefore non-compliant with Federal, State, and local laws, regulations and policies. Additionally, this measure has the potential for large environmental impacts and unintended adverse effects on native plants and wildlife, including Threatened and Endangered species.

Table 3-1. Screening Measures by Planning Objectives

Measure	Increase effectiveness of future/ongoing AIPS control measures	Reduce Impacts to Ecology and Infrastructure	Reduce AIPS spread, naturally and by watercraft
Measure 1: Mechanical Control	X	X	X
Measure 2: Watercraft Inspection Stations	X	X	X
Measure 3: Early Detection Monitoring	X	X	
Measure 4: Drone Surveys	X		
Measure 5: eDNA	X		
Measure 6: Public Awareness and Education	X		
Measure 7: Biological Control	X		X
Measure 8: Chemical Control	X	X	X

Table 3-2. Screening Measures by Planning Constraints

Measure	Comply with Federal, State, and local laws, regulations, and policies	Implement the program consistent with authorizing legislation and guidance	Avoid adverse effects on Threatened and Endangered Species	Avoid adverse impacts on water quality	Retained
Measure 1: Mechanical Control	Yes	Yes	Yes	Yes	Yes
Measure 2: Watercraft Inspection Stations	Yes	Yes	Yes	Yes	Yes
Measure 3: Early Detection Monitoring	Yes	Yes	Yes	Yes	Yes
Measure 4: Drone Surveys	Yes	Yes	Yes	Yes	Yes
Measure 5: eDNA	Yes	Yes	Yes	Yes	Yes
Measure 6: Public Awareness and Education	Yes	Yes	Yes	Yes	Yes
Measure 7: Biological Control	No	Yes	No	Yes	No
Measure 8: Chemical Control	Yes	Yes	Yes	Yes	Yes

3.6 ALTERNATIVES

For this ILR/PEA, Section 104 of the RHA of 1958 (33 USC § 610), as amended, serves as a guide for determining the range of alternatives to be considered. When an action is taken pursuant to a specific statute, the statutory objectives of the project serve as a guide by which to determine the reasonableness of objectives outlined in the NEPA document. This ILR/PEA has been prepared to ascertain Federal interest in the expansion of the State of Vermont APCP to include applicable waterbodies throughout the State. This alternatives analysis, therefore, focuses on identification of measures/alternatives that can be implemented under such a program. NEPA does not require an agency to consider all alternatives; rather, only “reasonable alternatives” need to be explored and objectively evaluated. The result of preliminary screening is that one action alternative–Cost Share Expanded Aquatic Plant Control Program–and the No Action alternative were carried forward for evaluation.

3.6.1 Alternative 1: No Action

Alternative 1 represents a continuation of Vermont's current practice (see Subsection 2.4), in which USACE would not participate in expanding the APCP outside of the Lake Champlain Basin. While current APCP measures would continue to be implemented, there would be an increased risk of ecological and infrastructure degradation associated with Alternative 1 due to a less robust APCP for the entire State.

3.6.2 Alternative 2: Proposed Action

Alternative 2 consists of the Federal government and the State of Vermont cost sharing in the expanded APCP throughout the entire State. By sharing the costs of the expanded APCP, the State of Vermont would be able to implement the program more effectively. This alternative would include the use of mechanical control measures, watercraft inspection and decontamination stations, early detection and rapid response measures, as well as public awareness and education.

Long-term benefits of aquatic invasive plant treatment include improved navigation, irrigation, and drainage; enhanced water-related recreational activities; increased fish and wildlife habitat; improved aquatic ecosystem and water quality; increased near-water land values; protection of public health; and decreased operation and maintenance costs associated with water-related infrastructure.

Using Federal funding, the State of Vermont would assume the following obligations:

- VTDEC would continue to perform activities in accordance with the Aquatic Plant Control Agreement. Statements of work (SOW) would be submitted annually by VTDEC. The SOW would detail treatment locations, timeline, and methodologies. Summary reports detailing the completed work would similarly be completed annually.
- Control methods would fall within those outlined in this ILR/PEA, including any listed minimization measures. Should there be a desire to use treatment options not detailed here, supplemental NEPA analysis would be required.

3.6.3 Alternatives Considered but Eliminated

USACE considered, but ultimately screened out any alternative that did not fully address the planning objectives and purpose and need for the project. An integrated invasive species management program, using all available methods, is the most effect way of managing invasive species while maintaining environmental balance. Using just one method or an incomplete array of methods could ultimately result in a less effective program with more environmental impacts. Therefore, a stand-alone alternative was screened out.

SECTION 4 – ECONOMIC IMPACTS ASSESSMENT

The State of Vermont is not free from AIPS, as several species have gained a foothold in waterbodies throughout the State. There is a statewide, regional, and national effort to reduce the economic damages and impacts that would result from AIPS moving into non-infested waterbodies. Expansion of AIPS populations into and throughout Vermont and into other parts of the region, along human-assisted pathways that exist between nearby infested waters, present a risk of AIPS infestations increasing throughout the region.

This Section evaluates and describes the costs and benefits of the proposed action and examines its economic impacts. Engineer Regulation 1105-2-103, Chapter 6, cites the general authority for aquatic ecosystem restoration provided by 33 U.S.C. §2213 (c)(7) and allows USACE participation in the Vermont APCP because it falls into the broad category described as: "general authority for USACE to restore degraded aquatic ecosystems." This ER (6-5)(a) also directs that "economic, social, and environmental benefits, impacts and costs are to be identified, measured, and/or qualitatively characterized using the four Principle & Guideline accounts" as described in Subsection 4.3 below.

4.1 ECONOMIC CONSIDERATIONS

4.1.1 Infestation Impacts

This Subsection attempts to quantify economic benefits of reducing AIPS in the State of Vermont. It focuses on describing the known impacts to the water resource-related infrastructure and activities within the State that are most likely to be affected by AIPS. The most important consequence of AIPS quantity reduction is improvement in water quality, which generates other social benefits. The impacts presented in the Subsections below include recreation, tourism, and waterfront property. The documented benefits for Lake Champlain were used to extrapolate the benefits to other infested lakes, adjusted by size and amount of AIPS historically present.

4.1.1.1 Recreation

There are local and regional studies utilizing stated and revealed preference models that demonstrate high consumer willingness to pay for water quality improvements associated with a range of recreational activities, such as boating, swimming and fishing (Johnston, et al., 2005) (Wolf, Chen, Gopalakrishnan, Haab, & Klaiber, 2019). In areas where dense aquatic invasive plant infestations grow adjacent to the shoreline and docks, recreational use is impaired, which leads to reduced tourism expenditure. Analysis conducted for Lake Champlain estimated that the annual tourism benefit of reducing AIPS in the Lake was $483,000 at the 2020 price level (Gourevitch, Koliba, Rizzo, Zia, & Ricketts, 2021). The annual Consumer Price Index (CPI) values for years 2020 and 2024 are 256 and 308, respectively (USIC, 2025). The annual benefit from an increase in tourism expenditure is $581,140 at the 2024 price level.

4.1.1.2 Property Value Appreciation

There is documented evidence that AIPS presence can significantly reduce the value of nearby properties (Liu, Gopalakrishnan, Browning, & Sivandran, 2019) (Moore, Doubek, Xu, & Cardinale, 2020). Analysis conducted for Lake Champlain estimated that improvements in water quality led to increased property values equating to a $200,000 benefit at the 2020 price level (Gourevitch, Koliba, Rizzo, Zia, & Ricketts, 2021). The Federal Reserve, St. Louis house price index values for Vermont for years 2020 and 2024 are 506 and 853, respectively (FRED, 2025). The annual benefit from an increase in property value is $337,154 at the 2024 price level.

4.1.1.3 Fishing License Sales Revenue

AIPS infestations have been shown to cause negative impacts on native fish populations. These impacts are primarily related to physical harm of fish species due to the sharp structures of certain invasive aquatic plants and the negative effects associated with dense mats of AIPS crowding out native aquatic vegetation and altering otherwise healthy fish habitat. Healthy native fish populations are correlated with waterbodies containing typical native aquatic vegetation, free of AIPS. AIPS-related decreases in native fish populations would reduce the benefit anglers derive from fishing, thus decreasing the likelihood of future return travel to certain waterbodies in Vermont.

In 2013, Vermont Agency of Natural Resources (VTANR) determined that fishing license sales totaled $3,000,000 at the 2011 price level (VTDEC, 2013). Although no studies relating fishing license sales and water quality have been conducted for Lake Champlain, such studies have historically been done for Lake Erie, which is nearby and geographically comparable. In Lake Erie, poor water quality was correlated with a 10-13% reduction in fishing license sales (Wolf, Georgic, & Klaiber, Reeling, 2017). This finding also indicates that an inverse improvement in water quality would lead to a 10-13% increase in fishing license sales. Applying this logic to Lake Champlain and utilizing CPI values of 220 and 308 for years 2011 and 2024 (USIC, 2025), respectively, the following equation can be used to represent a conservative 10% increase in fishing license sales related to improved water quality.

$$\$3{,}000{,}000 * 10\% * \frac{308}{220} = \$420{,}000$$

The annual benefit from an increase in fishing license sales is $420,000 at the 2024 price level.

4.1.1.4 Gross Benefit for Program Expansion

The total annual benefit of reducing invasive aquatic plants in Lake Champlain is $1,338,294. This benefit can be extrapolated to other lakes in Vermont and is expected to be proportional to lake size and amount of aquatic invasive plants present in each lake. Due to lack of available data, historical aquatic invasive plant survey detection totals were used as a proxy for amount of aquatic invasive plants present in a given lake. In calculating the gross total annual benefit across the State, lake sizes and historical survey detections were normalized and weighted to properly compare to the benefits received by Lake Champlain. Based on these calculations, the gross total benefit for the 90 lakes in Vermont included in this analysis was determined to be approximately $5.9 million annually. Calculations are further detailed in the Gross Benefit Calculations Table, attached to this ILR/PEA as Table 1.

4.1.2 Qualitative Effects

While many of the impacts on the resources in Vermont have quantitative impacts that can show damages in terms of a decrease in the National Economic Development (NED), AIPS infestation can cause numerous other economic impacts that cannot be easily shown as a cost. For example, AIPS infestations can hamper navigation and interrupt hydroelectric power generation and water supply treatment. These negative impacts are not well-studied within Vermont and have varying levels of applicability depending on the specific waterbody in question. Due to the limited scope and resources associated with this ILR/PEA, discussion of these impacts is limited to qualitative methods.

4.1.2.1 Navigation

In certain waterbodies throughout the State, dense AIPS infestations negatively impact navigation by restricting narrow channels, inundating shallow waters, and contributing to sedimentation in shallow channels. The presence of Eurasian watermilfoil and water chestnut along with the threat of Hydrilla infestations in the Connecticut River is of particular concern to Vermont navigation.

4.1.2.2 Hydroelectric Power

There are approximately 85 hydroelectric generation facilities operating in Vermont and on waters bordering other states (VTDEC, 2024g). Hydropower outages, and thus foregone economic benefits, are likely if intake blockages occur more frequently due to the Federal government not participating in the expanded APCP and restricting the areas of aquatic invasive plant control. The costs associated with outages are borne by both consumers and producers in the power market. These costs are a function of the magnitude of infestation, the cost of response measures, and the extent of impact vulnerabilities. In 2023, Vermont generated approximately 1,539,000 megawatt hours (MWh) from hydroelectric means (USEIA, 2024a). That made up approximately 57% of Vermont's in-State electricity generation (USEIA, 2024b).

The presence of Eurasian watermilfoil and water chestnut along with the threat of Hydrilla infestations in the Connecticut River is of particular concern to the hydroelectric capabilities of Vermont. It has been documented that thick mats of aquatic invasive plant infestations can break loose and clog water intakes for hydroelectric dams, particularly during storm events when power demands are particularly necessary.

Table 4-1. Hydropower Dams in Connecticut River Watershed in Vermont

Dam	Annual Megawatts
Moore Station Dam	192
Comerford Dam	144
Harriman Dam	41
Vernon Dam	37
McIndoes Falls	11
Searsburg Dam	5
Gilman	4.85
Silver Lake Reservoir	2.2
Canaan	1.1
Danville	1

Source: (TNC, 2018)

4.1.2.3 Water Supply and Treatment Facilities

There are approximately 45 active public drinking water sources utilizing surface water in Vermont, which serve a total population of approximately 178,000 people. This indicates that surface water supplies drinking water for roughly 25% of Vermont's population. Of the 45 active sources listed, 27 listings included data detailing the rate of water permitted to be drawn from each source. These data indicate that listed sources yield up to 925,000 gallons per minute (GPM), or 1,332 million gallons per day (MGD). Although many of these sources are located within the Lake Champlain Basin, several notable ones are not, such as: Stiles Pond, Minards Pond, Basin Brook, and Derby Lake. These four sources span the remaining major watersheds

of Vermont (Connecticut River, Lake Memphremagog, and Hudson River) and account for approximately 5 MGD (VTANR, 2024).

These water systems distribute clean drinking water throughout the State. Aquatic invasive plants can clog water intake pipes, reducing the reliability and quality of drinking water for a significant portion of Vermont's population.

4.1.3 Costs of Recommended Plan

The current APCP is limited to the Lake Champlain Basin and cost $1.3M in 2024, which was cost shared equally between the Federal government and VTDEC. Outside of Lake Champlain Basin, VTDEC spent an additional $700K on aquatic plant control measures, which was not subject to Federal cost-sharing.

Under the recommended plan, the APCP would be expanded to include geographical areas outside of the Lake Champlain Basin and the Federal government would cost share these APCP measures, contributing an additional $700K to the APCP. The costs of the existing APCP cost, Vermont's non-cost shared contributions, and the proposed expanded APCP Federal cost shared contributions total $2.7M, which represents the total cost of the recommended plan.

Using the $5.9M in annual benefits calculated in Subsection 4.1.1.4, the benefit-cost ratio (BCR) is 2.19. Applying a standard normal distribution to the data provided in the attached Table 1, the standard deviation of benefit is found to be 0.115 and the 95% confidence interval of benefit is found to be ($5.67M, $6.13M). No confidence interval is needed for the costs as they are based on historical data. Based on these values, the confidence interval of the BCR is (2.1, 2.27).

4.2 CONSIDERATIONS

If aquatic invasive species were to become further established in the State of Vermont, many changes to the aquatic environment would occur. Water quality would degrade as decomposition of invasive aquatic plant mats can result in depleted oxygen and liberated nutrients producing algae blooms which deplete dissolved oxygen further and result in large fish kills.

Millions of dollars have been invested within the State of Vermont to protect, restore, and recover riparian and riverine aquatic habitat to support native plant and animal populations. An infestation of AIPS would not only change the ecosystem but could cause physical injury to native species. Recreational fisheries could also be affected. Modified water quality could lead to habitat changes, which affect fish populations and composition. Native fish populations could also be negatively affected.

4.3 CONCLUSIONS

Based on the information evaluated in this ILR/PEA, USACE has determined that there is Federal interest in partnering with the State of Vermont to cost share an expanded APCP. As described in Subsection 4.1.3, a conservative estimate of annual benefits and costs avoided exceeds the estimated annual costs associated with expanding the APCP throughout the State, with a BCR of 2.19.

Alternative 2 helps to address the vulnerability issues indicated in this Section. The risk reduction efforts would also protect the environment by delaying potential adverse ecosystem impacts described in Subsection 4.2 (effects of the prevention efforts on the environment are provided in Section 6).

As previously described in Subsection 4.2, and later in Section 6, Alternative 2 would also generate significant ecosystem quality benefits that have not been quantified. Although they have not been quantified, these benefits are considered in the USACE decision making process.

Consistent with the USACE planning process, alternatives must be formulated in consideration of four criteria described in the Principle and Guidelines Report (U.S. Water Resources Council 1983) for completeness, effectiveness, efficiency, and acceptability, which are described below.

- **Completeness**. Alternative 2, Expanded APCP Cost Sharing Program, is the most complete solution available to reduce the risk of aquatic invasive plant infestations. It includes every potential measure considered except Measure 7 (Biological Control), which was screened out due to non-compliance with Federal, State, and local laws, regulations, and policies, as well as potential for adverse environmental impacts. Together these measures address all planning objectives while staying within bounds of the planning constraints. This creates powerful preventive actions, including mechanical control, watercraft inspection/decontamination stations, monitoring, educational opportunities, contingency plans, and preparation for quick response to potential infestations. This alternative provides and accounts for all necessary investments and other actions, including by other Federal and non-Federal entities. While this alternative cannot entirely eliminate the possibility of an aquatic plant infestation, it is the most comprehensive solution available.

- **Effectiveness**. Alternative 2, Expanded APCP Cost Sharing Program, includes a combination of different actions to prevent the introduction and spread of aquatic invasive plants. This alternative is a broad solution that will do more to control and prevent infestations than the other alternative considered. The alternative will increase the effectiveness of future and ongoing AIPS control measures in Vermont by expanding the APCP through cost sharing between the Federal Government and VTDEC. Utilizing the array of proposed measures, this expansion will effectively reduce both the negative impacts of AIPS to the ecology and infrastructure within the project area, as well the probability of AIPS spread, naturally and by boat/trailer, through VT waterbodies. This alternative is not 100 percent effective, but it is a broad solution that will do much to prevent aquatic invasive plant infestations throughout the State of Vermont.

- **Efficiency**. If aquatic invasive plants are not treated, they will eventually outcompete much of the native, desired vegetation. This scenario would involve substantial and recurring costs associated with the repeated eradication of well-established populations of AIPS in numerous waterbodies throughout Vermont. The proposed action will help avoid unnecessary costs that could arise from severe infestations. The costs of the cost-share partnership detailed above would undoubtedly be a small fraction of the costs associated with O&M costs resulting from severe infestations in many bodies of water throughout the State. Direct management of AIPS in other water bodies provides further protection to Vermont's priority waterbodies. Maintaining AIPS at lowest feasible levels State-wide reduces the risk of transport and spread.

- **Acceptability**. Alternative 2, Expanded APCP Cost Sharing Program, is acceptable to all entities per applicable laws, regulations, and public policies, including the VTDEC. Only USEPA registered chemicals will be used in an early response capacity, reducing environmental impacts. While the solution is not all-encompassing, it is accepted as the most complete and effective solution available.

4.3.1 Proposed Action Alternative

Alternative 2 meets the study objectives and is a complete, effective, efficient, and acceptable plan for addressing aquatic invasive plant infestations and the associated negative impacts to the environment and infrastructure in the State of Vermont. There are no significant technical or engineering challenges associated with any of the measures included in the alternative. Compared to Alternative 1 (the No Action Alternative), Alternative 2 increases the effectiveness of future and ongoing AIPS control measures in the State of Vermont by expanding the APCP through cost sharing with VTDEC, reduces the risk of AIPS infestations by implementing the proposed measures, and minimizes the probability of AIPS spread, both naturally and by boat/trailer, through waterbodies in the state. Based on the Federal interest and environmental acceptability, Alternative 2 is the Proposed Action Alternative to be considered further during the environmental consequences and compliance analysis.

SECTION 5 – EXISTING CONDITIONS

This Section provides general information about the environmental conditions within the study area, which as described in Subsection 1.2, consists of Federal, State and local government owned waterbodies, their immediate shorelines and vehicle access points, and reservoirs of cooperating water-related infrastructure facilities (e.g., hydroelectric generation) within the State of Vermont, and the approximate 255-mile length of the Connecticut River serving as the boundary between Vermont and New Hampshire.

The discussion of existing conditions is limited to the specific resources that would most likely be affected by the proposed action.

5.1 WATER QUALITY

In compliance with the Clean Water Act, the State of Vermont established the following designated uses of its surface waters through the Vermont Water Quality Standards:

- Aquatic biota and wildlife that may utilize or are present in the waters;
- Aquatic habitat to support aquatic biota, wildlife, or plant life;
- The use of waters for swimming and other primary contact recreation;
- The use of waters for boating and related recreational uses;
- The use of waters for fishing and related recreational uses;
- The use of waters for the enjoyment of aesthetic conditions;
- The use of the water for public water source; and
- The use of water for irrigation of crops and other agricultural uses.

Surface waters are classified for each designated use to inform management objectives and establish minimum water quality criteria. The four classes by which a surface water can be designated are as follows: Class A(1) – waters in their natural condition that have significant ecological value; Class B(1) – waters in which one or more uses are of demonstrably and consistently higher quality than Class B(2) waters; Class B(2) – good quality waters that support all designated uses; and A(2) – waters that are suitable for a public water source with filtration and disinfection or other required treatment. Per a review of the Vermont Water Quality Standards, classifications of waterbodies within the study area range from A(1) through B(2) depending on designated use category (VTDEC, 2023b).

The VTDEC Watershed Management Division monitors Vermont's surface waters with the goal of protecting and maintaining Vermont's high quality surface waters. Specific monitoring includes: chemical parameters, such as nutrients, conductivity, salinity, pH, and priority metals; physical parameters, such as lake shoreline condition, stream geomorphic conditions, water levels and stream flow, and land use type and conversion; and biological parameters such as macroinvertebrates, algae, fish species, and fish tissue contaminants (VTDEC, 2023b).

VTDEC utilizes targeted, fixed station monitoring to understand status and trends of individual lakes, ponds, wetlands, rivers and streams. The data collected is used to periodically assess the quality of Vermont's surface waters relative to Vermont Water Quality Standards, in accordance with the Clean Water Act. When standards are not met, VTDEC adds waterbodies to a Vermont Priority Waters List, which includes a list of impaired waters (VTDEC, 2023b). Impaired waterbodies are then targeted for pollutant reductions to attain and maintain water quality standards. Water quality issues documented on this list vary and most commonly include

nutrient deficiencies, metals, E. coli, sedimentation, phosphorus, and other pollutants (VTDEC, 2022).

Water quality, and in particular dissolved oxygen, is impacted by dense mats of invasive aquatic plants. Dissolved oxygen is impacted by reduced light penetration and photosynthesis, reduced gas exchange at the surface of the water, and decomposition of dying plant material. The impacts are localized to the immediate area of the matted plants, but certain mats of AIPS can span significant areas.

5.2 WETLANDS AND NATIVE WETLAND VEGETATION

Federal (33 CFR § 328.3(b); Executive Order 11990) and State of Vermont (10 VSA § 902(5)) definitions of wetlands are similar, identifying wetlands as “those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.” As defined above, wetlands generally include swamps, marshes, bogs, and similar areas.

Vermont Wetland Rules further identifies ten functions and values that wetlands provide, classifies wetlands as Class I, II or III, and establishes buffer zones of 100 feet for Class I wetlands and 50 feet for Class II wetlands. Class I and II wetlands are considered significant enough to warrant protection under the wetland rules. The ten wetland functions and values established by the Vermont Wetland Rules include wildlife habitat, fish habitat, recreation and economics, open space and aesthetics, storm and flood storage, endangered and rare species, exemplary natural community characteristics, education and research, erosion control and water quality protection.

Identification of wetlands within the study area were based on reviews of Vermont GIS environmental mapping database and the USFWS National Wetland Inventory maps. Based on the review, waterbodies and waterways within Vermont support various types of wetlands further described below.

- Aquatic beds: Wetlands dominated by vegetation that grows on or near the water surface. Vegetation present in these types of wetlands includes algal mats, floating mats, and rooted plants. Vermont has over 120 known aquatic plant species. Common native submersed plant species include wild celery, water marigold, common bladderwort, and slender naiad. Common native free-floating plants include small duckweed, big duckweed, white water lily, and cow lily.

  This wetland type is the most susceptible to invasion by and degradation from AIPS.

- Emergent wetlands: Occur as a transition between the water source and land and include marshes, swamps, bogs, and fens. Common vegetation inhabiting emergent wetland includes sedges, cattails, rushes, and flowering plants.

- Forested/shrub wetlands: Are typically found along floodplains and riverbanks and form when the soil is saturated or flooding for a portion of the growing season. Vegetation consisting of shrub and tree species adapted to periodic flooding include maples, oaks, ash, and elm.

5.3 FISHERIES AND AQUATIC RESOURCES

Approximately 92 species of warm and cold freshwater fish inhabit the various waterbodies within Vermont. Of the 92 species, 11 species are non-native and three are considered invasive by the Vermont Fish and Wildlife Department. Six species are protected under the State's endangered species law. Refer to Subsection 5.5 for further information on these species.

Important sportfish species found in Vermont include brook trout, rainbow trout, brown trout, lake trout, Atlantic landlocked salmon, rainbow smelt, brown bullhead, small mouth bass, largemouth bass, yellow perch, walleye, northern pike, chain pickerel, and panfish.

To support the populations of popular sportfish species, the Vermont Fish and Wildlife Department operates five hatcheries specializing in rearing rainbow, brown and steelhead trout, landlocked Atlantic salmon, walleye, and muskellunge (VTDEC, 2025).

The specific aquatic habitat characteristics (e.g. substrate, cover, velocities, water quality) required to support each species life cycle is dependent on a particular species.

Aquatic Macroinvertebrates

Aquatic macroinvertebrate is a general term that encompasses insects, clams, and mussels. Given the various types of waterbodies within the project area, aquatic insects will range from those adapted to impaired water quality and degraded habitat conditions, to those that are more sensitive to such environments. For example, aquatic insects such as leeches and midges are adapted to poor water quality and finer substrates with higher nutrient levels, while species such as mayflies, stoneflies and caddisflies inhabit less polluted waters with higher dissolved oxygen, heterogenous substrates and native vegetation along the banks/shorelines.

There are 17 species of native freshwater mussels that inhabit the various streams, rivers, ponds and lakes, with 10 species listed as protected under the Vermont's Endangered Species Law. Additional information on those species is located in Subsection 5.5.2 of this report. Eastern elliptio, eastern lampmussel, squawfoot, triangle floater and eastern floater are found through the state in both streams and lakes. Dwarf wedgemussel, brook floater, and alewife floater are found only within the Connecticut River Basin. Black sandshell, pink heelsplitter, fragile papershell, flutedshell, pocketbook, giant floater and cylindrical papershell are only found within the Lake Champlain Basin (Vermont Department of Fish and Wildlife, 1995). Invasive clam and mussel species found in Vermont waterways include zebra mussels, Asian clam, and golden clam.

5.3.1 Essential Fish Habitat

Essential Fish Habitat (EFH) is defined under the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity." The MSFCMA requires Federal agencies to conduct an assessment to determine whether the proposed action "may adversely affect" designated EFH and to consult with NOAA National Marine Fisheries Service (NMFS) on activities that may adversely affect EFH. The objective of an EFH assessment is to determine the potential effects of the proposed action on relevant commercial, federally managed fisheries species within the proposed action area.

Based on a review of the NOAA-Fisheries EFH Mapping System, the Connecticut River and its tributaries, listed below, are designated as EFH for all life stages for Atlantic salmon.

- Black River
- Ompompanoosuc River
- Ottauquechee River
- Passumpsic River
- Saxtons River
- Stevens River
- Waits River
- Wells River
- West River
- White River
- Williams River

The USFWS has conducted annual fish counts within the Connecticut River since 1967. Based on a review of the reports, although numbers of Atlantic salmon caught have fluctuated throughout the decades, a noticeable downward trend in the number of catches began in 2013 and has continued. The State of Connecticut operates a stocking program within the Connecticut River Basin, with 334,738 juvenile Atlantic salmon released in 2023 (USFWS, 2025a). Existing publicly available data on the occurrence of Atlantic salmon in the portion of the Connecticut River Basin in Vermont is lacking.

Habitat Areas of Particular Concern (HAPC) are defined as subsets of EFH that exhibit one or more of the following traits: rare, stressed by development, provide important ecological functions for federally managed species, or are especially vulnerable to human degradation. Neither the Connecticut River nor its tributaries are designated as a HAPC.

5.4 WILDLIFE AND TERRESTRIAL RESOURCES

The various lacustrine and riverine habitats within Vermont provide diverse habitat supportive of a wide variety of wildlife species including many different amphibians, birds, reptiles, and mammals. Many of the wildlife and terrestrial resources of Vermont rely on the wetlands, shorelines and open waters of the State for habitat, foraging, cove and reproduction. Migratory birds and waterfowl utilize wetlands for important nesting habitat. For many species, like the Canada goose, wood duck, great blue heron, muskrat, beaver, snapping turtle, and bullfrog, wetlands are primary habitats – the only places they can live. For other species, such as black bear, moose, deer, wood frogs, and marsh hawks, wetlands are not primary habitat but are important for a part of their life cycle or during certain times of the year (VTDEC, 2025).

Other terrestrial resources, such as plants, including a variety of trees, shrubs, forbs, and grasses, can be found near the many and diverse habitat types throughout the State.

5.5 THREATENED AND ENDANGERED SPECIES

The Endangered Species Act of 1973, as amended (ESA) (16 USC §§ 1531 – 1543) was passed to conserve the ecosystems upon which endangered and threatened species depend, and to conserve and recover those species. An endangered species is defined by the ESA as any species in danger of extinction throughout all or a significant portion of its range. A threatened species is likely to become endangered within the foreseeable future throughout all or a significant part of its range. Critical habitats, essential to the conservation of listed species, also can be designated under the ESA. The ESA establishes programs to conserve and recover

endangered and threatened species and makes their conservation a priority for Federal agencies. Section 7 of the ESA requires Federal agencies to consult with the USFWS and NOAA NMFS Protected Resources Division (PRD) when their proposed actions may affect endangered or threatened species or their critical habitats.

State endangered and threatened species are protected under the Vermont's Endangered Species Law (10 VSA § 123). As the Connecticut River serves as the border between Vermont and New Hampshire, any work would within the Connecticut River would also need to consider species protected under the New Hampshire Endangered Species Conservation Act.

5.5.1 Federally Listed Species

United States Fish and Wildlife (USFWS) Trust Species

An official list of Threatened and Endangered species that are known to potentially occur within the State of Vermont was obtained from USFWS in June 2025 and is attached as Appendix C1. Table 5-1 summarizes the species identified, Federal and State protection status and region where documented. The listing status for both Vermont and New Hampshire is included to account for the Connecticut River. However, since the expansion of the program is throughout Vermont, only regions where each species is known to occur within Vermont are included in the table.

No critical habitats for any species were noted as occurring within the State.

Table 5-1. Federally Listed Species Potentially Occurring in Study Area

Common Name	Federal Status	State Status VT/NH	Region Documented in VT
Indiana Bat	E	E/E	Central-western Vermont
Northern Long-eared Bat	E	E/E	Throughout Vermont
Tricolored Bat	PE	E/E	Throughout Vermont
Canada Lynx	T	E/E	Northeastern Vermont
Dwarf Wedgemussel	E	E/E	Eastern Vermont within Connecticut River and tributaries
Monarch Butterfly	PT	N/A	Throughout Vermont
Jesup's Milk-vetch	E	E/E	Six known sites along the Connecticut River
Northeastern Bulrush	E*	E/E	Southeastern Vermont along and within vicinity of Connecticut River

Notes:

C: Candidate
E: Endangered
PE: Proposed Endangered
T: Threatened
PE: Proposed Endangered
PT: Proposed Threatened

* USFWS published notice of proposal to delist in Federal Register July 31, 2024

Sources: (USFWS, 2025b)

Brief summaries of the protection status and habitat requirements of each species are presented below.

Indiana Bat, Northern Long-eared Bat and Tri-colored Bat: Indiana bat was originally listed as endangered in 1967 and Northern long-eared bat was reclassified from threatened to endangered by USFWS in 2022. USFWS issued its proposal to list Tri-colored bat for protection under ESA in 2022. All three species utilize caves and abandoned mineshafts as hibernacula during the winter and roost under the exfoliating bark of dead or dying trees in the summer. Roost sites predominantly occur in a variety of forested communities, including riparian buffers, and wetland forests and upland forests. Hunting and foraging areas include forest and wetland edges and riparian buffers (USFWS, 2025c) (USFWS, 2025d) (USFWS, 2025e).

Canada Lynx: USFWS listed Canada lynx as threatened in 2000. Occurrence of Canada lynx in Vermont is mostly restricted to the extreme northeastern corner of Vermont, which is considered the southernmost edge of its range. Habitat consists of forests in locations subject to deep snowpack that supports their primary prey, the snowshoe hare (USFWS, 2025f).

Dwarf Wedgemussel: USFWS listed this species as endangered in 1990. Within Vermont, this species only occurs within the Connecticut River Basin with specific occurrences documented in the Connecticut River mainstem and in the confluence areas of several of its larger tributaries. The mussel prefers substrates including stable mud, silty sand, sand and gravel in slow to moderate currents and will sometimes burrow into riverbanks along tree roots (USFWS, 2025g).

Monarch Butterfly: USFWS proposed listing monarch butterfly as threatened under the ESA in 2024. Habitat consists of any location supportive of flowering plants and in particular, milkweed. Adult monarchs feed from a variety of nectar producing flowers during breeding and migration. However, milkweed is the only plant used for laying eggs and serves as the sole food source for the larval (caterpillar) stage of the butterfly's life cycle (USFWS, 2025h).

Jesup's Milk-vetch: USFWS listed this species as endangered in 1987.The Jesup's milk-vetch plant inhabits crevices on ledges or shelves of bedrock outcrops that have minimal sediment accumulation and are exposed to full sun. This plant has been documented along a stretch of the mainstem Connecticut River that also has known habitat supportive of several other state and federally listed species, including the dwarf wedgemussel, the cobblestone tiger beetle, and numerous State-listed plant species (USFWS N. E., 2019).

Northeastern Bulrush: Originally listed as endangered by USFWS in 1991, the agency posted a proposal to delist Northeastern bulrush in the July 31, 2024 Federal Register (USFWS, 2024c), with the reasoning that threats to this species have been eliminated or reduced to an extent that the species no longer meets the endangered definition under ESA. No timeline has been provided as to when the final determination for delisting will be made. Northeastern bulrush typically grows in open areas surrounded by forest that have seasonal fluctuating water levels such as vernal pools, sinkhole ponds, depressions, and riparian areas (USFWS, 2025i).

<u>NOAA-Fisheries Trust Species</u>

The shortnose sturgeon was listed as Endangered in 1967. Although this species has historically been documented in the portion of the Connecticut River from Turner's Falls, MA to the Long Island Sound, recent analysis of eDNA sampling conducted by the Connecticut River Conservancy and its partners within the Connecticut River confirmed the potential presence of shortnose sturgeon further upstream in southern Vermont near the Massachusetts border (Connecticut River Conservancy, 2024). Although typically anadromous, the populations within the Connecticut River tend to complete their life cycle entirely within the river. Habitat

requirements include sand to cobble substrate for foraging and spawning and water depths greater than 13 feet for overwintering (Shortnose Sturgeon Status Review Team, 2010).

5.5.2 State Listed Species

Fifty-three animal species and 164 plant species are protected under Vermont's Endangered Species Law. For the purposes of this report, Tables 5-2 and 5-3 summarize those species whose entire life cycle occurs within water. Two aquatic plant species, the Northeastern bladderwort and dwarf water-lily, are listed as Threatened and Endangered, respectively. In addition, the list includes numerous emergent wetland species such as sedges, rushes and flowering plants. The full list of State protected species is attached as Appendix C2.

Table 5-2. State Listed Fish Species

Species (Common Name)	State Listing Status	Regions Where Documented
Channel Darter	E	Region: Winooski, LaPlatte, and Poultney rivers
		Habitat: Pool/riffle complexes within small – moderate sized rivers; shallow areas with slow currents in large rivers. Prefer sand, gravel or rock substrate.
Northern brook Lamprey	E	Region: Indian Brook, Mellets Creek
		Habitat: Inhabit portions of waterways with riffles with sand and pea gravel substrate.
Lake Sturgeon	E	Region: Lake Champlain/lower reaches of Winooski, Lamoille, Missisquoi rivers & Otter Creek
		Habitat: Prefer lake/river bottom in water depths less than 30 ft. Spawn in fast, shallow water with rocky substrate.
Stonecat	E	Region: Missisquoi and LaPlatte rivers
		Habitat: Slow to fast moving riffles with rocky, rubble, boulder substrate.
American Brook Lamprey	T	Region: Lake Champlain Valley; Trout Brook & Winooski River
		Habitat: Coldwater streams/small rivers; sand/pea gravel substrate.
Eastern Sand Darter	T	Region: Missisquoi, Lamoille, Winooski, and Poultney rivers
		Habitat: Slow to moderate currents; sandy substrate.

Table 5-3. State Listed Clams and Mussels

Species	State Listing Status	Regions Where Documented/Habitat Requirements
Black Sandshell	E	Region: Poultney and Missisquoi rivers; Otter and Hospital creeks
		Habitat: Riffle and run areas of larger rivers in sand or gravel and lakes with sandy mud, firm sand, or gravel.
Brook Floater	E	Region: Lower half of the West River in southeastern Vermont
		Habitat: Small streams to large rivers with stable, moderate-speed waters; coarse sand, gravel, and aquatic vegetation with strong roots.
Cylindrical Papershell	E	Region: Three drainages in far western Vermont
		Habitat: Shallow water small streams and the headwaters of larger streams near shore in silt; sandy or muddy substrate.
Dwarf Wedgemussel	E	Region: Connecticut River mainstem and slightly upstream into some larger tributaries
		Habitat: Stable mud, silty sand, sand, or gravel where the current is sufficient to keep the substrate free of surficial silt; stable substrates in slow or moderate currents; near the banks among roots.
Flutedshell	E	Region: Tributaries of Lake Champlain
		Habitat: Medium to large rivers, often in riffles and runs; Preferred substrates include sand, mud, or fine gravel in areas with slow to moderate flow.
Fragile Papershell	E	Region: Missisquoi, Lamoille, Winooski, and Poultney rivers; Otter Creek
		Habitat: Streams of all sizes, rivers, and lakes in sand, mud, or gravel substrate.
Pink Heelsplitter	E	Region: Missisquoi, Lamoille, Winooski, and Poultney rivers; Lewis, Otter, and Hospital creeks; littoral zone of Lake Champlain

Species	State Listing Status	Regions Where Documented/Habitat Requirements
		Habitat: Variety of substrates including gravel, sand, and mud; can adapt to shallow lake habitats.
Pocketbook	E	Region: Poultney, Missisquoi, and Lamoille rivers; Lewis and Otter creeks; littoral zone of Lake Champlain
		Habitat: Larger rivers with loose to firmly-packed sand, gravel-sand, or silty sand substrates.
Eastern Pearlshell	T	Region: Upper Winooski River and Lewis Creek in the Lake Champlain Basin; Passumpsic, West, and Nulhegan rivers in the Connecticut River Basin
		Habitat: Cold streams that support trout populations with firm sandy bottoms, often among gravel, cobble or small boulders; Tucked among tightly packed cobble and gravel; Clean gravel and sand (no siltation).
Giant Floater	T	Region: Missisquoi, Lamoille, Hubbardton, Poultney, and Winooski rivers; Otter and East creeks
		Habitat: Shallow streams, lakes, and pools with fine sediment, areas dominated by sand and gravel with little to no flowing water.

5.6 CULTURAL AND HISTORIC RESOURCES

“Cultural resources” is an umbrella term for many heritage-related resources, including prehistoric and historic archaeological sites, buildings, structures, districts, or certain objects. Cultural resources are discussed in terms of archaeological resources, architectural resources, or resources of traditional cultural significance. Several Federal laws and regulations have been established to manage cultural resources and are applicable to this Study, including the National Historic Preservation Act (NHPA) of 1966, the National Environmental Policy Act of 1970, the Archeological and Historic Preservation Act of 1974, the American Indian Religious Freedom Act of 1978, the Archeological Resource Protection Act of 1979, and the Native American Graves Protection and Repatriation Act of 1990. In addition, Department of Defense Instruction (DoDI) 4710.02, Department of Defense (DoD) Interactions with Federally Recognized Tribes (2006), governs DoD interactions with Federally Recognized Tribes and Executive Order 13175, Consultation and Coordination with Indian Governments (2000), charges federal departments and agencies with regular and meaningful consultation with Native American tribal officials in the development of policies that have tribal implications (USACE, 2010).

The National Register of Historic Places (NRHP) is administered by the National Park Service (NPS) and is the official list of the properties in the United States that are significant in terms of

prehistory, history, architecture, or engineering. Generally, resources must be more than 50 years old to be considered eligible for the NRHP. To meet the evaluation criteria for NRHP eligibility, a property needs to be significant under one or more NRHP evaluation criteria (36 CFR Part 60.4) and retain historic integrity expressive of the significance. More recent structures might be NRHP-eligible if they are of exceptional importance or if they have the potential to gain significance in the future per special NRHP considerations (ACHP, 2013).

As a Federal agency, USACE has certain responsibilities for the identification, protection and preservation of cultural resources that may be located within the Area of Potential Effect (APE) associated with any proposed undertaking. Current statutes and regulations governing the identification, protection, and preservation of these resources include the NHPA; NEPA; Executive Order 11593; and the regulations implementing Section 106 of the NHPA (36 CFR Part 800, Protection of Historic Properties, August 2004). The NHPA and its implementing regulations require Federal decision makers to consider historic properties in their evaluation of effects associated with an undertaking. Under the NHPA, historic property means any prehistoric or historic district, site, building, structure, or object included in or eligible for inclusion in the NRHP maintained by the Secretary of the Interior (NPS). Under NEPA, Federal agencies are charged with considering impacts to cultural and historic resources, which encompasses a broader range of resources, including archaeological collections, sacred sites, and some resources that may not meet the criteria for eligibility to the National Register.

In accordance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, its implementing regulation 36 CFR Part 800, and the National Environmental Policy Act (NEPA), a Phase IA cultural resources investigation and background study was conducted and consisted of historic map analysis, historic property inventory, review of archaeological and historic contexts, and an assessment of archaeological and historic sensitivity in the Study Area. The focus of the Phase IA investigation was to analyze the proposed Program measures for their potential to affect significant archaeological and architectural resources and to make recommendations for additional review, if applicable.

Given that the exact APCP locations and measures are expected to change from year to year under the Program, the Area of Potential Effect (APE) was broadly defined as any areas within the Study Area where the proposed measures will be employed. USACE conducted background research to identify known cultural resources located within the architectural and archaeological APEs and to review previous cultural resource surveys conducted throughout the Study Area, including several statewide historic resource inventories, historic context development studies, and NRHP nomination forms. Site forms, spreadsheets, archaeological site data, and previous USACE cultural resources survey reports on file at the District were consulted for this Study. Background research also consisted of a desktop review of VTSHPO GIS data layers to evaluate archaeological site locational data and survey report citations. According to the Vermont State Historic Preservation Office (VTSHPO) Online Resource Center (ORC), several archaeological sites and National and State Register of Historic Places (NRHP/SRHP) properties and districts have been identified in the Study Area (Online Resource Center (ORC), 2025) An inventory of 368 previously recorded SRHP historic districts across the State of Vermont was prepared and is provided in Appendix D.

Over the past several decades, the VTSHPO has conducted several historic context studies for various cultural resources identified throughout the state, including the Vermont Historic Sites and Structures Survey (VDHP, 1971) a historic architectural overview of Vermont's summer resort towns (Clifford, 1987) an analysis of historic government buildings throughout the state (Zirblis, 1994), historic bridge and dam surveys (A.G. Lichtenstein & Associates, 1997); (The Louis Berger Group), and several other statewide architectural surveys of historic structures that

contribute to significant themes of Vermont's heritage (Gilbertson, 2001); (Jamison, 2006); (Sagerman, 2010); (O'Shea, 2015). Several archaeological investigations throughout the state have been made available via the VTSHPO ORC and were also analyzed as part of this report (Haviland, 1981); (Power, 1984); (Dowd, 1990); (Thomas, 2001).

Due to the large size of the Study Area, the District has not conducted additional cultural resource studies as part of this PEA. A determination of the potential for additional cultural resources was considered based on the prehistory, history, and topography of each site; however, site-specific testing and assessment of effects will need to be addressed on a site-by-site basis. The scale and scope of the program has yet to be narrowed down to specific waterbodies, which will be selected for plant control measures at a later date. Surveys will be conducted to identify any additional resources in the proposed footprints once designs are developed. In accordance with Section 106 of the NHPA, a Programmatic Agreement (PA) may be developed to outline the activities and tasks that must be carried out to conclude identification of significant resources, determine adverse effects, and mitigate for those adverse effects. Further information is provided in Appendix D.

5.7 AESTHETICS AND VISUAL RESOURCES

Aesthetics or visual resources are the natural and artificial features of the landscape that can be seen and that contribute to the public's appreciative enjoyment of the environment. The aesthetic quality of an area is a subjective measure of one's perception of how pleasing an area is. The waterbodies within Vermont provide beautiful views, including pristine lake shores, desirable rivers, and clear waters.

5.8 RECREATION

Due largely to its scenic terrain, Vermont provides a wide variety of opportunities for outdoor recreation, which in turn provide genuine value to residents, as well as economic opportunities through tourism. A considerable industry has been established due to the availability and establishment of water- and land-based recreational opportunities. Depending on the location, popular activities include boating, swimming, water skiing, jet skiing, fishing, camping, hunting, walking, biking, and bird and wildlife viewing.

5.9 HTRW

VTANR compiles databases of hazardous, toxic, and radioactive waste (HTRW) listings and other environmental contamination records. Environmental databases VTANR lists in their Natural Resource Atlas include those relating to landfills, land use restrictions, hazardous sites, hazardous waste generations, brownfields, salvage yards, aboveground storage tanks, underground storage tanks, dry cleaners, urban soil background areas, and per- and polyfluoroalkyl substances (PFAS) results. In general, there is an increased number of environmental database listings in areas of historic anthropogenic activity, namely in population centers along waterbodies (VTANR, 2025).

5.10 COMMUNITIES AT RISK

The Draft ILR/PEA analysis incorporates the needs and considerations of all at-risk communities within the study area.

GIS datasets related to at-risk communities were evaluated for census block groups in Vermont. Of Vermont's 552 census block groups,169 block groups had a per capita income 80 percent or

less of the national average, and 111 census block groups had an unemployment rate equal to or greater than 1% more than the national average (with some groups meeting both criteria). Some of these communities disproportionately rely on tourism for economic support, which can be negatively impacted by waterbodies infested with aquatic invasive plants.

SECTION 6 – ENVIRONMENTAL CONSEQUENCES

This Section discusses the potential positive and adverse direct and indirect environmental consequences of the No Action Alternative and the Proposed Action. The anticipated effects associated with the No Action Alternative are compared to those of the Proposed Action. The proposed action is intended to treat and reduce the risk of invasive species infestations, resulting in reduction and avoidance of the adverse economic, environmental, and social consequences of such infestations.

Federal participation in the program would be dependent on the State of Vermont continuing to fund and implement the APCP and Congress specifically appropriating funds for the program. The No Action alternative represents a continuation of Vermont's current program, in which the APCP would not be expanded through the entire State, thus potentially limiting the areas treated. Without a sufficiently funded expanded APCP, aquatic invasive plants are more likely to establish a foothold in areas of Vermont outside of the Lake Champlain Basin. These areas of Vermont would remain vulnerable to infestation and existing populations of AIPS would be more likely to proliferate and spread.

6.1 WATER QUALITY

6.1.1 Alternative 1: No Action

The spread of AIPS throughout the State of Vermont would have notable adverse effects on water quality. Once established, floating aquatic invasive plants can form dense mats that limit light penetration and shade and crowd out native plants. When the plants decompose in the fall, they liberate nutrients in the water and reduce the amount of dissolved oxygen, often resulting in fish and other plant die offs.

If the No Action Alternative was implemented, there would remain a high risk of AIPS infestations affecting water quality throughout the State. The current APCP would continue to be implemented in the Lake Champlain Basin, but other geographical areas of the State would be left vulnerable to AIPS infestations due to the absence of Federal cost-shared funding. The No Action Alternative would limit any benefits to or protection of water quality.

6.1.2 Alternative 2: Proposed Action

The following measures will have no adverse effect on water quality:

- Measure 1: Mechanical Control (benthic matting method)
- Measure 2: Watercraft Inspection Stations
- Measure 3: Early Detection Monitoring
- Measure 4: Drone Surveys
- Measure 5: eDNA
- Measure 6: Public Awareness and Education

Benthic matting is not expected to generate any turbidity as installation involves slowly draping mats over the substrate and generally covers a small area. Watercraft inspection and decontamination stations are located at a distance from the waterbody to reduce the chances of reintroduction of invasive species into waterbodies during the decontamination process. For the construction of any new watercraft inspection and decontamination stations, erosion and sediment control best management practices would be employed to prevent sediment laden runoff from being introduced into waterways. Early detection monitoring is limited to observatory

or non-disruptive methods that would not generate turbidity. Drone surveys are conducted in the air and do not physically interact with the ground surface. eDNA sampling is limited to non-intrusive water sampling that would not generate turbidity. Public awareness and education are administrative in nature and do not interact with the resource.

The following measures will have short-term, less than significant effects on water quality:

- Measure 1: Mechanical Control (hand harvesting, raking, suction harvesting, etc.)
- Measure 8: Chemical Control

Mechanical control measures can adversely affect water quality by increasing water turbidity and suspending nutrients. However, these impacts are typically short-term, minor, and limited to when the measure is implemented. Overall, mechanical control can effectively treat and prevent AIPS infestations and has a net positive effect on water quality.

Chemical control measures can adversely affect water quality by altering water chemistry and degrading its characteristics. However, it is not used routinely and is typically limited to treating large aquatic invasive plant infestations, particularly in a rapid response capability. All pesticides permitted for use by VTDEC are approved for aquatic use by the USEPA and are applied according to their labels. The USEPA requires rigid testing of each active chemical prior to approval and has developed several risk assessments to evaluate the potential for the product to cause harm to the environment, humans, and wildlife (USEPA, 2024). Adverse impacts to water quality during pesticide application are typically short-term, minor, and mainly associated with water quality degradation at the time of application. Any herbicide treatment would be performed by a qualified licensed professional and in compliance with the conditions established within the Aquatic Nuisance permit provided by the State prior to initiation of treatment activities.

Long-term, chemical control has important positive effects on water quality that are particularly relevant in the Connecticut River, where Hydrilla has not yet been detected in Vermont but remains a threat due to its presence in downstream Massachusetts and Connecticut. Spread of Hydrilla into Vermont would represent a significant negative effect on water quality and cost-sharing of rapid response chemical control is an important measure to address this threat. Overall, chemical control can effectively treat and prevent AIPS infestations and has a net positive effect on water quality.

The implementation of the various AIPS control measures would benefit water quality as aquatic invasive plant infestations could be more effectively treated and prevented. Further, expansion of the APCP throughout the entire State of Vermont would allow for aquatic plant control in areas not benefiting from the current APCP. This expanded program would better protect the water quality of waterbodies currently free of AIPS and would improve the water quality in waterbodies experiencing AIPS infestations.

6.2 WETLANDS AND NATIVE AQUATIC VEGETATION

6.2.1 Alternative 1: No Action

The spread of AIPS throughout the State of Vermont would have notable adverse effects on wetlands and native aquatic vegetation. Once established, aquatic invasive plants would outcompete native aquatic vegetation in Vermont’s wetlands due to their abilities to rapidly take up nutrients and proliferate.

If the No Action Alternative was implemented, there would remain a high risk of AIPS infestations affecting wetlands and native aquatic vegetation throughout the State. The current

APCP would continue to be implemented in the Lake Champlain Basin, but other geographical areas of the State would be left vulnerable to AIPS infestations the absence of Federal cost-shared funding. The No Action Alternative would limit any benefits to wetlands and native aquatic vegetation.

6.2.2 Alternative 2: Proposed Action

The following measures will have no adverse effect on wetlands and native aquatic vegetation:

- Measure 2: Watercraft Inspection Stations
- Measure 3: Early Detection Monitoring
- Measure 4: Drone Surveys
- Measure 5: eDNA
- Measure 6: Public Awareness and Education

Watercraft inspection and decontamination stations are located away from wetlands to reduce the chances of invasive species being reintroduced into nearby wetlands. For the construction of any new watercraft inspection and decontamination stations, erosion and sediment control best management practices would be employed to prevent sediment laden runoff from being introduced into nearby wetlands. Early detection monitoring is limited to observatory or non-disruptive methods that would not disturb wetlands or native aquatic vegetation. Drone surveys are conducted in the air and do not physically interact with the ground surface. eDNA sampling is limited to non-intrusive water sampling that would not disturb wetlands or native aquatic vegetation. Public awareness and education are administrative in nature and do not interact with the resource.

The following measures will have short-term, less than significant effects on wetlands and native aquatic vegetation:

- Measure 1: Mechanical Control
- Measure 8: Chemical Control

Mechanical control measures can result in incidental removal of non-target vegetation during implementation of the measure. Conditions established in the Aquatic Nuisance Control permit require that an aquatic plant assessment be conducted prior to harvesting actions to aid in the identification of non-target vegetation. Therefore, the adverse effect on native aquatic vegetation is less than significant. Overall, mechanical control can effectively treat and prevent AIPS infestations and has a net positive effect on wetlands and native aquatic vegetation.

Chemical control measures can potentially adversely affect native aquatic vegetation by incidentally harming non-target vegetation. However, ProcellaCOR has been the only aquatic herbicide permitted by VTDEC since 2020 and is highly specific to Eurasian watermilfoil, one of the main target AIPS species. Negative effects on native aquatic vegetation related to ProcellaCOR have been documented as minimal to none. Overall, the use of ProcellaCOR as chemical control can effectively treat Eurasian watermilfoil infestations and has a net positive effect on native aquatic vegetation (VTANR, 2022). This ILR/PEA does however include any aquatic pesticides approved by USEPA in an effort to provide flexibility should VTDEC protocols and policy change in the future. These other aquatic pesticides would have varying levels of negative effects and evaluation of their impacts would occur prior to implementation. The herbicide treatment would be performed by a qualified licensed professional and in compliance with the conditions established within the Aquatic Nuisance permit provided by the State prior to initiation of treatment activities. Overall, chemical control can effectively treat and prevent AIPS infestations and has a net positive effect on wetlands and native aquatic vegetation.

The implementation of the various AIPS control measures would benefit wetlands and native aquatic vegetation as aquatic invasive plant infestations could be more effectively treated and prevented. Further, expansion of the APCP throughout State of Vermont would allow for aquatic plant control in areas not benefiting from the current APCP. This expanded program would better protect Vermont's wetlands and native aquatic vegetation from the negative impacts associated with infestations of aquatic invasive plants.

6.3 FISHERIES AND AQUATIC RESOURCES

6.3.1 Alternative 1: No Action

The spread of AIPS throughout the State of Vermont would have notable adverse effects on fisheries and aquatic resources. Invasive aquatic plants can form dense mats of plant matter, which decompose in the fall causing a reduction in waterbody dissolved oxygen, often resulting in fish die offs. Additionally, mats of AIPS can crowd out native aquatic vegetation negatively impacting fish habitat.

If the No Action Alternative was implemented, there would remain a high risk of AIPS infestations affecting fisheries and aquatic resources throughout the State. The current APCP would continue to be implemented in the Lake Champlain Basin, but other geographical areas of the State would be left vulnerable to AIPS infestations due to the absence of Federal cost-shared funding. The No Action Alternative would limit any benefits to fisheries and aquatic resources.

6.3.2 Alternative 2: Proposed Action

The following measures will have no adverse effects on fisheries and aquatic resources:

- Measure 2: Watercraft Inspection Stations
- Measure 3: Early Detection Monitoring
- Measure 4: Drone Surveys
- Measure 5: eDNA
- Measure 6: Public Awareness and Education

Watercraft inspection and decontamination stations are located at a distance from the waterbody to prevent reintroduction of invasive species during the decontamination process. For the construction of any new watercraft inspection and decontamination stations, erosion and sediment control best management practices would be employed to prevent sediment laden runoff from being introduced into waterways. Early detection monitoring is limited to observatory or non-disruptive methods that would not induce turbidity or disturb habitat. Flight elevations during drone surveys are expected to occur at heights where the noise, movement and/or shadowing from the unit would be imperceptible enough to fish as to not trigger a stress response. eDNA sampling is limited to non-intrusive water sampling that would not generate turbidity that could adversely affect foraging, hunting, or spawning habitat. Public awareness and education are administrative in nature and do not interact with the resource.

The following measures will have short-term, less than significant effects on fisheries and aquatic resources:

- Measure 1: Mechanical Control
- Measure 8: Chemical Control

Fishery Resources

Mechanical control measures have the potential of causing adverse effects consisting of potential mortality, disruption of foraging and hunting, and loss of spawning habitat. The management season for AIPS in Vermont extends from June 1st through October 1st when AIPS growth occurs and can coincide with the migration and spawning periods of certain fish species. Depending on the type of harvester used, fish can be accidentally entrained in equipment during operation. Additionally, noise from the harvester could inhibit foraging and spawning behavior. As the benthic matting control method is overlain on the substrate, it prevents access to spawning habitat.

Turbidity caused by mechanical harvesters could hinder predation efficiency of sight feeding fish within the management area. Additionally, the loss of aquatic macroinvertebrate species resulting from the mechanical operations will eliminate a food source for fish until the area is recolonized. Recolonization typically occurs within a several months.

There is documented use of certain species such as bass, sunfish, and killifish utilizing some AIPS like starry stonewort, hydrilla, and water chestnut for cover and a food source. However, the use is limited to those species that are adapted to degraded habitat conditions and impaired water quality and to sparse to moderate infestations where interstitial space remains large enough for fish access and movement. Ultimately, any limited ecological benefits are negated once the infestations become dense. Once formed, the dense matting created by AIPS develops a physical barrier that prevents fish from accessing the area for both foraging, hunting, and spawning. This in turn results in increased competition in non-infested areas of the waterbody that can result in stressed and reduced populations (Pullman & Crawford, 2010) (Engel, 1995) (Cornell Cooperative Extension, 2025) (LH PRISM, 2025). Therefore, any adverse effects to fish species related to the removal of AIPS as a source for food and cover is negligible.

Adverse effects to fish are temporary in nature and will be mitigated through the selection of the most appropriate control measure for the location to be managed and conditions established in the Aquatic Nuisance Control Permit that limit the work area and implement any seasonal restrictions during spawning periods if determined necessary. Benthic matting is required to be removed after October 30 and covers a small area (under 0.25 acres) in relation to the waterbody in which it's placed.

It should be noted that the Lake Champlain APCP has been ongoing for several decades without causing significant adverse effects to the fishery resources. Overall, the management of AIPS will result in positive effects to fish species as it will increase available spawning habitat, improve water quality and allow for the potential reestablishment of native submerged aquatic vegetation (SAV) that serves as a cover and food source.

Aquatic Macroinvertebrates

Mechanical control measures can cause direct mortality of aquatic invertebrates. Benthic matting smothers aquatic macroinvertebrates that are inhabiting the treated area and removes access to the substrate during the time it is employed. However, the area which benthic matting covers is typically small (under 0.25 acres) compared to the overall area of the waterbody being treated. In addition, VTDEC requires that benthic matting be removed by October 30. Therefore, recolonization is expected to occur once the matting is removed. Depending on the mechanical harvesting method, direct mortality to aquatic macroinvertebrates can be caused either by the equipment itself or through increased turbidity.

Mechanical harvesters are typically utilized in areas with dense infestations. Similar to fish, macroinvertebrate populations within any AIPS infestations would be reduced due to the loss of available substrate. There would also be a decreased presence of fish that may serve as hosts to those mussel species that utilize them as a means for dispersal. Therefore, the adverse effects to aquatic macroinvertebrates will be less than significant. Positive effects of AIPS removal includes the restoration of suitable habitat and water quality improvements that would promote recolonization and increased diversity of aquatic macroinvertebrate assemblages.

Chemical control measures have the potential to adversely affect fish and aquatic macroinvertebrates by introducing chemicals into the water column and generating noise during application that can disrupt hunting/foraging and spawning behavior. However, only limited pesticides have been permitted for use by VTDEC and they are highly specific to targeted AIPS with minimal to no documented negative effects on aquatic animals. Typical aquatic pesticide permits issued by VTDEC also contain conditions aimed at protecting wildlife including limiting portions of the waterbody where the work is allowed to take place. This ILR/PEA also includes any aquatic pesticides approved by USEPA in an effort to provide flexibility should VTDEC protocols and policy change in the future. These other aquatic pesticides would have varying levels of negative effects and evaluation of their impacts would occur prior to implementation. Overall, chemical control can effectively treat and prevent AIPS infestations and has a net positive effect on fish and aquatic resources.

6.4 ESSENTIAL FISH HABITAT

6.4.1 Alternative 1: No Action

The No Action alternative would have similar effects on EFH as described in Subsection 5.3.

6.4.2 Proposed Action

The following measures will have no adverse effects on Essential Fish Habitat, specifically for Atlantic salmon and its prey species:

- Measure 2: Watercraft Inspection Stations
- Measure 3: Early Detection Monitoring
- Measure 4: Drone Surveys
- Measure 5: eDNA
- Measure 6: Public Awareness and Education

In the event that Atlantic salmon still inhabit the portion of the Connecticut River and its tributaries in Vermont, it is not expected to occur in locations where AIPS are present due to water quality parameters, such as low dissolved oxygen, that are not supportive of this species. Although benthic matting removes access to natural substrate, the majority of AIPS are found in substrates that are not used by Atlantic salmon for spawning. Therefore, it is likely that neither mechanical controls nor chemical controls will adversely affect this species.

Any effects to prey species are similar to those described in Subsection 6.3.2.

To avoid diadromous fish spring migration, a work restriction will be implemented during management operations, between April 1 and June 30.

A programmatic level Essential Fish Habitat Assessment has been prepared and is located in Appendix B.

6.5 WILDLIFE AND TERRESTRIAL RESOURCES

6.5.1 Alternative 1: No Action

The spread of AIPS throughout the State of Vermont would have notable adverse effects on wildlife and terrestrial resources. Once established, aquatic invasive plants would outcompete native aquatic vegetation in Vermont's wetlands due to their abilities to rapidly take up nutrients and proliferate. This leads to imbalances in the ecosystem to the detriment of wildlife and terrestrial resources.

If the No Action Alternative was implemented, there would remain a high risk of AIPS infestations affecting wildlife and terrestrial resources throughout the State. The current APCP would continue to be implemented in the Lake Champlain Basin, but other geographical areas of the State would be left vulnerable to AIPS infestations due to the absence of Federal cost-shared funding. The No Action Alternative would limit any benefits to wildlife and terrestrial resources.

6.5.2 Alternative 2: Proposed Action

The following measures will have no adverse effect on wildlife and terrestrial resources:

- Measure 2: Watercraft Inspection Stations
- Measure 3: Early Detection Monitoring
- Measure 5: eDNA
- Measure 6: Public Awareness and Education

Watercraft inspection and decontamination stations are located on previously disturbed areas to reduce their effects on wildlife and terrestrial resources. For the construction of any new watercraft inspection and decontamination stations, erosion and sediment control best management practices would be employed to prevent sediment laden runoff from being introduced into nearby terrestrial resources. Early detection monitoring is limited to observatory or non-disruptive methods that would not disturb wildlife or terrestrial resources. eDNA sampling is limited to non-intrusive water sampling that would not disturb wildlife. Public awareness and education are administrative in nature and do not interact with the resource.

The following measures will have short-term, less than significant effects on wildlife and terrestrial resources:

- Measure 1: Mechanical Control
- Measure 4: Drone Surveys
- Measure 8: Chemical Control

Mechanical control measures can potentially adversely affect wildlife by disturbing wildlife during removal operations. However, mechanical control measures are subject to VTDEC permitting and such permits typically contain conditions aimed at protecting wildlife. These conditions can include seasonal work restrictions based on anticipated species encountered, depth of water restrictions subject to treatment, and other conditions aimed at protecting wildlife. Protocols would be taken to ensure that disturbance of wildlife and terrestrial resources would be minimized, to the greatest extent practicable. Overall, mechanical control can effectively treat and prevent AIPS infestations and has a net positive effect on wildlife and terrestrial resources.

Drone surveys can adversely impact wildlife by incidentally harming birds during drone operation. However, seasonal restriction windows would be implemented with the intent to

minimize the risk of drones interacting with birds during operation. Overall, drone surveys can effectively work as an early AIPS detection method and have a net positive effect on wildlife and terrestrial resources.

Chemical control measures have the potential to adversely affect wildlife by introducing chemicals to habitats and generating noise during application that can disturb wildlife. However, only limited pesticides have been permitted for use by VTDEC and they are highly specific to targeted AIPS with minimal to no documented negative effects on wildlife. Typical aquatic pesticide permits issued by VTDEC also contain conditions aimed at protecting wildlife including limiting portions of the waterbody where the work is allowed to take place. This ILR/PEA also includes any aquatic pesticides approved by USEPA in an effort to provide flexibility should VTDEC protocols and policy change in the future. These other aquatic pesticides would have varying levels of negative effects and evaluation of their impacts would occur prior to implementation. Overall, chemical control can effectively treat and prevent AIPS infestations and has a net positive effect on wildlife and terrestrial resources.

The implementation of the various AIPS control measures would benefit wildlife and terrestrial resources as aquatic invasive plant infestations could be more effectively treated and prevented. Further, expansion of the APCP throughout the entire State of Vermont would allow for aquatic plant control in areas not benefiting from the current APCP. This expanded program would better protect Vermont's wildlife and terrestrial resources from the negative impacts associated with infestations of aquatic invasive plants.

6.6 THREATENED AND ENDANGERED SPECIES

6.6.1 Alternative 1: No Action

The spread of AIPS throughout the State of Vermont reduces or eliminates habitats that either directly support Federal and State protected species or support their food sources. If the No Action Alternative was implemented, there remains a high risk of AIPS infestations adversely affecting such species throughout the State. The current APCP would continue to be implemented in the Lake Champlain Basin, but other geographical areas of the State would be left vulnerable to AIPS infestations due to the absence of Federal cost-shared funding. The No Action Alternative would limit any benefits to Federal and State protected species.

6.6.2 Alternative 2: Proposed Action

6.6.2.1 Federal Threatened and Endangered Species

No Effect Determinations

The District has prepared No Effect Determinations for the following species:

- Canada lynx
- Indiana bat
- Northern long-eared bat
- Tri-colored bat
- Monarch butterfly

The No Effect Determinations are based on the conclusion that none of the AIPS control measures will have any quantifiable adverse or positive effects on these species. Canada lynx could potentially occur as a transient along streambanks and the shorelines of lakes, ponds and reservoirs within the region it occupies in Vermont. However, it can easily avoid any AIPS

management operations. Additionally, their primary prey are not obligate aquatic species whose populations could be reduced by AIPS management measures. The listed bat species utilize river corridors and wetlands for foraging and hunting. However, because they are nocturnal, any AIPS management operations will not impede their ability to hunt. In addition, AIPS management measures are not expected to adversely affect populations of their prey species in a manner that could reduce food source availability. Monarch butterfly habitat is not located within littoral zones or open water where mechanical and chemical controls would occur. Construction of any new inspection and decontamination stations would be located in previously disturbed areas immediately adjacent to access roads.

The No Effect Determinations are included in Appendix C3.

<u>May Effect, Not Likely to Adversely Affect Determinations</u>

The following measures will have no adverse effects on the following federally listed species:

- Measure 2: Watercraft Inspection Stations
- Measure 3: Early Detection Monitoring
- Measure 4: Drone Surveys
- Measure 5: eDNA
- Measure 6: Public Awareness and Education

The District prepared letters determining a May affect, not likely to adversely affect for the following species as it relates to mechanical and chemical control measures:

- Jesup's milk-vetch
- Northeastern bulrush
- Dwarf wedgemussel
- Shortnose sturgeon

The four species are not likely to be present in areas of dense infestations of AIPS due to the habitat modifications and water quality impairments that result from their presence. However, given the scope of the project area and in absence of presence/absence surveys, there is potential for these species to be present in the vicinity of sparse to moderate infestations.

All four species are also protected by Vermont's Endangered Species Law. Mechanical and chemical control measures require an Aquatic Nuisance Control permit. For management operations that are occurring in or near locations of known protected species, the permit includes conditions requiring the completion of presence/absence surveys prior to initiating work. In addition, for protected plant species, staff knowledgeable in their identification are on site during the implementation of the control measures.

A positive effect is the restoration of habitat supportive of the reestablishment or expansion of these species.

The District is using the Draft ILR/PEA as the primarily coordination vehicle with the USFWS New England Field Office and NOAA-Fisheries to complete ESA Section 7 consultation. The May Affect, Not Likely to Adversely Affect determinations for each species are located in Appendix C4.

6.6.2.2 State Listed Species

Effects and protocols to protect state listed species are similar to those described in Subsection 6.6.2.1 above.

6.7 CULTURAL AND HISTORIC RESOURCES

6.7.1 Alternative 1: No Action

Since VTDEC currently manages several APCP measures throughout the Lake Champlain Basin, the potential to affect cultural resources may exist. However, given that Alternative 1 would only result in the continuation of current control measures which impose no potential for ground disturbance, and no additional measures would be implemented, the District has determined that Alternative 1 is unlikely to impact cultural resources. If potential adverse impacts are identified at any point during the continuation of current practices, additional investigation and consultation will be required in accordance with Section 106 of the NHPA.

6.7.2 Alternative 2: Proposed Action

The Study Area has been occupied for approximately 10,000 years and has been subject to significant changes in land use for centuries, namely due to deforestation and agriculture. The remains of this occupation may be encountered in many forms throughout the region and may include standing historic structures, Pre-Contact Period and historic archaeological sites, and historic landscapes. In general, waterbodies to be included in this program may contain a variety of potentially significant resources depending upon the historic land use of the properties and current site conditions. Based on available VTSHPO data, a total of 368 SRHP historic districts, 18 National Historic Landmarks (NHLs), and more than 8,000 archaeological sites have been recorded in the Study Area. Although the locational data for archaeological sites in the Study Area is currently restricted, GIS data suggests that more than 60 SRHP historic districts are located on or adjacent to waterbodies and their shorelines in the Study Area that may be subject to plant control measures as part of the APCP.

Because the specific location and scale of the proposed plant control measures are not known at this time it is possible that they may overlap with NRHP/SRHP-eligible historic districts, properties, or archaeological sites located in and around waterbodies throughout Vermont and the surrounding states. However, the District has determined that the proposed measures are not likely to have an adverse effect on cultural resources because they are expected to be short term and temporary in nature and not expected to involve ground disturbance within the previously undisturbed area. Based on the District's assessment, no additional work is recommended at this time.

As designs are further formulated, the District will be conducting an evaluation of the Area of Potential Effect (APE) for all proposed measures to identify cultural resources that may be affected by the APCP directly and indirectly and assess the effect each measure may have on cultural resources. Should an activity be proposed within a State Register/National Register-eligible or listed historic district, property, or archaeological site for an extended period of time or involve ground disturbance within previously undisturbed areas, additional investigations may be required to determine the potential for the activities to adversely affect cultural resources. Additional cultural resources assessments may include further review of information, site files, and archival materials held by the VTSHPO, local historical societies, libraries, municipal offices, tribal nations, the Vermont Archaeology Heritage Center, and the Vermont History Museum. If such activities are proposed, the District, in cooperation with the VTDEC shall carry out consultation with the appropriate SHPO and relevant stakeholders to determine what is required to evaluate the activity under Section 106 of the NRHP and depending on the results of that consultation and additional investigations, if needed, the District and the VTDEC shall consider measures to avoid, minimize or mitigate for adverse effects.

6.8 AESTHETICS AND VISUAL RESOURCES

6.8.1 Alternative 1: No Action

The spread of AIPS throughout the State of Vermont would have notable adverse effects on aesthetics and visual resources. Without a sufficiently funded expanded APCP, aquatic invasive plants are more likely to establish a foothold in areas of Vermont currently free of AIPS and existing populations of AIPS are more likely to proliferate and spread. Once established, certain aquatic invasive plants such as water chestnut and Eurasian watermilfoil can form dense unsightly mats on the surface of waterbodies, which inhibit water movement and lead to stagnant unattractive waters.

If the No Action Alternative was implemented, there would remain a high risk of AIPS infestations affecting aesthetics and visual resources. The current APCP would continue to be implemented in the Lake Champlain Basin, but other geographical areas of the State would be left vulnerable to AIPS infestations due to the absence of Federal cost-shared funding. The No Action Alternative would limit any benefits to aesthetics and visual resources.

6.8.2 Alternative 2: Proposed Action

The following measures will have no adverse effect on aesthetics and visual resources:

- Measure 2: Watercraft Inspection Stations
- Measure 3: Early Detection Monitoring
- Measure 5: eDNA
- Measure 6: Public Awareness and Education

Watercraft inspection and decontamination stations are located at a distance from the waterbody to reduce the chances of invasive species being reintroduced during the decontamination process, which in turn removes them from the geographic proximity of water-related visual resources. For the construction of any new watercraft inspection and decontamination stations, erosion and sediment control best management practices would be employed to prevent sediment laden runoff from being introduced into nearby waterbodies, which would reduce the potential for aesthetics to be degraded. Early detection monitoring is limited to observatory or non-disruptive methods that would not affect aesthetics or visual resources. eDNA sampling is limited to non-intrusive water sampling that would not affect aesthetics or visual resources. Public awareness and education are administrative in nature and do not interact with the resource.

The following measures will have short-term, less than significant effects on aesthetics and visual resources:

- Measure 1: Mechanical Control
- Measure 4: Drone Surveys
- Measure 8: Chemical Control

Mechanical control measures can adversely affect aesthetics and visual resources during removal operations due to the use of unsightly equipment (e.g., kayaks, boats, rakes, etc.) which would otherwise disturb a pristine waterbody. However, these impacts are typically short-term, minor, and limited to when the measure is implemented. Overall, mechanical control can effectively treat and prevent AIPS infestations and has a net positive effect on aesthetics and visual resources.

Drone surveys can adversely impact aesthetics and visual resources during removal operations due to the use of unsightly equipment (e.g., drones) which would otherwise disturb a pristine air space. However, these impacts are typically short-term, minor, and limited to when the measure is implemented. Overall, drone surveys can effectively work as an early AIPS detection method and have a net positive effect on aesthetics and visual resources.

Chemical control measures can adversely affect aesthetics and visual resources during application operations due to the use of unsightly equipment (e.g., boats, applicators, etc.) which would otherwise disturb a pristine waterbody. Additionally, application of herbicides has the potential to interfere with waterbody aesthetics due to the introduction of chemicals. However, these impacts are typically short-term, minor, and limited to when the measure is implemented. Overall, chemical control can effectively treat and prevent AIPS infestations and has a net positive effect on aesthetics and visual resources.

The implementation of the various AIPS control measures would benefit aesthetics and visual resources as aquatic invasive plant infestations could be more effectively treated and prevented. Further, expansion of the APCP throughout the State of Vermont would allow for aquatic plant control in areas not benefiting from the current APCP. This expanded program would better protect the aesthetics of waterbodies currently free of AIPS and would improve the aesthetics in waterbodies experiencing AIPS infestations.

6.9 RECREATION

6.9.1 Alternative 1: No Action

The spread of AIPS throughout the State of Vermont would have notable adverse effects on recreation. Once established, floating aquatic invasive plants can form dense mats on the surface of waterbodies, discouraging in-water recreation such as boating, swimming, water skiing, jet skiing, and fishing. Further, these dense mats of vegetation can be impossible to pass through and can foul water intakes, damaging boat motors. Swimming would also be undesirable through vegetation choked waterways, although the unattractive appearance would likely discourage most swimmers.

If the No Action Alternative was implemented, there would remain a high risk of AIPS infestations affecting recreation throughout the State. The current APCP would continue to be implemented in the Lake Champlain Basin, but other geographical areas of the State would be left vulnerable to AIPS infestations due the absence of Federal cost-shared funding. The No Action Alternative would limit any benefits to recreation.

6.9.2 Alternative 2: Proposed Action

The following measures will have no adverse effect on recreation:

- Measure 3: Early Detection Monitoring
- Measure 4: Drone Surveys
- Measure 5: eDNA
- Measure 6: Public Awareness and Education

Early detection monitoring is limited to observatory or non-disruptive methods that would not affect recreation. Drone surveys are conducted in the air and do not physically interact with the ground surface where recreational activities occur. eDNA sampling is limited to non-intrusive water sampling that would not affect recreation. Public awareness and education are administrative in nature and do not interact with the resource.

The following measures will have short- or long-term, less than significant effects on recreation:

- Measure 1: Mechanical Control
- Measure 2: Watercraft Inspection Stations
- Measure 8: Chemical Control

Mechanical control measures can adversely affect recreation during removal operations due to the operation of equipment (e.g., kayaks, boats, rakes, etc.) which could interfere with typical recreation activities. However, these impacts are typically short-term, minor, and limited to when the measure is implemented. Overall, mechanical control can effectively treat and prevent AIPS infestations and has a net positive effect on recreation.

Watercraft inspection and decontamination stations can adversely affect recreation by causing delays of otherwise occurring recreational activities due to the time needed to properly inspect and decontaminate boats prior to entering waterbodies. Additionally, there may be reluctance to engage in future recreation at a waterbody due to the delays associated with inspection and decontamination protocols required for boats. However, these impacts are typically minor and understood by the public as necessary requirements to protect the waterbodies. Additionally, waterbodies free of AIPS are more likely to receive long-term recreational use due to their favorable waters. Overall, watercraft inspection and decontamination stations can effectively treat and prevent AIPS infestations and have a net positive effect on recreation.

Chemical control measures can adversely affect recreation during application operations due to the use of equipment (e.g., boats, applicators, etc.) which could interfere with typical recreation activities. Additionally, there may be a negative stigma associated with waterbodies undergoing herbicide applications that could dissuade future recreation. However, the impacts are typically minor and either limited to when the measure is implemented or understood by the public as necessary requirements to protect the waterbodies. Additionally, the negative stigma associated with herbicide use may be outweighed by the fact that waterbodies free of AIPS are more likely to receive long-term recreational use due to their favorable waters. Overall, chemical control can effectively treat and prevent AIPS infestations and has a net positive effect on recreation.

The implementation of the various AIPS control measures would benefit recreation as aquatic invasive plant infestations could be more effectively treated and prevented. Further, expansion of the APCP throughout the State of Vermont would allow for aquatic plant control in areas not benefiting from the current APCP. This expanded program would better protect the recreational opportunities in waterbodies currently free of AIPS and would improve the recreational opportunities in waterbodies experiencing AIPS infestations.

6.10 HTRW

6.10.1 Alternative 1: No Action

The spread of AIPS throughout the State of Vermont would have minimal effects on HTRW.

6.10.2 Alternative 2: Proposed Action

The following measures will have no adverse effect related to HTRW concerns:

- Measure 3: Early Detection Monitoring
- Measure 4: Drone Surveys
- Measure 5: eDNA
- Measure 6: Public Awareness and Education

Early detection monitoring is limited to observatory or non-disruptive methods that would not have the potential to cause an HTRW concern. Drone surveys are conducted in the air and do not physically interact with the ground surface where primary HTRW concerns would be. eDNA sampling is limited to non-intrusive water sampling that would not have the potential to cause an HTRW concern. Public awareness and education are administrative in nature and do not interact with the resource.

The following measures will have short- or long-term, less than significant effects related to HTRW concerns:

- Measure 1: Mechanical Control
- Measure 2: Watercraft Inspection Stations
- Measure 8: Chemical Control

Mechanical control measures have the potential to disturb sediment which could be contaminated with HTRW. Should contaminated sediment be disturbed, there could be an increased risk to human health and the environment. However, best management practices would be used during mechanical control measure implementation and sediment disturbance would be limited as practicable. Additionally, surveys would be conducted prior to mechanical control implementation to ensure there are not HTRW concerns in any areas where sediment may be disturbed. Overall, mechanical control can effectively treat and prevent AIPS infestations and has a negligible effect on HTRW.

Construction of permanent watercraft inspection and decontamination stations has the potential to disturb soil that could be contaminated with HTRW. Should contaminated soil be disturbed, there could be increased risk to human health and the environment. However, best management practices would be implemented during construction of permanent watercraft inspection and decontamination stations and soil disturbance would be limited as practicable. Additionally, surveys would be conducted prior to construction to ensure there are not HTRW concerns in any areas where soil may be disturbed. Overall, watercraft inspection and decontamination stations can effectively treat and prevent AIPS infestations and have a negligible effect on HTRW.

Chemical control measures necessitate introduction of pesticides in waterbodies, which has the potential to cause an HTRW concern. Should excessive pesticides be applied to waterbodies, there could be increased risk to human health and the environment. However, all pesticides would be applied pursuant to a VTDEC Aquatic Nuisance permit and would be approved by USEPA. When applied in compliance with these restrictions, HTRW concerns associated with pesticide application would be negligible. Overall, chemical control can effectively treat and prevent AIPS infestations and has negligible effect on HTRW.

The implementation of the various AIPS control measures would have a negligible effect on HTRW.

6.11 COMMUNITIES AT RISK

6.11.1 Alternative 1: No Action

The spread of AIPS throughout the State of Vermont would have notable adverse effects on at-risk communities. Once established, aquatic invasive plant infestations could reduce tourism to municipalities with affected waterbodies, which could lead to income or job loss in communities that rely on tourism to support their economies.

If the No Action Alternative was implemented, there would remain a high risk of AIPS infestations affecting at-risk communities throughout the State. The current APCP would continue to be implemented in the Lake Champlain Basin, but other geographical areas of the State would be left vulnerable to AIPS infestations due to an absence of Federal cost-shared funding. The No Action Alternative would limit any benefits to or protection for at-risk communities.

6.11.2 Alternative 2: Proposed Action

The following measures will have no adverse effect on at-risk communities:

- Measure 3: Early Detection Monitoring
- Measure 4: Drone Surveys
- Measure 5: eDNA
- Measure 6: Public Awareness and Education

Early detection monitoring is limited to observatory or non-disruptive methods that would not affect recreation. Drone surveys are conducted in the air and do not physically interact with the ground surface where recreational activities occur. eDNA sampling is limited to non-intrusive water sampling that would not affect recreation. Public awareness and education are administrative in nature and do not interact with the resource.

The following measures will have short- or long-term, less than significant effects on at-risk communities:

- Measure 1: Mechanical Control
- Measure 2: Watercraft Inspection Stations
- Measure 8: Chemical Control

Mechanical control measures can adversely affect communities at risk during removal operations due to interfering with water-related recreational opportunities, which may be a significant part of the local economy. However, these impacts are typically short-term, minor, and limited to when the measure is implemented. Overall, mechanical control can effectively treat and prevent AIPS infestations and has a net positive effect on at-risk communities.

Watercraft inspection and decontamination stations can adversely affect communities at risk by increasing traffic due to the time needed to properly inspect and decontaminate boats prior to entering waterbodies. Additionally, there may be reluctance to engage in future tourism of a community if there are delays associated with accessing main attractions, such as water-related recreation. However, these impacts are typically minor and understood by the public as necessary requirements to protect the waterbodies and associated tourism. Additionally, waterbodies free of AIPS are more likely to receive long-term tourism use due to their favorable waters. Overall, watercraft inspection and decontamination stations can effectively treat and prevent AIPS infestations and have a net positive effect on economically disadvantaged communities.

Chemical control measures can adversely affect communities at risk during application operations due to interfering with water-related recreational opportunities, which may be a significant part of the local economy. Additionally, there may be a negative stigma associated with waterbodies undergoing herbicide applications that could dissuade future tourism. However, the impacts are typically minor and either limited to when the measure is implemented or understood by the public as necessary requirements to protect the waterbodies and associated tourism. Additionally, the negative stigma associated with herbicide use may be

outweighed by the fact that waterbodies free of AIPS are more likely to receive long-term tourism use due to their favorable waters. Overall, chemical control can effectively treat and prevent AIPS infestations and has a net positive effect on communities at risk.

The implementation of the various AIPS control measures would benefit communities at risk as aquatic invasive plant infestations could be more effectively treated and prevented. Further, expansion of the APCP throughout the State of Vermont would allow for aquatic plant control in areas not benefiting from the current APCP. This expanded program would better protect the tourism opportunities in waterbodies currently free of AIPS and would improve the tourism opportunities in waterbodies experiencing AIPS infestations.

6.12 FORESEEABLE EFFECTS

NEPA regulations require Federal agencies to consider the foreseeable effects of their actions when combined with past and future similar actions. The primary goal of foreseeable effects analysis is to determine the magnitude and significance of the environmental consequences of the proposed action in the context of the effects from other past, present, and reasonably foreseeable future actions.

Past and Present: In 1983, the Department of the Army and the State of Vermont entered into an Aquatic Plant Control Agreement to cooperate in the implementation of a cost-shared APCP for Lake Champlain. In 1994, the Vermont APCP was expanded to the entire Lake Champlain Basin to address other waterbodies with infestations of Eurasian watermilfoil and water chestnut within the watershed (VTDEC, 2024a). This APCP with cost-sharing limited to the Lake Champlain Basin is implemented currently and includes the following measures discussed in Subsection 2.4: mechanical control; watercraft inspection and decontamination; early detection and rapid response; and public awareness and education.

Reasonably Foreseeable Future: Federal investment in the proposed action would expand the APCP throughout the State of Vermont allowing for aquatic plant control in areas not benefiting from the current APCP.

VTDEC is also considering additional invasive aquatic plant control programs outside of the proposed action, including participation in USACE's Watercraft Inspection and Decontamination Program and Connecticut River Hydrilla Control research. Findings of the Connecticut River Hydrilla Control research may inform future proposed chemical control measures utilized by Vermont should Hydrilla ever spread upstream into Vermont's jurisdiction of the waterbody.

The analysis of the environmental resources above concludes that implementation of the Proposed Action Alternative would not result in significant adverse effects, either individually or in conjunction with the effects from other similar actions.

SECTION 7 – ENVIRONMENTAL LAWS AND REGULATIONS COMPLIANCE

This Section identifies the legal, policy, and regulatory requirements applicable to the proposed action and discusses the implications for each of those requirements. Summaries of compliance and coordination activities for each of the laws, policies, or regulation are also provided. Also included in this Section are additional authorities and guidance related to the proposed action.

7.1 ENVIRONMENTAL COMPLIANCE TABLES

Table 7-1. Federal Laws

Legislative Title	USC	Compliance
Bald and Golden Eagle Protection Act	16 USC §§ 668-668c et seq.	Avoidance measures recommended in National Bald Eagle Management Guidelines will be implemented in the event AIPS control measures could disturb nesting and/or foraging eagles.
Clean Air Act	42 USC § 7401 et seq.	Vermont is in attainment for all National Ambient Air Quality Standards. As such a General conformity analysis is not required.
Clean Water Act	33 USC § 1251 et seq.	Section 402 of the Clean Water Act is the National Pollutant Discharge Elimination System (NPDES) Program, which regulates the discharge of pollutants and stormwater runoff. Aquatic pesticide application would require approval for use under a NPDES permit. Pesticide application will continue to be operated under VTDEC's NPDES General Permit for the Application of Pesticides. A Construction General Permit would not be required for construction of permanent watercraft inspection stations because ground disturbance is expected to be less than an acre. As benthic matting constitutes fill, a 404b(1) Evaluation has been prepared and is attached as Appendix G.

Legislative Title	USC	Compliance
Endangered Species Act	16 USC § 1531 et seq.	The proposed action will have No Effect on Canada lynx, Indiana bat, northern long-eared bat, tri-colored bat, and Jesup's milk-vetch. The proposed action is Not Likely to Effect northeastern bulrush or dwarf wedgemussel. The Draft ILR/EA will be used as the coordination vehicle to complete informal ESA consultation with USFWS.
Fish and Wildlife Coordination Act	16 USC § 661 et seq.	The proposed action would not impound, divert, control or modify any body of water and would not involve activities subject to the FWCA.
Magnuson-Stevens Fishery Conservation and Management Act	16 USC § 1801 et seq.	An Essential Fish Habitat Assessment has been prepared and is included in Appendix B. The Draft ILR/EA and the EFH Assessment will be used as the coordination vehicle with NOAA-Fisheries.
Migratory Bird Treaty Act	16 USC. §§ 703-712 et seq.	Seasonal restrictions associated with nesting may be implemented depending on proposed AIPS control measures. VTDEC as the implementing agency will coordinate with the VTANR Fish and Wildlife Department for each action as necessary.
National Environmental Policy Act	42 USC §§ 4321 et seq.	The Draft ILR/PEA will undergo a 30-day public/agency comment period. The final ILR/PEA will incorporate any comments received. The FONSI will fulfill requirements of this act.
National Historic Preservation Act	16 USC § 470 et seq.	The District has determined that the proposed invasive aquatic plant treatment methods, as described, would have no impacts to historic properties based on the methods used. USACE is conducting Section 106 consultation with the SHPO and relevant tribes. NHPA Section 106 compliance will be considered complete upon completion of consultation.

Table 7-2. Executive Orders

Executive Order	Date	Compliance
Executive Order 11593 Protection and Enhancement of the Cultural Environment	May 13, 1971	Requires Federal agencies to administer to cultural properties under their control to preserve, restore and maintain these properties. This Executive Order does not apply to this project as no portion of the project is owned by or under the control of the District.
Executive Order 11988 Floodplain Management	May 24, 1977	The proposed action would not affect floodplain functionality.
Executive Order 11990 Protection of Wetlands	May 24, 1977	Any disturbance to wetlands related to the implementation of APCP measures such as mechanical harvesting and aquatic pesticide application will be authorized under the Aquatic Nuisance Control Permit.
Presidential Memorandum: Government-to-Government Relations with Native American Tribal Governments	May 4, 1994	Consultation with the Delaware Nation, the Delaware Tribe of Indians, Saint Regis Mohawk Tribe, and the Stockbridge Munsee Community of Indians is ongoing.
Executive Order 13007 Indian Sacred Sites	May 24, 1996	This Executive Order does not apply as there are no Federal lands as part of this project.
Executive Order 13045 Protection of Children from Environmental Health Risks and Safety Risks	April 21, 1997	Implementation of this project will reduce environmental health risks.
Executive Order 13112 Invasive Species	February 3, 1999	Implementation of the proposed action will assist in preventing the spread of aquatic invasive species. BMPs to prevent the spread of AIPS during harvesting operations and proper disposal techniques will be employed.

Executive Order	Date	Compliance
Executive Order 13175 Consultation and Coordination with Indian Tribal Governments	November 6, 2000	Consultation with the Delaware Nation, the Delaware Tribe of Indians, Saint Regis Mohawk Tribe, and the Stockbridge Munsee Community of Indians is ongoing.
Executive Order 13751 Invasive Species	December 5, 2016	Implementation of the proposed action will assist in preventing the spread of aquatic invasive species. Proper disposal methods of harvested invasive vegetation and inspection and cleaning of equipment will be implemented during removal operations to minimize the spread of invasive species.

Table 7-3. State Laws

Legislative Title	Statute/Code	Compliance
Vermont Water Pollution Control Statutes	10 VSA § 1250 et seq.	VTDEC as the implementing agency for the APCP will coordinate erosion and sediment control plans or NPDES permits should they be needed for any of the measures of the proposed action.
Vermont Wetland Rules	CVR R 12 004 056	VTDEC as the implementing agency of the APCP will obtain any necessary permits associated with control measures.
Aquatic Nuisance Control Permit	10 VSA § 1455	VTDEC as the implementing agency of the APCP will obtain the necessary permits during implementation of the program.
Vermont Endangered Species	10 VSA §§ 5401 et seq.	Compliance with this law will occur as part of the aquatic nuisance control (ANC) permit application. If required as a permit condition, surveys to determine the presence/absence of protected species prior to initiation of AIPS control measures will be conducted and coordinated with the appropriate State agencies (e.g. VTANR Fish & Wildlife Department).
New Hampshire Endangered Species Conservation Act	RSA 212-A	VTDEC as the implementing agency will consult with the New Hampshire Fish and Game Department on any required permits and/or conservation measures prior to initiation of APCP measures.

7.2 ADDITIONAL AUTHORITY AND GUIDANCE

Additional authority and guidance related to the Recommended Alternative includes the following:

7.2.1 USACE Invasive Species Policy

USACE Invasive Species Policy of February 21, 2023, compliments the National Invasive Species Act (and related laws) and directs Civil Works to address invasive species concerns in analyses of project impacts, and authorizes permits to include stipulations regarding control of invasive species.

7.2.2 USACE Environmental Operating Principles

The USACE Environmental Operating Principles (EOPs) (https://www.usace.army.mil/Missions/Environmental-Operating-Principles) have been taken into consideration throughout the study process and would continue to be part of the implementation of the Recommended Alternative. Below are the USACE EOPs:

- Foster sustainability as a way of life throughout the organization.
- Proactively consider environmental consequences of all USACE activities and act accordingly.
- Create mutually supporting economic and environmentally sustainable solutions.
- Continue to meet corporate responsibility and accountability under the law for activities undertaken by USACE, which may impact human and natural environments.
- Consider the environment in employing a risk management and systems approach throughout the life cycles of projects and programs.
- Leverage scientific, economic, and social knowledge to understand the environmental context and effects of USACE actions in a collaborative manner.
- Employ an open, transparent process that respects views of individuals and groups interested in USACE activities.

In coordination with the agencies and other stakeholders, USACE proactively considered the environmental consequences of several measures and developed a comprehensive solution that supports economic and environmentally sustainable solutions.

SECTION 8 – COORDINATION, TRIBAL CONSULTATION, AND PUBLIC INVOLVEMENT

In preparation for developing this ILR/PEA, VTDEC provided information on their respective APCP and reviewed and consulted on the development of data summaries and other Sections of the document during development.

8.1 PUBLIC AND AGENCY INVOLVEMENT

Project Delivery Team meetings have been held between representatives of the District, VTDEC, and the Lake Champlain Basin Program throughout the evaluation process. A stakeholder meeting attended by representatives of State and Federal agencies and Tribes was held on March 13, 2025, to introduce them to the evaluation and discuss any initial questions and concerns they may have. There were minimal issues raised at the stakeholder meeting and any identified concerns have been incorporated into the Draft ILR/PEA.

The Draft ILR/PEA will be used as the main coordination vehicle for informal Section 7 Consultation with the USFWS and consultation with NOAA-Fisheries regarding Essential Fish Habitat.

The Draft ILR/PEA and FONSI was released to Federal and State agencies, Tribes, and the public for a 30-day review and comment period beginning on or about June 23, 2025. The documents are available on the USACE New York District website, https://www.nan.usace.army.mil/Media/Fact-Sheets/Fact-Sheet-Article-View/Article/487394/fact-sheet-aquatic-plant-control-program-vt/. Any other information or announcements regarding this study are also posted on the website.

A list identifying the Federal, State and local agencies who received the Notice of Availability of the Draft ILR/Programmatic Assessment is attached as Appendix E.

8.2 TRIBAL CONSULTATION

The U.S. Government has a unique legal relationship with Tribal Nations, governed by treaties, statutes, executive orders, court decisions, and the U.S. Constitution. The United States works with Indian Tribes on a Government-to-Government basis to address issues concerning Indian Tribal self-government, trust resources, Indian Tribal treaties, and other rights. As such, USACE will make good faith efforts to engage Tribes to ascertain interest in USACE projects and obtain information relevant to USACE Federal decisions.

The USACE Tribal Consultation Policy is composed of the following six principles: Tribal Sovereignty; Tribal Responsibility; Government to Government Relations; Pre-Decisional and Honest Consultation; Self-Reliance, Capacity Building, and Growth; and Natural and Cultural Resources. Specific to this action, USACE New York District strives to establish relationships that focus on successful communications and a collaborative process that ensures Tribal involvement in project development and implementation.

USACE provided informational letters to points of contact for Native American Tribes in the Study Area in letters dated 5 March 2025 to notify them of the proposed action. Letters were sent to the Delaware Nation, the Delaware Tribe of Indians, and the Stockbridge Munsee Community. In the letter to Tribes, USACE also extended the invitation for government-to-government consultation. As described in the introductory letter and in accordance with NEPA, NHPA, and USACE Tribal Consultation Policy, the District is providing the SHPOs, Tribes, the

ACHP, and other relevant consulting parties the opportunity to review the NEPA document and the NHPA Section 106 effects determination. In a letter dated 20 March 2025, the Stockbridge Munsee Community accepted the District's invitation to participate in the Program as a Section 106 consulting party. Per a request from the New York State Historic Preservation Office (NYSHPO), the District will include the St. Regis Mohawk Tribe in all future consultation going forward.

SECTION 9 – RECOMMENDATIONS

Based on the information evaluated in this ILR/PEA, USACE selects Alternative 2, Expanded APCP Cost Sharing Program, as the Recommended Alternative. The features of the Recommended Alternative include cost-sharing in the expanded APCP throughout the State of Vermont with the potential measures below:

- Measure 1 – Mechanical Control
- Measure 2 – Expanded Watercraft Inspection and Decontamination Stations
- Measure 3 – Monitoring for Early Detection
- Measure 4 – Drone Surveys
- Measure 5 – eDNA Sampling and Detection
- Measure 6 – Increased Public Awareness and Education
- Measure 7 – Chemical Control (herbicide application)

9.1 MECHANICAL CONTROL

Once AIPS have established themselves in waterbodies, mechanical control is the most effective measure for eradicating populations.

Vermont's existing APCP within the Lake Champlain Basin utilizes both mechanical harvesting and hand harvesting of AIPS. Generally, mechanical harvesting is implemented where large mats of aquatic invasive plants have aggregated, while hand harvesting is used in more sparsely infested areas and areas that are too shallow for harvesting machinery to operate in.

USACE recommends expanding the current mechanical control methods used within the Lake Champlain Basin to include all applicable waterbodies within Vermont where mechanical harvesting, hand harvesting, and/or benthic matting would be appropriate and effective.

9.2 EARLY DETECTION AND RAPID RESPONSE

Prevention is the first priority for addressing the threat of aquatic invasive species in Vermont. This includes keeping contaminated watercraft from entering non-infested waterbodies within the State. However, as prevention efforts fail and invasive species continue to invade waterbodies within the State, advanced planning is needed to ensure an effective response.

As part of a comprehensive early detection and rapid response plan, USACE recommends a combination of monitoring, drone surveys, eDNA sampling and analysis, and herbicide application, where necessary (Measures 3, 4, 5, and 7).

9.3 WATERCRAFT INSPECTION AND DECONTAMINATION STATIONS

Under Alternative 2, Expanded APCP Cost Sharing Program, seasonal watercraft inspection and decontamination stations would be established throughout the State of Vermont at strategic locations based on several factors: safety of personnel and public; ease of public access; infrastructure availability for setting up facilities (electricity, water, restrooms, etc.); and availability of suitable spaces for conducting decontamination procedures that do not pose any threat to the environment. Although only water is used to decontaminate watercraft, stations are

set up in parking lots, gravel pits, or other areas where water runoff does not present an environmental concern.

The establishment of watercraft inspection and decontamination stations throughout the State will aid in building a multi-layered line of defense, preventing the spread of AIPS both from out of state into Vermont and from waterbodies in Vermont to others within the State.

9.4 PUBLIC AWARENESS AND EDUCATION

Public awareness and education regarding the seriousness of aquatic invasive species is an important element of the ongoing efforts to prevent further spread into, out of, or within the State of Vermont. USACE recommends the following pertaining to public awareness and education:

- Continue to implement AIPS ad campaigns to obtain greater consistency and better recognition with boaters and visitors to waterbodies throughout the State of Vermont.
- Provide brochures, literature, and ads about AIPS in State fishing and boat license applications and at recreational boating outlets, events, inspection stations, as well as visitor centers.

SECTION 10 – ROLES AND RESPONSIBILITIES

This Section generally describes how the expanded APCP would function. Upon review and approval of the ILR/Pmatic EA, USACE will execute the Aquatic Plant Control Program Project Partnership Agreement (PPA) with the non-Federal sponsor (VTDEC). PPAs expire one (1) year after their effective date and must be renewed.

Annually, if Federal funds for the cost-share program are available and have been received by USACE, USACE would send a letter to the non-Federal sponsor asking for an annual work plan for the upcoming APCP season. During the annual work plan preparation, USACE and the non-Federal sponsor would engage in an evaluation process to ensure that the non-Federal sponsor's anticipated AIPS prevention and control activities are eligible for the cost-share program. This evaluation process includes coordination with the non-Federal sponsor and considers specific budgets and statutory authorities. To be considered for this cost-share program, the APCP activities must be located in applicable areas of the State of Vermont and provide the highest likelihood of preventing the spread of AIPS into, out of, or within the State.

After the annual work plan has been reviewed and approved by the USACE project manager and environmental compliance groups, USACE would then work with the non-Federal sponsor to (1) ensure Federal appropriations can cover the requested budget amount and (2) to draft a statement of work that contains their anticipated AIPS prevention and control activities for the period of performance (typically 1 year). After the statement of work is finalized and approved by USACE, the statement of work will be signed by the non-Federal sponsor and USACE. Signing the statement of work will obligate the funds to make them available for reimbursement for the period of performance covered by the statement of work.

SECTION 11 – LIST OF PREPARERS

Team Member	Role
Terence Fung	Economist
Kailey Loughran	Cultural Resource/Archaeologist
Daniel McSweeney	Planner
Kimberly Rightler	Endangered/Threatened Species; Essential Fish Habitat
John Sulich	NEPA Lead, Main Report Preparer

SECTION 12 – REFERENCES

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ATTACHMENTS

Appendix A

Vermont Department of Environmental Conservation Letters of Support

VERMONT

Department of Environmental Conservation *Agency of Natural Resources*
Commissioner's Office
1 National Life Dr., Davis 3 [phone] 802-828-1556
Montpelier, VT 05620

February 20, 2025

Colonel Alexander Young
District Commander
U.S. Army Corps of Engineers
Executive Office - Room 17-205
26 Federal Plaza
New York, New York 10278-0900

Subject: Letter of Intent – Expansion of Aquatic Plant Control Program Cost Share Agreement between State of Vermont and U.S. Army Corps of Engineers

Dear Colonel Young,

The State of Vermont Agency of Natural Resources (ANR) supports the U.S. Army Corps of Engineers' (Corps) work in the State of Vermont to expand the existing Aquatic Plant Control Program agreement from a focus on the Lake Champlain Basin to work throughout the entire state. The lakes, ponds, and rivers of Vermont are critical resources to the State's economy, and protecting these waters from the threat of invasive aquatic plants and the negative impacts is paramount to the Agency. These actions may include chemical, mechanical, and biological control activities. In addition, spread prevention activities that may include watercraft inspections and decontamination stations, education and outreach tools, and monitoring and surveying for future or known threats, would continue to supplement the ongoing projects within the present APCP and expand throughout the state.

We look forward to working with the Corps on this very important and encompassing project.

Sincerely,

Jason Batchelder
Commissioner
Department of Environmental Conservation

VERMONT

Department of Environmental Conservation *Agency of Natural Resources*
Commissioner's Office
1 National Life Dr., Davis 3 [phone] 802-828-1556
Montpelier, VT 05620

February 20, 2025

Colonel Alexander Young
District Commander
U.S. Army Corps of Engineers
Executive Office - Room 17-205
26 Federal Plaza
New York, New York 10278-0900

Subject: USACE Northeast Watercraft Inspection Station and Decontamination Program

Dear Colonel Young,

The State of Vermont Agency of Natural Resources (ANR) supports the U.S. Army Corps of Engineers' (USACE) potential to develop a regional northeast Watercraft Inspection Station and Decontamination Program, as authorized under the Rivers and Harbor's Act of 1958, Section (d). The authority provides USACE and non-federal sponsor the ability cost-share the construction, operation, and maintenance of Watercraft Inspection Stations to protect basins that adjoin the international border between the United States and Canada.

The Department of Environmental Conservation's Aquatic Invasive Species Program works collaboratively with local municipalities, regional state partners, and other state agencies in the northeast on spread prevention practices within the Northeast Aquatic Nuisance Species Panel. This effort would strengthen this relationship and allow states to better share information on watercraft inspection and decontamination (WID) programs. As the northeast is unique in its make-up of public water resources with many boat accesses found in rural locations, this program would be beneficial in creating a network of WID stations that are strategically placed at high-risk priority locations, both along the Canadian border and at locations that may impact the waterbodies along the border.

As an increase in Canadian aquatic invasive species threats has taken place the past few years, Vermont is poised to be at-risk for these new threats, as many Canadian recreational boaters visit Vermont across the border and within the region.

We look forward to working with the Corps on this very important and encompassing project.

Sincerely,

Jason Batchelder
Commissioner

Appendix B

Essential Fish Habitat Assessment

1. Introduction

In compliance with Section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (1996 amendments), the New York District – U.S. Army Corps of Engineers (District) in partnership with the Vermont Department of Environmental Conservation (VTDEC) and the Lake Champlain Basin Program (LCBP) is proposing to the expand the existing Lake Champlain Aquatic Plant Control Program (APCP) to include the entire State of Vermont.

The USACE has prepared a Draft Integrated Letter Report/Programmatic Environmental Assessment (DILR/PEA) to document the evaluation conducted to determine federal interest in expanding the APCP and the environmental effects resulting from the proposed expansion. Alternatives evaluated in the Draft ILR/PEA include 1) Alternative #1: No Action; and 2) Alternative #2: Expansion of the APCP. Based on the evaluation, Alternative #2 was identified as the Recommended Plan/Proposed Action.

The Proposed Action includes the following aquatic invasive plant species (AIPS) control measures:

- Measure 1 – Mechanical Control
- Measure 2 – Expanded Watercraft Inspection and Decontamination Stations
- Measure 3 – Monitoring for Early Detection
- Measure 4 – Drone Surveys
- Measure 5 – eDNA Sampling and Detection
- Measure 6 – Increased Public Awareness and Education
- Measure 7 – Chemical Control

The USACE is providing this assessment of the potential effects on Essential Fish Habitat (EFH) from the Recommended Alternative and to demonstrate compliance with EFH requirements.

2. Federal Project Authorization

The project is authorized under Section 104 of the River and Harbor Act (RHA) of 1958 (Public Law [PL] 85-500), as amended by Section 1039(d) of the Water Resources Reform and Development Act (WRRDA) of 2014 (PL 113-121), Section 1178(b) of the Water Infrastructure Improvements for the Nation (WIIN) Act of 2016 (PL 114-322), Section 1170 of the Water Resources Development Act (WRDA) of 2018 (PL 115-270), Section 505 of the WRDA of 2020 (PL 116-260), and by Section 8305(b) of the WRDA of 2022 (PL 117-263), codified as amended at 33 United States Code (USC) § 610.

3. Project Description/Activity Details

The proposed action involves expanding an existing APCP that is cost-shared between the USACE and the state of Vermont. USACE provides annual funding to the state of Vermont to execute and manage the APCP. Specifically, the VTDEC is the managing authority who oversees program implementation.

AIPS to be managed under the Recommended Alternative include the following:

- Eurasian watermilfoil (*Myriophyllum spicatum)*
- Starry stonewart (*Nitellopsis obtuse*)
- European frogbit (*Hydrocharis morsus-ranae*)
- Water chestnut (*Trapa natans L*)
- Hydrilla (*Hydrilla verticillata*)
- Giant salvinia (*Salvinia molesta*)

- Water hyacinth (*Eichornia crassipe*)
- Brazilian elodea (*Egeria densa*)

The Recommended Plan consists of multiple early detection and active control measures to serve as a comprehensive strategy for managing AIPS. Descriptions the control measures listed below:

a) **Measure 1 – Mechanical Control**

Mechanical control measures can consist of several types of different methods including hand harvesting, harvesting conducted via equipment, and the use of benthic matting. The hand harvesting method is typically limited to where the growth density is sparse and cover a small area (less than 0.25 acres), or in areas that may be inaccessible to equipment such as harvesters.

Mechanical harvesting uses devices and machines to harvest the targeted AIPS. Mechanical devices can include floating booms, underwater cutters, hydro-rakes, rotavators, suction harvesters and mechanical harvesters. Mechanical harvesters are generally used for dense stands and/or larger acreages of AIPS beds.

Suction harvesting involves a trained diver hand harvesting AIPS by using a suction line that collects and bags the plant material. This method is reserved for small, scattered infestations to moderate infestations under one acre. Hydro-raking is rarely permitted in Vermont due to the level of disturbance it can cause to substrate. When permitted, it is usually limited in scope.

Benthic matting includes installation of a barrier at the bottom of a waterbody with the intent of blocking sunlight from reaching the water's sediment layer and making sediments inhospitable for plant growth. Implementation of benthic matting is mainly utilized around docks and marinas. Coverage is on average less than 0.25 acres and use of matting is limited to between July 1 through October 30.

b) **Measure 2 – Expanded Watercraft Inspection and Decontamination Stations**

Vermont Department of Environmental Conservation sponsors the Vermont Public Access Greeter Program that utilizes paid public access monitors staffed at public access points on various waterbodies. Greeters are tasked with inspecting intercepted watercraft and removing identified aquatic invasive species. Greeters are also hired to provide waterbody users with information about aquatic invasive species.

Certain Vermont Public Access Greeter Program stations include decontamination stations consisting of high-pressure hot water used for removing identified AIPS from intercepted watercraft.

c) **Measure 3 – Monitoring for Early Detection**

Early detection is focused on searching for the presence of AIPS before they are able to establish and begin reproduction. Monitoring methods can include a variety of approaches, but the most frequent approach is to physically search for AIPS in areas judged at high risk of infestation. This includes shoreline and dock surveys for invasive aquatic plants, snorkels surveys, as well as boat-based surveys. Tools used in early detection investigations include nets, rakes, and other hand tools.

d) **Measure 4 – Drone Surveys**

Drone surveys are conducted over certain waterbodies, such as the Lake Champlain, to identify infestations before they can establish in an area and reproduce.

e) **Measure 5 – eDNA Sampling and Detection**

In environmental deoxyribonucleic acid (eDNA) monitoring, biologists collect subsamples from surface tows at high-risk sampling sites into standardized eDNA collection vials. The eDNA subsamples are processed to detect presence of AIPS DNA particles in the subsampled water, with the intent to increase efficiency and more rapid turn-around of results to improve response and reaction timing if results indicate the presence of AIPS DNA.

f) **Measure 6 – Increased Public Awareness and Education**

VTDEC works to promote public awareness of the existence and risks associated with aquatic invasive plants. Public outreach includes ad campaigns which are aimed at keeping boats free from AIPS. Signs are placed at boat ramps and other strategic places in an effort to reach the key targeted audience along with stocked brochure boxes. A common outreach slogan is "Clean, Drain, Dry." VTDEC supports public workshops to increase aquatic invasive species awareness in local communities. These outreach efforts have not been cost-shared through the existing APCP.

g) **Measure 7 – Chemical Control (herbicide application)**

Although chemical control is not used by VTDEC as a routine measure for dealing with AIPS, VTDEC has the ability to issue permits for pesticide use related to aquatic invasive species, particularly in a rapid response capability.

ProcellaCOR was first permitted for use in 2019 and has been the only aquatic herbicide permitted for use by VTDEC since 2020. As such, ProcellaCOR is currently the most commonly used aquatic herbicide for treating invasive aquatic plants in Vermont and is typically the only one considered for use during permit application review.

4. Project Purpose

The purpose of the proposed action is to increase the effectiveness of future and ongoing invasive aquatic plant control measures in the State of Vermont by cost sharing expanded measures with the VTDEC. The risk of the spread of AIPS is high, and the introduction and further establishment of AIPS has the potential to hamper navigation, irrigation, and drainage; limit water-related recreational activities; reduce fish and wildlife habitat; degrade the aquatic ecosystem and water quality; decrease near-water land values; threaten public health; and increase operation and maintenance costs associated with water-related infrastructure. Expansion of the APCP is needed to ensure there are minimal opportunities for AIPS to spread throughout the State and that any existing AIPS can be treated effectively limiting further negative impacts.

5. Project Duration

The APCP is annually funded; therefore implementation of in-water measures such as mechanical and chemical control will occur on a yearly basis pending availability of funds. The seasonal window in which in-water measures such as mechanical and chemical control are implemented extends from June 1 through October 30.

Durations of specific management operations may vary depending on control measure utilized and extent of infestation in any given location selected to be managed. As an estimate, in-water management measures in a specific location could last one day to a week. Multiple measures could also potentially be utilized for areas where AIPS growth is dense. For example, mechanical harvesting could be initially implemented in a location to remove the AIPS followed by spot chemical treatment.

6. Site Description

The project area will consist of federal, state and local government owned waterbodies, their immediate shorelines and vehicle access points, and reservoirs of cooperating water-related infrastructure facilities (e.g., hydroelectric generation) within the State of Vermont. It also includes the approximate 255-mile length of the Connecticut River that serves as the boundary between Vermont and New Hampshire.

6.1 EFH Designations within Project Area

Based on a review the Essential Fish Habitat mapper and the Table of New England rivers, streams and estuaries designated as EFH for Atlantic Salmon and Map of designated Atlantic Salmon EFH for all life stages contained in the 2017 Omnibus Essential Fish Habitat Amendment 2, the Connecticut River and the following tributaries are designated as EFH for Atlantic Salmon: (NOAA-Fisheries, 2025, NEFMS, 2017):

- West River
- Black River: Eurasian watermilfoil around Springfield
- Ottauquechee River
- Stevens River
- Wells River
- Waits River
- Passumpsic River
- Ompompanoosuc River
- Saxtons River
- White River
- Williams River: Eurasian watermilfoil observed

6.2 HAPC Designation within Study Area

Neither the Connecticut River nor its tributaries are listed as HAPCs.

6.3 Special Aquatic Sites

There are no special aquatic sites within the study area.

6.4 Coordination under FWCAR

This EFH Assessment coordination is not under the Fish and Wildlife Coordination Act.

6.5 Total Area of Impact to EFH

The total area of impact to EFH will vary depending on the extent of infestation of the area being managed, the funding available and the and the prioritization of areas to be managed for AIPCS. Typically, the average area managed in a specific location ranges from less than one acre to 20 acres in one location.

6.6 Current Range of Water Depths

The average depth of the Connecticut River within the project area ranges from 5 ft in the northernmost portion of the project area to 13 ft near the Vermont/Connecticut border. The average depths of the primary tributaries to the Connecticut River range from 2 to 6 ft. The average depths of the smaller tributaries range from one to 2 ft. Average depths of lakes and ponds in the project area for which the EFH designation is applicable range from 5 ft to 90 ft (VANR, 2025).

6.7 Salinity Range

The salt wedge of the Connecticut River can extend as far as 10 miles upstream from the Long Island Sound (Whitney MM, Jia Y, Cole KL, MacDonald DG and Huguenard KD. 2021). The southernmost portion of the project area is approximately 85 miles from the northernmost extent of the salt wedge. Therefore, all waterways and waterbodies within the project area freshwater with salinities less than 0.5 PPT.

6.8 Water Temperature Range

The Connecticut River Water and its tributaries typically range from a minimum temperature of 32^{O}F in the winter to a maximum temperature of 75^{O}F during the summer. Lakes, ponds and reservoirs: 32^{O}F to as much as 84^{O}F depending on water depths (Seatemperature.net, 2025).

7. Habitat Types and Characteristics

7.1 Habitat and Sediment Characteristics

The project area consists of submerged aquatic vegetation (SAV) beds within freshwater lacustrine and riverine systems that occur within the littoral zone and water column. Proximity of occurrences of SAV near unconsolidated sediment and unconsolidated rocky shorelines and streambank habitat is also expected. The specific habitat and sediment types effected will be dependent upon the presence of the targeted aquatic invasive plant species. Typically, AIPS occur in areas of stagnant to slow moving water and substrate comprised of mud, silt, detritus and sand. As a general guide, the habitat characteristics of the AIPS targeted for management is presented in Table 1.

Table 1: General Habitat Characteristics of the Targeted Aquatic Invasive Plant

Species	Location	Rooting Habit/Avg Depth	Substrate
Eurasian Watermilfoil	Littoral Zone – Open Water	3-10 ft, up to 20 ft	Mud/Silt/Sand
Water Chestnut	Littoral Zone – Open Water	Up to 16 ft.	Mud/Silt
Hydrilla	Littoral Zone – Open Water	Up to 35 ft	Silt/Sand/Rock
Starry Stonewort	Littoral Zone – Open Water	Up to 2 ft	Silt/Sand/Detritus

Brazilian Elodea	Littoral Zone to Open Water	Up to 20 ft	Mud/Sand Gravel
European Frogbit	Open Water	Free floating	N/A
Giant Salvinia	Open Water	Free Floating	N/A
Water Hyacinth	Open Water	Free Floating	N/A

7.2 Presence of SAV (at/adjacent to project site w/description of species and spatial extent)

As the project purpose is to manage AIPS, SAV will be present in the project area. Growth densities of the AIPS can range from sparse to abundant/dense. In areas where the density of AIPS is minimal, native SAV species could be present. However, once dense mats of AIPS form, the littoral zone and/or water column consists of a monoculture absent of native SAV. The specific areal extent of the AIPS in the locations selected for management under the expanded APCP will vary but is anticipated to range from under one acre to multiple acres.

7.3 Diadromous Fish Species and Habitat

Based on a review of annual fish count data published by the USFWS, American Shad and Sea Lamprey have been found in the portion of Connecticut River within the project area (USFWS, 2025). These species are also presumed to potentially inhabit tributaries of the Connecticut River that contain habitat supportive of their life cycles. In addition, analysis of eDNA sampling conducted by the Connecticut River Conservancy and its partners within the Connecticut River confirmed the potential presence of shortnose sturgeon in the southernmost portion of the River near the Vermont/Massachusetts border (Connecticut River Conservancy, 2024).

8. Atlantic Salmon Life History

Atlantic Salmon inhabit well oxygenated, freshwater riverine systems with gravelly substrates. Specifically, they occupy portions of streams with slower velocities which can include riffle and runs, pools and vegetated areas in water depths ranging from 4-30 inches depending on life stage.

All six life stages of Atlantic salmon utilize freshwater habitats either exclusively or at some point during their life. Intra-gravel habitat in the stream bed is essential for Atlantic salmon eggs and alevins, whereas essential fish habitat for the juveniles and spawning adults is the stream itself. Only parr and smolts utilize non-riffle and run habitats.

Eggs are deposited in late October-November and are buried in the substrate in water depths ranging between 4-10 inches where they remain for 175-195 days before hatching. Larvae remain in the substrate for about six weeks before emerging as fry in the spring. Juveniles begin metamorphosis into smolts while still in fresh water, in preparation for downstream migration into brackish and fully saline seawater in the spring. The timing of downstream migration depends on a variety of factors, including temperature, salinity, and the physiological adaptations that make it possible for the smolts to tolerate higher salinity (NEFMS, 2017).

Food sources vary between life stage. Young salmon eat insects, invertebrates while in freshwater and plankton once at sea. Adult salmon mainly prey on fish such as Atlantic herring, alewife, rainbow smelt, capelin, sand lances, and small Atlantic mackerel (NOAA Fisheries, 2025).

The USFWS has conducted annual fish counts within the portion of the Connecticut River since 1967. Based on a review of the reports, although numbers of Atlantic salmon caught have fluctuated throughout the decades, a noticeable downward trend in the number of catches began in 2013 and has continued to the present (USFWS, 2025). Existing publicly available data on the occurrence of Atlantic salmon in the portion of the Connecticut River in Vermont and its tributaries is lacking.

9. Effects Evaluation

The following measures will have no adverse effects on EFH:

- Measure 2: Watercraft Inspection Stations
- Measure 3: Early Detection Monitoring
- Measure 4: Drone Surveys
- Measure 5: eDNA
- Measure 6: Public Awareness and Education

Watercraft inspection and decontamination stations are located at a distance from the waterbody to prevent reintroduction of invasive species during the decontamination process. For the construction of any new watercraft inspection and decontamination stations, erosion and sediment control best management practices would be employed to prevent sediment laden runoff from being introduced into waterways. Early detection monitoring is limited to observatory or non-disruptive methods that would not induce turbidity or disturb habitat. Flight elevations during drone surveys are expected to occur at heights where the noise, movement and/or shadowing from the unit would be imperceptible enough to fish as to not trigger a stress response. eDNA sampling is limited to non-intrusive water sampling that would not generate a level of turbidity that could adversely affect filter feeding and/or spawning. Public awareness and education are administrative in nature and do not interact with the resource.

Tables 2 and 3 summarizes the stressors and habitat alterations that could potentially result from Measure 1: Mechanical Control and Measure 7: Chemical Control.

Table 2: Potential Stressors

Applicability	Potential Stressor	Description
Yes	Underwater noise	Noise from engine and operation of cutting mechanism from mechanical harvesters; motor from suction line equipment;
Yes	Water quality/turbidity/contaminant release	Minor and temporary increases in turbidity during management operations utilizing mechanical, water-based equipment
Yes	Vessel traffic/barge grounding	Use of mechanical harvesters and/or motorized or non-motorized watercraft (e.g. rowboat, kayak) during AIPS management operations. No grounding of barges is proposed.
Yes	Impingement/entrainment	Incidental uptake of fish and turtles can result during mechanical harvesting equipment operations depending on equipment type used.
No	Prevent fish passage/spawning	

Yes	Benthic community disturbance	Minor and temporary alteration to the benthic community within the area being managed during AIPS harvesting or treatment operations.
Yes	Impacts to prey species	Minor and temporary during Mechanical harvesters and suction lines could result in mortality of prey either through direct entrainment, disturbance of substrate or turbidity. Benthic matting could result in direct mortality of aquatic macroinvertebrates.

Table 3: Habitat Alterations Caused By Activity

Applicable Impact Duration		Habitat Alteration Type	Description
Temporary	Permanent		
N	N	Water Depth Change	
N/A	N/A	Tidal Flow Change	
Y	N	Fill	Potential deployment of benthic matting between July 1 through October 30 if deemed appropriate for a particular location.
Y	N	Habitat type conversion	Removal of AIPS will result in a temporary conversion of SAV habitat to littoral or open water habitat. However AIPS provide little to no habitat value and their removal will facilitate the re-establishment of native SAV within the treated area.

Project Impacts to Atlantic Salmon

As noted in Section 8, the Connecticut River and tributaries are designated as EFH for all life stages of Atlantic Salmon. Both AIPS and Atlantic Salmon occur portions of waterways with slow currents. However, with the exception of hydrilla, the majority of the AIPS targeted for management are found in substrates that are not supportive of Atlantic Salmon. Dense growths of AIPS can form a physical barrier that prevents fish from accessing the area for both foraging, hunting, and spawning. In addition, when the plants decompose in the fall, they liberate nutrients into the water column and reduce the amount of dissolved oxygen which can stress species such as Atlantic Salmon that are sensitive to water quality impairments.

The proposed action may have minor and temporary adverse effects to Atlantic Salmon resulting from turbidity, noise, and disturbance to the substrate generated during AIPS management operations. Regarding chemical control, ProcellaCOR is an aquatic herbicide registered with EPA and is classified as reduced risk as it presents a low risk of toxicity to non-target plant species, animal species and to water quality. The state of Vermont stringently regulates the use of ProcellaCOR and requires post treatment water quality testing and reporting as part of the Aquatic Nuisance Control permit. The Vermont Department of Environmental Conservation conducted its own toxicity review in 2022 and found that the potential for acute and chronic risks to aquatic plant and animal species is considered low. In

the six years since the state first approved its use, no significant adverse effects to aquatic resources have been documented (VTDEC, 2022).

Additionally, the existing Lake Champlain APCP, which is the basis for the proposed action, has been ongoing for several decades without causing significant adverse effects to the fishery resources. Furthermore, the management of AIPS will result in positive effects to EFH as it will increase available spawning habitat, improve water quality and allow for the reestablishment of native SAV that serves as cover.

9.1 Mitigation

An Aquatic Nuisance Control (ANC) Permit from the state of Vermont in accordance with 10.V.S.A. 1455 is required for mechanical and chemical control measures. Conditions within the ANC permit to minimize adverse effects to the aquatic environment can include, but not be limited to the following:

Conditions universal to any ANC permit type:

- Limiting equipment access to a 20 of wide lane leading directly to shore from the approved harvesting area.
- Staying within the approved work area limits.
- Submission of annual harvesting activity report

Conditions Specific to Benthic Barriers:

- Installation no earlier than July 1, must be removed no later than October 30.
- Barrier material and weighting devices materials must be of such quality and fabrication as to not deteriorate during use and potentially leave debris within the water.
- Barrier material and weighting devices cannot discharge contaminants into the waters of the State.
- Prior to installing barriers, the control location will be surveyed for all rare, threatened, or endangered aquatic plant species known to occur in the waterbody. Barriers shall not be installed overtop rare, threatened, or endangered aquatic plant species.
- Prior to installing barriers, the control location shall be searched for turtles, mussels, or other aquatic wildlife. Observed animals shall be safely moved to a location immediately outside of the control location within the same waterbody when possible.
- Rocks, boulders, or woody debris shall not be removed from the lake bottom.
- Removal of all barriers and weighing devices by the stipulated timeframe stipulated in the Aquatic Nuisance Control Permit issued by the State.

Conditions specific to chemical control measures:

- Applicators must be certified by Vermont Agency of Agriculture Food and Markets (AAFM).
- Notification to the AAFM of the treatment to facilitate Agency coordination for inspection.
- Treatment locations must be approved every year by DEC by presenting a detailed map, description of species density, map of wetlands and rare, threatened, and endangered species, and a map of treatment concentration monitoring locations.
- The overall area of control of aquatic vegetation may not exceed 40% of the body of water’s littoral zone.

- Compliance with treatment plan approved by State.
- Water sample collection and analysis until the pesticide drops below approved levels.
- Completion of aquatic species surveys including baseline surveys in the year prior to treatment, a qualitative density survey the year of treatment, a post treatment quantitative survey the year of treatment, and a quantitative survey in the year following treatment.
- Submission of an annual report detailing the full extent of the project.
- Implementation of pesticide minimization measures.
- Submission of a report outlining pesticide minimization efforts.

A work restriction between April 1 and June 30 to avoid diadromous fish spring migration will be implemented during management operations.

No compensatory mitigation is proposed.

10. Conclusion

Based on the analyses and conclusions presented the proposed project would have no significant impact to EFH for the species and life stages listed in Section 6.1. Disturbance to river sediments and aquatic habitat would be temporary due to the in-water AIPS management measures.

Environmentally sound engineering practices and best management practices would be employed to avoid and minimize adverse impacts to Atlantic Salmon. By employing best management practices and reporting requirements as described in Section 9.1, the project would avoid and minimize impacts to natural resources and result in no need for additional or compensatory mitigation measures.

There are no significant (permanent, long term or extensive) adverse direct effects or indirect effects to EFH associated with the proposed action. The expansion of the Aquatic Plant Control Program (Proposed Action) will result in EFH habitat improvements through improved water quality and the reestablishment of native SAV.

The District has concluded that there will be no significant adverse effect on EFH resulting from the implementation of the expansion of the Aquatic Plant Control Program proposed in the Integrated Letter Report/ Programmatic Environmental Assessment, and therefore requests an abbreviated EFH Consultation.

11. References

Connecticut River Conservancy. Aug. 29, 2024. eDNA confirms shortnose sturgeon in the Connecticut River between Turners Falls MA and Bellows Falls VT. Retrieved from: https://www.ctriver.org/post/edna-shortnose-sturgeon-connecticut-river. Accessed

New England Fishery Management Council (NEFMC). 2017. Final Omnibus Essential Fish Habitat Amendment 2, Volume 2: EFH and HAPC Designation Alternatives and Environmental Impacts. Prepared by the NEFMC in cooperation with the National Marine Fisheries Service.

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USFWS. 2025. Connecticut River Basin Fishway Counts. Retrieved from: https://www.fws.gov/office/connecticut-river-fish-and-wildlife-conservation/connecticut-river-migratory-fish-counts . Accessed April 1, 2025.

Vermont Agency of Natural Resources (VANR). 2025. Lakes Scorecard. Retrieved from: https://anrweb.vt.gov/DEC/IWIS/ReportViewer2.aspx?Report=LakesScorecardLinksTable&ViewParms=True . Accessed April 16, 2025.

Vermont Department of Environmental Conservation (VTDEC). March 16, 2022. Aquatic Nuisance Control Permit, ProcellaCOR EC Aquatic Toxicity Review.

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Appendix C

Federal and State Endangered and Threatened Species

Appendix C1

List of Federal Threatened and Endangered Species

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
Phone: (603) 223-2541 Fax: (603) 223-0104

In Reply Refer To: 06/20/2025 20:13:58 UTC
Project Code: 2025-0112281
Project Name: Vermont Aquatic Plant Control Program Expansion

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

Updated 4/12/2023 - Please review this letter each time you request an Official Species List, we will continue to update it with additional information and links to websites may change.

About Official Species Lists

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Federal and non-Federal project proponents have responsibilities under the Act to consider effects on listed species.

The enclosed species list identifies threatened, endangered, proposed, and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested by returning to an existing project's page in IPaC.

Endangered Species Act Project Review

Please visit the "**New England Field Office Endangered Species Project Review and Consultation**" website for step-by-step instructions on how to consider effects on listed

species and prepare and submit a project review package if necessary:

https://www.fws.gov/office/new-england-ecological-services/endangered-species-project-review

NOTE Please do not use the **Consultation Package Builder** tool in IPaC except in specific situations following coordination with our office. Please follow the project review guidance on our website instead and reference your **Project Code** in all correspondence.

Northern Long-eared Bat - (**Updated 4/12/2023**) The Service published a final rule to reclassify the northern long-eared bat (NLEB) as endangered on November 30, 2022. The final rule went into effect on March 31, 2023. You may utilize the **Northern Long-eared Bat Rangewide Determination Key** available in IPaC. More information about this Determination Key and the Interim Consultation Framework are available on the northern long-eared bat species page:

https://www.fws.gov/species/northern-long-eared-bat-myotis-septentrionalis

For projects that previously utilized the 4(d) Determination Key, the change in the species' status may trigger the need to re-initiate consultation for any actions that are not completed and for which the Federal action agency retains discretion once the new listing determination becomes effective. If your project was not completed by March 31, 2023, and may result in incidental take of NLEB, please reach out to our office at newengland@fws.gov to see if reinitiation is necessary.

Additional Info About Section 7 of the Act
Under section 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to determine whether projects may affect threatened and endangered species and/or designated critical habitat. If a Federal agency, or its non-Federal representative, determines that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Federal agency also may need to consider proposed species and proposed critical habitat in the consultation. 50 CFR 402.14(c)(1) specifies the information required for consultation under the Act regardless of the format of the evaluation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

https://www.fws.gov/service/section-7-consultations

In addition to consultation requirements under Section 7(a)(2) of the ESA, please note that under sections 7(a)(1) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species. Please contact NEFO if you would like more information.

Candidate species that appear on the enclosed species list have no current protections under the ESA. The species' occurrence on an official species list does not convey a requirement to

consider impacts to this species as you would a proposed, threatened, or endangered species. The ESA does not provide for interagency consultations on candidate species under section 7, however, the Service recommends that all project proponents incorporate measures into projects to benefit candidate species and their habitats wherever possible.

Migratory Birds

In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see:

https://www.fws.gov/program/migratory-bird-permit

https://www.fws.gov/library/collections/bald-and-golden-eagle-management

Please feel free to contact us at **newengland@fws.gov** with your **Project Code** in the subject line if you need more information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat.

Attachment(s): Official Species List

Note: IPaC has provided all available attachments because this project is in multiple field office jurisdictions.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Bald & Golden Eagles
- Migratory Birds
- Wetlands

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
(603) 223-2541

This project's location is within the jurisdiction of multiple offices. However, only one species list document will be provided for all offices. The species and critical habitats in this document reflect the aggregation of those that fall in each of the affiliated office's jurisdiction. Other offices affiliated with the project:

New York Ecological Services Field Office
3817 Luker Road
Cortland, NY 13045-9385
(607) 753-9334

PROJECT SUMMARY

Project Code: 2025-0112281
Project Name: Vermont Aquatic Plant Control Program Expansion
Project Type: Invasive Plant Control
Project Description: The proposed action involves expanding an existing aquatic plant control program that is cost-shared between the USACE and the state of Vermont. The project area includes federal, state and local government owned waterbodies, their immediate shorelines and vehicle access points and reservoirs of cooperating water-related infrastructure facilities within the state of Vermont. It also includes the 255 mile length of the Connecticut River that serves as the boundary between Vermont and New Hampshire. The aquatic plant control program is an annually funded; therefore implementation of measures will occur on a yearly basis pending availability of funds. The seasonal window in which work is conducted extends from June 1 through October 30.

Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@43.976783499999996,-72.74520548948715,14z

Counties: Massachusetts, New Hampshire, New York, and Vermont

ENDANGERED SPECIES ACT SPECIES

There is a total of 8 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Canada Lynx *Lynx canadensis* Population: Wherever Found in Contiguous U.S. There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3652	Threatened
Indiana Bat *Myotis sodalis* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5949	Endangered
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Endangered
Tricolored Bat *Perimyotis subflavus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10515	Proposed Endangered

CLAMS

NAME	STATUS
Dwarf Wedgemussel *Alasmidonta heterodon* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/784	Endangered

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/9743	Proposed Threatened

FLOWERING PLANTS

NAME	STATUS
Jesup's Milk-vetch *Astragalus robbinsii var. jesupii* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/388	Endangered
Northeastern Bulrush *Scirpus ancistrochaetus* Population: No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6715	Endangered

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

USFWS NATIONAL WILDLIFE REFUGE LANDS AND FISH HATCHERIES

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

The following FWS National Wildlife Refuge Lands and Fish Hatcheries lie fully or partially within your project area:

FACILITY NAME	ACRES
MISSISQUOI NATIONAL WILDLIFE REFUGE https://www.fws.gov/our-facilities?$keywords="%5C%22MISSISQUOI+NATIONAL+WILDLIFE+REFUGE%5C%22"	7,333.799
SILVIO O. CONTE NATIONAL FISH AND WILDLIFE REFUGE https://www.fws.gov/our-facilities?$keywords="%5C%22SILVIO+O.+CONTE+NATIONAL+FISH+AND+WILDLIFE+REFUGE%5C%22"	4,522.934
SILVIO O. CONTE NATIONAL FISH AND WILDLIFE REFUGE https://www.fws.gov/our-facilities?$keywords="%5C%22SILVIO+O.+CONTE+NATIONAL+FISH+AND+WILDLIFE+REFUGE%5C%22"	26,805.063

BALD & GOLDEN EAGLES

Bald and Golden Eagles are protected under the Bald and Golden Eagle Protection Act [2] and the Migratory Bird Treaty Act (MBTA) [1]. Any person or organization who plans or conducts activities that may result in impacts to Bald or Golden Eagles, or their habitats, should follow appropriate regulations and consider implementing appropriate avoidance and minimization measures, as described in the various links on this page.

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1. The Bald and Golden Eagle Protection Act of 1940.
2. The Migratory Birds Treaty Act of 1918.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

There are Bald Eagles and/or Golden Eagles in your project area.

Measures for Proactively Minimizing Eagle Impacts

For information on how to best avoid and minimize disturbance to nesting bald eagles, please review the National Bald Eagle Management Guidelines. You may employ the timing and activity-specific distance recommendations in this document when designing your project/ activity to avoid and minimize eagle impacts. For bald eagle information specific to Alaska, please refer to Bald Eagle Nesting and Sensitivity to Human Activity.

The FWS does not currently have guidelines for avoiding and minimizing disturbance to nesting Golden Eagles. For site-specific recommendations regarding nesting Golden Eagles, please consult with the appropriate Regional Migratory Bird Office or Ecological Services Field Office.

If disturbance or take of eagles cannot be avoided, an incidental take permit may be available to authorize any take that results from, but is not the purpose of, an otherwise lawful activity. For assistance making this determination for Bald Eagles, visit the Do I Need A Permit Tool. For assistance making this determination for golden eagles, please consult with the appropriate Regional Migratory Bird Office or Ecological Services Field Office.

Ensure Your Eagle List is Accurate and Complete
If your project area is in a poorly surveyed area in IPaC, your list may not be complete and you may need to rely on other resources to determine what species may be present (e.g. your local FWS field office, state surveys, your own surveys). Please review the Supplemental Information on Migratory Birds and Eagles, to help you properly interpret the report for your specified location, including determining if there is sufficient data to ensure your list is accurate.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to bald or golden eagles on your list, see the "Probability of Presence Summary" below to see when these bald or golden eagles are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Oct 15 to Aug 31
Golden Eagle *Aquila chrysaetos* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1680	Breeds Jan 1 to Aug 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper

Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

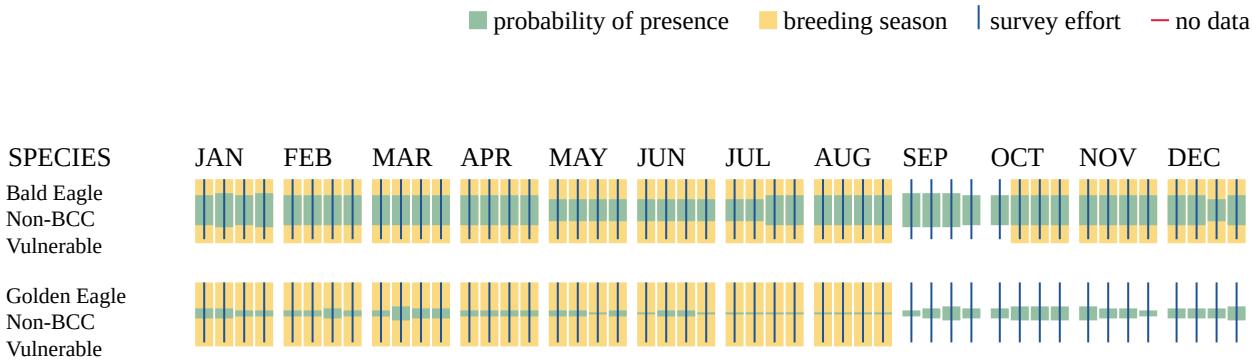
Probability of Presence (■)

Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (■)
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (–)
A week is marked as having no data if there were no survey events for that week.



Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

MIGRATORY BIRDS

The Migratory Bird Treaty Act (MBTA) [1] prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the Department of Interior U.S. Fish and Wildlife Service (Service).

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1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the "Probability of Presence Summary" below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
American Golden-plover *Pluvialis dominica* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/10561	Breeds elsewhere
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Oct 15 to Aug 31
Bay-breasted Warbler *Setophaga castanea* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9583	Breeds May 25 to Aug 1
Belted Kingfisher *Megaceryle alcyon* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9407	Breeds Mar 15 to Jul 25
Bicknell's Thrush *Catharus bicknelli* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/606	Breeds Jun 10 to Aug 20
Black-billed Cuckoo *Coccyzus erythropthalmus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9399	Breeds May 15 to Oct 10

NAME	BREEDING SEASON
Blue-winged Warbler *Vermivora cyanoptera* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9509	Breeds May 1 to Jun 30
Bobolink *Dolichonyx oryzivorus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9454	Breeds May 20 to Jul 31
Canada Warbler *Cardellina canadensis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9643	Breeds May 20 to Aug 10
Cape May Warbler *Setophaga tigrina* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/10571	Breeds Jun 1 to Jul 31
Cerulean Warbler *Setophaga cerulea* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/2974	Breeds Apr 20 to Jul 20
Chimney Swift *Chaetura pelagica* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9406	Breeds Mar 15 to Aug 25
Eastern Meadowlark *Sturnella magna* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9455	Breeds Apr 25 to Aug 31
Eastern Whip-poor-will *Antrostomus vociferus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/10678	Breeds May 1 to Aug 20
Evening Grosbeak *Coccothraustes vespertinus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9465	Breeds May 15 to Aug 10
Golden Eagle *Aquila chrysaetos* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1680	Breeds Jan 1 to Aug 31

NAME	BREEDING SEASON
Golden-winged Warbler *Vermivora chrysoptera* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8745	Breeds May 1 to Jul 20
Grasshopper Sparrow *Ammodramus savannarum perpallidus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/8329	Breeds Jun 1 to Aug 20
Hudsonian Godwit *Limosa haemastica* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9482	Breeds elsewhere
King Rail *Rallus elegans* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8936	Breeds May 1 to Sep 5
Lesser Yellowlegs *Tringa flavipes* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere
Long-eared Owl *asio otus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3631	Breeds Mar 1 to Jul 15
Olive-sided Flycatcher *Contopus cooperi* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3914	Breeds May 20 to Aug 31
Pectoral Sandpiper *Calidris melanotos* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9561	Breeds elsewhere
Prairie Warbler *Setophaga discolor* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9513	Breeds May 1 to Jul 31
Prothonotary Warbler *Protonotaria citrea* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9439	Breeds Apr 1 to Jul 31

NAME	BREEDING SEASON
Purple Sandpiper *Calidris maritima* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9574	Breeds elsewhere
Red-headed Woodpecker *Melanerpes erythrocephalus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9398	Breeds May 10 to Sep 10
Rose-breasted Grosbeak *Pheucticus ludovicianus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/11965	Breeds May 15 to Jul 31
Ruddy Turnstone *Arenaria interpres morinella* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/10633	Breeds elsewhere
Rusty Blackbird *Euphagus carolinus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9478	Breeds elsewhere
Scarlet Tanager *Piranga olivacea* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/11967	Breeds May 10 to Aug 10
Semipalmated Sandpiper *Calidris pusilla* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9603	Breeds elsewhere
Short-billed Dowitcher *Limnodromus griseus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9480	Breeds elsewhere
Upland Sandpiper *Bartramia longicauda* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9294	Breeds May 1 to Aug 31
Veery *Catharus fuscescens fuscescens* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/11987	Breeds May 15 to Jul 15

NAME	BREEDING SEASON
Whimbrel *Numenius phaeopus hudsonicus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/11991	Breeds elsewhere
Willet *Tringa semipalmata* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/10669	Breeds Apr 20 to Aug 5
Wood Thrush *Hylocichla mustelina* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9431	Breeds May 10 to Aug 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

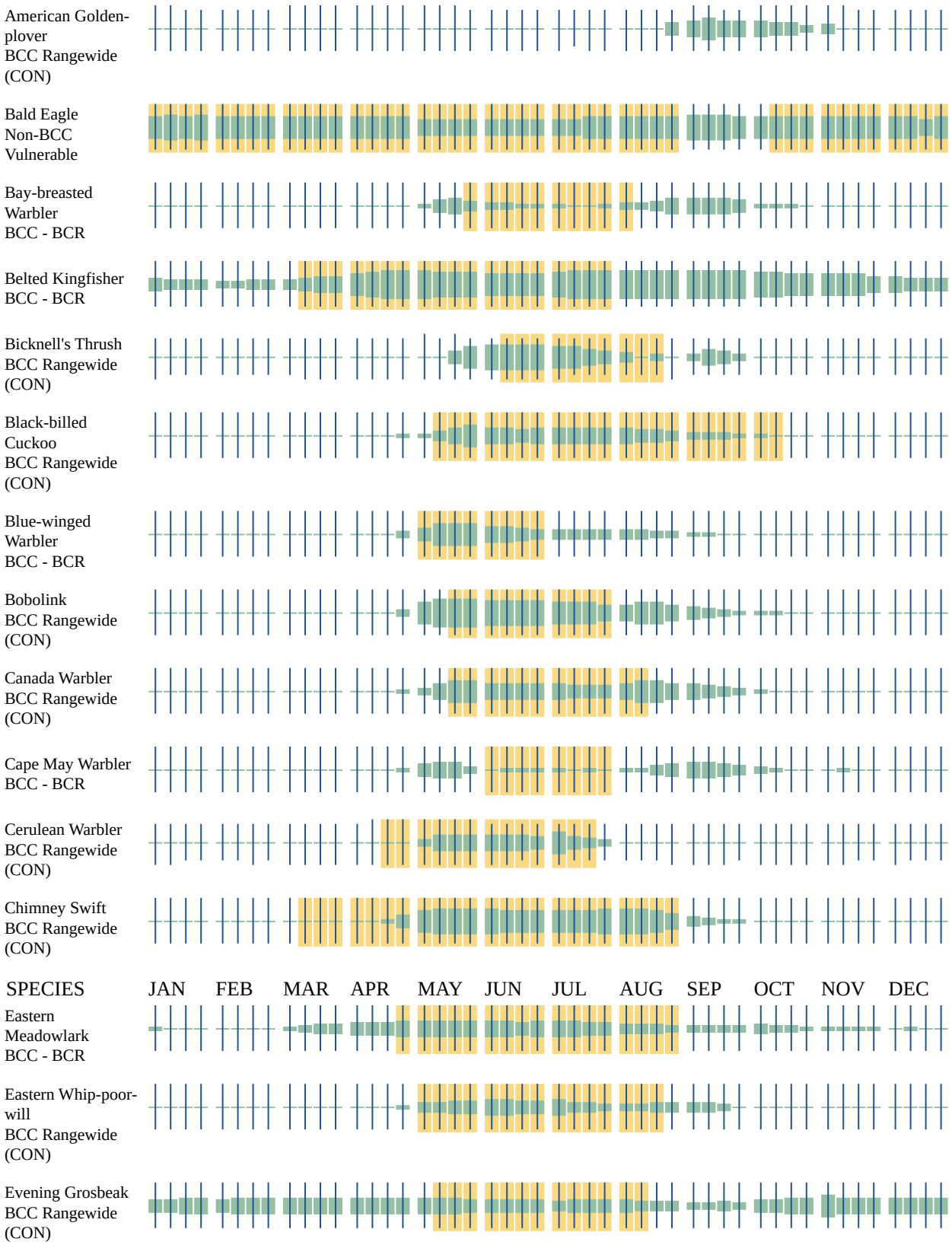
Breeding Season (■)
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

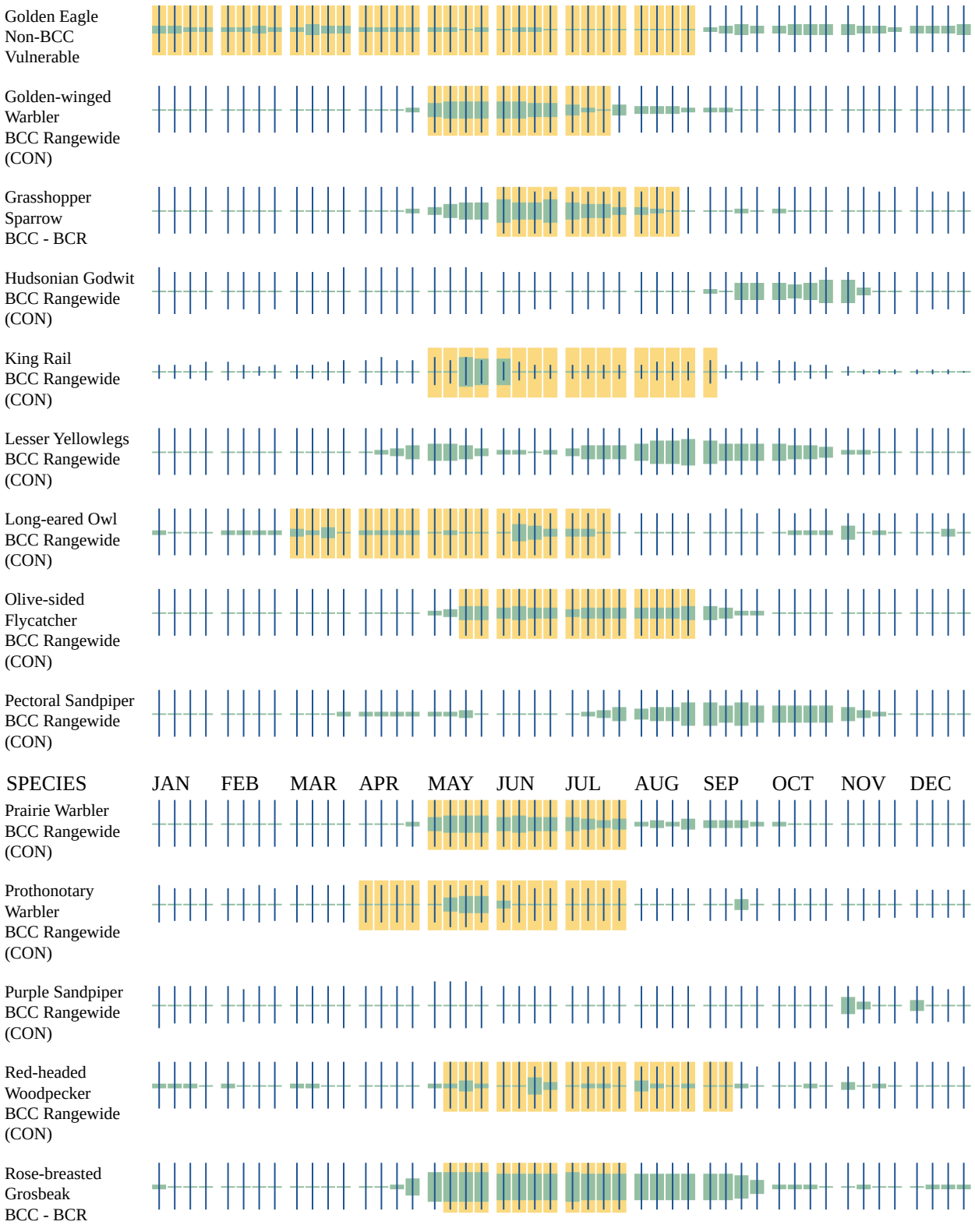
Survey Effort (|)
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

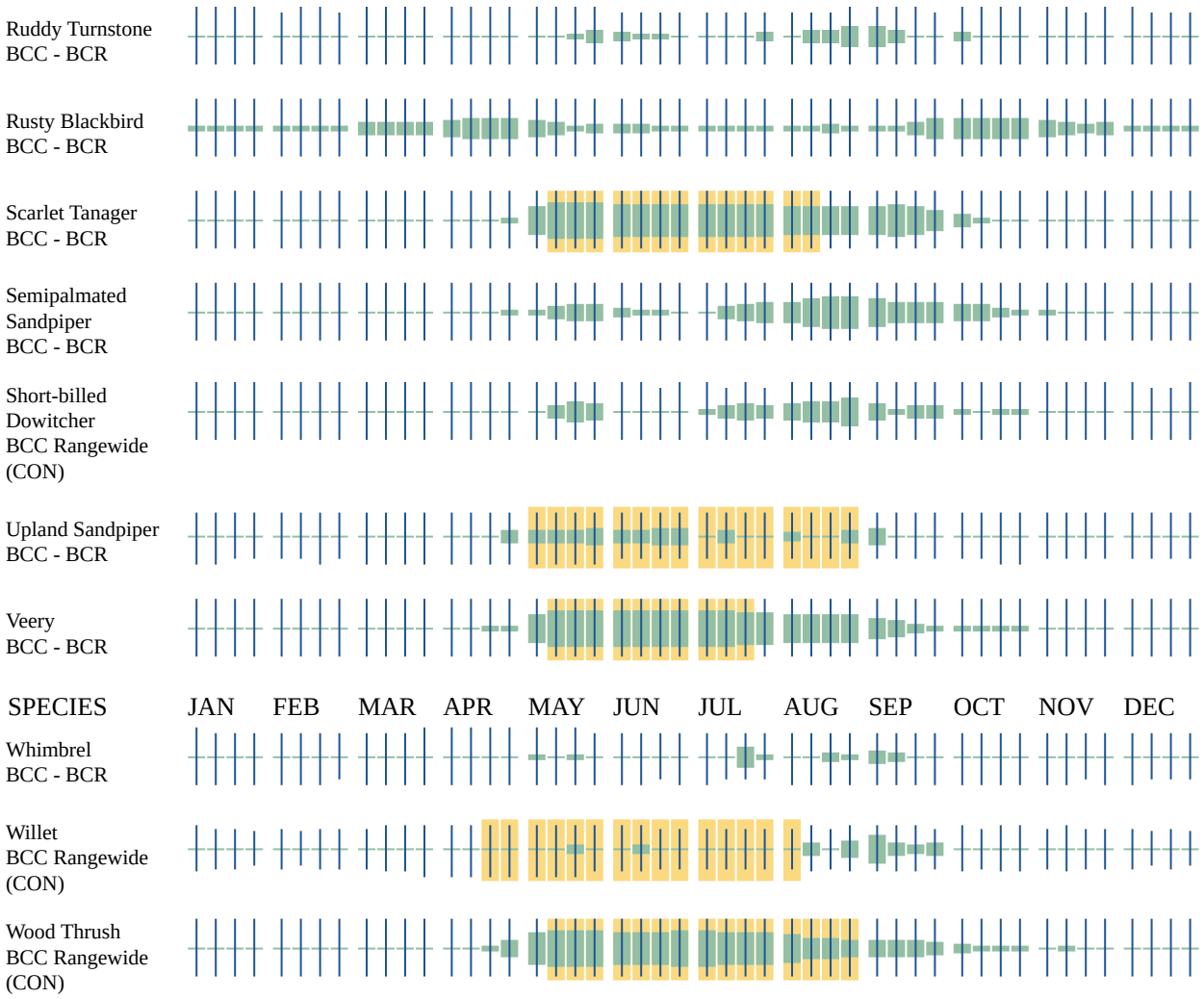
No Data (–)
A week is marked as having no data if there were no survey events for that week.

■ probability of presence ■ breeding season | survey effort – no data

SPECIES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC


American Golden-plover
BCC Rangewide (CON)
Bald Eagle
Non-BCC Vulnerable
Bay-breasted Warbler
BCC - BCR
Belted Kingfisher
BCC - BCR
Bicknell's Thrush
BCC Rangewide (CON)
Black-billed Cuckoo
BCC Rangewide (CON)
Blue-winged Warbler
BCC - BCR
Bobolink
BCC Rangewide (CON)
Canada Warbler
BCC Rangewide (CON)
Cape May Warbler
BCC - BCR
Cerulean Warbler
BCC Rangewide (CON)
Chimney Swift
BCC Rangewide (CON)
SPECIES
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
Eastern Meadowlark
BCC - BCR
Eastern Whip-poor-will
BCC Rangewide (CON)
Evening Grosbeak
BCC Rangewide (CON)


Golden Eagle
Non-BCC
Vulnerable
Golden-winged
Warbler
BCC Rangewide
(CON)
Grasshopper
Sparrow
BCC - BCR
Hudsonian Godwit
BCC Rangewide
(CON)
King Rail
BCC Rangewide
(CON)
Lesser Yellowlegs
BCC Rangewide
(CON)
Long-eared Owl
BCC Rangewide
(CON)
Olive-sided
Flycatcher
BCC Rangewide
(CON)
Pectoral Sandpiper
BCC Rangewide
(CON)
SPECIES
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
Prairie Warbler
BCC Rangewide
(CON)
Prothonotary
Warbler
BCC Rangewide
(CON)
Purple Sandpiper
BCC Rangewide
(CON)
Red-headed
Woodpecker
BCC Rangewide
(CON)
Rose-breasted
Grosbeak
BCC - BCR



Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

WETLANDS

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

Due to your project's size, the list below may be incomplete, or the acreages reported may be inaccurate. For a full list, please contact the local U.S. Fish and Wildlife office or visit https://www.fws.gov/wetlands/data/mapper.HTML

FRESHWATER EMERGENT WETLAND

- PEM1Ah
- PEM1B
- PEM1/FO5Fb
- PEM1/FO4Eb
- PEM1/SS1E
- PEM1/USC
- PEM1/SS1Ed
- PEM1/SS3Eh
- PEM1/FO1B
- PEM1/SS1A
- PEM1/SS4Ed
- PEM1/UBFh
- PEM1/SS4C
- PEM1/SSFb
- PEM1/FO1A
- PEM1/SS1Eb
- PEM1Ad
- PEM1/SS1Bd
- PEM1/FO4E
- PEM1/UBFb
- PEM1/SS3Ch
- PEM1/SS1Eh
- PEM1/2F
- PEM1/5F
- PEM1/SS1Fb
- PEM1/FO1C
- PEM1/SS4E

- PEM1/SS1C
- PEM1/FO4B
- PEM1/FO1Eb
- PEM1/FO1E
- PEM1/FO5Fh
- PEM1/SS4B
- PEM1/ABF
- PEM1/SS3Eb
- PEM1Ab
- PEM1/5E
- PEM1/SS1Cb
- PEM1/SS1Cd
- PEM1Bd
- PEM1/SS3E
- PEM1C
- PEM1A
- PEM1/SS1B
- PEM1/FOFb
- PEM1/SS3Ed
- PEM1/SS4Eb
- PEM1/SS1F
- PEM1/SS5F
- PEM1/UBF
- PEM1/UBFx
- PEM1/FO4C

FRESHWATER POND

- PABF
- PAB/UBF
- PAB/UBH
- PAB4F
- PAB4/EM2Fh
- PAB4H
- PAB4/UBFh
- PABH
- PAB4/EM2F
- PAB4/EM1Fd

- PAB4Fh
- PAB4Hh
- PAB4Fx
- PAB4/EM1Fh
- PAB4/UBF
- PAB4/UBH
- PAB4/UBHx
- PAB4/UBHh
- PABHb
- PAB4Hx

LAKE

- L2UBHh
- L1UBHx
- L2EM2F
- L2UBG
- L2AB4H
- L2AB4/EM2F
- L1ABH
- L2AB4Fh
- L2UBFb
- L1UBHh
- L2AB4/UBFh
- L2UBH
- L1UBH
- L2AB4F
- L2AB4/UBH
- L2ABH

IPAC USER CONTACT INFORMATION

Agency: Army Corps of Engineers
Name: Kimberly Rightler
Address: 26 Federal Plaza
City: New York
State: NY
Zip: 10278
Email karightler@hotmail.com
Phone: 9172842435

Appendix C2

List of State Protected Species

Endangered and Threatened Animals of Vermont
Vermont Natural Heritage Inventory
Vermont Fish & Wildlife Department
10 February 2022

The species in the following list are protected by **Vermont's Endangered Species Law (10 V.S.A. Chap. 123)**. There are 37 state-endangered and 16 state-threatened animals in Vermont. Those with a federal status of Threatened or Endangered are also protected by the **Federal Endangered Species Act (P.L. 93-205)**.

For further information contact the Vermont Natural Heritage Inventory, Vermont Fish & Wildlife Department, 1 National Life Drive, Davis 2, Montpelier, VT 05620-3702. (802) 828-1000.

English Name	Scientific Name	State Status	Federal Status
Fishes			
Northern Brook Lamprey	*Ichthyomyzon fossor*	E	
American Brook Lamprey	*Lethenteron appendix* Synonym: *Lampetra appendix*	T	
Lake Sturgeon	*Acipenser fulvescens*	E	UR
Stonecat	*Noturus flavus*	E	
Eastern Sand Darter	*Ammocrypta pellucida*	T	
Channel Darter	*Percina copelandi*	E	
Amphibians			
Fowler's Toad	*Anaxyrus fowleri*	E	
Boreal Chorus Frog	*Pseudacris maculata*	E	
Reptiles			
Spotted Turtle	*Clemmys guttata*	E	UR
Spiny Softshell (Turtle)	*Apalone spinifera*	T	
Common Five-lined Skink	*Plestiodon fasciatus* Synonym: *Eumeces fasciatus*	E	
North American Racer	*Coluber constrictor*	T	
Eastern Ratsnake	*Pantherophis alleghaniensis* Synonym: *Elaphe obsoleta*	T	
Timber Rattlesnake	*Crotalus horridus*	E	
Mammals			
Eastern Small-footed Bat	*Myotis leibii*	T	
Little Brown Bat	*Myotis lucifugus*	E	UR

English Name	Scientific Name	State Status	Federal Status
Northern Long-eared Bat	*Myotis septentrionalis*	E	E
Indiana Bat	*Myotis sodalis*	E	E
Tri-colored Bat	*Perimyotis subflavus* Synonym: *Pipistrellus subflavus*	E	PE
Canadian Lynx	*Lynx canadensis*	E	T
Eastern Mountain Lion	*Puma concolor couguar* Synonym: *Felis concolor couguar*	E	
American Marten	*Martes americana*	E	
Birds			
Spruce Grouse	*Canachites canadensis* Synonym: *Falcipennis canadensis*	E	
Eastern Whip-poor-will	*Antrostomus vociferus* Synonym: *Caprimulgus vociferus*	T	
Common Nighthawk	*Chordeiles minor*	E	
Upland Sandpiper	*Bartramia longicauda*	E	
Red Knot	*Calidris canutus*	T*	T
Black Tern	*Chlidonias niger*	E	
Common Tern	*Sterna hirundo*	E	
Loggerhead Shrike	*Lanius ludovicianus*	E	
Sedge Wren	*Cistothorus stellaris* Synonym: *Cistothorus platensis*	E	
Rusty Blackbird	*Euphagus carolinus*	E	
Eastern Meadowlark [1]	*Sturnella magna*	T	
Grasshopper Sparrow	*Ammodramus savannarum*	T	
Henslow's Sparrow	*Centronyx henslowii* Synonym: *Ammodramus henslowii*	E	
Amphipods			
Taconic Cave Amphipod	*Stygobromus borealis*	E	
Beetles			
Hairy-necked Tiger Beetle	*Cicindela hirticollis*	T	
Cobblestone Tiger Beetle	*Cicindela marginipennis*	T	
Puritan Tiger Beetle	*Ellipsoptera puritana* Synonym: *Cicindela puritana*	T	T
Bees			
Rusty-patched Bumble Bee	*Bombus affinis*	E	E

* Red Knot (*Calidris canutus rufa*) was added to the Federal list on 12 January 2015. Listed in Vermont by default, per statute; has not undergone rule-making in Vermont.

1 Listed 10 February 2022

English Name	Scientific Name	State Status	Federal Status
Ashton Cuckoo Bumble Bee	*Bombus ashtoni* (*Bombus bohemicus*)	E	
American Bumble Bee [2]	*Bombus pensylvanicus*	E	UR
Yellow-banded Bumble Bee	*Bombus terricola*	T	
Freshwater Mussels and Cla			
Eastern Pearlshell	*Margaritifera margaritifera*	T	
Dwarf Wedgemussel	*Alasmidonta heterodon*	E	E
Brook Floater	*Alasmidonta varicosa*	E	
Cylindrical Papershell	*Anodontoides ferussacianus*	E	
Pocketbook	*Lampsilis ovata*	E	
Flutedshell	*Lasmigona costata*	E	
Fragile Papershell	*Leptodea fragilis*	E	
Black Sandshell	*Ligumia recta*	E	
Pink Heelsplitter	*Potamilus alatus*	E	
Giant Floater	*Pyganodon grandis*	T	

2 Listed 10 February 2022

State Status - Legal protection under Vermont Endangered Species Law (10 V.S.A. Chap. 123)
E = Endangered: in immediate danger of becoming extirpated in the state
T = Threatened: with high possibility of becoming endangered in the near future

Federal Status - Legal protection under the federal Endangered Species Act, U.S. Fish & Wildlife Service
E = Endangered
T = Threatened
P = Proposed
UR = Under Review

Appendix C3

No Effect Determinations

Federal Participation in Expansion of the Aquatic Plant Control Program
State of Vermont
Endangered Species Act
No Effect Determination – Indiana bat, Northern long-eared bat, Tri-colored bat

Project Area. The study area consists of federal, state and local government owned waterbodies, their immediate shorelines and vehicle access points, and reservoirs of cooperating water-related infrastructure facilities (e.g., hydroelectric generation) within the State of Vermont. It also includes the approximate 255-mile length of the Connecticut River serving as the boundary between Vermont and New Hampshire.

Proposed Federal Action. The proposed action involves expanding the existing Aquatic Plant Control Program within the Lake Champlain Basin to the entire state of Vermont. The expanded APCP will be cost-shared between the United States Army Corps of Engineers (USACE) and the state of Vermont. Under the expanded APCP, USACE provides annual funding to the Vermont Department of Environmental Conservation as the managing authority overseeing program implementation.

Aquatic invasive plant species (AIPS) to be managed under the expanded APCP include the following:

- Eurasian watermilfoil (*Myriophyllum spicatum*)
- Starry stonewort (*Nitellopsis obtusa*)
- European frogbit *(Hydrocharis morsus-ranae*)
- Water chestnut (*Trapa natans L*)
- Hydrilla (*Hydrilla verticillata)*
- Giant salvinia (*Salvinia molesta*)
- Water hyacinth (*Eichhornia crassipe)*
- Brazilian elodea (*Egeria densa)*

The expanded APCP includes the following AIPS control measures listed below:

- Measure 1 – Mechanical Control (hand pulling, mechanical harvesting, benthic barrier)
- Measure 2 – Expanded Watercraft Inspection and Decontamination Stations
- Measure 3 – Monitoring for Early Detection
- Measure 4 – Drone Surveys
- Measure 5 – eDNA Sampling and Detection
- Measure 6 – Increased Public Awareness and Education
- Measure 7 – Chemical Control (herbicide application)

Effects Determination.

Stressor	Impact
Direct Habitat Structure and Disturbance	No Effect
Indirect Habitat Structure and Disturbance	No Effect
Noise	No Effect
Water Quality	No Effect
Prey Quantity/Quality	No Effect

Discussion. Indiana bat *(Myotis sodalis)* has been documented in the Central-western portion of Vermont within the Lake Champlain Basin. Northern long-eared bat, and tri-colored bat have been documented throughout the state of Vermont. Summer roost sites for all three species predominantly occur in a variety of forested communities, including riparian buffers, and wetland forests and upland forests. Hunting and foraging areas include forest and wetland edges and riparian buffers. Prey species various insect species such as moths, flies, beetles, and spiders (USFWS 2025a, USFWS 2025b, USFWS 2025c).

The project area is limited to streams, lakes and reservoirs and their immediate shorelines, and access points/existing roads to state, local and/or privately owned lakes, ponds, and reservoirs. Any occurrences of this species within these locations would be transient in nature.

The listed bat species utilize river corridors and wetlands for foraging and hunting. However, because they are nocturnal, any AIPS management operations will not impede their ability to hunt. In addition, AIPS management measures are not expected to adversely affect populations of their prey species in a manner that could reduce food source availability. The aquatic pesticides used are registered with the EPA and have undergone reviews to confirm there will be no short or long-term toxicity issues related to water quality, non-target vegetation and animals. Aquatic pesticides such as ProcellaCor dissipate quickly in the water and will not pose a risk to bat species. The installation of any new inspection and decontamination stations will be within previously disturbed areas immediately adjacent to access roads. Therefore, removal of trees that could serve as roost sites will not occur. The Lake Champlain APCP has been ongoing for several decades with no documented adverse effect to bat species.

The purpose of the proposed action is to increase the effectiveness of future and ongoing invasive aquatic plant control for the protection of public health, water-related infrastructure and commerce, and the enhancement of aquatic ecosystem and water quality. Expansion of the APCP is needed to ensure there are minimal opportunities for AIPS to spread throughout the State and that any existing AIPS can be treated effectively limiting further negative impacts.

Conclusion. USACE has determined that there will be No Effect to listed bat species as a result of implementing the expansion of aquatic invasive plant control measures throughout the state of Vermont as currently proposed. If there are any changes to the project or within the action area that might result in adverse effects to protected species, the Vermont Department of Environmental Conservation will undertake consultation with the U.S. Fish and wildlife Service as required By Section 7 of the Endangered Species Act.

References

United States Fish and Wildlife Service. 2025a. Indiana bat species profile. Accessed at: https://ecos.fws.gov/ecp/species/5949 Retrieved April 17, 2025.

USFWS. 2025b. Northern Long-Eared Bat Species Profile. 2025b. Accessed at: https://ecos.fws.gov/ecp/species/9045 Retrieved April 17, 2025.

USFWS. 2025c. Tri-colored Bat Species Profile. 2025c. Accessed at: https://ecos.fws.gov/ecp/species/10515 Retrieved April 17, 2025.

Federal Participation in Expansion of the Aquatic Plant Control Program
State of Vermont
Endangered Species Act No Effect Determination - Canada Lynx

Project Area. The study area consists of federal, state and local government owned waterbodies, their immediate shorelines and vehicle access points, and reservoirs of cooperating water-related infrastructure facilities (e.g., hydroelectric generation) within the State of Vermont. It also includes the approximate 255-mile length of the Connecticut River serving as the boundary between Vermont and New Hampshire.

Proposed Federal Action. The proposed action involves expanding the existing Aquatic Plant Control Program within the Lake Champlain Basin to the entire state of Vermont. The expanded APCP will be cost-shared between the United States Army Corps of Engineers (USACE) and the state of Vermont. Under the expanded APCP, USACE provides annual funding to the Vermont Department of Environmental Conservation as the managing authority overseeing program implementation.

Aquatic invasive plant species (AIPS) to be managed under the expanded APCP include the following:

- Eurasian watermilfoil (*Myriophyllum spicatum*)
- Starry stonewort (*Nitellopsis obtusa*)
- European frogbit *(Hydrocharis morsus-ranae*)
- Water chestnut (*Trapa natans L*)
- Hydrilla (*Hydrilla verticillata)*
- Giant salvinia (*Salvinia molesta*)
- Water hyacinth (*Eichhornia crassipe)*
- Brazilian elodea (*Egeria densa)*

The expanded APCP includes the following AIPS control measures listed below:

- Measure 1 – Mechanical Control (hand pulling, mechanical harvesting, benthic barrier)
- Measure 2 – Expanded Watercraft Inspection and Decontamination Stations
- Measure 3 – Monitoring for Early Detection
- Measure 4 – Drone Surveys
- Measure 5 – eDNA Sampling and Detection
- Measure 6 – Increased Public Awareness and Education
- Measure 7 – Chemical Control (herbicide application)

Effects Determination.

Stressor	Impact
Direct Habitat Structure and Disturbance	No Effect
Indirect Habitat Structure and Disturbance	No Effect
Water Quality	No Effect
Prey Quantity/Quality	No Effect

Discussion. Canada lynx (*Lynx canadensis*) has been documented in the northeastern Vermont which is the southernmost corner of their known range in the Northeastern United States. Dominant habitat of this species consists of boreal forest (USFWS, 2025a). Snowshoe hare comprises about 75% of their diet with other prey consisting of small mammals and birds that are non-obligate wetland and/or aquatic species (USFWS, 2025b).

The project area is limited to streams, lakes and reservoirs and their immediate shorelines, and access points/existing roads to state, local and/or privately owned lakes, ponds, and reservoirs. Any occurrences of this species within these locations would be transient in nature. The aquatic pesticides used are registered with the EPA and have undergone reviews to confirm there will be no short or long-term toxicity issues related to water quality, non-target vegetation and animals. Aquatic pesticides such as ProcellaCor dissipate quickly in the water and will not pose a risk to Canada lynx.

The purpose of the proposed action is to increase the effectiveness of future and ongoing invasive aquatic plant control for the protection of public health, water-related infrastructure and commerce, and the enhancement of aquatic ecosystem and water quality. Expansion of the APCP is needed to ensure there are minimal opportunities for AIPS to spread throughout the State and that any existing AIPS can be treated effectively limiting further negative impacts.

The federal action will not result in any modifications to habitat that would adversely affect Canada lynx habitat.

Conclusion. USACE has determined that there will be No Effect to Canada lynx as a result of implementing the expansion of aquatic invasive plant control measures throughout the state of Vermont as currently proposed. If there are any changes to the project or within the action area that might result in adverse effects to protected species, the Vermont Department of Environmental Conservation will undertake consultation with the U.S. Fish and wildlife Service as required By Section 7 of the Endangered Species Act.

References

United States Fish and Wildlife Service (USFWS). 2025a. Canada Lynx Species Profile. Environmental Conservation Online System. Accessed at: https://ecos.fws.gov/ecp/species/3652 Retrieved April 16, 2025.

USFWS. 2025b. Canada Lynx Fact Sheet. Accessed at: https://www.fws.gov/sites/default/files/documents/Canada%20lynx_fact%20sheet.pdf. Retrieved April 16, 2025.

Appendix C4

Not Likely to Adversely Affect Determinations

Federal Participation in Expansion of the Aquatic Plant Control Program
State of Vermont
Endangered Species Act
May Affect, Not Likely to Adversely Affect Determination – Dwarf Wedgemussel

1. Project Area

The study area consists of federal, state and local government owned waterbodies, their immediate shorelines and vehicle access points, and reservoirs of cooperating water-related infrastructure facilities (e.g., hydroelectric generation) within the State of Vermont. It also includes the approximate 255-mile length of the Connecticut River serving as the boundary between Vermont and New Hampshire.

2. Proposed Federal Action

The proposed action involves expanding the existing Aquatic Plant Control Program within the Lake Champlain Basin to the entire state of Vermont. The expanded APCP will be cost-shared between the United States Army Corps of Engineers (USACE) and the state of Vermont. Under the expanded APCP, USACE provides annual funding to the Vermont Department of Environmental Conservation as the managing authority overseeing program implementation.

Aquatic invasive plant species (AIPS) to be managed under the expanded APCP include the following:

- Eurasian watermilfoil (*Myriophyllum spicatum*)
- Starry stonewort (*Nitellopsis obtusa*)
- European frogbit *(Hydrocharis morsus-ranae*)
- Water chestnut (*Trapa natans L*)
- Hydrilla (*Hydrilla verticillata)*
- Giant salvinia (*Salvinia molesta*)
- Water hyacinth (*Eichhornia crassipe)*
- Brazilian elodea (*Egeria densa)*

The Proposed Action includes the following AIPS control measures listed below:
consists of multiple early detection and active control measures to serve as a comprehensive strategy for managing AIPS. Descriptions the control measures listed below:

a) **Measure 1 – Mechanical Control**

Mechanical control measures can consist of several types of different methods further described below.

1. Hand-pulling: The hand harvesting method is typically limited to sparsely dense infestations that cover a small area (less than 0.25 acres) or in areas that may be inaccessible to equipment such as harvesters.
2. Benthic Matting: Benthic matting includes installation of a barrier at the bottom of a waterbody with the intent of blocking sunlight from reaching the water's sediment layer and making sediments inhospitable for plant growth. Implementation of benthic matting is mainly utilized around boat launches, docks and marinas. Coverage is on average less than 0.25 acres
3. Diver Assisted Suction Harvesting (DASH): Suction harvesting involves a trained diver hand harvesting AIPS by using a suction line that collects and bags the plant material.

This method is typically reserved for small, scattered infestations to moderate infestations under one acre.

4. Mechanical Harvester: Mechanical harvesting uses devices and machines to harvest the targeted AIPS. Mechanical devices can include floating booms, underwater cutters, hydro-rakes, rotavators, suction harvesters and mechanical harvesters. Mechanical harvesters are generally used for dense stands where cover is 25% or greater and/or larger acreages of AIPS infestations.

b) **Measure 2 – Expanded Watercraft Inspection and Decontamination Stations**

Vermont Department of Environmental Conservation sponsors the Vermont Public Access Greeter Program that utilizes paid public access monitors staffed at public access points on various waterbodies. Greeters are tasked with inspecting intercepted watercraft and removing identified aquatic invasive species. Greeters are also hired to provide waterbody users with information about aquatic invasive species.

Certain Vermont Public Access Greeter Program stations include decontamination stations consisting of high-pressure hot water used for removing identified AIPS from intercepted watercraft.

c) **Measure 3 – Monitoring for Early Detection**

Early detection is focused on searching for the presence of AIPS before they are able to establish and begin reproduction. Monitoring methods can include a variety of approaches, but the most frequent approach is to physically search for AIPS in areas judged at high risk of infestation. This includes shoreline and dock surveys for invasive aquatic plants, snorkels surveys, as well as boat-based surveys. Tools used in early detection investigations include nets, rakes, and other hand tools.

d) **Measure 4 – Drone Surveys**

Drone surveys are conducted over certain waterbodies, such as the Lake Champlain, to identify infestations before they can establish in an area and reproduce.

e) **Measure 5 – eDNA Sampling and Detection**

In environmental deoxyribonucleic acid (eDNA) monitoring, biologists collect subsamples from surface tows at high-risk sampling sites into standardized eDNA collection vials. The eDNA subsamples are processed to detect presence of AIPS DNA particles in the subsampled water, with the intent to increase efficiency and more rapid turn-around of results to improve response and reaction timing if results indicate the presence of AIPS DNA.

f) **Measure 6 – Increased Public Awareness and Education**

VTDEC works to promote public awareness of the existence and risks associated with aquatic invasive plants. Public outreach includes ad campaigns which are aimed at keeping boats free from AIPS. Signs are placed at boat ramps and other strategic places in an effort to reach the key targeted audience along with stocked brochure boxes. A common outreach slogan is “Clean, Drain, Dry.” VTDEC supports public workshops to increase aquatic invasive species awareness in local communities. These outreach efforts have not been cost-shared through the existing APCP.

g) **Measure 7 – Chemical Control (herbicide application)**

Although chemical control is not used by VTDEC as a routine measure for dealing with AIPS, VTDEC has the ability to issue permits for pesticide use related to aquatic invasive species, particularly in a rapid response capability.

ProcellaCOR was first permitted for use in 2019 and has been the only aquatic herbicide permitted for use by VTDEC since 2020. As such, ProcellaCOR is currently the most commonly used aquatic herbicide for treating invasive aquatic plants in Vermont and is typically the only one considered for use during permit application review.

3. Project Purpose

The purpose of the proposed action is to increase the effectiveness of future and ongoing invasive aquatic plant control for the protection of public health, water-related infrastructure and commerce, and the enhancement of aquatic ecosystem and water quality. Expansion of the APCP is needed to ensure there are minimal opportunities for AIPS to spread throughout the State and that any existing AIPS can be treated effectively limiting further negative impacts.

4. Project Duration

The APCP is annually funded; therefore implementation of in-water measures such as mechanical and chemical control will occur on a yearly basis pending availability of funds. The seasonal window in which in-water measures such as mechanical and chemical control are implemented typically occur from June 1 through October 30.

Durations of specific management operations may vary depending on control measure utilized and extent of infestation in any given location selected to be managed. As an estimate, in-water management measures in a specific location could last one day to a week. Multiple measures could also potentially be utilized for areas where AIPS growth is dense. For example, mechanical harvesting could be initially implemented in a location to remove the AIPS followed by spot chemical treatment.

5. Species Occurrence within Project Area

Dwarf wedgemussel (*Alasmidonta heterodon*) has been documented within the Connecticut River Basin with specific occurrences documented in the Connecticut River mainstem and its confluence areas of several of its larger tributaries (Vermont Atlas of Life, 2017).

6. Presence of Critical Habitat

The project area does not contain any critical habitat for dwarf wedgemussel (USFWS, 2025).

7. Life History

Dwarf wedgemussel (*Alasmidonta heterodon*) inhabits portions of freshwater streams and rivers where currents are slow to moderate and in depths of three to 26 feet. Water temperatures needed for survival range from 56 ºF to 80 ºF. It has been found in substrates consisting of mixed sand, pebble, and gravel within streams and rivers of various sizes. It may also occur in areas of mud or silt mixed with firmer substrates, such as sand or gravel. Occasionally, it has also been found embedded in clay banks. The species requires unpolluted, well-oxygenated water (with little silt deposition (Michaelson and Neves 1995). Primary diet consists of microorganisms, phytoplankton and organic matter.

Like other freshwater mussels, dwarf wedgemussel eggs are fertilized in the female as sperm passes over the gills. They are long term brooders with fertilization typically occurring in midsummer and fall and release of larvae (glochidia) occurring in the following spring and summer (Michaelson and Neves 1993). Upon release, the glochidia attach to a fish host until

they reach juvenile stage where they then drop to the streambed. Studies have shown the tessellated darter (*Etheostoma olmstedi*), slimy sculpin (*Cottus cognatus*), and mottled sculpin (*Cottus bairdi*) to be glochidial host fishes for the dwarf wedgemussel. Others such as brown trout (Salmo trutta), banded killifish (*Fundulus diaphanus*), striped bass (*Morone saxatilis)*, and shield darter (*Percina peltata*) are also possible host fishes.

Threats to the dwarf wedgemussel include direct habitat destruction from damming and river channelization, and indirect habitat degradation due to pollution, sedimentation, invasion by exotic species, and fluctuations in water level or temperature. Freshwater mussels, including the dwarf wedgemussel, are sensitive to potassium, zinc, copper, cadmium, and other elements associated with industrial pollution. Industrial, agricultural, and domestic pollution are largely responsible for the disappearance of the dwarf wedgemussel from much of the species' historic range (USFWS, 2024).

8. Effects Determination

Dwarf wedgemussel shares similar habitat requirements as the targeted AIPS as it relates to substrate, water depths and flow velocities. It would not be expected to occur where dense growths of AIPS are found as they can form dense barriers that prevent utilization of the substrate and potential access to fish hosts that facilitate mussel dispersal. Additionally, AIPS are known to create low dissolved oxygen levels that dwarf wedgemussel cannot tolerate. However, it could potentially be found within proximity to areas where the growth density AIPS stands are sparse.

The following AIPS control measures will have No Effects on Dwarf wedgemussel.

- Measure 2 – Expanded Watercraft Inspection and Decontamination Stations
- Measure 3 – Monitoring for Early Detection
- Measure 4 – Drone Surveys
- Measure 5 – eDNA Sampling and Detection
- Measure 6 – Increased Public Awareness and Education

Watercraft inspection and decontamination stations are located at a distance from the waterbody to prevent reintroduction of invasive species during the decontamination process. For the construction of any new watercraft inspection and decontamination stations, erosion and sediment control best management practices would be employed to prevent sediment laden runoff from being introduced into waterways. Early detection monitoring is limited to observatory or non-disruptive methods that would not induce turbidity or disturb habitat. Drone surveys do not come into contact with the water. eDNA sampling is limited to non-intrusive water sampling that would not generate a level of turbidity that could adversely affect filter feeding and/or spawning. Public awareness and education are administrative in nature and do not interact with the resource.

AIPS Control Measure 1: Mechanical Control and AIPS Control Measure 7: Chemical Control could potentially have adverse effects on dwarf wedgemussel.

8.1 Direct Effects

Both mechanical and chemical control measures have the potential to cause direct mortality of benthic species such as dwarf wedgemussel resulting either from the equipment used for management or from the treatment itself.

Benthic matting can smother aquatic macroinvertebrates that are inhabiting the treated area during the time it is employed. Mechanical harvesting measures such as DASH and hydro raking are the most impactful methods due to the extent of direct contact they have to substrate. Based on a 2023 Annual Report prepared by the Vermont Aquatic Nuisance Control Study Committee, hydro-raking is rarely permitted in the state due to the level of disturbance it can cause to substrate, and when permitted, it is usually limited in scope. DASH is typically cost prohibitive and time consuming to be routinely utilized (ANCSC, 2023).

Mechanical harvesters such as rotavators and underwater cutters act like mowers where the AIPS is cut just above the substrate. Although turbidity would still be generated, it would be to a lesser degree and the risk of direct mortality is reduced because the machinery does not come into direct contact with the substrate. The least impactful mechanical measure is the hand-pulling method as only a small amount is removed at any given time and generates minimal disturbance to the substrate.

Direct impacts to dwarf wedgemussel can also occur from the turbidity created during management operations. Turbidity interferes with feeding and can suffocate mussel species. As this species is sensitive to pollutants, disturbance to the substrate could release organic and/or contaminants that can potentially stress or cause death this species.

As dwarf wedgemussel is sensitive to pollutants, either direct or incidental contact with the aquatic pesticide could result in death or cause stress that could result in reduced populations. However, only limited pesticides have been permitted for use by VTDEC and they are highly specific to targeted AIPS with minimal to no documented negative effects on aquatic animals. Typical aquatic pesticide permits issued by VTDEC also contain conditions aimed at protecting aquatic and are further discussed in the Conservation Measures section.

Positive effects of AIPS removal includes the restoration of suitable habitat and localized water quality improvements that could be supportive of this species.

8.2 Indirect Effects:

Indirect effects from mechanical and chemical control measures could include a reduction or loss in food sources due to either direct mortality and/or as a result of turbidity. A reduction of host species that allow for dispersal of the dwarf wedgemussel could also occur as a result of management activities and adverse effects to water quality.

However, AIPS can also indirectly adversely affect dwarf wedgemussel through water quality impairment and forming a dense physical barrier that would prevent fish from accessing the area and thus preventing dispersal to new locations.

8.3 Cumulative Effects:

Managing AIPS could potentially require the use of multiple methods in one location over the span of the annual management season, or recurring management over the course of several years. Other water-based construction and/or recreational activities within the vicinity of dwarf wedgemussel populations would also contribute to potential adverse cumulative effects. In-water work would require permits that would include a requirement for presence/absence surveys prior to initiating in-water work to prevent or minimize adverse effects to this species.

Positive cumulative effects include restoration of suitable habitat and improved water quality supportive of dwarf wedgemussel.

9. **Conservation Measures**

An Aquatic Nuisance Control (ANC) Permit from the state of Vermont in accordance with 10.V.S.A. 1455 is required for mechanical and chemical control measures. Conditions within the ANC permit to minimize adverse effects to the aquatic environment can include, but not be limited to the following:

Conditions universal to any ANC permit type:

- Dwarf wedgemussel is listed as Endangered under the Vermont Endangered Species Act. Presence/absence surveys would be required prior to initiating any in-water management activities. Should the survey determine the presence of dwarf wedgemussel, the state could evaluate the following options:
  - Avoiding the area all together and deny any permit application that could result in adverse effects to dwarf wedgemussel populations.
  - Establish additional conservation measures/best management practices that would minimize adverse effects.
  - Utilize a different AIPS control measure that avoids or minimizes adverse effects to dwarf wedgemussel.
- Limiting access to a 20 foot of wide lane leading directly to shore from the approved harvesting area.
- Staying within the approved work area limits.
- Submission of annual harvesting activity report.

Conditions specific to Benthic Barriers:

- Installation no earlier than July 1, must be removed no later than October 30.
- Barrier material and weighting devices materials must be of such quality and fabrication as to not deteriorate during use and potentially leave debris within the water.
- Barrier material and weighting devices cannot discharge contaminants into the waters of the State.
- Prior to installing barriers, the control location will be surveyed for all rare, threatened, or endangered aquatic plant species known to occur in the waterbody. Barriers shall not be installed overtop rare, threatened, or endangered aquatic plant species.
- Prior to installing barriers, the control location shall be searched for turtles, mussels, or other aquatic wildlife. Observed animals shall be safely moved to a location immediately outside of the control location within the same waterbody when possible.
- Rocks, boulders, or woody debris shall not be removed from the lake bottom.
- Removal of all barriers and weighing devices by the stipulated timeframe stipulated in the Aquatic Nuisance Control Permit issued by the State.

Conditions specific to chemical control measures:

- Applicators must be certified by Vermont Agency of Agriculture Food and Markets (AAFM).
- Notification to the AAFM of the treatment to facilitate Agency coordination for inspection.
- Treatment locations must be approved every year by DEC by presenting a detailed map, description of species density, map of wetlands and rare, threatened, and endangered species, and a map of treatment concentration monitoring locations.

- The overall area of control of aquatic vegetation may not exceed 40% of the body of water's littoral zone.
- Compliance with treatment plan approved by State.
- Water sample collection and analysis until the pesticide drops below approved levels.
- Completion of aquatic species surveys including baseline surveys in the year prior to treatment, a qualitative density survey the year of treatment, a post treatment quantitative survey the year of treatment, and a quantitative survey in the year following treatment.
- Submission of an annual report detailing the full extent of the project.
- Implementation of pesticide minimization measures.
- Submission of a report outlining pesticide minimization efforts.

10. Conclusion

Based on the analysis and conclusions presented, the Proposed Action may affect, but not likely adversely affect dwarf wedgemussel. Disturbance to the substrate would be temporary due to the in-water management measures.

Environmentally sound engineering practices and best management practices would be employed to avoid and minimize adverse impacts to dwarf wedgemussel. By employing avoidance measures or the Conservation Measures listed in Section 9 as required by the state, the project would avoid and minimize impacts to natural resources and result in no need for additional or compensatory mitigation measures.

There are no significant (permanent, long term or extensive) adverse direct effects, indirect or cumulative effects to dwarf wedgmemussel associated with the Proposed Action and that potential benefits could result from project implementation.

11. References

Michaelson, David L. and Richard J. Neves. 1995. Life history and habitat of the endangered dwarf wedgemussel *Alasmidonta heterodon* (Bivalvia: Unionidae). J.N. Am Benthological Society. 1995. 14(2):324-340

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USFWS. December 12, 2024. Narratives and Best Practices for Federally Listed, Proposed, and Candidate Species in New Jersey.

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Aquatic Nuisance Control Study Committee. December 15, 2023. Report of the Aquatic Nuisance Control Study Committee, Act Number 57 (H.31 of 2023).

Federal Participation in Expansion of the Aquatic Plant Control Program
State of Vermont
Endangered Species Act
May Affect, Not Likely to Adversely Affect Determination – Jesup's Milk-Vetch

1. Project Area

The study area consists of federal, state and local government owned waterbodies, their immediate shorelines and vehicle access points, and reservoirs of cooperating water-related infrastructure facilities (e.g., hydroelectric generation) within the State of Vermont. It also includes the approximate 255-mile length of the Connecticut River serving as the boundary between Vermont and New Hampshire.

2. Proposed Federal Action

The proposed action involves expanding the existing Aquatic Plant Control Program within the Lake Champlain Basin to the entire state of Vermont. The expanded APCP will be cost-shared between the United States Army Corps of Engineers (USACE) and the state of Vermont. Under the expanded APCP, USACE provides annual funding to the Vermont Department of Environmental Conservation as the managing authority overseeing program implementation.

Aquatic invasive plant species (AIPS) to be managed under the expanded APCP include the following:

- Eurasian watermilfoil (*Myriophyllum spicatum*)
- Starry stonewort (*Nitellopsis obtusa*)
- European frogbit *(Hydrocharis morsus-ranae*)
- Water chestnut (*Trapa natans L*)
- Hydrilla (*Hydrilla verticillata)*
- Giant salvinia (*Salvinia molesta*)
- Water hyacinth (*Eichhornia crassipe)*
- Brazilian elodea (*Egeria densa)*

The Proposed Action includes the following AIPS control measures listed below:
consists of multiple early detection and active control measures to serve as a comprehensive strategy for managing AIPS. Descriptions the control measures listed below:

a) **Measure 1 – Mechanical Control**

Mechanical control measures can consist of several types of different methods further described below.

1. Hand-pulling: The hand harvesting method is typically limited to sparsely dense infestations that cover a small area (less than 0.25 acres) or in areas that may be inaccessible to equipment such as harvesters.
2. Benthic Matting: Benthic matting includes installation of a barrier at the bottom of a waterbody with the intent of blocking sunlight from reaching the water's sediment layer and making sediments inhospitable for plant growth. Implementation of benthic matting is mainly utilized around boat launches, docks and marinas. Coverage is on average less than 0.25 acres
3. Diver Assisted Suction Harvesting (DASH): Suction harvesting involves a trained diver hand harvesting AIPS by using a suction line that collects and bags the plant material. This method is typically reserved for small, scattered infestations to moderate infestations under one acre.

4. Mechanical Harvester: Mechanical harvesting uses devices and machines to harvest the targeted AIPS. Mechanical devices can include floating booms, underwater cutters, hydro-rakes, rotavators, suction harvesters and mechanical harvesters. Mechanical harvesters are generally used for dense stands where cover is 25% or greater and/or larger acreages of AIPS infestations.

b) **Measure 2 – Expanded Watercraft Inspection and Decontamination Stations**

Vermont Department of Environmental Conservation sponsors the Vermont Public Access Greeter Program that utilizes paid public access monitors staffed at public access points on various waterbodies. Greeters are tasked with inspecting intercepted watercraft and removing identified aquatic invasive species. Greeters are also hired to provide waterbody users with information about aquatic invasive species.

Certain Vermont Public Access Greeter Program stations include decontamination stations consisting of high-pressure hot water used for removing identified AIPS from intercepted watercraft.

c) **Measure 3 – Monitoring for Early Detection**

Early detection is focused on searching for the presence of AIPS before they are able to establish and begin reproduction. Monitoring methods can include a variety of approaches, but the most frequent approach is to physically search for AIPS in areas judged at high risk of infestation. This includes shoreline and dock surveys for invasive aquatic plants, snorkels surveys, as well as boat-based surveys. Tools used in early detection investigations include nets, rakes, and other hand tools.

d) **Measure 4 – Drone Surveys**

Drone surveys are conducted over certain waterbodies, such as the Lake Champlain, to identify infestations before they can establish in an area and reproduce.

e) **Measure 5 – eDNA Sampling and Detection**

In environmental deoxyribonucleic acid (eDNA) monitoring, biologists collect subsamples from surface tows at high-risk sampling sites into standardized eDNA collection vials. The eDNA subsamples are processed to detect presence of AIPS DNA particles in the subsampled water, with the intent to increase efficiency and more rapid turn-around of results to improve response and reaction timing if results indicate the presence of AIPS DNA.

f) **Measure 6 – Increased Public Awareness and Education**

VTDEC works to promote public awareness of the existence and risks associated with aquatic invasive plants. Public outreach includes ad campaigns which are aimed at keeping boats free from AIPS. Signs are placed at boat ramps and other strategic places in an effort to reach the key targeted audience along with stocked brochure boxes. A common outreach slogan is “Clean, Drain, Dry.” VTDEC supports public workshops to increase aquatic invasive species awareness in local communities. These outreach efforts have not been cost-shared through the existing APCP.

g) **Measure 7 – Chemical Control (herbicide application)**

Although chemical control is not used by VTDEC as a routine measure for dealing with AIPS, VTDEC has the ability to issue permits for pesticide use related to aquatic invasive species, particularly in a rapid response capability.

ProcellaCOR was first permitted for use in 2019 and has been the only aquatic herbicide permitted for use by VTDEC since 2020. As such, ProcellaCOR is currently the most commonly used aquatic herbicide for treating invasive aquatic plants in Vermont and is typically the only one considered for use during permit application review.

3. Project Purpose

The purpose of the proposed action is to increase the effectiveness of future and ongoing invasive aquatic plant control for the protection of public health, water-related infrastructure and commerce, and the enhancement of aquatic ecosystem and water quality. Expansion of the APCP is needed to ensure there are minimal opportunities for AIPS to spread throughout the State and that any existing AIPS can be treated effectively limiting further negative impacts.

4. Project Duration

The APCP is annually funded; therefore implementation of in-water measures such as mechanical and chemical control will occur on a yearly basis pending availability of funds. The seasonal window in which in-water measures such as mechanical and chemical control are implemented typically occur from June 1 through October 30.

Durations of specific management operations may vary depending on control measure utilized and extent of infestation in any given location selected to be managed. As an estimate, in-water management measures in a specific location could last one day to a week. Multiple measures could also potentially be utilized for areas where AIPS growth is dense. For example, mechanical harvesting could be initially implemented in a location to remove the AIPS followed by spot chemical treatment.

5. Species Occurrence within Project Area

Jesup's Milk Vetch (*Astragalus robbinsii* var. *jusupii)* has been documented within a 16-mile segment of the Connecticut River between central New Hampshire and Vermont with basin with specific occurrences documented in the Connecticut River mainstem and its confluence areas of several of its larger tributaries (USFWS New England Field Office, 2019).

6. Presence of Critical Habitat

The project area does not contain any critical habitat for Jesup's Milk Vetch (USFWS, 2025).

7. Life History

The Jesup's milk-vetch plant inhabits crevices on ledges or shelves of bedrock outcrops that have minimal sediment accumulation and are exposed to full sun. Specifically, it is found within the portion of riverbank that is periodically subjected to flood and ice related scouring and silt deposition with the majority of plants establishing below the ice scour line. Approximately five distinct populations have been documented within a 16-mile portion along the Connecticut River Main Stem and within the confluence areas of its tributaries. Each community was under one acre at the time surveys were conducted.

Plants on average emerge in April and bloom in early to mid-May but actual timing varies from year to year. Flowering generally lasts to early July and seed set occurs from Late June to mid-July. Vegetative stems usually remain green until September or October. Seed germination is delayed until the following year or later and dispersal has been documented to be very localized.

Immediate threats to populations include encroachment of competing native and non-native invasive vegetation such as poison ivy and Japanese knotweed respectively, genetic and

reproductive problems due to small populations and localized seed dispersal, and hydrological alterations as a result of hydropower management. Herbivory and trampling by recreational uses of the Connecticut River are deemed to be lesser threats (USFWS, New England Field Office, 2019).

8. Effects Determination

Jesup's milk-vetch would not be found within the immediate area of the targeted AIPS which are submerged aquatic vegetative species. However, given that it inhabits riverbanks, it could potentially occur adjacent to AIPS populations and therefore be potentially adversely affected by AIPS control measures.

The following AIPS control measures will have No Effects on Jesup's milk-vetch

- Measure 2 – Expanded Watercraft Inspection and Decontamination Stations
- Measure 3 – Monitoring for Early Detection
- Measure 4 – Drone Surveys
- Measure 5 – eDNA Sampling and Detection
- Measure 6 – Increased Public Awareness and Education

Watercraft inspection and decontamination stations are located at a distance from the waterbody to prevent reintroduction of invasive species during the decontamination process. For the construction of any new watercraft inspection and decontamination stations, erosion and sediment control best management practices would be employed to prevent sediment laden runoff from being introduced into waterways. Early detection monitoring is limited to observatory or non-disruptive methods that would not induce turbidity or disturb habitat. Drone surveys do not come into contact with the water. eDNA sampling is limited to non-intrusive water sampling that would not generate a level of turbidity that could adversely affect filter feeding and/or spawning. Public awareness and education are administrative in nature and do not interact with the resource.

AIPS Control Measure 1: Mechanical Control and AIPS Control Measure 7: Chemical Control could potentially have adverse effects on Jesup's milk-vetch.

8.1 Direct Effects

The primary risk for direct adverse effects to Jesup's milk-vetch resulting from the Proposed Action would be from the launching of any equipment used in mechanical and chemical control from the riverbank into the water and/or accidental trampling by crews/individuals involved in the control operations. This can be mitigated by presence/absence surveys prior to initiating work and restricting access to locations occupied by Jesup's milk-vetch.

8.2 Indirect Effects:

Indirect effects from mechanical measures includes accidental removal if equipment comes into contact with the riverbank during harvesting operations and/or incidental contact with the aquatic herbicide during control operations. Similar to mitigating direct impacts, indirect adverse effects can be mitigated by presence/absence surveys prior to initiating work and restricting access to locations occupied by Jesup's milk-vetch.

8.3 Cumulative Effects:

Managing AIPS could potentially require the use of multiple methods in one location over the span of the annual management season, or recurring management over the course of several years. Other water-based construction and/or recreational activities within the vicinity of Jesup's

milk-vetch populations would also contribute to potential adverse cumulative effects. In-water where that requires equipment access from the riverbank would require permits that include a requirement for presence/absence surveys prior to initiating in-water work to prevent or minimize adverse effects to this species.

9. **Conservation Measures**

An Aquatic Nuisance Control (ANC) Permit from the state of Vermont in accordance with 10.V.S.A. 1455 is required for mechanical and chemical control measures. Conditions within the ANC permit to minimize adverse effects to the aquatic environment can include, but not be limited to the following:

Conditions universal to any ANC permit type:

- Jesup's milk-vetch is listed as Endangered under the Vermont Endangered Species Act. Presence/absence surveys would be required prior to initiating any in-water management activities. Should the survey determine the presence of Jesup's milk-vetch, the state could evaluate the following options:
  - Avoiding the area all together and deny any permit application that could result in adverse effects to Jesup's milk-vetch populations.
  - Establish additional conservation measures/best management practices that would minimize adverse effects.
  - Utilize a different AIPS control measure that avoids or minimizes adverse effects to Jesup's milk-vetch.
- Limiting access to a 20 foot of wide lane leading directly to shore from the approved harvesting area.
- Staying within the approved work area limits.
- Submission of annual harvesting activity report

Conditions specific to Benthic Barriers:

- Installation no earlier than July 1, must be removed no later than October 30.
- Barrier material and weighting devices materials must be of such quality and fabrication as to not deteriorate during use and potentially leave debris within the water.
- Barrier material and weighting devices cannot discharge contaminants into the waters of the State.
- Prior to installing barriers, the control location will be surveyed for all rare, threatened, or endangered aquatic plant species known to occur in the waterbody. Barriers shall not be installed overtop rare, threatened, or endangered aquatic plant species.
- Prior to installing barriers, the control location shall be searched for turtles, mussels, or other aquatic wildlife. Observed animals shall be safely moved to a location immediately outside of the control location within the same waterbody when possible.
- Rocks, boulders, or woody debris shall not be removed from the lake bottom.
- Removal of all barriers and weighing devices by the stipulated timeframe stipulated in the Aquatic Nuisance Control Permit issued by the State.

Conditions specific to chemical control measures:

- Applicators must be certified by Vermont Agency of Agriculture Food and Markets (AAFM).

- Notification to the AAFM of the treatment to facilitate Agency coordination for inspection.
- Treatment locations must be approved every year by DEC by presenting a detailed map, description of species density, map of wetlands and rare, threatened, and endangered species, and a map of treatment concentration monitoring locations.
- The overall area of control of aquatic vegetation may not exceed 40% of the body of water's littoral zone.
- Compliance with treatment plan approved by State.
- Water sample collection and analysis until the pesticide drops below approved levels.
- Completion of aquatic species surveys including baseline surveys in the year prior to treatment, a qualitative density survey the year of treatment, a post treatment quantitative survey the year of treatment, and a quantitative survey in the year following treatment.
- Submission of an annual report detailing the full extent of the project.
- Implementation of pesticide minimization measures.
- Submission of a report outlining pesticide minimization efforts.

10. Conclusion

Based on the analysis and conclusions presented, the Proposed Action may affect, but not likely adversely affect Jesup's milk-vetch. Disturbance to the substrate would be temporary due to the in-water management measures.

Environmentally sound engineering practices and best management practices would be employed to avoid and minimize adverse impacts to Jesup's milk-vetch. By employing avoidance measures or the Conservation Measures listed in Section 9 as required by the state, the project would avoid and minimize impacts to natural resources and result in no need for additional or compensatory mitigation measures.

There are no significant (permanent, long term or extensive) adverse direct effects, indirect or cumulative effects to Jesup's milk-vetch associated with the Proposed Action.

11. References

United States Fish and Wildlife Service (USFWS). February 27, 2025. List of threatened and endangered species for VT Aquatic Plant Control Program Expansion.

USFWS, New England Field Office. February 28, 2019. Jesup's milk-vetch. Draft Revised Recovery Plan.

Vermont Department of Environmental Conservation (VTDEC). March 16, 2022. Aquatic Nuisance Control Permit, ProcellaCOR EC Aquatic Toxicity Review.

Federal Participation in Expansion of the Aquatic Plant Control Program
State of Vermont
Endangered Species Act
May Affect, Not Likely to Adversely Affect Determination – Northeastern Bulrush

1. Project Area

The study area consists of federal, state and local government owned waterbodies, their immediate shorelines and vehicle access points, and reservoirs of cooperating water-related infrastructure facilities (e.g., hydroelectric generation) within the State of Vermont. It also includes the approximate 255-mile length of the Connecticut River serving as the boundary between Vermont and New Hampshire.

2. Proposed Federal Action

The proposed action involves expanding the existing Aquatic Plant Control Program within the Lake Champlain Basin to the entire state of Vermont. The expanded APCP will be cost-shared between the United States Army Corps of Engineers (USACE) and the state of Vermont. Under the expanded APCP, USACE provides annual funding to the Vermont Department of Environmental Conservation as the managing authority overseeing program implementation.

Aquatic invasive plant species (AIPS) to be managed under the expanded APCP include the following:

- Eurasian watermilfoil (*Myriophyllum spicatum*)
- Starry stonewort (*Nitellopsis obtusa*)
- European frogbit *(Hydrocharis morsus-ranae*)
- Water chestnut (*Trapa natans L*)
- Hydrilla (*Hydrilla verticillata)*
- Giant salvinia (*Salvinia molesta*)
- Water hyacinth (*Eichhornia crassipe)*
- Brazilian elodea (*Egeria densa)*

The Proposed Action includes the following AIPS control measures listed below:
consists of multiple early detection and active control measures to serve as a comprehensive strategy for managing AIPS. Descriptions the control measures listed below:

a) **Measure 1 – Mechanical Control**

Mechanical control measures can consist of several types of different methods further described below.

1. Hand-pulling: The hand harvesting method is typically limited to sparsely dense infestations that cover a small area (less than 0.25 acres) or in areas that may be inaccessible to equipment such as harvesters.
2. Benthic Matting: Benthic matting includes installation of a barrier at the bottom of a waterbody with the intent of blocking sunlight from reaching the water's sediment layer and making sediments inhospitable for plant growth. Implementation of benthic matting is mainly utilized around boat launches, docks and marinas. Coverage is on average less than 0.25 acres
3. Diver Assisted Suction Harvesting (DASH): Suction harvesting involves a trained diver hand harvesting AIPS by using a suction line that collects and bags the plant material.

This method is typically reserved for small, scattered infestations to moderate infestations under one acre.

4. Mechanical Harvester: Mechanical harvesting uses devices and machines to harvest the targeted AIPS. Mechanical devices can include floating booms, underwater cutters, hydro-rakes, rotavators, suction harvesters and mechanical harvesters. Mechanical harvesters are generally used for dense stands where cover is 25% or greater and/or larger acreages of AIPS infestations.

b) **Measure 2 – Expanded Watercraft Inspection and Decontamination Stations**

Vermont Department of Environmental Conservation sponsors the Vermont Public Access Greeter Program that utilizes paid public access monitors staffed at public access points on various waterbodies. Greeters are tasked with inspecting intercepted watercraft and removing identified aquatic invasive species. Greeters are also hired to provide waterbody users with information about aquatic invasive species.

Certain Vermont Public Access Greeter Program stations include decontamination stations consisting of high-pressure hot water used for removing identified AIPS from intercepted watercraft.

c) **Measure 3 – Monitoring for Early Detection**

Early detection is focused on searching for the presence of AIPS before they are able to establish and begin reproduction. Monitoring methods can include a variety of approaches, but the most frequent approach is to physically search for AIPS in areas judged at high risk of infestation. This includes shoreline and dock surveys for invasive aquatic plants, snorkels surveys, as well as boat-based surveys. Tools used in early detection investigations include nets, rakes, and other hand tools.

d) **Measure 4 – Drone Surveys**

Drone surveys are conducted over certain waterbodies, such as the Lake Champlain, to identify infestations before they can establish in an area and reproduce.

e) **Measure 5 – eDNA Sampling and Detection**

In environmental deoxyribonucleic acid (eDNA) monitoring, biologists collect subsamples from surface tows at high-risk sampling sites into standardized eDNA collection vials. The eDNA subsamples are processed to detect presence of AIPS DNA particles in the subsampled water, with the intent to increase efficiency and more rapid turn-around of results to improve response and reaction timing if results indicate the presence of AIPS DNA.

f) **Measure 6 – Increased Public Awareness and Education**

VTDEC works to promote public awareness of the existence and risks associated with aquatic invasive plants. Public outreach includes ad campaigns which are aimed at keeping boats free from AIPS. Signs are placed at boat ramps and other strategic places in an effort to reach the key targeted audience along with stocked brochure boxes. A common outreach slogan is “Clean, Drain, Dry.” VTDEC supports public workshops to increase aquatic invasive species awareness in local communities. These outreach efforts have not been cost-shared through the existing APCP.

g) **Measure 7 – Chemical Control (herbicide application)**

Although chemical control is not used by VTDEC as a routine measure for dealing with AIPS, VTDEC has the ability to issue permits for pesticide use related to aquatic invasive species, particularly in a rapid response capability.

ProcellaCOR was first permitted for use in 2019 and has been the only aquatic herbicide permitted for use by VTDEC since 2020. As such, ProcellaCOR is currently the most commonly used aquatic herbicide for treating invasive aquatic plants in Vermont and is typically the only one considered for use during permit application review.

3. Project Purpose

The purpose of the proposed action is to increase the effectiveness of future and ongoing invasive aquatic plant control for the protection of public health, water-related infrastructure and commerce, and the enhancement of aquatic ecosystem and water quality. Expansion of the APCP is needed to ensure there are minimal opportunities for AIPS to spread throughout the State and that any existing AIPS can be treated effectively limiting further negative impacts.

4. Project Duration

The APCP is annually funded; therefore implementation of in-water measures such as mechanical and chemical control will occur on a yearly basis pending availability of funds. The seasonal window in which in-water measures such as mechanical and chemical control are implemented typically occur from June 1 through October 30.

Durations of specific management operations may vary depending on control measure utilized and extent of infestation in any given location selected to be managed. As an estimate, in-water management measures in a specific location could last one day to a week. Multiple measures could also potentially be utilized for areas where AIPS growth is dense. For example, mechanical harvesting could be initially implemented in a location to remove the AIPS followed by spot chemical treatment.

5. Species Occurrence within Project Area

Northeastern bulrush (*Scirpus ancistrochaetus)* has been documented within the Southeastern portion of Vermont along and within Connecticut River (USFWS, 2025a).

6. Presence of Critical Habitat

The project area does not contain any critical habitat for Northeastern bulrush (USFWS, 2025b).

7. Life History

The northeastern bulrush is a wetland obligate plant occurring in acidic to almost neutral wetlands including sinkhole ponds, wet depressions, vernal pools, beaver flowages, and other riparian areas found in hilly country. Optimal habitat includes abundant sunlight, higher organic matter, and seasonally and/or annually fluctuating water levels, although prolonged periods with too much or too little water may be detrimental.

The northeastern bulrush may be found in a wide range of water depths from deep water to several feet away from the water's edge, depending on seasonal fluctuations in water levels. Plants typically grow in open areas surrounded by forest. Light availability is known to influence plant growth, reproduction, and distribution. Wetland types supporting the northeastern bulrush are fed by surface water, although some wetlands also receive ground water inputs, which likely increase the stability of those wetlands (Lentz-Cipollini and Dunson 2006, p. 275).

The northeastern bulrush primarily propagates through rhizomes and may grow as single plants or in clumps comprised of multiple stems. Flowering occurs from mid-June to July, with fruit forming between July and September. Fluctuations in population size are common, and plants can be absent above ground for several years in response to unfavorable environmental

conditions before re-emerging when favorable habitat conditions return (USFWS, Northeastern Region, 2019).

In general, threats to this species have been related to habitat degradation, development activities related to logging operations, agriculture and infrastructure and changes in hydrology that has resulted in reduced water availability. However, the USFWS published a proposal to remove the northeastern bulrush from the Federal List of Endangered and Threatened Plants in the Federal Register on July 31, 2024. The de-listing proposal is based on a determination that threats to the northeastern bulrush have been eliminated or reduced to the point that the species no longer meets the definition of an endangered or threatened species under the Endangered Species Act of 1973, as amended (Act) (USFWS, 2024)

8. Effects Determination

Northeastern bulrush would not be found within the immediate area of the targeted AIPS which are submerged aquatic vegetative species. However, as it can occur within palustrine emergent wetlands associated with lakes and ponds and riparian areas, it could potentially occur adjacent to AIPS populations and therefore be potentially adversely effected by AIPS control measures.

The following AIPS control measures will have No Effects on Northeastern bulrush

- Measure 2 – Expanded Watercraft Inspection and Decontamination Stations
- Measure 3 – Monitoring for Early Detection
- Measure 4 – Drone Surveys
- Measure 5 – eDNA Sampling and Detection
- Measure 6 – Increased Public Awareness and Education

Watercraft inspection and decontamination stations are located at a distance from the waterbody to prevent reintroduction of invasive species during the decontamination process. For the construction of any new watercraft inspection and decontamination stations, erosion and sediment control best management practices would be employed to prevent sediment laden runoff from being introduced into waterways. Early detection monitoring is limited to observatory or non-disruptive methods that would not induce turbidity or disturb habitat. Drone surveys do not come into contact with the water. eDNA sampling is limited to non-intrusive water sampling that would not generate a level of turbidity that could adversely affect filter feeding and/or spawning. Public awareness and education are administrative in nature and do not interact with the resource.

AIPS Control Measure 1: Mechanical Control and AIPS Control Measure 7: Chemical Control could potentially have adverse effects on Northeastern bulrush.

8.1 Direct Effects

The primary risk for direct adverse effects to Northeastern bulrush resulting from the Proposed Action would be from the launching of any equipment used in mechanical and chemical control from the riverbank into the water and/or accidental trampling by crews/individuals involved in the control operations. This can be mitigated by presence/absence surveys prior to initiating work and restricting access to locations occupied by Northeastern bulrush.

8.2 Indirect Effects:

Indirect effects from mechanical measures includes accidental removal if equipment comes into contact with the riverbank during harvesting operations and/or incidental contact with the aquatic herbicide during control operations. Similar to mitigating direct impacts, indirect adverse

effects can be mitigated by presence/absence surveys prior to initiating work and restricting access to locations occupied by Northeastern bulrush.

8.3 Cumulative Effects:

Managing AIPS could potentially require the use of multiple methods in one location over the span of the annual management season, or recurring management over the course of several years. Other water-based construction and/or recreational activities within the vicinity of Northeastern bulrush populations would also contribute to potential adverse cumulative effects. In-water where that requires equipment access from the riverbank would require permits that include a requirement for presence/absence surveys prior to initiating in-water work to prevent or minimize adverse effects to this species.

9. **Conservation Measures**

An Aquatic Nuisance Control (ANC) Permit from the state of Vermont in accordance with 10.V.S.A. 1455 is required for mechanical and chemical control measures. Conditions within the ANC permit to minimize adverse effects to the aquatic environment can include, but not be limited to the following:

Conditions universal to any ANC permit type:

- Northeastern bulrush is listed as Endangered under the Vermont Endangered Species Act. Presence/absence surveys would be required prior to initiating any in-water management activities. Should the survey determine the presence of Northeastern bulrush, the state could evaluate the following options:
  - Avoiding the area all together and deny any permit application that could result in adverse effects to Northeastern bulrush populations.
  - Establish additional conservation measures/best management practices that would minimize adverse effects.
  - Utilize a different AIPS control measure that avoids or minimizes adverse effects to Northeastern bulrush.
- Limiting access to a 20 foot of wide lane leading directly to shore from the approved harvesting area.
- Staying within the approved work area limits.
- Submission of annual harvesting activity report

Conditions Specific to Benthic Barriers:

- Installation no earlier than July 1, must be removed no later than October 30.
- Barrier material and weighting devices materials must be of such quality and fabrication as to not deteriorate during use and potentially leave debris within the water.
- Barrier material and weighting devices cannot discharge contaminants into the waters of the State.
- Prior to installing barriers, the control location will be surveyed for all rare, threatened, or endangered aquatic plant species known to occur in the waterbody. Barriers shall not be installed overtop rare, threatened, or endangered aquatic plant species.
- Prior to installing barriers, the control location shall be searched for turtles, mussels, or other aquatic wildlife. Observed animals shall be safely moved to a location immediately outside of the control location within the same waterbody when possible.
- Rocks, boulders, or woody debris shall not be removed from the lake bottom.

- Removal of all barriers and weighing devices by the stipulated timeframe stipulated in the Aquatic Nuisance Control Permit issued by the State.

Conditions specific to chemical control measures:

- Applicators must be certified by Vermont Agency of Agriculture Food and Markets (AAFM).
- Notification to the AAFM of the treatment to facilitate Agency coordination for inspection.
- Treatment locations must be approved every year by DEC by presenting a detailed map, description of species density, map of wetlands and rare, threatened, and endangered species, and a map of treatment concentration monitoring locations.
- The overall area of control of aquatic vegetation may not exceed 40% of the body of water's littoral zone.
- Compliance with treatment plan approved by State.
- Water sample collection and analysis until the pesticide drops below approved levels.
- Completion of aquatic species surveys including baseline surveys in the year prior to treatment, a qualitative density survey the year of treatment, a post treatment quantitative survey the year of treatment, and a quantitative survey in the year following treatment.
- Submission of an annual report detailing the full extent of the project.
- Implementation of pesticide minimization measures.
- Submission of a report outlining pesticide minimization efforts.

10. Conclusion

Based on the analysis and conclusions presented, the Proposed Action may affect, but not likely adversely affect Northeastern bulrush. Disturbance to the substrate would be temporary due to the in-water management measures.

Environmentally sound engineering practices and best management practices would be employed to avoid and minimize adverse impacts to Northeastern bulrush. By employing avoidance measures or the Conservation Measures listed in Section 9 as required by the state, the project would avoid and minimize impacts to natural resources and result in no need for additional or compensatory mitigation measures.

There are no significant (permanent, long term or extensive) adverse direct effects, indirect or cumulative effects to Northeastern bulrush associated with the Proposed Action.

11. References

United States Fish and Wildlife Service. 2025 (USFWS 2025a). Northeastern bulrush (Scirpus ancistrochaetus). Environmental Conservation Online System. Retrieved from: https://ecos.fws.gov/ecp/species/6715 Accessed April 23, 2025.

USFWS, 2025b. February 27, 2025. List of threatened and endangered species for VT Aquatic Plant Control Program Expansion.

USFWS, Northeast Region. August 2019. Species Status Assessment Report for the Northeastern Bulrush (*Scirpus ancistrochaetus*). Version 4.

USFWS. July 31, 2024. Endangered and Threatened Wildlife and Plants; Removal of Northeastern Bulrush from the Federal List of Endangered and Threatened Plants

Vermont Department of Environmental Conservation (VTDEC). March 16, 2022. Aquatic Nuisance Control Permit, ProcellaCOR EC Aquatic Toxicity Review.

Federal Participation in Expansion of the Aquatic Plant Control Program
State of Vermont
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May Affect, Not Likely to Adversely Affect Determination – Shortnose Sturgeon

1. Project Area

The study area consists of federal, state and local government owned waterbodies, their immediate shorelines and vehicle access points, and reservoirs of cooperating water-related infrastructure facilities (e.g., hydroelectric generation) within the State of Vermont. It also includes the approximate 255-mile length of the Connecticut River serving as the boundary between Vermont and New Hampshire.

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The Proposed Action includes the following AIPS control measures listed below:
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Although chemical control is not used by VTDEC as a routine measure for dealing with AIPS, VTDEC has the ability to issue permits for pesticide use related to aquatic invasive species, particularly in a rapid response capability.

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3. Project Purpose

The purpose of the proposed action is to increase the effectiveness of future and ongoing invasive aquatic plant control for the protection of public health, water-related infrastructure and commerce, and the enhancement of aquatic ecosystem and water quality. Expansion of the APCP is needed to ensure there are minimal opportunities for AIPS to spread throughout the State and that any existing AIPS can be treated effectively limiting further negative impacts.

4. Project Duration

The APCP is annually funded; therefore implementation of in-water measures such as mechanical and chemical control will occur on a yearly basis pending availability of funds. The seasonal window in which in-water measures such as mechanical and chemical control are implemented typically occur from June 1 through October 30.

Durations of specific management operations may vary depending on control measure utilized and extent of infestation in any given location selected to be managed. As an estimate, in-water management measures in a specific location could last one day to a week. Multiple measures could also potentially be utilized for areas where AIPS growth is dense. For example, mechanical harvesting could be initially implemented in a location to remove the AIPS followed by spot chemical treatment.

5. Site Description

The project area will consist of federal, state and local government owned waterbodies, their immediate shorelines and vehicle access points, and reservoirs of cooperating water-related infrastructure facilities (e.g., hydroelectric generation) within the State of Vermont. It also includes the approximate 255-mile length of the Connecticut River that serves as the boundary between Vermont and New Hampshire.

5.1. Species Occurrence within Project Area

Shortnose sturgeon (*Acipenser brevirostrum)* has historically been documented from Turner's Falls, MA to the Long Island Sound. However, recent analysis of eDNA sampling conducted by the Connecticut River Conservancy and its partners within the Connecticut River confirmed the potential presence of shortnose sturgeon in the river upstream of known occurrences near the Vermont/Massachusetts border (Connecticut River Conservancy, 2024). Additionally, historical observations of shortnose sturgeon have also been documented in Connecticut River tributaries in Massachusetts and Connecticut (Shortnose Sturgeon Status Review Team, 2010).

5.2. Presence of Critical Habitat

The project area does not contain any critical habitat for shortnose sturgeon (USFWS, 2025).

5.3. Special Aquatic Sites

There are no special aquatic sites within the study area.

5.4. Total Area of Impact

The total area of impact within the Connecticut River and it's tributaries will vary depending on the extent of infestation of the area being managed, the funding available and the and the

prioritization of areas to be managed for AIPCS. Typically, the average area managed in a specific location ranges from less than one acre to 20 acres in one location.

5.5. Current Range of Water Depths

The average depth of the Connecticut River within the project area ranges from 5 ft in the northernmost portion of the project area to 13 ft near the Vermont/Connecticut border. The average depths of the primary tributaries to the Connecticut River range from 2 to 6 ft. The average depths of the smaller tributaries range from one to 2 ft. Average depths of lakes and ponds in the project area for which the EFH designation is applicable range from 5 ft to 90 ft (VANR, 2025).

5.6. Salinity Range

The salt wedge of the Connecticut River can extend as far as 10 miles upstream from the Long Island Sound (Whitney MM, Jia Y, Cole KL, MacDonald DG and Huguenard KD. 2021). The southernmost portion of the project area is approximately 85 miles from the northernmost extent of the salt wedge. Therefore, all waterways and waterbodies within the project area freshwater with salinities less than 0.5 PPT.

5.7. Water Temperature Range

The Connecticut River Water and its tributaries typically range from a minimum temperature of 32F in the winter to a maximum temperature of 75F during the summer. Lakes, ponds and reservoirs: 32F to as much as 84F depending on water depths (Seatemperature.net, 2025).

6. Habitat Types and Characteristics

6.1. Habitat and Sediment Characteristics

The project area consists of submerged aquatic vegetation (SAV) beds within freshwater lacustrine and riverine systems that occur within the littoral zone and water column. Proximity of occurrences of SAV near unconsolidated sediment and unconsolidated rocky shorelines and streambank habitat is also expected. The specific habitat and sediment types effected will be dependent upon the presence of the targeted aquatic invasive plant species. Typically, AIPS occur in areas of stagnant to slow moving water and substrate comprised of mud, silt, detritus and sand. As a general guide, the habitat characteristics of the AIPS targeted for management is presented in Table 1.

Species	Location	Rooting Habit/Avg Depth	Substrate
Eurasian Watermilfoil	Littoral Zone – Open Water	3-10 ft, up to 20 ft	Mud/Silt/Sand
Water Chestnut	Littoral Zone – Open Water	Up to 16 ft.	Mud/Silt
Hydrilla	Littoral Zone – Open Water	Up to 35 ft	Silt/Sand/Rock
Starry Stonewort	Littoral Zone – Open Water	Up to 2 ft	Silt/Sand/Detritus

Brazilian Elodea	Littoral Zone to Open Water	Up to 20 ft	Mud/Sand Gravel
European Frogbit	Open Water	Free floating	N/A
Giant Salvinia	Open Water	Free Floating	N/A
Water Hyacinth	Open Water	Free Floating	N/A

7. Shortnose Sturgeon Life History

The Connecticut River populations have been documented as living their entire life stages within the river. Shortnose sturgeon are benthic feeders with a diet comprised of benthic insects, crustaceans, mollusks and polychaetes. Preferred foraging locations consist of river bends dominated by sand or cobble substrates at depths of one to 50 ft.

In the northeastern region, spawning occurs from April through May. Eggs are deposited at or near the substrate consisting of gravel, rubble and/or cobble or large rocks. Spawning sites are characterized by moderate river flows with average bottom velocities between 0.4 and 0.8 m/s.

During the winter, shortnose sturgeon form dense aggregations in relatively deep river (3-10m) during winter months. Wintering sites in the Connecticut River have been documented in only the freshwater portions of the River over sand bottom. Movement to and from wintering areas during spring and fall in the upper portion of the CT River were strongly correlated with day length. (Shortnose Sturgeon Status Review Team, 2010).

8. Effects Determination

The following measures will have no adverse effects on shortnose sturgeon:

- Measure 2: Watercraft Inspection Stations
- Measure 3: Early Detection Monitoring
- Measure 4: Drone Surveys
- Measure 5: eDNA
- Measure 6: Public Awareness and Education

Watercraft inspection and decontamination stations are located at a distance from the waterbody to prevent reintroduction of invasive species during the decontamination process. For the construction of any new watercraft inspection and decontamination stations, erosion and sediment control best management practices would be employed to prevent sediment laden runoff from being introduced into waterways. Early detection monitoring is limited to observatory or non-disruptive methods that would not induce turbidity or disturb habitat. Flight elevations during drone surveys are expected to occur at heights where the noise, movement and/or shadowing from the unit would be imperceptible enough to fish as to not trigger a stress response. eDNA sampling is limited to non-intrusive water sampling that would not generate a level of turbidity that could adversely affect filter feeding and/or spawning. Public awareness and education are administrative in nature and do not interact with the resource.

Tables 2 and 3 summarizes the stressors and habitat alterations that could potentially result from Measure 1: Mechanical Control and Measure 7: Chemical Control.

Applicability	Potential Stressor	Description
Yes	Underwater noise/Sound Pressure	Noise from engine and operation of cutting mechanism from mechanical harvesters; motor from suction line equipment;
Yes	Water quality/turbidity	Minor and temporary increases in turbidity during management operations utilizing mechanical, water-based equipment
Yes	Vessel traffic	Use of mechanical harvesters and/or motorized or non-motorized watercraft (e.g. rowboat, kayak) during AIPS management operations. No grounding of barges is proposed.
Yes	Impingement/Capture	Incidental uptake of fish and turtles can result during mechanical harvesting equipment operations depending on equipment type used.
Yes	Benthic community disturbance	Minor and temporary alteration to the benthic community within the area being managed during AIPS harvesting or treatment operations. Benthic matting could result in direct mortality of aquatic macroinvertebrates.

Applicable Impact Duration		Habitat Alteration Type	Description
Temporary	Permanent		
N	N	Water Depth Change	
N/A	N/A	Tidal Flow Change	
Y	N	Fill	Potential deployment of benthic matting between July 1 through October 30 if deemed appropriate for a particular location.
Y	N	Habitat type conversion	Removal of AIPS will result in a temporary conversion of SAV habitat to littoral or open water habitat. However AIPS provide little to no habitat value and their removal will facilitate the re-establishment of native SAV within the treated area.

Shortnose sturgeon could potentially occur portions of waterways with slow currents and substrates conducive to supporting AIPS. However, dense growths of AIPS can form a physical barrier that prevents fish from accessing the area for both foraging. In addition, when the plants decompose in the fall, they liberate nutrients into the water column and reduce the amount of dissolved oxygen which can stress species such as shortnose sturgeon that are sensitive to water quality impairments.

The proposed action may have minor and temporary adverse effects to shortnose sturgeon resulting from turbidity, noise, and disturbance to the substrate generated during AIPS management operations. Regarding chemical control, ProcellaCOR is an aquatic herbicide registered with EPA and is classified as reduced risk as it presents a low risk of toxicity to non-target plant species, animal species and to water quality. The state of Vermont stringently regulates the use of ProcellaCOR and requires post treatment water quality testing and reporting as part of the Aquatic Nuisance Control permit. The Vermont Department of Environmental Conservation conducted its own toxicity review in 2022 and found that the potential for acute and chronic risks to aquatic plant and animal species is considered low. In the six years since the state first approved its use, no significant adverse effects to aquatic resources have been documented (VTDEC, 2022).

Additionally, the existing Lake Champlain APCP, which is the basis for the proposed action, has been ongoing for several decades without causing significant adverse effects to the fishery resources. Furthermore, the management of AIPS will result in positive effects to EFH as it will increase available spawning habitat, improve water quality and allow for the reestablishment of native SAV that serves as cover.

8.1. **Indirect Effects:**

Indirect effects from mechanical and chemical control measures could include a reduction or loss in food sources due to either direct mortality and/or as a result of turbidity. However, AIPS can also indirectly adversely affect shortnose sturgeon through water quality impairment and forming a dense physical barrier that would prevent fish from accessing the area for foraging.

8.2. **Cumulative Effects:**

Managing AIPS could potentially require the use of multiple methods in one location over the span of the annual management season, or recurring management over the course of several years. Other water-based construction and/or recreational activities could also contribute to potential adverse cumulative effects. In-water work would require permits that would include a requirement to implement best management practices to minimize adverse effects to fish species including shortnose sturgeon.

Positive cumulative effects include restoration of suitable foraging habitat and improved water quality supportive of shortnose sturgeon.

9. **Conservation Measures**

An Aquatic Nuisance Control (ANC) Permit from the state of Vermont in accordance with 10.V.S.A. 1455 is required for mechanical and chemical control measures. Conditions within the ANC permit to minimize adverse effects to the aquatic environment can include, but not be limited to the following:
Conditions universal to any ANC permit type:

- Limiting equipment access to a 20 of wide lane leading directly to shore from the approved harvesting area.

- Staying within the approved work area limits.
- Submission of annual harvesting activity report

Conditions Specific to Benthic Barriers:

- Installation no earlier than July 1, must be removed no later than October 30.
- Barrier material and weighting devices materials must be of such quality and fabrication as to not deteriorate during use and potentially leave debris within the water.
- Barrier material and weighting devices cannot discharge contaminants into the waters of the State.
- Prior to installing barriers, the control location will be surveyed for all rare, threatened, or endangered aquatic plant species known to occur in the waterbody. Barriers shall not be installed overtop rare, threatened, or endangered aquatic plant species.
- Prior to installing barriers, the control location shall be searched for turtles, mussels, or other aquatic wildlife. Observed animals shall be safely moved to a location immediately outside of the control location within the same waterbody when possible.
- Rocks, boulders, or woody debris shall not be removed from the lake bottom.
- Removal of all barriers and weighing devices by the stipulated timeframe stipulated in the Aquatic Nuisance Control Permit issued by the State.

Conditions specific to chemical control measures:

- Applicators must be certified by Vermont Agency of Agriculture Food and Markets (AAFM).
- Notification to the AAFM of the treatment to facilitate Agency coordination for inspection.
- Treatment locations must be approved every year by DEC by presenting a detailed map, description of species density, map of wetlands and rare, threatened, and endangered species, and a map of treatment concentration monitoring locations.
- The overall area of control of aquatic vegetation may not exceed 40% of the body of water's littoral zone.
- Compliance with treatment plan approved by State.
- Water sample collection and analysis until the pesticide drops below approved levels.
- Completion of aquatic species surveys including baseline surveys in the year prior to treatment, a qualitative density survey the year of treatment, a post treatment quantitative survey the year of treatment, and a quantitative survey in the year following treatment.
- Submission of an annual report detailing the full extent of the project.
- Implementation of pesticide minimization measures.
- Submission of a report outlining pesticide minimization efforts.

A work restriction between April 1 and June 30 to avoid diadromous fish spring migration will be implemented during management operations.

10. Conclusion

Based on the analysis and conclusions presented, the Proposed Action may affect, but not likely adversely affect shortnose sturgeon.

Environmentally sound engineering practices and best management practices would be employed to avoid and minimize adverse impacts to shortnose sturgeon. By employing avoidance measures or the Conservation Measures listed in Section 9 as required by the state, the project would avoid and minimize impacts to natural resources and result in no need for additional or compensatory mitigation measures.

There are no significant (permanent, long term or extensive) adverse direct effects, indirect or cumulative effects to shortnose sturgeon associated with the Proposed Action.

11. References

Connecticut River Conservancy. 10 December 2024. Letter to Federal Energy Regulatory Commission. Additional data regarding eDNA evidence of shortnose sturgeon in project areas of the Bellows Falls (FERC No. 1855), Vernon (FERC No. 1904), Northfield Mountain (FERC No. 2485), and Turners Falls (FERC No. 1889) projects.

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Shortnose Sturgeon Status Review Team. 2010. A Biological Assessment of shortnose sturgeon (*Acipenser brevirostrum*). Report to National Marine Fisheries Service, Northeast Regional Office. November 1, 2010.

United States Fish and Wildlife (USFWS). 2025. Shortnose sturgeon. Environmental Conservation Online System. Retrieved from: https://ecos.fws.gov/ecp/species/6635 Accessed June 9, 2025

Vermont Department of Environmental Conservation (VTDEC). March 16, 2022. Aquatic Nuisance Control Permit, ProcellaCOR EC Aquatic Toxicity Review.

Vermont Agency of Natural Resources (VANR). 2025. Lakes Scorecard. Retrieved from: https://anrweb.vt.gov/DEC/IWIS/ReportViewer2.aspx?Report=LakesScorecardLinksTable&ViewParms=True . Accessed April 16, 2025.

Vermont Department of Environmental Conservation (VTDEC). March 16, 2022. Aquatic Nuisance Control Permit, ProcellaCOR EC Aquatic Toxicity Review.

Whitney MM, Jia Y, Cole KL, MacDonald DG and Huguenard KD. 2021. Freshwater Composition and Connectivity of the Connecticut River Plume During Ambient Flood Tides. *Front. Mar. Sci.* 8:747191. doi: 10.3389/fmars.2021.747191

Appendix D

Cultural Resources Phase IA Investigation

Appendix D.1:

Cultural Resources Correspondence

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT
JACOB K. JAVITS FEDERAL BUILDING
26 FEDERAL PLAZA
NEW YORK NEW YORK 10278-0090

REPLY TO
ATTENTION OF

February 24, 2025

Planning Division
Environmental Analysis Branch

Brona Simon
State Historic Preservation Officer
Massachusetts Historical Commission
220 Morrissey Boulevard
Boston, MA 02125

Subject: Expansion of the Aquatic Plant Control Program (APCP) in Vermont

Dear Ms. Simon,

This letter is intended to inform you that the U.S. Army Corps of Engineers, New York District (District) is evaluating the Expansion of the Vermont Aquatic Plant Control Program (APCP). The purpose of the APCP Study is to control invasive aquatic plants – particularly but not limited to water chestnut and Eurasian milfoil – in the Connecticut River, Hudson River, Lake Champlain, and Lake Memphremagog watershed drainage basins and minimize adverse ecological, economic, and recreational effects. The Study is authorized by the River and Harbor Act of 1958 (PL 85-500, Section 104) which recognizes the severe impact that aquatic invasive species can have on our national economy, public health, wildlife, and agriculture and includes continuous research into efficient methods for aquatic plant control.

A Programmatic Environmental Assessment (EA) is being prepared in accordance with the National Environmental Policy Act of 1969 (NEPA) to evaluate environmental impacts and determine the potential for significant impacts related to any proposed undertaking. In accordance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, its implementing regulation 36 CFR Part 800, and the National Environmental Policy Act (NEPA), it is the District's intent at this time to inform you and the public of the nature of this Study and plans to assess potential effects to cultural resources.

The District began investigating aquatic plant control solutions for the Lake Champlain Basin in 1979. In June of 1981, the District released the Lake Champlain Aquatic Nuisance Control Program State Design Memorandum and Environmental Assessment (EA), the purpose of which was to delineate a control program, determine costs and benefits, and evaluate economic and environmental impacts associated with such a program. In August of 2024, the District executed a Project Partnership Agreement (PPA) to expand the APCP from the Lake Champlain Basin to the entire state of Vermont.

The Study Area now encompasses the state of Vermont, which consists of four major watershed drainage basins: the Connecticut River, Hudson River, Lake Champlain,

and the Lake Memphremagog basins (Enclosure 1). The Study Area consists of federal, state and local government owned waterbodies, their immediate shorelines and vehicle access points, and reservoirs of cooperating water-related infrastructure facilities (e.g., hydroelectric generation). The Study Area will also extend into portions of the shorelines of the states of New York, Massachusetts, and New Hampshire, as well as the province of Quebec, the extent of which will be further defined as the program develops. The District is the lead federal agency and the Vermont Department of Environmental Conservation (VTDEC) is the non-federal sponsor for this Study.

The Study will revisit previously analyzed control measures as well as new measures. Existing APCP measures utilized within the Lake Champlain Basin include mechanical harvesting, hand harvesting, benthic matting, watercraft inspection and decontamination stations, early detection monitoring, and drone surveys. Additional measures under consideration include eDNA monitoring, aquatic herbicide use, public awareness in the form of educational workshops for lakeside residents, and community outreach through signage and brochures.

As part of the cultural resources effects assessment, the District has been compiling information from previous investigations carried out within the State and information pertaining to historic properties available on the Vermont Historic Preservation Office's (VT SHPO) cultural resources database. In accordance with NEPA and Section 106 of the NHPA, as the details of the program are developed, the District will be developing an Area of Potential Effect (APE) and evaluating the potential for the program to have an effect on cultural resources. The cultural resources assessment will include further review of information, site files, and archival materials held by the VT SHPO, local historical societies, libraries, municipal offices, tribal nations, the Vermont Archaeology Heritage Center, and the Vermont History Museum.

This letter serves to invite the Massachusetts SHPO to participate as a Consulting Party for this Study under 36 CFR 800.3(f)(2). In addition to your office, the District is coordinating with the Vermont, New York, and New Hampshire SHPOs, the Delaware Nation, the Delaware Tribe of Indians, and the Stockbridge Munsee Community. The District developed a list of state-recognized tribes and other potentially interested parties to invite as Consulting Parties (CPs) in the consultation process (Enclosure 2). We encourage your feedback on this list and invite you to recommend additional CPs with whom we should initiate consultation.

Please review the enclosed materials and provide a written response, including any input you wish to provide at this time regarding the study area and proposed measures, within thirty days of receipt of this letter. **A virtual Stakeholder Meeting will be held between the District, VTDEC, and any other interested parties and is planned for Thursday, March 13th, 2025, at 9:00am.** Meeting invitation and access details will be provided via email. If you or your staff require additional information or have any questions, please contact Kailey Loughran, Project Archaeologist, at

Kailey.R.Loughran@usace.army.mil or (917) 790-8706. Thank you for your assistance with this Study.

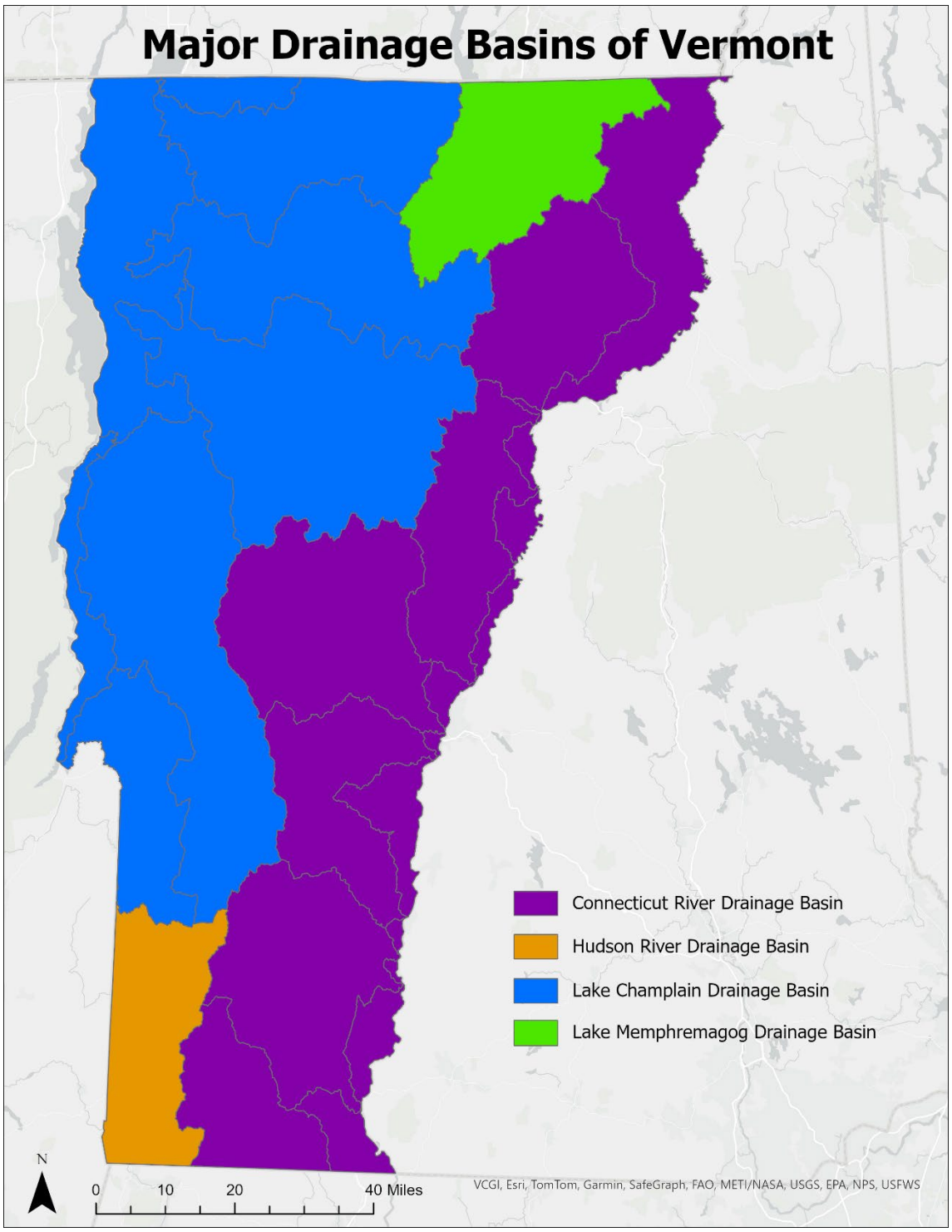
Sincerely,

Peter Weppler
Chief, Environmental Analysis Branch

Enclosures

Enclosure 1: Map of the Study Area
Enclosure 2: List of Potential Consulting Parties

Enclosure 1
Map of the Study Area showing Major Drainage Basins



Enclosure 2
List of Potential Consulting Parties (CPs)

Name of Consulting Party (CP)	Point of Contact (POC)	Address	Contact Information
Abenaki Nation of Missisquoi	Brenda Gagne	100 Grand Avenue, Swanton, VT 05488	info@abenakination.com
Elnu Abenaki Tribe	Roger Longtoe Sheehan	350 Putney Road, Brattleboro, VT 05301	gitceedadann@yahoo.com
Koasek Traditional Band of the Koas Abenaki Nation	Co-Chief Shirly Hook and Co-Chief Colin Wood	188 Allen Bent Road West Braintree VT 05669	info@koasek.org
Nulhegan Abenaki Tribe	Chief Don Stevens	156 Bacon Drive Shelburne, VT 05482	chiefdonstevens@comcast.net
Vermont Archaeological Society	Nathan Allison, President	PO Box 542 Hinesburg, VT 05461	info@vtarchaeology.org
Vermont Historical Society	Steve Perkins, Executive Director	60 Washington St, Ste 1 Barre, VT 05641	info@vermonthistory.org
Vermont Covered Bridge Society	Steve Miyamoto, Vice President	PO Box 267, Underhill, VT 05489	vermontcoveredbridgesociety@gmail.com

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT
JACOB K. JAVITS FEDERAL BUILDING
26 FEDERAL PLAZA
NEW YORK NEW YORK 10278-0090

REPLY TO
ATTENTION OF

February 24, 2025

Planning Division
Environmental Analysis Branch

Nadine Miller
Deputy State Historic Preservation Officer
State Historic Preservation Office
New Hampshire Division of Historical Resources
172 Pembroke Road
Concord, NH 03301

Subject: Expansion of the Aquatic Plant Control Program (APCP) in Vermont

Dear Ms. Miller,

This letter is intended to inform you that the U.S. Army Corps of Engineers, New York District (District) is evaluating the Expansion of the Vermont Aquatic Plant Control Program (APCP). The purpose of the APCP Study is to control invasive aquatic plants – particularly but not limited to water chestnut and Eurasian milfoil – in the Connecticut River, Hudson River, Lake Champlain, and Lake Memphremagog watershed drainage basins and minimize adverse ecological, economic, and recreational effects. The Study is authorized by the River and Harbor Act of 1958 (PL 85-500, Section 104) which recognizes the severe impact that aquatic invasive species can have on our national economy, public health, wildlife, and agriculture and includes continuous research into efficient methods for aquatic plant control.

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The Study will revisit previously analyzed control measures as well as new measures. Existing APCP measures utilized within the Lake Champlain Basin include mechanical harvesting, hand harvesting, benthic matting, watercraft inspection and decontamination stations, early detection monitoring, and drone surveys. Additional measures under consideration include eDNA monitoring, aquatic herbicide use, public awareness in the form of educational workshops for lakeside residents, and community outreach through signage and brochures.

As part of the cultural resources effects assessment, the District has been compiling information from previous investigations carried out within the State and information pertaining to historic properties available on the Vermont Historic Preservation Office's (VT SHPO) cultural resources database. In accordance with NEPA and Section 106 of the NHPA, as the details of the program are developed, the District will be developing an Area of Potential Effect (APE) and evaluating the potential for the program to have an effect on cultural resources. The cultural resources assessment will include further review of information, site files, and archival materials held by the VT SHPO, local historical societies, libraries, municipal offices, tribal nations, the Vermont Archaeology Heritage Center, and the Vermont History Museum.

This letter serves to invite the New Hampshire SHPO to participate as a Consulting Party for this Study under 36 CFR 800.3(f)(2). In addition to your office, the District is coordinating with the Vermont, New York, and Massachusetts SHPOs, the Delaware Nation, the Delaware Tribe of Indians, and the Stockbridge Munsee Community. The District developed a list of state-recognized tribes and other potentially interested parties to invite as Consulting Parties (CPs) in the consultation process (Enclosure 2). We encourage your feedback on this list and invite you to recommend additional CPs with whom we should initiate consultation.

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details will be provided via email. If you or your staff require additional information or have any questions, please contact Kailey Loughran, Project Archaeologist, at Kailey.R.Loughran@usace.army.mil or (917) 790-8706. Thank you for your assistance with this Study.

Sincerely,

Peter Weppler
Chief, Environmental Analysis Branch

Enclosures

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Enclosure 2: List of Potential Consulting Parties

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT
JACOB K. JAVITS FEDERAL BUILDING
26 FEDERAL PLAZA
NEW YORK NEW YORK 10278-0090

REPLY TO
ATTENTION OF

February 24, 2025

Planning Division
Environmental Analysis Branch

R. Daniel Mackay
Deputy Commissioner
New York State Historic Preservation Officer
Office of Parks, Recreation, and Historic Preservation (OPRHP)
Peebles Island, P.O. Box 189
Waterford, NY 12188-0189

Subject: Expansion of the Aquatic Plant Control Program (APCP) in Vermont

Dear Mr. Mackay,

This letter is intended to inform you that the U.S. Army Corps of Engineers, New York District (District) is evaluating the Expansion of the Vermont Aquatic Plant Control Program (APCP). The purpose of the APCP Study is to control invasive aquatic plants – particularly but not limited to water chestnut and Eurasian milfoil – in the Connecticut River, Hudson River, Lake Champlain, and Lake Memphremagog watershed drainage basins and minimize adverse ecological, economic, and recreational effects. The Study is authorized by the River and Harbor Act of 1958 (PL 85-500, Section 104) which recognizes the severe impact that aquatic invasive species can have on our national economy, public health, wildlife, and agriculture and includes continuous research into efficient methods for aquatic plant control.

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This letter serves to invite the New York SHPO to participate as a Consulting Party for this Study under 36 CFR 800.3(f)(2). In addition to your office, the District is coordinating with the Vermont, New Hampshire, and Massachusetts SHPOs, the Delaware Nation, the Delaware Tribe of Indians, and the Stockbridge Munsee Community. The District developed a list of state-recognized tribes and other potentially interested parties to invite as Consulting Parties (CPs) in the consultation process (Enclosure 2). We encourage your feedback on this list and invite you to recommend additional CPs with whom we should initiate consultation.

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Sincerely,

Peter Weppler
Chief, Environmental Analysis Branch

Enclosures

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DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT
JACOB K. JAVITS FEDERAL BUILDING
26 FEDERAL PLAZA
NEW YORK NEW YORK 10278-0090

REPLY TO
ATTENTION OF

February 24, 2025

Planning Division
Environmental Analysis Branch

R. Scott Dillon
Senior Historic Preservation Review Coordinator
Vermont Division for Historic Preservation
One National Life Drive
Deane C. Davis Building, 6th Floor
Montpelier, VT 05620-0501

Subject: Expansion of the Aquatic Plant Control Program (APCP) in Vermont

Dear Mr. Dillon,

This letter is intended to inform you that the U.S. Army Corps of Engineers, New York District (District) is evaluating the Expansion of the Vermont Aquatic Plant Control Program (APCP). The purpose of the APCP Study is to control invasive aquatic plants – particularly but not limited to water chestnut and Eurasian milfoil – in the Connecticut River, Hudson River, Lake Champlain, and Lake Memphremagog watershed drainage basins and minimize adverse ecological, economic, and recreational effects. The Study is authorized by the River and Harbor Act of 1958 (PL 85-500, Section 104) which recognizes the severe impact that aquatic invasive species can have on our national economy, public health, wildlife, and agriculture and includes continuous research into efficient methods for aquatic plant control.

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This letter serves to invite you to participate as a Consulting Party for this Study under 36 CFR 800.3(f)(2). In addition to your office, the District is coordinating with the New York, Massachusetts, and New Hampshire SHPOs, the Delaware Nation, the Delaware Tribe of Indians, and the Stockbridge Munsee Community. The District developed a list of state-recognized tribes and other potentially interested parties to invite as Consulting Parties (CPs) in the consultation process (Enclosure 2). We encourage your feedback on this list and invite you to recommend additional CPs with whom we should initiate consultation.

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Sincerely,

Peter M. Weppler
Chief, Environmental Analysis Branch

Enclosures

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DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT
JACOB K. JAVITS FEDERAL BUILDING
26 FEDERAL PLAZA
NEW YORK NEW YORK 10278-0090

REPLY TO
ATTENTION OF

March 5, 2025

Planning Division
Environmental Analysis Branch

Katelyn Lucas
Tribal Historic Preservation Officer
Delaware Nation
P.O. Box 825
31064 SH 281
Anadarko, OK 73005

Subject: EXPANSION OF THE VERMONT AQUATIC PLANT CONTROL PROGRAM

Dear Ms. Lucas,

This letter is intended to inform you that the U.S. Army Corps of Engineers, New York District (District) is evaluating the Expansion of the Vermont Aquatic Plant Control Program (APCP). The purpose of the APCP Study is to control invasive aquatic plants – particularly but not limited to water chestnut and Eurasian milfoil – in the Connecticut River, Hudson River, Lake Champlain, and Lake Memphremagog watershed drainage basins and minimize adverse ecological, economic, and recreational effects. The Study is authorized by the River and Harbor Act of 1958 (PL 85-500, Section 104) which recognizes the severe impact that aquatic invasive species can have on our national economy, public health, wildlife, and agriculture and includes continuous research into efficient methods for aquatic plant control.

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As part of the cultural resources effects assessment, the District has been compiling information from previous investigations carried out within the State and information pertaining to historic properties available on the Vermont State Historic Preservation Office's (VT SHPO) cultural resources database. In accordance with NEPA and Section 106 of the NHPA, as the details of the program are developed, the District will be developing an Area of Potential Effect (APE) and evaluating the potential for the program to have an effect on cultural resources. The cultural resources assessment will include further review of information, site files, and archival materials held by the VT SHPO, local historical societies, libraries, municipal offices, tribal nations, the Vermont Archaeology Heritage Center, and the Vermont History Museum.

To date, no Native American Traditional Cultural Properties, protected tribal resources, treaty rights, sacred sites, or Indian lands have been identified within the study area. Pursuant to 36 CFR § 800.3, the District is seeking your input on this study early in the process to help identify resources of concern. Please be assured that, in accordance with confidentiality and disclosure stipulations in Section 106 of the NHPA, we will maintain strict confidentiality about certain types of information regarding historic properties and properties of religious and/or cultural significance to your tribe. We will also continue to consult with your office under Section 106 to share study results and the District's recommendations.

The District is planning to carry out its Section 106 compliance activities through use of the NEPA process as described in 36 CFR 800.8. This letter serves to invite you to participate as a Consulting Tribal Nation for this project under 36 CFR § 800.3(f)(2). In addition to your office, the District is coordinating with the Vermont, New York,

Massachusetts, and New Hampshire SHPOs, the Delaware Tribe of Indians, and the Stockbridge Munsee Community. The District developed a list of state-recognized tribes and other potentially interested parties to invite as Consulting Parties (CPs) in the consultation process (Enclosure 2). We encourage your feedback on this list and invite you to recommend additional CPs with whom we should initiate consultation.

Your feedback is important and a written response within 30 days of receipt of this letter would enable us to ensure that your concerns are fully considered in our evaluation. **A virtual Stakeholder Meeting will be held between the District, VTDEC, and any other interested parties and is planned for Thursday, March 13th, 2025, at 9:00am.** Meeting invitation and access details will be provided via email. If interested, we would also like to offer the option of a one-on-one meeting with the District. If we can provide any assistance or additional information that would aid in your review, please contact Kailey Loughran, Project Archaeologist, at kailey.r.loughran@usace.army.mil or 917-790-8706 or Carissa Scarpa, District Tribal Liaison, at carissa.a.scarpa@usace.army.mil or 917-790-8612. Thank you for your assistance with this Study.

Sincerely,

Peter M. Weppler
Chief, Environmental Analysis Branch

Enclosures

Enclosure 1: Map of the Study Area
Enclosure 2: List of Potential Consulting Parties

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT
JACOB K. JAVITS FEDERAL BUILDING
26 FEDERAL PLAZA
NEW YORK NEW YORK 10278-0090

REPLY TO
ATTENTION OF

March 5, 2025

Planning Division
Environmental Analysis Branch

Martina Thomas
Tribal Historic Preservation Officer
Delaware Tribe of Indians
126 University Circle
Stroud Hall, Rm. 437
East Stroudsburg, PA 18301

Subject: EXPANSION OF THE VERMONT AQUATIC PLANT CONTROL PROGRAM

Dear Ms. Thomas,

This letter is intended to inform you that the U.S. Army Corps of Engineers, New York District (District) is evaluating the Expansion of the Vermont Aquatic Plant Control Program (APCP). The purpose of the APCP Study is to control invasive aquatic plants – particularly but not limited to water chestnut and Eurasian milfoil – in the Connecticut River, Hudson River, Lake Champlain, and Lake Memphremagog watershed drainage basins and minimize adverse ecological, economic, and recreational effects. The Study is authorized by the River and Harbor Act of 1958 (PL 85-500, Section 104) which recognizes the severe impact that aquatic invasive species can have on our national economy, public health, wildlife, and agriculture and includes continuous research into efficient methods for aquatic plant control.

A Programmatic Environmental Assessment (EA) is being prepared in accordance with the National Environmental Policy Act of 1969 (NEPA) to evaluate environmental impacts and determine the potential for significant impacts related to any proposed undertaking. In accordance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, its implementing regulation 36 CFR Part 800, and the National Environmental Policy Act (NEPA), it is the District's intent at this time to inform you and the public of the nature of this Study and plans to assess potential effects to cultural resources.

The District began investigating aquatic plant control solutions for the Lake Champlain Basin in 1979. In June of 1981, the District released the Lake Champlain Aquatic Nuisance Control Program State Design Memorandum and Environmental Assessment (EA), the purpose of which was to delineate a control program, determine costs and benefits, and evaluate economic and environmental impacts associated with such a program. In August of 2024, the District executed a Project Partnership Agreement (PPA) to expand the APCP from the Lake Champlain Basin to the entire state of Vermont.

The Study Area now encompasses the state of Vermont, which consists of four major watershed drainage basins: the Connecticut River, Hudson River, Lake Champlain, and the Lake Memphremagog basins (Enclosure 1). The Study Area consists of federal, state and local government owned waterbodies, their immediate shorelines and vehicle access points, and reservoirs of cooperating water-related infrastructure facilities (e.g., hydroelectric generation). The Study Area will also extend into portions of the shorelines of the states of New York, Massachusetts, and New Hampshire, as well as the province of Quebec, the extent of which will be further defined as the program develops. The District is the lead federal agency and the Vermont Department of Environmental Conservation (VTDEC) is the non-federal sponsor for this Study.

The Study will revisit previously analyzed control measures as well as new measures. Existing APCP measures utilized within the Lake Champlain Basin include mechanical harvesting, hand harvesting, benthic matting, watercraft inspection and decontamination stations, early detection monitoring, and drone surveys. Additional measures under consideration include eDNA monitoring, aquatic herbicide use, public awareness in the form of educational workshops for lakeside residents, and community outreach through signage and brochures.

As part of the cultural resources effects assessment, the District has been compiling information from previous investigations carried out within the State and information pertaining to historic properties available on the Vermont State Historic Preservation Office's (VT SHPO) cultural resources database. In accordance with NEPA and Section 106 of the NHPA, as the details of the program are developed, the District will be developing an Area of Potential Effect (APE) and evaluating the potential for the program to have an effect on cultural resources. The cultural resources assessment will include further review of information, site files, and archival materials held by the VT SHPO, local historical societies, libraries, municipal offices, tribal nations, the Vermont Archaeology Heritage Center, and the Vermont History Museum.

To date, no Native American Traditional Cultural Properties, protected tribal resources, treaty rights, sacred sites, or Indian lands have been identified within the study area. Pursuant to 36 CFR § 800.3, the District is seeking your input on this study early in the process to help identify resources of concern. Please be assured that, in accordance with confidentiality and disclosure stipulations in Section 106 of the NHPA, we will maintain strict confidentiality about certain types of information regarding historic properties and properties of religious and/or cultural significance to your tribe. We will also continue to consult with your office under Section 106 to share study results and the District's recommendations.

The District is planning to carry out its Section 106 compliance activities through use of the NEPA process as described in 36 CFR 800.8. This letter serves to invite you to participate as a Consulting Tribal Nation for this project under 36 CFR § 800.3(f)(2). In addition to your office, the District is coordinating with the Vermont, New York,

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Sincerely,

Peter M. Weppler
Chief, Environmental Analysis Branch

Enclosures

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Enclosure 2: List of Potential Consulting Parties

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT
JACOB K. JAVITS FEDERAL BUILDING
26 FEDERAL PLAZA
NEW YORK NEW YORK 10278-0090

REPLY TO
ATTENTION OF

March 5, 2025

Planning Division
Environmental Analysis Branch

Dr. Jeffrey Bendremer
Tribal Historic Preservation Officer
Stockbridge Munsee Community
86 Spring Street
Williamstown, MA 01267

Subject: EXPANSION OF THE VERMONT AQUATIC PLANT CONTROL PROGRAM

Dear Dr. Bendremer,

This letter is intended to inform you that the U.S. Army Corps of Engineers, New York District (District) is evaluating the Expansion of the Vermont Aquatic Plant Control Program (APCP). The purpose of the APCP Study is to control invasive aquatic plants – particularly but not limited to water chestnut and Eurasian milfoil – in the Connecticut River, Hudson River, Lake Champlain, and Lake Memphremagog watershed drainage basins and minimize adverse ecological, economic, and recreational effects. The Study is authorized by the River and Harbor Act of 1958 (PL 85-500, Section 104) which recognizes the severe impact that aquatic invasive species can have on our national economy, public health, wildlife, and agriculture and includes continuous research into efficient methods for aquatic plant control.

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and the Lake Memphremagog basins (Enclosure 1). The Study Area consists of federal, state and local government owned waterbodies, their immediate shorelines and vehicle access points, and reservoirs of cooperating water-related infrastructure facilities (e.g., hydroelectric generation). The Study Area will also extend into portions of the shorelines of the states of New York, Massachusetts, and New Hampshire, as well as the province of Quebec, the extent of which will be further defined as the program develops. The District is the lead federal agency and the Vermont Department of Environmental Conservation (VTDEC) is the non-federal sponsor for this Study.

The Study will revisit previously analyzed control measures as well as new measures. Existing APCP measures utilized within the Lake Champlain Basin include mechanical harvesting, hand harvesting, benthic matting, watercraft inspection and decontamination stations, early detection monitoring, and drone surveys. Additional measures under consideration include eDNA monitoring, aquatic herbicide use, public awareness in the form of educational workshops for lakeside residents, and community outreach through signage and brochures.

As part of the cultural resources effects assessment, the District has been compiling information from previous investigations carried out within the State and information pertaining to historic properties available on the Vermont State Historic Preservation Office's (VT SHPO) cultural resources database. In accordance with NEPA and Section 106 of the NHPA, as the details of the program are developed, the District will be developing an Area of Potential Effect (APE) and evaluating the potential for the program to have an effect on cultural resources. The cultural resources assessment will include further review of information, site files, and archival materials held by the VT SHPO, local historical societies, libraries, municipal offices, tribal nations, the Vermont Archaeology Heritage Center, and the Vermont History Museum.

To date, no Native American Traditional Cultural Properties, protected tribal resources, treaty rights, sacred sites, or Indian lands have been identified within the study area. Pursuant to 36 CFR § 800.3, the District is seeking your input on this study early in the process to help identify resources of concern. Please be assured that, in accordance with confidentiality and disclosure stipulations in Section 106 of the NHPA, we will maintain strict confidentiality about certain types of information regarding historic properties and properties of religious and/or cultural significance to your tribe. We will also continue to consult with your office under Section 106 to share study results and the District's recommendations.

The District is planning to carry out its Section 106 compliance activities through use of the NEPA process as described in 36 CFR 800.8. This letter serves to invite you to participate as a Consulting Tribal Nation for this project under 36 CFR § 800.3(f)(2). In addition to your office, the District is coordinating with the Vermont, New York, Massachusetts, and New Hampshire SHPOs, the Delaware Nation, and the Delaware Tribe of Indians. The District developed a list of state-recognized tribes and other

potentially interested parties to invite as Consulting Parties (CPs) in the consultation process (Enclosure 2). We encourage your feedback on this list and invite you to recommend additional CPs with whom we should initiate consultation.

Your feedback is important and a written response within 30 days of receipt of this letter would enable us to ensure that your concerns are fully considered in our evaluation. **A virtual Stakeholder Meeting will be held between the District, VTDEC, and any other interested parties and is planned for Thursday, March 13th, 2025, at 9:00am.** Meeting invitation and access details will be provided via email. If interested, we would also like to offer the option of a one-on-one meeting with the District. If we can provide any assistance or additional information that would aid in your review, please contact Kailey Loughran, Project Archaeologist, at kailey.r.loughran@usace.army.mil or 917-790-8706 or Carissa Scarpa, District Tribal Liaison, at carissa.a.scarpa@usace.army.mil or 917-790-8612. Thank you for your assistance with this Study.

Sincerely,

Peter M. Weppler
Chief, Environmental Analysis Branch

Enclosures

Enclosure 1: Map of the Study Area
Enclosure 2: List of Potential Consulting Parties

From: Miller, Nadine
To: Loughran, Kailey R CIV USARMY CENAN (USA)
Subject: RE: Vermont Aquatic Plant Control Stakeholder Meeting
Date: Thursday, February 27, 2025 11:46:00 AM

Thanks! I now see your Consulting Party letter in my project reviews. I had not seen this when the meeting invite came in and was wondering why NH was included. It is helpful to know that there is a possibility of the program extending into NH at some point in the future.

Our office would like to consult on any such projects in New Hampshire when they are initiated. Please continue to use the DHR's EMMIT+ system to initiate formal Section 106 consultation. As you can see, all of our known/evaluated above-ground resources have been mapped within the system. Archaeological resource locations are available to approved archaeologists. If you are interested in gaining access to this information, please contact Tanya Krajcik for instructions (tanya.e.krajcik@dncr.nh.gov).

I will respond to your Consulting Party request within EMMIT+ and will attach this email as written proof of our interest in participating when/if future projects have the potential to affect historic resources in New Hampshire.

Thanks again!

Sincerely,
Nadine Miller
DSHPO
NH Division of Historical Resources

From: Loughran, Kailey R CIV USARMY CENAN (USA) <Kailey.R.Loughran@usace.army.mil>
Sent: Thursday, February 27, 2025 11:34 AM
To: Miller, Nadine <nadine.m.miller@dncr.nh.gov>
Subject: RE: Vermont Aquatic Plant Control Stakeholder Meeting

---

Good morning Nadine,

Thank you for your quick response! Understood. We wanted to provide an opportunity to review and attend the stakeholder call in case your office expressed interest in participating in the 106 process for the APC program. As plans become further developed, we'll reach back out if any of the proposed measures may extend into New Hampshire and result in any potential impacts.

If you have any questions or comments, I'll be your point of contact for the program. Please feel free to email me at kailey.r.loughran@usace.army.mil or call me at (917) 790-8706.

Thanks again,

Kailey

Kailey Loughran
Archaeologist
Environmental Analysis Branch
USACE New York District
26 Federal Plaza, New York NY 10278
Office: (917) 790-8706

-----Original Appointment-----
From: Miller, Nadine <Nadine.M.Miller@dncr.nh.gov>
Sent: Wednesday, February 26, 2025 9:12 AM
To: Sulich, John G CIV USARMY CENAN (USA)
Subject: [Non-DoD Source] Declined: FW: Vermont Aquatic Plant Control Stakeholder Meeting
When: Thursday, March 13, 2025 7:00 AM-8:30 AM (UTC-07:00) Mountain Time (US & Canada).
Where: Microsoft Teams Meeting

It doesn't look like New Hampshire will be impacted by this undertaking, so I am declining. Please let me know if I am incorrect and my assistance would be needed.
Thanks,
Nadine Miller
DSHPO – New Hampshire Division of Historical Resources

The Commonwealth of Massachusetts

William Francis Galvin, Secretary of the Commonwealth
Massachusetts Historical Commission

March 14, 2025

Kailey Loughran
Archaeologist
Environmental Analysis Branch
USACE New York District
26 Federal Plaza
New York, NY 10278

RE: Aquatic Plant Control Program in Vermont; MHC #RC.76420

Dear Ms. Loughran:

Staff of the Massachusetts Historical Commission (MHC) have reviewed the Project Notification Form (PNF) that you submitted for the project referenced above, and the MHC's files.

The PNF indicates that the project consists of expanding the Vermont Aquatic Plan Control Program.

The PNF indicates that the project includes permitting by the US Army Corps of Engineers. The Vermont Aquatic Control Program works to control invasive aquatic plants in the Connecticut River, Hudson River, Lake Champlain, and Lake Memphremagog watershed drainage basins.

The basin of the Connecticut River in Massachusetts is sensitive for both ancient period Native American and historical archaeological sites. The MHC is unable to determine the potential effects of the project on archaeological resources without additional project information.

The MHC requests a map showing the specific locations for aquatic plant control within Massachusetts. Please provide the map to the MHC for review and comment.

These comments are offered to assist in compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (36 CFR 800), Massachusetts General Laws, Chapter 9, Section 26-27C (950 CMR 71). Should you have any questions or require further information, please contact Caitriona Parker at this office.

Sincerely,

Brona Simon
State Archaeologist
State Historic Preservation Officer
Executive Director
Massachusetts Historical Commission

220 Morrissey Boulevard, Boston, Massachusetts 02125
(617) 727-8470 • Fax: (617) 727-5128
www.sec.state.ma.us/mhc

From: thpo <thpo@mohican-nsn.gov>
Sent: Thursday, March 20, 2025 10:09 AM
To: Loughran, Kailey R CIV USARMY CENAN (USA) <Kailey.R.Loughran@usace.army.mil>
Cc: Scarpa, Carissa A CIV USARMY CENAN (USA) <Carissa.A.Scarpa@usace.army.mil>
Subject: [Non-DoD Source] RE: Request for Review and Comment - Vermont Aquatic Plant Control Program (APCP)

Dear Kailey,

Thank you for the notice regarding the proposed Vermont Aquatic Plant Control Program with a study area that encompasses the four major watershed drainage basins in the State of Vermont: the Connecticut River, Hudson River, Lake Champlain, and the Lake Memphremagog basins. The Stockbridge-Munsee Tribal Historic Preservation Office has no issue with the project moving forward with the following standard stipulations:

- If previously undocumented archaeological resources are encountered, please contact me promptly and follow the Inadvertent Discovery Policy on the Stockbridge-Munsee Community website: https://www.mohican.com/mt-content/uploads/2022/09/smc-inadvertent-discovery-policy.pdf.
- Please give due attention to the incidental or routine movement of heavy machinery both inside and outside the stated area of potential effects (APE) that may cause unintended or inadvertent impacts to cultural resources.
- Should the proposed work be altered to expand beyond the current scope of work and/or APE, we ask to be notified.

Regards,
Jeff

Jeffrey C Bendremer Ph.D., RPA
Tribal Historic Preservation Officer
Stockbridge-Munsee Community
Tribal Historic Preservation Extension Office
86 Spring St.
Williamstown, MA 01267
413-884-6029 (o)
715-881-2254 (c)

www.mohican.com

From: New York State Parks CRIS Application <cris.web@parks.ny.gov>
Sent: Tuesday, February 25, 2025 2:19 PM
To: Loughran, Kailey R CIV USARMY CENAN (USA) <Kailey.R.Loughran@usace.army.mil>
Subject: [Non-DoD Source] NY SHPO: Submission Consolidated Response A5EVYWYGESSQ Issued for Consultation Project 25PR01629

Submission Consolidated Response Issued

The New York State Historic Preservation Office (SHPO) has issued a submission consolidated response for the following project. The consolidated response may include letters with comments from the reviewers or requests for more information.

Consolidated Response Link: https://cris.parks.ny.gov/?type=CR&id=A5EVYWYGESSQ
Project Number: 25PR01629
Project Type: Consultation
Project Name: Expansion of the Vermont Aquatic Plant Control Program (APCP)
Consolidated Response Token: A5EVYWYGESSQ
Submission Number: 25PR01629.001
Submission Description: Initial Consultation Submission

The submission description above is for reference only. Please go to the consolidated response page to view new correspondence or information requests from SHPO.

New York State Historic Preservation Office
Peebles Island State Park, P.O. Box 189, Waterford, NY 12188-0189
518-237-8643 | https://parks.ny.gov/shpo
CRIS: https://cris.parks.ny.gov

Response
Thank you for reaching out to the NYSHPO. The NYSHPO has no comments about this study project at this time.

Phase IA Cultural Resources Report and Background Study

Expansion of the Vermont Aquatic Plant Control Program (APCP)

Prepared by:

Kailey Loughran, M.A.
Project Archaeologist
Environmental Analysis Branch
The U.S. Army Corps of Engineers
New York District

May 2025

Management Summary

The U.S. Army Corps of Engineers, New York District (District), in partnership with the Vermont Department of Environmental Conservation (VTDEC), is undergoing the Feasibility Study for the Expansion of the Aquatic Plant Control Program (APCP). A Programmatic Environmental Assessment (EA) is being prepared in accordance with the National Environmental Policy Act of 1969 (NEPA) to evaluate environmental impacts and determine the potential for significant impacts related to any proposed undertaking.

The overall Study Area encompasses the entirety of the State of Vermont (Figure 1). As a Federal undertaking the APCP is subject to Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulations (36 Code of Federal Regulations § 800). Given that the exact APCP locations and measures are expected to change from year to year under the Program the Area of Potential Effect was broadly defined as any areas within the study area where the proposed measures will be employed. The focus of the Phase IA cultural resources investigation, therefore, was to determine the likelihood of significant archaeological and architectural resources being affected by the proposed measures and to make recommendations for additional review, if applicable. District Archaeologist Kailey Loughran conducted the background study under the supervision of Supervisory Archaeologist Carissa Scarpa.

The Phase IA background study consisted of a broad based inventory of previously recorded archaeological sites and aboveground historic properties, including 368 recorded State Register of Historic Places (SRHP) historic districts across the State of Vermont. Additionally, the Phase IA background study reviewed previous cultural resource surveys conducted throughout the Study Area, including several statewide historic resource inventories, historic context development studies, and NRHP nomination forms.

The Phase IA background study also analyzed the proposed Program measures for their potential to have an effect on cultural resources. Despite the presence of many historic properties and districts throughout the State of Vermont, the District determined that none of the proposed APCP measures are likely to result in direct adverse effects to archaeological sites and aboveground historic properties. The proposed APCP measures do not have the potential to diminish the integrity of historic districts and properties that may exist in the program footprint. Therefore, no further work is recommended provided that any ground disturbing work occurs within previously disturbed areas.

Figure 1: Study Area for the Expansion of the Vermont Aquatic Plant Control Program (APCP)

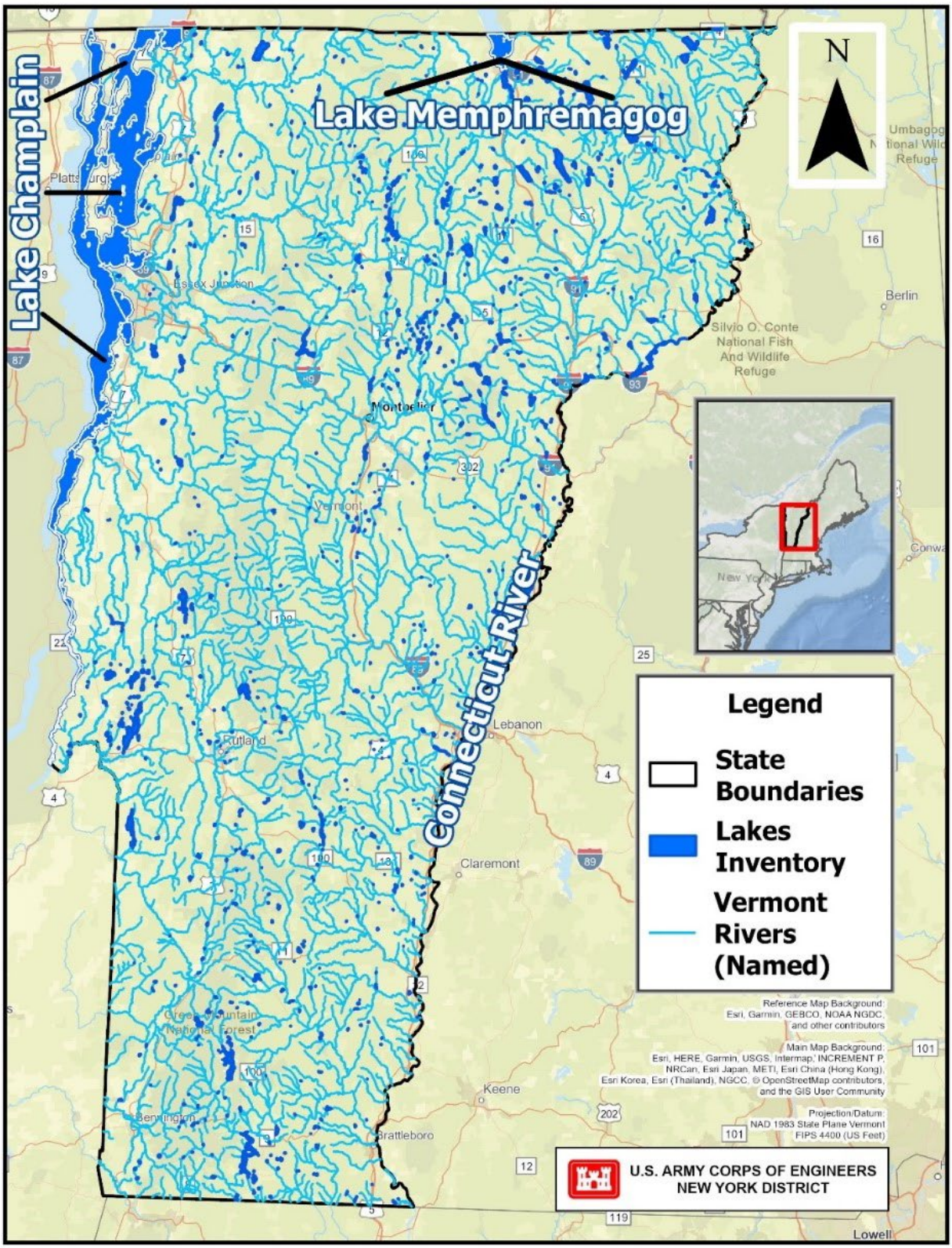

Lake Champlain
Lake Memphremagog
Connecticut River
N
Legend
State Boundaries
Lakes Inventory
Vermont Rivers (Named)
Reference Map Background: Esri, Garmin, GEBCO, NOAA NGDC, and other contributors
Main Map Background: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community
Projection/Datum: NAD 1983 State Plane Vermont FIPS 4400 (US Feet)
U.S. ARMY CORPS OF ENGINEERS
NEW YORK DISTRICT
Montpelier
Vermont
Rutland
Lebanon
Claremont
Keene
Brattleboro
Bennington
Berlin
Silvio O. Conte National Fish And Wildlife Refuge
Lowell

Table of Contents

List of Figures

List of Tables

Appendices

1. Introduction

1.1 Study Purpose

The U.S. Army Corps of Engineers, New York District (District) is evaluating the Expansion of the Vermont Aquatic Plant Control Program (APCP). The purpose of the APCP Study is to control invasive aquatic plants – particularly but not limited to water chestnut and Eurasian milfoil – in the Connecticut River, Hudson River, Lake Champlain, and Lake Memphremagog watershed drainage basins and minimize their adverse ecological, economic, and recreational effects. The District Environmental Analysis Branch has conducted a Phase IA cultural resources investigation in support of the preparation of cultural resources sections and appendices for the Combined Feasibility Study and NEPA Document. A Programmatic Environmental Assessment (EA) has been prepared in accordance with the National Environmental Policy Act of 1969 (NEPA) to evaluate environmental impacts and determine the potential for significant impacts related to any proposed undertaking.

USACE has determined that there is Federal interest in partnering with the State of Vermont to continue and expand the APCP to increase the effectiveness of future and ongoing invasive aquatic plant control measures in the State of Vermont. In accordance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, its implementing regulation 36 CFR Part 800, this program will undergo review by the Vermont State Historic Preservation Office (VTSHPO) for evaluation of potential impacts to cultural resources that may be listed on or eligible for the National Register of Historic Places (NRHP).

The APCP is authorized by the River and Harbor Act of 1958 (PL 85-500, Section 104) which recognizes the severe impact that aquatic invasive species can have on our national economy, public health, wildlife, and agriculture and includes continuous research into efficient methods for aquatic plant control. The expanded measures will be cost-shared with the Vermont Department of Environmental Conservation (VTDEC), the non-federal sponsor for the APCP.

This report is organized into the following sections:

- Section 1 – Introduction – presents the Program description, the investigations undertaken, and conformance to regulations and guidelines;
- Section 2 – Environmental Setting – explores the environmental history and current ecological conditions of the Study Area;
- Section 3 – Research Methods – provides an overview of the methods undertaken during the Phase IA investigation and previous cultural resources reports that were consulted;
- Section 4 – Cultural Contexts – describes the socio-cultural developments as they relate to Pre-Contact and historic periods;
- Section 5 – Existing Conditions – presents the data on recorded cultural resources within the Study Area;

- Section 6 – Management Guidance and the Section 106 Process – establishes next steps for managing cultural resources in accordance with Section 106 and potential impacts of the Alternatives;
- Section 7 – Summary and Recommendations – summarizes the Phase IA Investigation findings and presents recommendations for future work;
- Section 8 – References Cited.

1.2 APC Expansion Description

Infestations of aquatic invasive species (AIS) in Vermont date back to the 1940s and 1950s when water chestnut and yellow floating heart were first identified in southern Lake Champlain. The two species were presumed to have infiltrated the waterbody through the Champlain Canal. A water chestnut control program was implemented in the 1950s and proved successful as only eight bushels of chestnut were hand pulled in 1967. However, the program was terminated in 1971 and water chestnut populations correspondingly increased. On the northern portion of Lake Champlain, AIS infestations date back to the early 1960s when Eurasian watermilfoil was identified in St. Albans Bay. Since that time Eurasian watermilfoil populations have spread to several nearby lakes (USACE 1981).

The District began investigating aquatic plant control solutions for the Lake Champlain Basin in 1979. In June of 1981, the District released the Lake Champlain Aquatic Nuisance Control Program State Design Memorandum and Environmental Assessment (EA), the purpose of which was to delineate a control program, determine costs and benefits, and evaluate economic and environmental impacts associated with such a program. The Department of the Army and the State of Vermont entered into an Aquatic Plant Control Agreement on May 13, 1983 to cooperate in the implementation of a cost-shared APCP for Lake Champlain.

The principal objective of the program was to provide and maintain access in high public use and navigational areas, including marinas, yacht clubs, commercial docks, boat ramps, large concentrations of private dockage serving shoreline communities, and public swimming areas or similar identifiable water-contact-related areas serving the public. Aquatic plant control in Lake Champlain and the surrounding basin was accomplished through hand harvesting plants and the use of mechanical devices (e.g., harvesters, suction devices, or cutters) among other measures. Based on studies of submerged aquatic plants and potential control methods identified, hand harvesting and mechanical harvesting were found to be the most appropriate practices for Lake Champlain. Surveys and investigations were also conducted to determine the presence and spread of submerged aquatic plants in the Lake Champlain basin. Public notification activities were carried out to inform government officials, the media, and the general public of program activities and other related topics of interest. Such activities have included seminars and the preparation and distribution of educational materials. A general public education and outreach program was also conducted to enhance spread prevention efforts (VTDEC 2024).

During the first ten years of operation, the APCP concentrated on work only in Lake Champlain. However, during that time invasive aquatic plants had continued to spread throughout the entire Lake Champlain basin. Addressing the problem from a basin-wide perspective was crucial for running a successful program. In 1994, the Vermont APCP was expanded to the entire Lake Champlain Basin to address other waterbodies with infestations of Eurasian watermilfoil and water chestnut within the watershed (VTDEC 2024).

In August of 2024, the District executed a Project Partnership Agreement (PPA) to expand the APCP from the Lake Champlain Basin to the entire state of Vermont. The Study Area now encompasses the state of Vermont, which consists of four watershed drainage basins: the Connecticut River basin, the Hudson River basin, the Lake Champlain basin, and the Lake Memphremagog basin (Figure 2). The Study Area consists of federal, state and local government owned waterbodies, their immediate shorelines and vehicle access points, and reservoirs of cooperating water-related infrastructure facilities (e.g., hydroelectric generation). The Study Area will also extend into portions of the shorelines of the states of New York, Massachusetts, and New Hampshire, as well as the province of Quebec, the extent of which will be further defined as the program develops.

Currently, the threat of AIS exists throughout the entire State of Vermont and is not limited to the Lake Champlain Basin, which had historically been managed under the cost-shared APCP. In 2007, Eurasian watermilfoil was identified in the Connecticut River; and in 2018, starry stonewort was identified in Lake Memphremagog and Lake Derby. These discoveries are of particular concern to Vermont as these waterbodies have the capacity to further spread AIS throughout the State. The Connecticut River runs the entire length of Vermont and is fed by many smaller rivers and tributaries further inland, all of which are vulnerable to AIS proliferation from the main stem. Lake Memphremagog is subject to significant boating activity, with many boats being used in other Vermont lakes. As such, Lake Memphremagog is a potential vector for AIS spread to any waterbodies that share boats with the Lake (VTDEC 2024).

Aquatic invasive plant infestations grow prolifically and, once established, hamper navigation, irrigation, and drainage; limit water-related recreational activities; reduce fish and wildlife habitat; degrade the aquatic ecosystem and water quality; diminish riparian land values; threaten public health; and increase operation and maintenance costs associated with water-related infrastructure. As such, prevention of the spread of AIS throughout the State of Vermont is a priority for the VTDEC.

The Proposed Action includes the following aquatic invasive plant species (AIPS) control measures:

- Measure 1 – Mechanical Control
- Measure 2 – Expanded Watercraft Inspection and Decontamination Stations
- Measure 3 – Monitoring for Early Detection
- Measure 4 – Drone Surveys

- Measure 5 – eDNA Sampling and Detection
- Measure 6 – Increased Public Awareness and Education
- Measure 7 – Chemical Control

a) Measure 1 – Mechanical Control

Mechanical control measures can consist of several types of different methods including hand harvesting, harvesting conducted via equipment, and the use of benthic matting. The hand harvesting method is typically limited to where the growth density is sparse and cover a small area (less than 0.25 acres), or in areas that may be inaccessible to equipment such as harvesters.

Mechanical harvesting uses devices and machines to harvest the targeted AIPS. Mechanical devices can include floating booms, underwater cutters, hydro-rakes, rotavators, suction harvesters and mechanical harvesters. Mechanical harvesters are generally used for dense stands and/or larger acreages of AIPS beds.

Suction harvesting involves a trained diver hand harvesting AIPS by using a suction line that collects and bags the plant material. This method is reserved for small, scattered infestations to moderate infestations under one acre. Hydro-raking is rarely permitted in Vermont due to the level of disturbance it can cause to substrate. When permitted, it is usually limited in scope.

Benthic matting includes installation of a barrier at the bottom of a waterbody with the intent of blocking sunlight from reaching the water's sediment layer and making sediments inhospitable for plant growth. Implementation of benthic matting is mainly utilized around docks and marinas. Coverage is on average less than 0.25 acres and use of matting is limited to between July 1 through October 30.

b) Measure 2 – Expanded Watercraft Inspection and Decontamination Stations

Vermont Department of Environmental Conservation sponsors the Vermont Public Access Greeter Program that utilizes paid public access monitors staffed at public access points on various waterbodies. Greeters are tasked with inspecting intercepted watercraft and removing identified aquatic invasive species. Greeters are also hired to provide waterbody users with information about aquatic invasive species.

Certain Vermont Public Access Greeter Program stations include decontamination stations consisting of high-pressure hot water used for removing identified AIPS from intercepted watercraft.

c) Measure 3 – Monitoring for Early Detection

Early detection is focused on searching for the presence of AIPS before they are able to establish and begin reproduction. Monitoring methods can include a variety of approaches, but

the most frequent approach is to physically search for AIPS in areas judged at high risk of infestation. This includes shoreline and dock surveys for invasive aquatic plants, snorkels surveys, as well as boat-based surveys. Tools used in early detection investigations include nets, rakes, and other hand tools.

d) Measure 4 – Drone Surveys

Drone surveys are conducted over certain waterbodies, such as Lake Champlain, to identify infestations before they can establish in an area and reproduce.

e) Measure 5 – eDNA Sampling and Detection

In environmental deoxyribonucleic acid (eDNA) monitoring, biologists collect subsamples from surface tows at high-risk sampling sites into standardized eDNA collection vials. The eDNA subsamples are processed to detect presence of AIPS DNA particles in the subsampled water, with the intent to increase efficiency and more rapid turn-around of results to improve response and reaction timing if results indicate the presence of AIPS DNA.

f) Measure 6 – Increased Public Awareness and Education

VTDEC works to promote public awareness of the existence and risks associated with aquatic invasive plants. Public outreach includes ad campaigns which are aimed at keeping boats free from AIPS. Signs are placed at boat ramps and other strategic places in an effort to reach the key targeted audience along with stocked brochure boxes. A common outreach slogan is "Clean, Drain, Dry." VTDEC supports public workshops to increase aquatic invasive species awareness in local communities. These outreach efforts have not been cost-shared through the existing APCP.

g) Measure 7 – Chemical Control

Although chemical control is not used by VTDEC as a routine measure for dealing with AIPS, VTDEC has the ability to issue permits for pesticide use related to aquatic invasive species, particularly in a rapid response capability.

ProcellaCOR was first permitted for use in 2019 and has been the only aquatic herbicide permitted for use by VTDEC since 2020. As such, ProcellaCOR is currently the most commonly used aquatic herbicide for treating invasive aquatic plants in Vermont and is typically the only one considered for use during permit application review.

1.3 Areas of Potential Effects (APE)

An Area of Potential Effects (APE) is defined as the "geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist" (36 Code of Federal Regulations [CFR] § 800.16(d)). The Programmatic EA evaluated a variety of measures, for APCP expansion to be implemented throughout waterbodies spanning the entire State of Vermont. Locations are

selected each year by the VTDEC based on field research identifying hotspots or problem areas therefore the location of the proposed activities is subject to change depending on fluctuating conditions. Vermont is home to 800+ lakes, 23,000+ miles of rivers and streams, and 300,000 acres of wetlands (VTDEC 2024). The more notable waterbodies in the State include Lake Champlain, Lake Memphremagog, and the Connecticut River. These waterbodies are the namesakes of three of the four major watersheds in the State, with the fourth being the Hudson River watershed located primarily in New York (Figure 1). Due to the programmatic nature of the analysis, the APE was broadly defined as all areas within waterbodies and around the shorelines of waterbodies where the proposed activities may occur. This approach considers any and all archaeological or architectural resources that may be present in the location of proposed activities.

2. Environmental Setting

2.1 Physiography

The Study Area encompasses the entire state of Vermont, which comprises 9,250 square miles of land and 365 square miles of water. Vermont is characterized by five distinct physiographic regions, categorized by geological and physical attributes: the Northeastern Highlands, the Green Mountains, the Taconic Mountains, the Champlain Lowlands, and the Vermont Piedmont (Doolan 1996). The Northeastern Highlands region is dominated by northern hardwood forests and consists of parts of Caledonia, Essex, and Orleans Counties in the northeastern corner of the state, bordered by Canada and New Hampshire. The Green Mountains are centrally located in the state and represent part of the Appalachian Mountain chain that extends from the southeastern United States into Canada and make up the coldest climate and highest annual precipitation in the state. The Taconic Mountains region borders New York and has a variable climate and consist of hardwood, spruce, fir, hemlock, and white pine forests. The Champlain Lowlands region has one of the warmest and driest climates in Vermont and is characterized by clay soils, wetlands, and limited forested lands. The Vermont Piedmont region has a moderate climate and topography and is known for its temperate forests between the Green Mountains and the Connecticut River Valley. Land use within all regions is predominantly rural, forested, and agricultural.

The Vermont bedrock is composed of schists, slates, marbles, granites, gneisses, quartz, and sandstones (VTDEC 2024). The Vermont archaeological record indicates that quartz, quartzite, chert, jasper, rhyolite, slate, and argillite were quarried for stone tool making during the Pre-Contact Period (Dowd and Trubitt 1990). Eighteenth and nineteenth century agriculture and lumbering activities have had a significant geological impact on Vermont soils. Prime agricultural soils abound in floodplain zones and on some of the higher terraces, and several studies have demonstrated these are highly correlated with prehistoric and historic habitation sites (Ward 1965; Woods 1987:280-281). Even though more water entered drainage systems as a result of deforestation, this resulted in irregular and more rapid runoff, which left Vermont drier at most seasons of the year than it had been before. Today, Vermont is much more forested than it was in the nineteenth century. Evergreens such as pine, spruce, fir, hemlock,

and deciduous species like maple, elm, birch, beech, oak, ash, cherry, and butternut dominate the landscape (Dowd and Trubitt 1990).

2.2 Hydrology

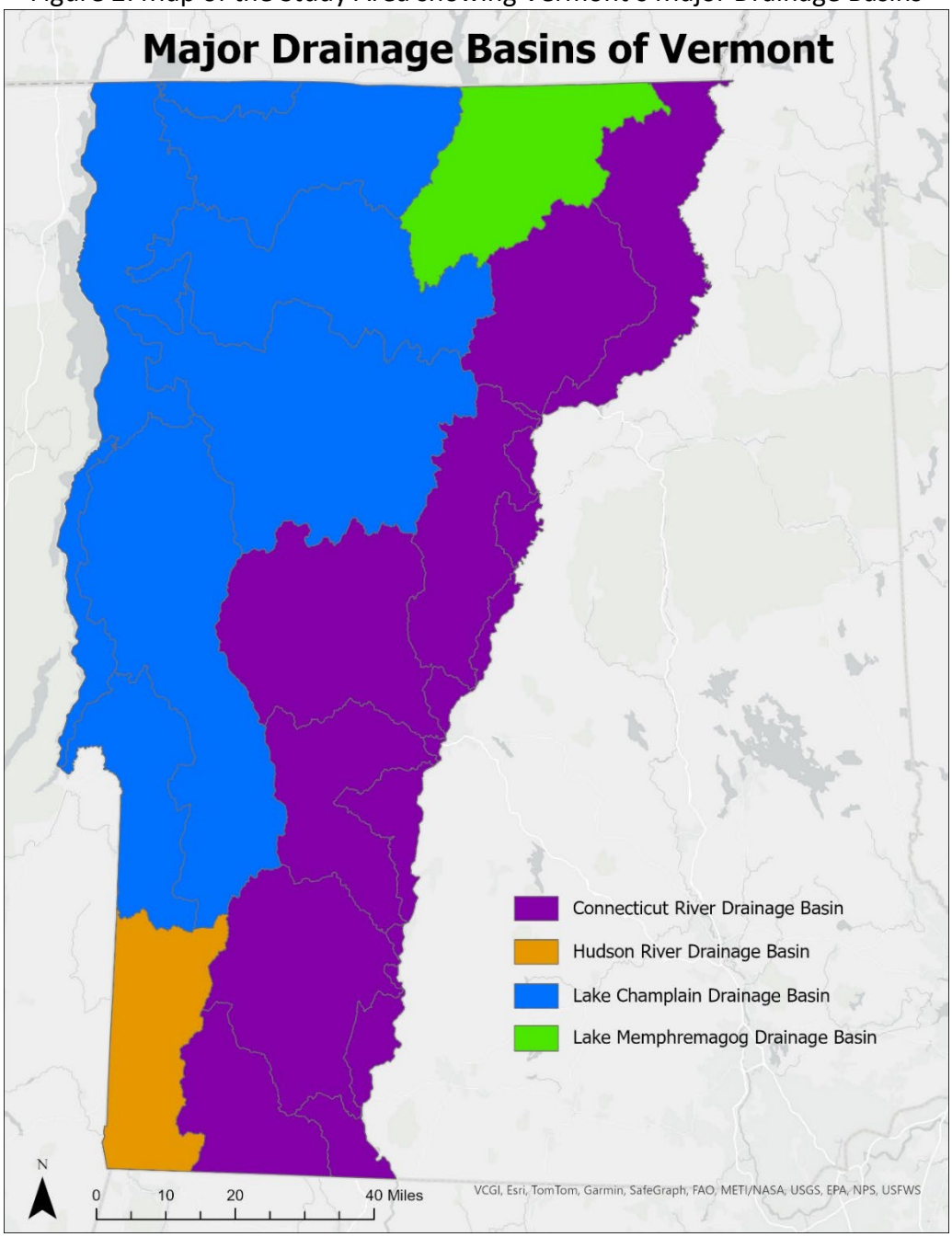
Vermont has four major drainage basins: the Hudson River, Lake Memphremagog, Lake Champlain, and the Connecticut River drainage basins (Figure 2). The Hudson River Drainage Basin consists of the Batten Kill, Hoosic, and Walloomsac sub-basins. The basin is in southwestern Vermont and drains Bennington County and a small portion of Windham County. The length of the Hudson River in Vermont is approximately 24 miles. The Vermont portion of the Batten Kill watershed drains much of northern Bennington County and has an area of about 200 square miles. A total of 207 square miles of the drainage area of the basin is located in the New York portion of the watershed. The Batten Kill, Walloomsac, and Hoosic Basins are predominantly covered by forest (81.8%) while agricultural lands cover 5.9%, developed lands cover 5.8% (including the interstate and roads), and wetlands cover 4.5%. Washington County contains the upper reaches of the Winooski River, an east-west corridor that people used to travel between the Lake Champlain-Hudson River Valley and the Connecticut River Valley (Dowd and Trubitt 1990).

The Lake Memphremagog drainage basin covers approximately 589 square miles and its waters flow north into the Saint Francis River. The majority of the watershed flows into Lake Memphremagog, a shared waterbody with Quebec, or into the Tomifobia River which flows into Lake Massawippi. The Lake Memphremagog, Tomifobia and Coaticook Watershed is a predominantly forested landscape. Forested land covers about 65% of the Basin while about 7.7% is wetlands and 4.7% is open water. Developed and agricultural land cover about 5.3% and 14% of the Basin, respectively. A basin wide analysis of land use change from 2001 to 2019 showed some small changes in land cover over this time including an increase in cropland acreage, developed lands, and wetlands and decreases in pasture and forested lands.

The Lake Champlain Drainage Basin consists of 8,234 square miles and includes portions of Vermont, New York, and the Province of Quebec. Lake Champlain occupies an area of 435 square miles, has 587 miles of shoreline, and is one of the largest freshwater lakes in the United States (USACE 2017). Lake Champlain originates in Whitehall, New York, then flows north through Vermont to its outlet at Richelieu River in Quebec. Water then flows north to the St. Lawrence River and drains to the Atlantic Ocean at the Gulf of St. Lawrence. Lake Champlain is approximately 120 miles long and 12 miles wide at its widest point, Mallets Bay. Forested land covers about 56% of the basin while about 8% is wetlands and 8% is open water. Developed and agricultural land uses comprise about 1.5% and 19% of the basin, respectively. Historically, the Basin has been heavily farmed and 35% of the basin is still in agricultural use (USACE 2017). General land uses within Lake Champlain include recreation (such as fishing, boating, swimming, and water sports) and other water-dependent uses such as transportation via ferry services.

The Connecticut River Drainage Basin is the largest watershed in New England, flowing through New Hampshire, Vermont, Massachusetts, and Connecticut and spanning 11,260 square miles. Approximately 410 miles long and passing through New Hampshire, Vermont, Massachusetts and Connecticut, the Connecticut River is the longest river in New England. It starts at a small pond known as the Fourth Connecticut Lake in Pittsburg, New Hampshire and empties into the Long Island Sound in Connecticut. Approximately 74% of the basin is forested. Interspersed among the forests are patches of agricultural (6%) and urban (9%) lands, with the highest-density population centers in the southern regions of the watershed, surrounding the cities of Springfield, Massachusetts and Hartford, Connecticut. Hartford, 48 river miles (77 km) upstream from Long Island Sound, is the most downstream city in the watershed, a unique feature for major river basins of the northeastern United States, which usually have port cities near their mouths. As a result, the Connecticut River estuary remains intact and is one of international significance, having been named a Wetland of International Importance in 1994 under the Ramsar Convention.

Figure 2: Map of the Study Area showing Vermont's Major Drainage Basins



2.3 Climate

Precipitation across Vermont is evenly distributed throughout the year, with mean annual accumulations ranging from about 35 inches (90 cm) to about 47 inches (120 cm) (Garabedian et al. 1998; Magilligan and Nislow 2001). The annual hydrological pattern of Vermont is typical of natural annual streamflow patterns across New England, consisting of high flows in the spring, followed by lower summer and early-fall flows, a slight increase in flows in late fall and early winter, and then a slight decrease through the winter months. Snowfall in

Vermont usually averages between 70 and 80 inches (1,800 and 2,000 mm) in the valleys and up to 110 inches (2,800 mm) in the mountains. Winter temperatures can drop to −34 °F (−37 °C) and lower, and summer temperatures rarely rise above 90 °F (32 °C). Pleasant summer days often turn cool after nightfall. The annual growing season is only about 120 days—somewhat longer in the low-lying Champlain Valley—because frost usually comes in September and may strike as late as the beginning of June. The short growing season and rocky soil make dairying the dominant form of commercial farming.

At higher elevations, especially in the Green and White Mountains, much of the annual precipitation accumulates in the winter months as snow. In most years, as air temperatures increase and snow melts in early spring, the accumulated snowpack results in a spring freshet. After the spring freshet recedes, summer months are typically characterized by low, stable flows interrupted by periodic storm events. As transpiration decreases in late fall and early winter, flows typically increase slightly, and then decrease again through winter as precipitation is locked up as snow. Flooding associated with the spring freshet can last for several weeks on the mainstem Connecticut River, especially where the waters initially rise from snowmelt in the southern reaches of the watershed and are sustained by later snowmelt cascading from the north. When combined with rain or ice jams, snowmelt-related flooding can become protracted, as occurred during the rain-on-snow flood event of March 1936 (Jahns 1947). Other significant flood events have been associated with late-summer or early-fall hurricanes, as in the 1938 and 1955 floods (Wolman and Eiler 1958), and most recently as a result of Tropical Storm Irene in August 2011.

Over the past century, average temperatures across the Northeast have increased by almost 2°F (Horton et al. 2014). Precipitation has also increased (10% increase), with an increasing proportion falling in heavy events (70% increase; Horton et al. 2014), and a decreasing proportion falling as snow (Huntington et al. 2004). Corresponding trends in hydrology have included an increase in the frequency of flood events per year (Armstrong et al. 2012; Archfield et al. 2016), and a shift toward earlier timing of the spring snowmelt peak as temperatures rise sooner in the spring (Hodgkins et al. 2003; Hodgkins and Dudley 2006). Regional projections are for continued increases in precipitation in winter and spring, and in the frequency of heavy precipitation events (Horton et al. 2014). Annual peak spring flows are also predicted to decrease by as much as 35% as snowfall contributes less to annual precipitation (Demaria et al. 2016). However, parts of Vermont have experienced several moderate to severe droughts. The most severe drought on record for the region occurred from 1961 to 1969, when annual precipitation values were at a continuous deficit, resulting in agricultural losses and water supply restrictions and emergencies (USGS 1991).

2.4 Flora and Fauna

Much of Vermont was heavily deforested in the eighteenth and nineteenth centuries, as land was cleared for agricultural pastures and open fields. By the twentieth century many of these cleared spaces were abandoned and pine, spruce, fir, maple, birch, and hemlock trees began to populate them. Oak, white pine, northern white cedar, hemlock, and hickory forests

remain prevalent throughout Vermont, particularly in the Champlain Valley and Vermont Piedmont (VTDEC 2024). The state tree is the sugar maple, reflecting Vermont's prominence in maple sugar and syrup production. The Green Mountains are largely dominated by yellow birch and red spruce trees.

The floodplains of the Champlain Lowlands and Vermont Piedmont provide habitat for regionally significant waterfowl and marsh bird habitat. The wooded areas, with their small brooks and springs, produce a great variety of ferns and wildflowers which attract several species of birds common to the Northeast. Common loons, turkey, gray squirrel, and white-tailed deer are some of the species that benefit from the abundance of acorns throughout the Champlain and Hudson Valleys. Fishing in the lakes and streams throughout Vermont, particularly ice fishing during the winter, remains popular today.

The high elevation forests of the Green Mountains provide habitat for several species of birds, including Bicknell's thrush, Swainson's thrush, and blackpoll warbler. Beavers are abundant and have had a significant influence on the wetlands of the plateau. The spruce-fir forests of the Northeastern Highlands support several boreal forest species of wildlife including spruce grouse, gray jay, black-backed woodpecker, rusty blackbird, and mink frog. Canada lynx and American marten have recently returned to portions of this remote region. Moose are common throughout the highlands and the spruce-fir forests provide critical overwintering habitat. While bears remain common, wild members of the cat family are rarely encountered.

3. Methods

3.1 Background Research

The Phase IA investigation employs a three-fold research strategy to identify potential impacts to recorded cultural resources within the Study Area. First, a high-level literature review was undertaken to place the Study Area's environmental setting and history of land use into the context of cultural resources. Topics related to environmental settings included soils, regional geomorphology, and native flora and fauna. Pertinent resources regarding Pre-Contact and historic period land use include Section 106 survey reports, journal articles, and historic context development studies.

The second step in the research strategy was the collection, organization, and synthesis of cultural resource information obtained from state and federal agency databases. The USACE obtained access to recorded historic properties within the Study Area via the VTSHPO cultural resources GIS dataset in October 2024. Along with the shapefile layers of archaeological sites and archaeological sensitivity modeling, the Vermont Open Geodata Portal contains the State Register of Historic Places (SRHP) data layer of SRHP-listed historic districts throughout the state (Vermont Center for Geographic Information 2024).

The third step in the research strategy would be the evaluation of currently proposed alternative measures to identify potential impacts to previously identified cultural resources and anticipate the development of mitigation plans as necessary. However, since exact locations of where the measures will be implemented have yet to be fully formulated, an inventory of cultural resources within the locations for APCP measures could not be compiled. This review of cultural resources data was developed for the Program for the purpose of evaluating existing conditions of cultural resources in preparation for evaluating potential impacts associated with the proposed alternative measures.

USACE conducted background research to identify known cultural resources and previous cultural resources surveys located within the architectural and archaeological APEs. Site forms, spreadsheets, VTSHPO archaeological site data, and previous USACE cultural resources survey reports on file at the District were consulted for this study. Background research also consisted of a desktop review of VTSHPO GIS data layers to evaluate archaeological site locational data and survey report citations. Information provided by the VTSHPO indicated that several statewide cultural resource surveys have been conducted in Vermont since the late twentieth century. Details for the previous cultural resource surveys are shown in Table 1.

Table 1 – Previous State-wide Cultural Resources Publications

Report Title	Author	Publication Year
Vermont Historic Sites and Structures Survey (VHSSS)	Vermont Division for Historic Preservation (VDHP)	1971
Retreat to Vermont: An Architectural and Social History of a Vermont Summer Community	Clifford	1987
Growth of Government in Vermont, 1777-1940	Zirblis	1994
Vermont Historic Metal Truss Bridge Study	A. G. Lichtenstein and Associates, Inc.	1997
Preserving Vermont's Most Significant Historic Dams	The Louis Berger Group, Inc.	2000
Religious Buildings, Sites, and Structures of Vermont	Gilbertson	2001
Survey of International Style Buildings in Vermont, 1937-1975	Liz Pritchett Associates	2003
Fire Stations of Vermont	Jamison et al.	2006
Masonry Arch Bridges of Vermont	Vermont Agency of Transportation	2008
Vermont Historic Sites and Structures Survey Report for 1950-1960 Vermont Military Department Resources at Camp Johnson and Vermont Army National Guard Armory Complexes	Sagerman	2010

Vermont National Historic Landmark (NHL) inventory	VT SHPO	2014
State of Vermont Historic Rail Buildings	O'Shea and Newman	2015
Transportation in Vermont	The Louis Berger Group, Inc.	2018

3.2 Architectural Study

Aboveground historic properties are defined as buildings, structures, or objects, generally at least 50 years old or older, that are NRHP-listed, NRHP-eligible, or properties that have not yet been evaluated for NRHP eligibility. In accordance with 36 CFR 60, a Historic District is a geographically definable area, urban or rural, possessing a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united by past events or aesthetically by plan or physical development. Historic Districts may also comprise individual elements separated geographically but linked by association or history. Further information on historic properties and districts in the Study Area are provided in Section 5.

In order to be considered eligible for the SRHP or NRHP a resource must be at least fifty years of age (unless they are of exceptional significance), and must meet one or more of the following criteria: Criterion A: Associated with events that have made a significant contribution to the broad patterns of our history. Criterion B: Associated with the lives of persons significant in our past. Criterion C: Embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction. Criterion D: Have yielded, or may be likely to yield, information important in prehistory or history.

Because of the programmatic nature of the undertaking and the limited nature of VT SHPO data available through digital sources, the District did not compile a list of historic properties in the Study Area. According to datasets provided by the Vermont Open Geodata Portal, a total of 368 State Register-listed historic districts are located in the state (Table 3).

Over the past several decades, the VT SHPO has conducted several historic context studies for various cultural resources identified throughout the state. In 1971, the Vermont Historic Sites and Structures Survey (VHSSS) was initiated to survey all historic resources in each town that are SRHP eligible. The goal of the VHSSS was to document historic resources within the state that are SRHP eligible. Information on the forms includes resource location, owner, historic property names, architectural description, statement of significance, photographs, and sketch map. Many historic resources that have been surveyed over the years are now SRHP-listed. The VHSSS documentation is reviewed and approved by the VT SHPO, or Vermont Division for Historic Preservation (VDHP), and the documentation is available for public viewing and copying in the VDHP's Resource Room at the National Life Building in Montpelier. The survey was completed on a town by town basis, beginning in the southern part of the state and then moving northward.

An early report entitled “Vermont Retreat History” provides an overview of the historic and architectural significance of summer resort towns throughout Vermont, using the Town of Greensboro in Orleans County as a case study (Clifford 1987). The assessment outlines the development of the Vermont summer resort industry, which began as a means of revitalizing a rapidly declining agricultural economy in the late nineteenth and early twentieth centuries. The early twentieth century saw a growth of the middle classes who enjoyed shorter work weeks, longer vacation time, and a desire and ability to escape from the dense urban environments. Greensboro represents one of the earliest summer resort communities in Vermont and symbolizes the growing appeal of the simple rustic cottages that created a sense of communion with nature (Clifford 1987, 35). The architectural characteristics of the summer resort structures at Greensboro mostly embody the Adirondack, bungalow and vernacular styles, featuring a variety of stylistic elements such as wide and spacious porches, long sloping roofs, and a lack of ornamentation, all of which are meant to convey simplicity and rusticity. Summer resort cottages were designed to blend into the natural landscape with details such as exposed rafters, cobblestone chimneys, and the use of natural wood finishes on the interior (Clifford 1987, 63). The report references contemporary literature on the history and architecture of twentieth century summer homes to situate the Vermont summer cottages, many of which remain well-preserved today, within the broader context of popular ideas about the summer home in terms of both symbol and function (Clifford 1987, 104).

The VT SHPO completed a NRHP Multiple Property Documentation Form and historic context study, "Growth of Government in Vermont, 1777-1940," to evaluate historic and architectural resources relating to town, county, state, and federal government in Vermont (Zirblis 1994; Gilbertson 1994). This multiple property listing was based on the VHSSS findings and emphasized the importance of public buildings and the development of local government control (Gilbertson 1994, 11). The historic context study was defined as a result of a public, statewide planning process and provided an overview of early state institutions such as the county court system and described the associated property types such as the town hall and the evolution of its architectural styles from the eighteenth century into present day. The time period for the historic context study is 1777, the date of Vermont's constitution, to 1945, the end of World War II. Since state legislation shaped the town and county units of government, the State was the basic unit of government for this evaluation. The town hall was the main property type to be documented for the multiple property listing, as several extant examples date to the nineteenth century and are based on a specific function as a meeting place and are used for annual town meetings, school meetings, and cultural and social events. Most of the property type information about town halls was gathered from the VHSSS, with other information from town histories. The requirements for integrity were based on NRHP criteria and existing conditions assessments (Gilbertson 1994, 19).

The Vermont Agency of Transportation (VAOT) conducted a historic structure survey of 111 historic truss bridges in Vermont to establish a comprehensive preservation plan to evaluate which of Vermont’s historic truss bridges are worthy of preservation and recommend a preservation alternative for each bridge (A. G. Lichtenstein and Associates 1997). Vermont’s assemblage of metal truss bridges is an impressive and valuable record of the evolution of

transportation networks in the state. They, along with the roadways they service, are tangible testaments to the growth of the state and increased interconnectedness of society made possible by technological advances through the late nineteenth and early twentieth centuries (A. G. Lichtenstein and Associates 1997, 4). The construction dates for the truss bridges evaluated for this study range from 1870 to 1943 and several designs and technologies are represented, including several pony trusses, through trusses, and deck trusses. At the time of survey, 54 bridges remained from the reconstruction campaign following the 1927 Flood (A. G. Lichtenstein and Associates 1997, 2). Thirteen of Vermont's fourteen counties are represented by at least one truss bridge. This investigation prepared individual summary reports for 104 bridges that provides a breakdown of each bridge into several categories so that characteristics such as size, age, design, geographic location and preservation cost. The study determined that 70 bridges can remain in use and should serve as the core group that will maintain the aesthetic impact of the metal truss on the Vermont landscape. The study concluded that 66 of the selected historic bridges can undergo preservation efforts to continue to serve vehicular traffic at their current site, with four that can be potentially relocated to areas where traffic is less demanding. This document provided decision makers with a valuable tool when mapping the future of Vermont's historic metal trusses (A. G. Lichtenstein and Associates 1997, 3).

The VT SHPO conducted a similar study entitled "Preserving Vermont Dams" to develop a priority preservation plan for historic dams in Vermont (Louis Berger Group, Inc. 2000). Recent concerns about water quality, aquatic habitat, and recreational opportunities in Vermont that fueled calls for restoration officers and streams, which could include removal of historic dams (Louis Berger Group, Inc. 2000, 18). Investigators compiled a preliminary list of historic dams in Vermont, conducted field assessments of each, and developed historic contexts to establish preservation criteria and identify historical significance. The study evaluated 278 dams in Vermont, including 16 mill dams dated between 1790 and 1860 and 17 mill dams dated between 1861 and 1889 (Louis Berger Group, Inc. 2000, 12). The majority of twentieth century dams were built for hydroelectric power. Nearly half of all dams evaluated for this study are characterized as earthfill, but several are made of stone, timber, and concrete.

The "Religious Buildings, Sites, and Structures of Vermont" historic context study was developed as part of the VT SHPO's statewide historic preservation planning process and based on the VHSSS. The study was used to inform a multiple property listing for National Register nomination for several historic churches throughout Vermont (Gilbertson 2001, 19). NRHP standards of integrity, existing conditions, and previous surveys – including the VHSSS – were reviewed for this study and analyzed to develop property type information (Gilbertson 2001, 20). Church buildings, found in almost every Vermont town, are the physical evidence of the history and patterns of religious and architectural practices in the state, New England, and the nation from the time of first permanent Euro-American settlement in the late eighteenth century to the present day. Some also tell of Vermont's civic life, having been built with large open spaces to for services, meetings, and other governmental and educational uses. They are among the most prominent buildings in each town, constructed on small lots facing village greens, in village centers, as centerpieces of residential neighborhoods, anchoring commercial districts, or located on rural parcels serving more remote congregations (Gilbertson 2001, 1).

Churches in Vermont in the historic period range in style from vernacular and unadorned to high style Federal, Greek Revival, Gothic Revival, Italianate, Queen Anne, Victorian Gothic, Neo-Classical, Neo-Gothic, and Colonial Revival, or a mixture of several styles. They are built of wood, brick, or stone and may be small one-story buildings or large structures with several stories and bell towers, steeples, or ornate spires. This assessment outlines several architectural styles and time periods and provides examples of each (Gilbertson 2001, 2). In general, churches will be individually NRHP-eligible because they reflect trends significant to the broad patterns of religious history in Vermont, maintain a historic role in a community, region, or the state, or are good examples of an architectural style or period, method of construction, or the work of a master. To be determined eligible, churches should retain the characteristic defining form, design features, and materials from the historic period, including historic period changes or modifications. The study states they must be architecturally distinguished and have become important landmarks over time, maintaining a physical character that has added distinction to the Vermont landscape. The study emphasized the appearance of these well-preserved historic buildings as a major part of the Vermont image, and thus their importance over the years in attracting visitors to the state.

Another historic context study entitled "Building Styles in Vermont" was developed for a historic survey of historic buildings in Vermont (Liz Pritchett Associates 2003). The analysis provided an overview of the International Style, a prominent architectural style in Vermont from the 1930s to the 1970s, and provided detailed descriptions of remaining properties that embody this style. The evaluation discussed the results of field assessments and interviews with architects and property owners, as well as a brief outline of Vermont's architectural periods over time (Liz Pritchett Associates 2003, 14).

The "Fire Stations of Vermont" historic context study provided an overview of the institution of firefighting in Vermont and the evolution of firefighting equipment, tools, and the firehouse design and structure as part of a NRHP Multiple Property Documentation Form (Jamison et. al 2006). Firehouses clearly reflect the long history of firefighting in Vermont as well as the social, political, economic, and technological trends associated with fire protection. The introduction of firefighting is intricately connected to the settlement and development of any community, and fire stations have held a vital place in Vermont towns since their first construction and inception in the mid-nineteenth century. Vermont's historic firehouses were built in response both to a growing public awareness of the need for improved fire protection—often in the wake of a major fire—and to the changing equipment used for fighting fires. As the nineteenth century progressed, Vermonters began to recognize the importance of fire companies as towns began voting to provide public support for the volunteers by paying their expenses, purchasing additional fire equipment, and erecting buildings to store the apparatus (Jamison et. al 2006, 5).

The study discussed how the initial function of firehouses to protect equipment evolved into social functions such as meeting spaces, sleeping and living quarters, and polling places. Firehouse designs in Vermont vary by town and company, but several historical examples

survive. The study posited that Vermont fire stations may be individually eligible for the National Register primarily under criterion A for their association with the broad patterns of firefighting history in Vermont. In addition, it is expected that stations will be eligible under criterion C for the distinctive characteristics of their period and property type. Firehouses also are often eligible for the National Register as integral parts of historic districts and for reflecting the architectural styles of their periods of construction (Jamison et. al 2006, 19, 23).

The VT SHPO conducted a survey of masonry arch bridges in Vermont to develop a preservation plan and outline a workable process for decision-making regarding the future use and maintenance of the bridges (VTrans2008). Masonry arch bridges comprise an especially important category of historic bridges in Vermont, a state where stone artisans have long proclaimed the value of the region's granite and marble industries. Each bridge displays an ancient structural and aesthetically distinctive design that represents an important part of Vermont's engineering heritage. The study developed a historic context for the bridges and included recommendations for preservation strategies and treatment plans that can be arranged in order of priority. Today, the public is encouraging engineers to design highways and bridges that visually complement environmental contexts, and Vermont's surviving stone arch bridges can play an important role in that effort. The study outlined the review and planning process for developing bridge preservation plans but cautioned that further discussion and technical expertise will be needed (VTrans 2008).

The investigation entitled "Vermont Historic Sites and Structures Survey Report for 1950-1960 Vermont Military Department Resources at Camp Johnson and Vermont Army National Guard Armory Complexes" is the first documentation of Vermont's Cold War era military resources and evaluates twelve historic armories, eight armory auxiliary buildings, two historic rocket storage buildings at Camp Johnson, and the Vermont Army National Guard's headquarters in Colchester, VT (Sagerman 2010, 2). The primary objective of the survey was to document all historic Vermont Army National Guard resources in Vermont that were not yet evaluated for the State and National Registers of Historic Places. The survey consisted of site assessments, visual inspections, photography, historic architectural evaluation, and a historic context overview of military resources in Vermont. Each evaluation included the architectural and structural descriptions as well as a statement of significance. All twelve of the surveyed armories appear to be eligible for the State and National Registers of Historic Places under Criterion A for their contribution to Vermont's military history. The Bennington, Bradford, Enosburg Falls, Morrisville, North Springfield, Swanton, Waterbury, Williston, and Windsor armories also appear to be eligible for the State and National Registers of Historic Places under Criterion C for their contribution to Vermont's architectural history, specifically for their unique appearance as mid twentieth century American International Style brick armories with two-story drill halls (Sagerman 2010, 5).

The VTSHPO conducted a National Historic Landmark (NHL) inventory and status report for all Vermont NHLs in 2014. NHLs are nationally significant historic places designated by the Secretary of the Interior because they possess exceptional value or quality in illustrating or interpreting the heritage of the United States. A total of 17 properties in Vermont are currently

designated NHLs. The purpose of the inventory and status report was to document the existing conditions for each NHL and identify any potential preservation issues. The Socialist Labor Party Hall was the only NHL determined to be under threat, as it experienced extensive flooding from Tropical Storm Irene in 2011 and is at risk of future flooding that could potentially result in a loss of integrity. The Socialist Labor Party Hall is significant for its association with socialist and anarchist politics, labor organizations, and Italian immigrant heritage in the early twentieth century. The town of Barre played a central role in the history of Italian anarchism and militant unionism in the United States, and was the leading place of debates among anarchists, socialists, and union leaders over the future direction of the labor movement in America. The Socialist Labor Party Hall, as the primary site for these discussions, embodies the radical heritage and the strength of the union movement during the early twentieth century. The report noted that some repairs and flood proofing are complete and additional work was in coordination with FEMA. All other NHLs are considered "satisfactory," in that there are no known current or potential threats to the historic resources (VT SHPO 2014).

The "Vermont Historic Rail Buildings" is a historic context study that evaluated the existing conditions of twenty state-owned and state-supported rail related buildings in order to prioritize maintenance, overcome challenges, and highlight the value of public investment in Vermont's heritage (O'Shea and Newman 2015, 4). Railroads have been an important component of Vermont's transportation system and economy since the first rail companies were chartered in the state in 1832. Railroads brought dramatic changes to the Vermont landscape, its community development, and to the economy. Villages along the rail line grew quickly in response to the industrial, commercial, and manufacturing opportunities afforded by the railroad. Communities and the economy developed around the confluence of rail lines and shipping ports, in lockstep with an increase in rail traffic. This study involved site assessments, field surveys, photographic documentation, and a historic context analysis completed by the VTrans Historic Preservation Department. The evaluation provided an overview of railroad architecture in Vermont with the understanding that additional research is required in order to develop a proper typology and chronology of railroad depots. The rail buildings included in this report represented a small sample of the railroad stations and buildings throughout Vermont. The study recommended a more expansive investigation of railroad stations in Vermont in order to verify and build upon the discussion of railroad architecture in this report (O'Shea and Newman 2015, 9). The Vermont Agency of Transportation recognizes the significance of the historic railroad buildings to the people and their collective heritage, and supports these values through transportation enhancement grants and state maintenance responsibilities. The VT SHPO also developed a historic context study for transportation in Vermont (Louis Berger Group Inc. 2018). This study provided an overview of transportation periods in Vermont since European settlement began in the seventeenth century, beginning with water transportation and early overland roads and turnpikes, moving into railroad growth and expansion, and concluding with automobile and air transportation.

3.3 Archaeological Study

Since the early twentieth century, USACE and others have undertaken several cultural resource surveys to identify archaeological resources throughout the Study Area. The John's Bridge site on the lower Missisquoi River was excavated in 1983 and yielded the earliest Archaic materials known in Vermont, with four radiocarbon dates obtained at the site dating to approximately 8,000 years ago (Thomas and Robinson 1983). Power and Petersen (1984) conducted archaeological investigations at the Winooski Site (VT-CH-46) in the City of Winooski, a hunting and fishing camp that yielded a previously unknown projectile point type in New England, the Swanton corner notched point. Later Archaic materials, characterized in part by another projectile point form - the side notched Otter Creek - probably represent a timespan of about 5,500 to 5,000 years ago (Haviland and Power 1981:59-60). Other typical artifacts of this "Vergennes Archaic" manifestation are ground slate projectile points, heavy woodworking tools, atlatl weights, and plummets. Many dozens of these Archaic period sites have been identified both in the Champlain Valley and in the Connecticut Valley. Perhaps the best known sites are the Ketcham's Island Site and the Otter Creek No. 2 Site. Both sites also yielded evidence of Archaic Period burial practices (Power and Petersen 1984:3).

The earliest inhabitants of what is now Vermont were Paleo-Indians - small nomadic groups who hunted large game such as mastodon and musk oxen that were present at the end of the last glaciation. The hunter's chipped stone tool kit included one particular artifact - a fluted projectile point, hafted on a throwing spear - that was unique to this time period. The Champlain Sea was a product of glacial activity, specifically the melting of the Laurentian glacial mass. At its maximum extent, approximately 12,000 years ago, the Champlain Sea's waters covered about 20,500 square miles (Haviland and Power 1981, 21). A few locations well to the east of the Sea's maximum extent suggests the possibility that some groups might have been hunting in Vermont around that time (Haviland and Power 1981, 29-31).

Both ceremonialism and apparent participation in long distance trade networks were expanded considerably in the subsequent Early Woodland period, beginning sometime around 3,000 years ago. The conventional marker for this period is the introduction of pottery. In common with some areas in the Northeast, information about the Early Woodland Period comes mostly from cemeteries rather than habitation sites. Two of the four known cemeteries in Vermont were located near each other on the lower Missisquoi River - the Swanton Site (Perkins 1873) and the Boucher Site (Basa 1975). The remaining cemeteries, Bennett (Ritchie 1944) and East Creek (Gifford 1948), were located farther south on Lake Champlain in Orwell. All showed lavish use of red ochre and contained elaborate and exotic grave goods. The sources of raw materials from which many of the objects were made represent a broad geographical spread, from the Ohio Valley to the Atlantic coast (Power and Petersen 1984, 5).

Data from the Winooski Site, along with the results of subsequent surveys (Thomas 1980), indicate that Middle Woodland groups in the Champlain Valley exploited a variety of habitats, with larger settlements located on the lower reaches of major rivers and smaller sites found in a variety of settings such as inland ponds or along small tributary streams, a land use pattern suggestive of seasonal exploitation of different environments. The striking burial ceremonialism of Early Woodland peoples was apparently not emphasized by Middle

Woodland groups, and by the end of the period, participation in trade networks also ceased (Power and Petersen 1984).

In conjunction with USACE, the National Park Service (NPS) conducted a reconnaissance archaeological survey of seven flood control areas in Vermont (Salwan and Cousins 1964). The report details the location and surface characteristics of archaeological sites of Pre-Contact and historic significance and an evaluation of these sites within the following reservoir areas: Victory, Gaysville, and the Connecticut River drainage on the west side of the Connecticut River, plus minor Local Protection Projects, including Waterbury, Rutland, and Roaring Branch of Bennington. The results of the survey were largely negative. None of the areas surveyed yielded evidence of Pre-Contact Period materials, or even individual artifacts, and only one—"The Island" in the Connecticut River drainage area —contained significant historical materials. The report provided summaries of the field surveys in each water control area and an account of the colonial materials at The Island site, which represents an early example of an eighteen-century village in the Connecticut River Valley of Vermont (Salwan and Cousins 1964).

The Connecticut River Valley archaeological record extends as far back as 12,000 years ago (Hemmings 1985). The Connecticut River, the stem of New England's major drainage system, flows about 360 miles from the Canadian border to Long Island Sound (Jahns 1947). More than 190 miles of river border the states of Vermont and New Hampshire and were heavily utilized as an important route of travel and a dominant feature of the landscape throughout the Pre-Contact and historic periods (Wikoff 1985). During exploration and settlement of the Upper Connecticut Valley, two sections of river and floodplain (the adjoining meadows, subject to flooding each year or two) were well distinguished in travelers' accounts and early maps. These were the Upper or Great Coos Intervales, near modern Lunenburg, Vermont, and the Lower or Little Coos Intervales near Newbury. The Abenaki word Coos meant "place of white pines", and the term intervale referred to meadows cleared of trees, presumably the result of Native American agricultural methods. At Upper and Lower Coos the river meanders across a relatively broad fertile floodplain, more than a mile wide at many points. At Newbury, in the Lower Coos, the river makes a sweeping bend, some two miles in length, called the Great Oxbow (Hemmings 1985).

Hemmings (1985) conducted an archaeological survey of the banks of the Connecticut River from Moore Dam near Lower Waterford in Caledonia County to Wilder Dam at Hartford in Windsor County, spanning approximately 65 miles. The goal of the survey was to locate and record Pre-Contact and historic period sites along the riverbank. Excavations were conducted at four previously identified sites to evaluate their extent, preservation, and significance (Hemmings 1985, 16). Testing identified the presence of a shallow, buried, occupation zone which yielded Woodland Period ceramics, triangular Levanna arrowpoints, flint flakes, and sparse charcoal. One of the sites contained many substantial stone foundation blocks of a nineteenth century farm building. A number of quartzite flakes, fire-cracked rock fragments, and historic artifacts were recovered in 30-80 cm of silt and sand above bedrock. The survey also recorded and investigated seven previously unidentified sites, the majority of which represent a Woodland Period occupation (Hemmings 1985, 21).

Dowd and Trubitt (1990) assessed the archaeological potential of Mad River Valley and evaluated several sites within the towns of Warren, Waitsfield, Fayston. The survey investigated two previously identified Pre-Contact Period sites and identified and recorded five historic sites (Dowd and Trubitt 1990, 14). Located in central Vermont, the Mad River Valley contains a serpentine, sometimes turbulent river bordered by steep mountains. The valley's topographic boundaries make it an ideal geographic unit for the study of both Euro-American and Native American settlement. Mad River Valley is rich in archaeological resources ranging from those created by early hunter-gatherer and later horticultural Native American populations who settled the valley, to colonial and early industrial developments following European and Euro-American settlement (Dowd and Trubitt 1990, 49).

The Mad River floodplain is an area with high potential for Pre-Contact Period sites (Farley et al. 1988). In the floodplain, upper alluvial sediments are of recent origin, the result of accelerated soil erosion and deposition brought about by manmade changes to the landscape during historic times, such as lumbering and agricultural activities. These upper layers of the floodplain are thus not expected to contain primary deposition; however, based upon the ages of nearby floodplains and on the relationships between archaeological remains and geography in western Vermont and eastern New York, Pre-Contact archaeological deposits may be buried by up to two to three meters of recent sediments (Dowd and Trubitt 1990, 61).

In 1987, Middlebury College and the Sheldon Museum conducted an archaeological study of eighteenth and nineteenth century Addison County, specifically the Middlebury and Shoreham township areas. The goal of the survey was to record and describe the temporal and spatial changes in settlement patterns and community development for Middlebury and Shoreham. The study defined areas where historic resources are threatened, identified several threatened archaeological properties, compiled specific historic documentation, and conducted preliminary site surveys (Andrews 1987).

In 1995, the U.S. Department of Transportation (USDOT), in partnership with the U.S. Federal Highway Administration and the Vermont Agency of Transportation (VAOT), released a Draft Supplemental Environmental Impact Statement (EIS) for the Champlain Park Way Project. The project would involve the construction of approximately 2.5 miles of highway known as the Southern Connector/Champlain Park Way, commencing at the interchange of 1-189 with Shelburne Street (US Route 7), and extending westerly and northerly to the intersection of Battery and Main streets in the Central Business District of Burlington, Vermont (USDOT 1995).

A cultural resources survey was conducted for the project in 1977 and determined that the proposed construction would have no effect on any significant archaeological resources, provided that the project be relocated away from the Pine Street Barge Canal, a National Register-eligible historic property. This survey also determined that the National Register-listed Battery Street-King Street Neighborhood Historic District would not be impacted by the proposed widening of Battery Street, to which the VTSHPO and ACHP concurred in 1978. Archaeologists surveyed the area between Battery and Batchelor Streets, the Potash Brook

area, and two nearby tributaries and determined that the proposed project would have no effect on Pre-Contact Period resources. While the VTSHPO concurred with this effects determination, concerns were raised about the haul roads, waste and fill areas to be used in the construction of this project (USDOT 1995).

In 2001, the University of Vermont Consulting Archaeology Program (UVM CAP) completed an assessment of archaeological research conducted for the proposed Chittenden County Circumferential Highway (CCCH) on behalf of the Vermont Agency of Transportation (VAOT). From 1984-2000, UVM CAP completed Phase I site identification surveys, Phase II site evaluations, and Phase III data recovery studies related to various alignments and segments of the CCCH corridor. These investigations identified 79 Pre-Contact Period sites, ultimately amassing one of the largest assemblages of Pre-Contact sites ever studied as a result of a single highway or development project in northern New England (Thomas 2001, 1).

The archaeological studies conducted for the CCCH constitute the largest archaeological project ever undertaken in Vermont. The CCCH sites represent all periods of Native American occupation in Vermont—Paleoindian, Archaic and Woodland. The sites provide an opportunity for the study of archaeological resources in a variety of environments, as they range from small hunting, provisioning and special purpose extractive camps to Late Woodland fall-winter base camps, to the largest Paleoindian summer base camp in New England. The 23 Pre-Contact sites in the eastern section of the final alignment represent multiple occupations that occurred over a 10,000-11,000 year period, yielding irreplaceable information about some 500 generations of Native American life and culture in Chittenden County and providing tangible links to how people lived in Vermont since the end of the Ice Age. The contributions that data from these sites have made to our understanding of cultural chronology, settlement systems, lithic technology, environment, trade and long distance interaction (Thomas 2001, 153).

The review of archaeological literature reveals evidence of Pre-Contact Period occupation along lake shores throughout Vermont. While a complete inventory of cultural resources in the Study Area was not completed as part of this investigation, this review of previous investigations across the State of Vermont was carried out to provide a context for an archaeological sensitivity assessment and to summarize the general trends and settlement patterns evidenced by available archaeological site data collected throughout the state. Previous archaeological investigations and regional settlement pattern studies indicate that in the Lake Champlain Basin, and elsewhere in Vermont, areas closest to wetlands, lakes, streams, and rivers provided access to diverse fisheries, contained fertile floodplain soils suitable for horticulture, and provided contact points for long distance traders (Thomas 2001, 20). Archaeological site sensitivity modeling suggests these areas of high resource density exhibit at least a moderate site density for Late Archaic, Middle Woodland, and Late Woodland period occupations (Thomas 2001, 22). Areas within waterbodies or along the shorelines of waterbodies may exhibit archaeological sensitivity for Pre-Contact materials in areas where deposits are deeply buried, but their preservation tends to be affected by development, erosion, or burial as a result of natural hydraulic processes. Therefore, certain areas within the APE for proposed

measures are believed to be archaeologically sensitive and will require an assessment of impacts and an evaluation of the archaeological potential of historic properties. The VT SHPO has identified thousands of recorded archaeological sites in the Study Area. While a list of all recorded sites is currently unavailable, further review of the potential archaeological sensitivity of the APE for proposed measures is forthcoming. Due to the sensitive nature of site locational data, the specific locations of archaeological sites will not be reproduced as part of this Phase IA investigation.

3.4 Review of Historic Maps

A sequence of eighteenth- and nineteenth-century maps was inspected to establish a baseline for the discussion of the Study Area's archaeological and historic sensitivity. The review of late-eighteenth century maps suggests that while the southern counties of Vermont – Addison, Bennington, Rutland, and Windsor – had established boundaries, the northern portion of Vermont remained largely unsettled (Figures 3 and 4). Background research indicates the Study Area was sparsely settled until the late nineteenth century, with much of the area remaining agricultural or forested. The maps shed light on the degree to which the Pre-Contact landscape might have been disturbed by historic and modern development, as well as how modern development may have altered the types and locations of historic archaeological remains that may be present within the project APE.

The review of historic maps and aerial photography indicated that much of the Study Area remained undeveloped until the mid-nineteenth century (Figures 5 and 6). Maps of the entire state provide few details on the sparsity of population at this time, as they merely provide the early layout of town and county boundaries rather than the extent of settlement or the relativity density of each geographic area. Figure 7 illustrates the expansion of railroads into Vermont and shows the settlement of several additional towns located along the railroad lines, suggesting demographic growth and an increase in the development of these areas. However, county-wide maps produce much more refined results (Figures 8 and 9).

An 1856 map of Windham County, located along Vermont's southern border, provides a clear example of mid-nineteenth century settlement patterns in this portion of the state (Figure 8). Windham County was well populated at this time, with a larger portion of Windham County residents inhabiting the western portion of the county and settling along the Connecticut River. Windham County, situated in such proximity to Massachusetts, Connecticut and the rest of New England, likely experienced more commercial and industrial development compared to more remote portions of the state. An 1858 map of Caledonia County in northern Vermont reveals an area that was predominantly agricultural (Figure 9). Although Caledonia County is also located along the Connecticut River, it is significantly less populated than Windham County and the towns were much sparser and larger in area, possibly due to being further north and therefore further removed from economic activities downriver.

Unlike other parts of the Northeast, rapid development, settlement expansion, or demographic growth did not occur in Vermont in abundance in the twentieth century. The

landscape of much of the state remains much the same as they did in the late nineteenth century, when agricultural, commercial, and industrial activities reached their peak. Based on the availability of historic maps, it does not appear that significant settlement occurred along lake shores in Vermont. By the mid-twentieth century, much of the remaining farmland had given way to recreational and residential development. Very few densely settled residential areas or industrial-scale commercial areas exist in Vermont. The Study Area remains largely rural, residential, and agricultural, primary fulfilling the roles of tourism and recreation that Vermont has become well known for.

The historical maps show relatively little evidence for historical or modern disturbances along the shorelines of waterbodies. Additionally, twentieth-century aerial photography does not indicate any large-scale construction that would result in significant disturbance to waterbodies throughout the state. Therefore, it is unlikely that any impacts or disturbances to waterbodies or their shorelines have undermined the integrity of potential historical or Pre-Contact archaeological remains that may be present. Any potential impacts or disturbances are largely limited to construction of residential structures, camps, and recreational facilities. In general, any previously unidentified Pre-Contact and historic archaeological resources along such lakes may remain undisturbed. A more detailed review will be conducted once a plan is selected.

Historic topographic maps reviewed included those prepared by the USGS and made available via topoView online: Glens Falls, NY, 1950, scale 1:250000; Groveton, NH, 1986, scale 1:100000; Lake Champlain, 1950, scale 1:250000; Lewiston, ME, 1956, scale 1:1250000; Montpelier, 1988, scale 1:100000. Larger maps were needed to cover the extent of the entire Study Area. Smaller-scale maps will be reviewed for specific areas as exact measures are proposed. Historic aerial imagery reviewed included photography made available by the USGS via Earth Explorer online.

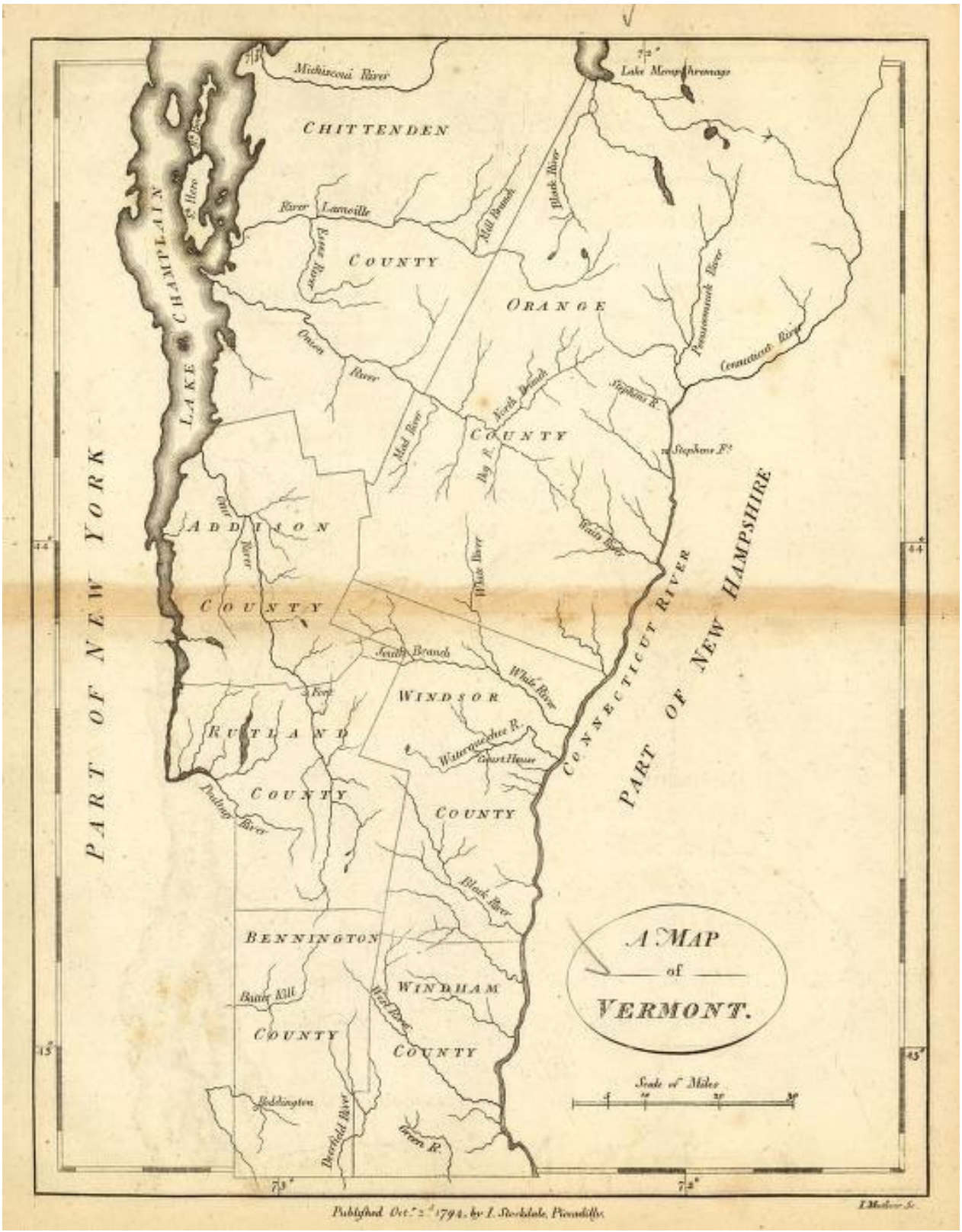


Figure 3: “A Map of Vermont” by Stockdale and Morse (1794). Map courtesy of the Library of Congress.

Figure 4: “Vermont” by Sotzmann, Bohn, and Schmidt (1796). Map courtesy of the Library of Congress.

Figure 5: “Vermont, from Actual Survey” by Doolittle, A. & Lewis, S. (1810). Map courtesy of the Library of Congress.

Figure 6: “Vermont” by F. Lucas (1826). Map courtesy of the Library of Congress.

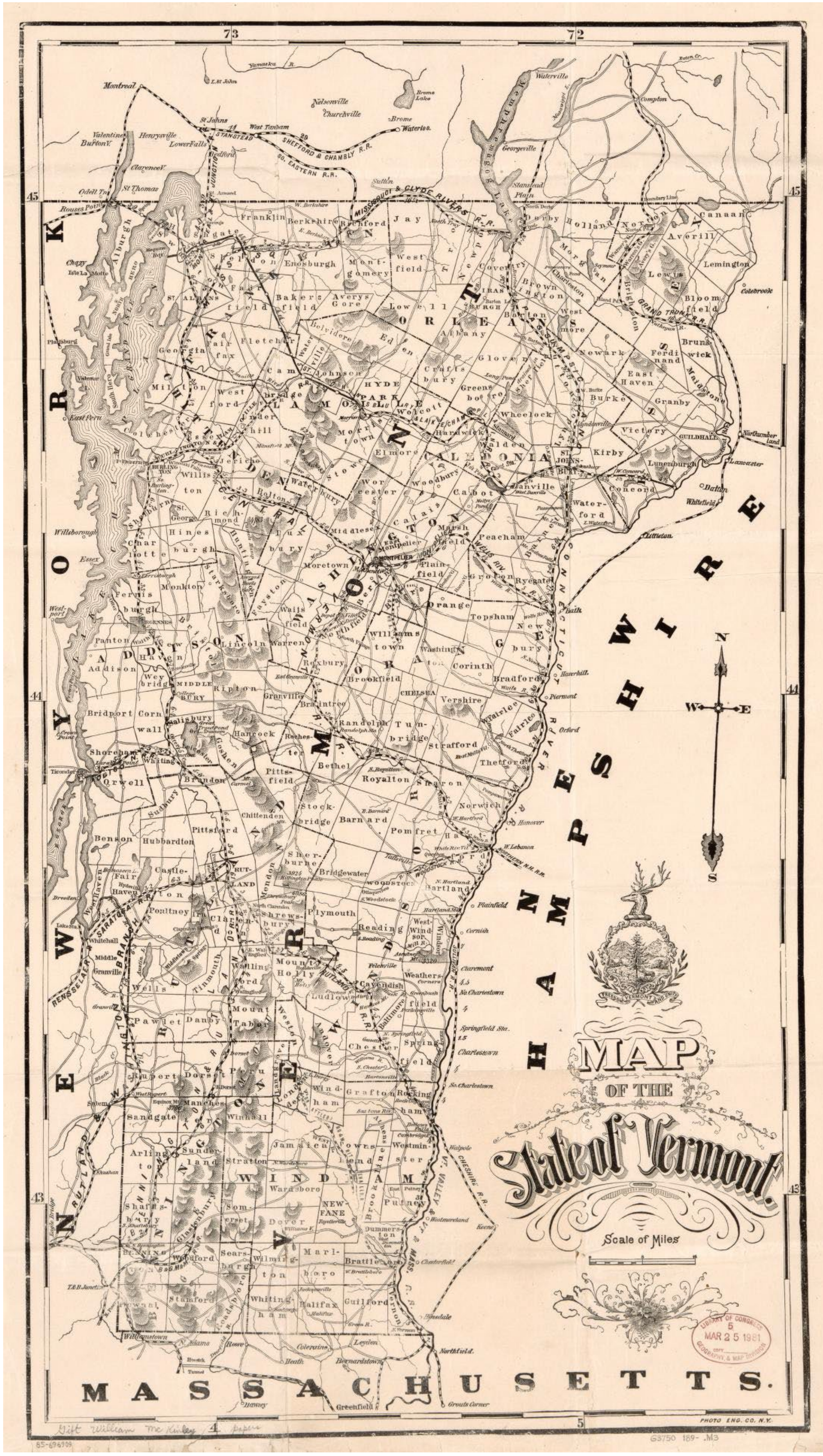


Figure 7: “Map of the State of Vermont” by the Photo Engraving Company (1890). Map courtesy of the Library of Congress.

Figure 8: "McClellan's Map of Windham County, Vermont" by C. McClellan and Company and J. Chace (1856). Map courtesy of the Library of Congress.

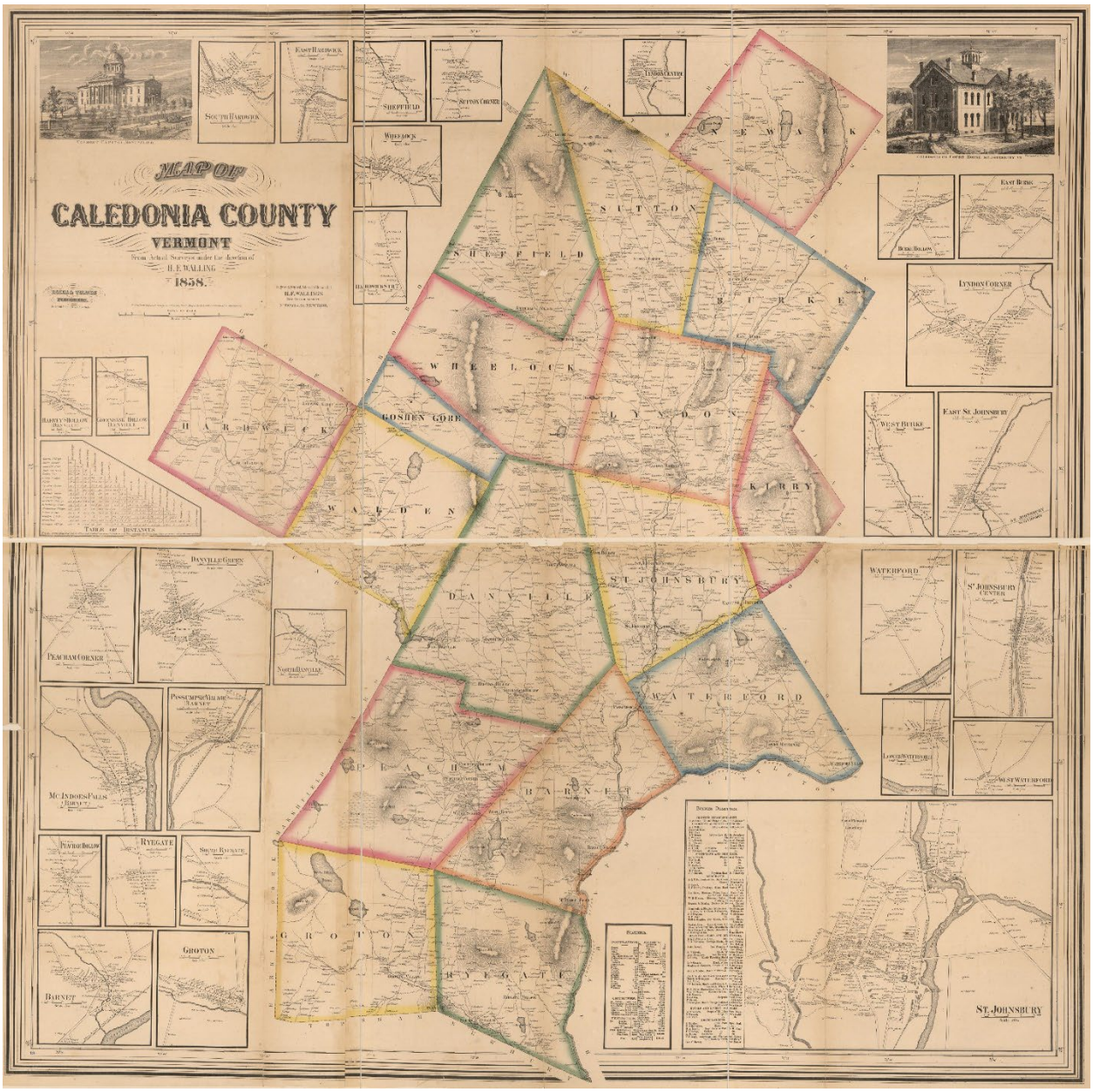


Figure 9: “Map of Caledonia County, Vermont” by H. F. Walling (1858). Map courtesy of the Library of Congress.

4. Cultural Contexts

4.1 Prehistoric Context

During the Wisconsin glaciation, New England was covered by the Laurentide glacier, which in Vermont began to retreat and melt about 13,000 years ago. Meltwater formed large lakes in the Champlain and Connecticut valleys, termed Lake Vermont and Lake Hitchcock, respectively, as well as smaller lakes in the upland valleys between them. These lakes had relatively low biotic productivity and little in the way of edible resources to attract early inhabitants. Around 12,500 years ago, glacial ice had moved north of the St. Lawrence Valley, releasing the waters of Lake Vermont. A series of landscape adjustments occurred, accommodating shifts in lake level, rises in surfaces by geologic rebounding and the formation of present drainage patterns (Dowd and Trubitt 1990). Rising sea levels from the increased meltwater caused flooding in the St. Lawrence and Champlain valleys and created a marine Champlain Sea which reached its maximum extent about 12,000 years ago. It is after this date that prehistoric people first began to venture north into Vermont.

Native Americans inhabited what is now Vermont for thousands of years prior to Euroamerican settlement. At the time of contact, bands of western Abenakis lived throughout Vermont. Our knowledge of Abenakis comes from ethnohistoric records of early chroniclers and settlers and from archaeological investigations, but information about earlier Native American groups must be gleaned solely through archaeological methods (Haviland and Power 1981; Dowd and Trubitt 1990).

The Paleo-Indian period (10,000 - 7,500 B.C.) in Vermont is known mainly by isolated finds of distinctive fluted projectile points. Paleo-Indian point finds in the Champlain Valley appear to have strong associations with the Champlain Sea (Loring 1980). A fluted point found in the project area, known as the "Moretown point" (Fowler 1954), provides direct evidence for the presence of Paleo-Indians in the Mad River Valley (Dowd and Trubitt 1990). The best-known Paleo-Indian site in Vermont is the Reagen Site, located on a bluff above the Missisquoi River in the Champlain Valley. Chert, rhyolite, and jasper flakes and tools were found at the Reagen Site, along with charcoal and fire-cracked rock in hearth features. Both fluted and nonfluted projectile points were recovered, with the nonfluted points resembling late Paleo-Indian Piano points found in the western United States. Although no radiocarbon dates were obtained from this site, Haviland and Power (1981) estimate that the Reagen site may date to 10,000 years ago. The environment at this time was a park-tundra environment with scattered growths of spruce, fir, larch, and birch that would have supported fauna such as caribou and mastodon. The marine resources of the Champlain Sea may also have acted as an attraction for Paleo-Indian groups (Dowd and Trubitt 1990).

Little information exists on the time between the Paleo-Indian period and the Late Archaic period in Vermont. Researchers are unsure if continuous occupation from the Paleo-Indian Period into the Early and Middle Archaic Periods occurred in Vermont, or whether the area was depopulated between about 9,500-7,000 years ago in what is known as the

population hiatus hypothesis. Haviland and Power (1981) suggest that Paleo-Indian populations followed the marine resources north and east after the decline of the Champlain Sea around 9,500 years ago. In addition, environmental changes caused lowered productivity and diversity in forests, and extinctions of mammals such as the mastodon after about 9,000 years ago. However, Thomas (1980) notes that points similar in style to those found in the Early and Middle Archaic in southern New England are found in collections from Vermont, so this time period in Vermont requires further exploration (Dowd and Trubitt 1990).

About 7,000 years ago, the climate in Vermont became slightly warmer and dryer, with forests characterized by more hardwood and nut trees. The Late Archaic period (6,000 to 3,000 years ago) was a time of reoccupation or increased occupation of the region. This period in Vermont is best known by sites such as Ketcham's Island on Otter Creek. This site, as well as others, belong to the Late Archaic period known as the Vergennes Archaic, which lasted from approximately 6,000 – 4,500 years ago. Artifacts recovered from these sites include chipped stone projectile points, ground slate points and atlatl weights, plummets, gouges, celts, and adzes, as well as structures and burial features. The tool assemblages indicate that the inhabitants engaged in hunting and processing of animal hides and meat, gathering of wild plant products and foods, fishing, and heavy woodworking. This hunting-gathering-fishing subsistence pattern established in the Archaic proved to be very successful and continued to form the basis of Native American subsistence in Vermont until historic times (Dowd and Trubitt 1990).

In the succeeding Woodland period (3,000 to 400 years ago), the hunting-fishing-gathering subsistence pattern continued, but was supplemented with maize (corn) cultivation 1,000 years ago. Technological innovations marking this period include pottery and the bow and arrow. The Early Woodland period is known primarily by data from cemetery sites rather than from habitation sites in Vermont. A continuation of midwestern influences on burial treatment is seen in the presence of cremation burials, use of red ochre, and Adena-type artifacts included with the interments. Many of the artifacts found are made of non-local raw materials, including copper from the Lake Superior area, stone from New York and Ohio, and shell from the Atlantic Ocean, indicating interaction with other groups. Adena-type points are found on these Early Woodland sites, made both from local and non-local stone (Dowd and Trubitt 1990).

The best known Middle Woodland period site in Vermont is the Winooski Site, a large habitation site located on a floodplain near Burlington (Power and Peterson 1984). This site exhibits access to both marine and terrestrial resources and suggests two major occupations – the first dating to A.D. 60-350, with the later, more intensive occupation dating to A.D. 500-1000, based on the pottery types recovered. Although the Haudenosaunee began practicing corn-beans-squash by A.D. 1100, corn horticulture is not found in Vermont until later. The Late Woodland Donohue site, dating from A.D. 1470 to the seventeenth century, has evidence of corn horticulture; corn cobs and fragments were found in the floral samples from the site, and large globular storage pits were found at this site. However, corn horticulture in Vermont was more of a dietary addition and did not instill radical change in subsistence, as hunting-fishing-

gathering subsistence patterns continued. During the Middle and Late Woodland periods, in addition to small special purpose camp sites, there were large village sites, suggesting larger population aggregates than previous periods (Dowd and Trubitt 1990).

4.2 Historic Context

In 1609, when the French explore Samuel de Champlain became the first recorded European to visit Vermont (and the lake that would soon bear his name), he encountered Mohawk, Mohican, and Abenaki inhabitants. The Abenaki maintained settlements at present-day Swanton, in the Champlain islands, and along the Winooski and Connecticut Rivers. The Abenaki lived in large, palisaded villages and practiced corn horticulture supplemented heavily by hunting, gathering, and fishing. The seasonal round consisted of wintering in the villages, followed in early spring by dispersal of small family groups to the upland hunting territories for hunting. Spring was the time for maple sugaring and fishing, and by late April or May people again congregated in the villages for the planting of corn. During the summer the fields were tended and some fishing and hunting took place. In the late summer, green corn was harvested, and nuts, acorns and berries were collected. The fall was again a time of movement to upland hunting camps to hunt deer, moose, and furbearing mammals before wintering in the villages (Dowd and Trubitt 1990).

At the time of Champlain's 1609 journey, there were two aboriginal groups who spoke Eastern Algonquian languages living in what is now Vermont. The Mahicans, whose home territory was the upper Hudson drainage, occupied the southwestern portion of the state; the Western Abenakis, whose language is distinguished from that of Eastern Abenakis on the basis of phonology, grammar and lexicon (Day 1978, 148; Haviland and Power 1981, 3-6), occupied the rest of Vermont. Western Abenakis included the Missisquoi band and other bands located on the major rivers in western Vermont, the Cowasucks of the upper Connecticut River, the Sokokis of the middle Connecticut River and the Penacooks and Winnipesaukees of the upper Merrimack River. At the time of earliest Indian-European contact, generally designated as 1609 in Vermont, each of the major Abenaki bands was associated with a sizeable village - usually situated on bluffs close to water and nearby bottomlands suitable for corn agriculture. The earliest known villages were palisaded for defense purposes (Day 1978: 149, 153). Population estimates for the villages vary; a Sokoki village in the middle Connecticut Valley may have included 500 people (Thomas and Robinson 1979), while about 300 may have occupied the Missisquoi village, according to a mid-eighteenth century reference (Day 1981).

Champlain initiated an alliance between the Abenaki and the French, which was meant to undermine the Iroquois Confederacy’s alliance with the British. This intervention in local politics was ultimately responsible for the warlike relations that were to pit the Iroquois against the French for generations. Champlain was followed by missionaries, traders, settlers, and soldiers who identified rivers and other physical features of the Champlain watershed. Although trading posts and forts were established by the Europeans in the seventeenth century, it was only in the second half of the eighteenth century that significant numbers of Euro-American settlers came into Vermont. Despite control of the strategic and fertile Lake Champlain Basin,

the French were primarily involved in the fur trade and gave less attention to colonization and settlement than the British. Vermont attracted few European settlers in the seventeenth and eighteenth centuries. By 1755, all of New France contained only 75,000 settlers, compared to British America's 1.5 million (Duffy et. al 2003, 5). At that time, however, native populations had been decimated by a series of epidemics, especially smallpox epidemics, which took their toll throughout the seventeenth and early eighteenth centuries. The fur trading industry also served to disrupt native culture by making people dependent on European goods and by involving the Abenaki in trade wars between the French and English. By the mid-1700s, the fur trade had exhausted the supply of furbearing mammals in Vermont, and sale of land by Abenakis opened the way to European settlement of the territory (Dowd and Trubitt 1990).

The French and Indian War (1754-1763) was the final British-French contest for the North American empire and ended with a British victory that gave them sovereignty over what was to become Vermont, a lightly settled frontier region saddled with conflicting claims fueled by inaccurate maps supporting various royal charters. By the time the war ended with the Treaty of Paris in 1763, both New York and New Hampshire were issuing patents and land grants in present-day Vermont that often conflicted and overlapped with each other. In 1777, following a series of conventions, delegates for the residents of present-day Vermont – an area at the time known as New Connecticut – drafted a constitution and established a government for what became known as the State of Vermont. However, Congress did not recognize Vermont's statehood until 1791 after Vermont paid $30,000 to New York to settle land disputes.

Vermont became the fourteenth U.S. state on March 9th, 1791 and the first state with no border along the Atlantic Ocean. Western Vermont depended on trade with Canada through Lake Champlain, while eastern Vermont depended on the Connecticut River as its principal commercial artery and aligned with the economic interests of New Hampshire and the rest of New England. The early nineteenth century saw a rise in population and economic growth, particularly in agriculture and lumber. Sheep farming made way for wool production and woolen mills as a vital source of revenue. Dairy farming became a major economic pursuit that continues today, shaping the state's economy and landscape. Shipping milk, cream, cheese, and butter by railroad broadened Vermont farmers' marketing opportunities.

By the late nineteenth century, hundreds of miles of railroad tracks crossed the state as a link between the Great Lakes Basin and the Atlantic seaports, bringing increased demographic growth. The twentieth century brought about an increased focus on tourism and recreation in Vermont, inspiring recurring efforts to stimulate the state's economy. During the 1930s, Vermont hosted a large number of Civilian Conservation Corps (CCC) camps which built mountain roads and state parks, carved out early ski trails, and helped construct dams. While Vermont's landscape lacked the ruggedness and grandeur associated with the Adirondack and White Mountains, its pastoral qualities were unmatched and became the focus of government promotion, particularly during the summertime. The popularity of skiing after World War II owed much of its success to the arrival of the interstate highway system, converting Vermont's recreation industry from summertime to year-round activities.

The 1970 census was the first since 1810 to record more than a 10% increase in state population, with the 1980 census showing even more rapid growth (Duffy et. al 2003, 10). More recently, efforts have been made to retain Vermont's pastoral landscape by encouraging the preservation of much-heralded – yet rapidly disappearing – green pastures. Maple sugar operations are one of the leading industries in Vermont today.

5. Existing Conditions

5.1 Cultural Resources Inventory

Cultural resources include buildings, structures, objects, districts, Pre-Contact and historic archaeological sites, locations of important historic events that lack material evidence of those events, and landscapes that convey cultural or traditional importance to social and ethnic groups. Tables listing the recorded historic properties within the Study Area according to the current NJHPO database are presented as follows:

Table 2 – National Historic Landmarks (NHLs) in the Study Area
Table 3 - SRHP Historic Districts in the Study Area

The Vermont Archaeological Inventory (VAI) lists approximately 5,000 archaeological sites in the state of Vermont. Since 1966, more than 12,000 buildings, structures, sites, and districts in Vermont have been nominated and listed to the National Register of Historic Places (NRHP) and the Vermont State Register of Historic Places (SRHP). A total of 898 historic properties in Vermont are NRHP-listed (NPS 2025). More than 30,000 historic and architectural properties have been surveyed and added to the state's inventory. As of 2014, a total of 18 historic properties in Vermont have been designated National Historic Landmarks (NHLs) (Table 2).

Currently, 368 historic districts in Vermont are SRHP-listed (Figure 10). The locational data for any historic district or property that has yet to be evaluated for NRHP or SRHP eligibility is not available at this time. Specific resource data will need to be consulted at a later date once plans are established to determine the level of impact and potential for adverse effects. Due to the sensitive nature of archaeological sites, no locational data is reproduced here.

According to the National Oceanic and Atmospheric Administration (NOAA) Office of Coast Survey's Electronic Navigational Charts (ENC) shipwreck database, there are currently 34 recorded submerged shipwrecks within 1,000 meters of the Study Area (NOAA 2025). All recorded submerged shipwrecks in the Study Area are located in Lake Champlain (Table 4). For any potential control measures anticipated for Lake Champlain, further investigation will be required to evaluate potential adverse impacts to shipwrecks that may be determined NRHP eligible.

There are a total of 826 recorded lakes in the Study Area (VTDEC 2025). While a list of lakes that will potentially receive APC treatment measures has not been developed, several SRHP districts are located on or adjacent to one of several lakes throughout Vermont.

Table 2 – National Historic Landmarks (NHLs) in the Study Area

Name of NHL	County	Nearby Waterbodies
Brown Bridge	Rutland	None
Calvin Coolidge Homestead District	Windsor	None
Robert Frost Farm	Addison	None
George Perkins Marsh Boyhood Home	Windsor	None
Justin S. Morrill Homestead	Orange	None
Mount Independence	Addison	Lake Champlain
Rudyard Kipling House	Windham	None
Robbins and Lawrence Armory and Machine Shop	Windsor	Connecticut River
Rockingham Meeting House	Windham	None
Rokeby	Addison	None
Round Church	Chittenden	None
Shelburne Farms	Chittenden	Lake Champlain
Socialist Labor Party Hall	Washington	None
St. Johnsbury Athenaeum	Caledonia	None
Stellafane Observatory	Windsor	None
Ticonderoga Steamboat	Chittenden	None
Vermont Statehouse	Washington	None
Emma Willard House	Addison	None

Table 3 – SRHP Historic Districts in the Study Area

District Name	County
Albert Martell Place	Chittenden
Alburgh Springs Center Historic District	Grand Isle
Allenwood	Chittenden
Apple Barns Historic District	Rutland
Ascutney Mill Dam Historic District	Windsor
Aspenhurst Historic District	Orleans
Avalon Beach Historic District	Rutland
Baptist Corners Historic District	Chittenden
Barber Farm	Chittenden
Barre Camp Historic District	Chittenden
Barre Downtown Historic District	Washington
Barre Street Granite District	Washington
Bayley Historic District Historic District	Orange
Bellows Falls Historic District	Windham
Belmont Historic District	Rutland
Benson Village Historic District	Rutland
Berkshire Center Historic District	Franklin

Berlin Corner Historic District	Washington
Bickford-Phillips Farm	Chittenden
Binghamville Historic District	Franklin
Boltonville Historic District	Orange
Bonnet Street Historic District	Bennington
Bordoville Village Historic District	Franklin
Bostwick Farm	Chittenden
Brick District	Chittenden
Brick Row Historic District	Bennington
Bridge Street Historic District	Chittenden
Bridport Historic District	Addison
Bristol Downtown Historic District	Addison
Bristol Village Historic District	Addison
Brown Ledge Camp	Chittenden
Brownsville Historic District	Windsor
Bryan Farm	Chittenden
Bucklin Estate	Chittenden
Bushey Farm	Chittenden
Buttles-Brewster Farm	Chittenden
Cabot Village Historic District	Washington
Cambridge Borough Historic District	Lamoille
Camp Rich	Chittenden
Canal St/Clark St Neighborhood Historic District	Windham
Castleton Corners Residential District	Rutland
Cavendish Village Historic District	Windsor
Cedar Beach Historic District	Chittenden
Center Rutland Historic District	Rutland
Central Street Historic District	Chittenden
Cephas Kent Tavern Historic District	Bennington
Champlain Valley Fair Grounds	Chittenden
Chapman Farm	Chittenden
Charlotte Center Historic District	Chittenden
Checkerberry Green Historic District	Chittenden
Chester Depot Historic District	Windsor
Chester Main Street Historic District	Windsor
Chittenden Village Historic District	Rutland
Church Lane Historic District	Chittenden
Church Street Historic District	Rutland
Church Street Historic District	Rutland
Church Street Historic District	Rutland
Church Street Historic District	Chittenden
Clarendon Springs Historic District	Rutland

Clarendon Village Historic District	Rutland
Clark Farm	Chittenden
Clark Summer Residence	Chittenden
Colbyville Historic District	Washington
Colchester Village Historic District	Chittenden
Commercial Center Historic District	Chittenden
Conant Square - Pearl Street Historic District	Rutland
Cookeville Historic District	Orange
Corinth Center Historic District	Orange
Cornwall Village Historic District	Addison
Cottage Complex off Harbor Road	Chittenden
Court Square Historic District	Windsor
Court Street Historic District	Addison
Craftsbury Common Historic District	Orleans
Craftsbury Village Historic District	Orleans
Crescent St. Historic District	Washington
Crystal Haven Historic District	Rutland
Cuttingsville Village Historic District	Rutland
Day Farms Historic District	Windsor
Depot Square Historic District	Windsor
Depot Square Historic District	Washington
Devino Farm	Chittenden
Dorset Village Green Historic District	Bennington
Downtown Richford Historic District	Franklin
Dublin Corner Historic District	Orange
Duvino Farm	Chittenden
E.B. & A.C. Whiting Co. Complex	Chittenden
East Alburgh Historic District	Grand Isle
East Barre Historic District	Washington
East Berkshire Historic District	Franklin
East Brookfield Historic District	Orange
East Calais Historic District	Washington
East Corinth Historic District	Orange
East Craftsbury Historic District	Chittenden
East Franklin Historic District	Franklin
East Granville Historic District	Addison
East Hardwick Historic District	Caledonia
East Middlebury Village Historic District	Addison
East Montpelier Village Historic District	Washington
East Randolph Historic District	Orange
East Richford Historic District	Franklin
East Topsham Historic District	Orange

East Wallingford Village Historic District	Rutland
Eastern Lakeside Historic District	Rutland
Eden Historic Camp District	Lamoille
Eden Mills Historic District	Lamoille
Elizabeth Mine	Orange
Elm Street Historic District	Addison
Enosburg Falls Downtown Historic District	Franklin
Enosburg Falls Historic Railroad District	Franklin
Enosburg Falls Orchard St/N Main St Historic District	Franklin
Essex Center Historic District	Chittenden
Essex Tree Farm	Chittenden
Fair Haven Historic District	Rutland
Fairfax Village Historic District	Franklin
Fairfield Center Historic District	Franklin
Fairlee Village Historic District	Orange
Farnham-Atkinson Historic District	Orange
Fellows Gear Shaper Housing Complex	Windsor
Fletcher Center Historic District	Franklin
Fletcher Company Village	Washington
Florence Historic District	Rutland
Fontaine Farm	Chittenden
Four Corners Historic District	Chittenden
Foxville Historic District	Windsor
Francis LeClair Worker Houses	Chittenden
Franklin Village Historic District	Franklin
Georgia Center Historic District	Franklin
Georgia Plain Historic District	Franklin
Grafton Historic District	Windham
Grahamsville Historic District	Windsor
Granite Street Historic District	Caledonia
Granville Village Historic District	Addison
Greatwood Campus of Goddard College	Washington
Green Bay Historic District	Rutland
Green Bay Historic District	Rutland
Green River Historic District	Windham
Greensboro Bend Historic District	Orleans
Greensboro Historic District	Orleans
Grey Rocks Farm	Chittenden
Hancock Village Historic District	Addison
Harbor Hide-A-Way	Chittenden
Hartland Three Corners Historic District	Windsor
Hathaway Point Camp Historic District	Franklin

Henry Carse Farm	Chittenden
Hinesburg Lower Village Historic District	Chittenden
Holden Historic District	Rutland
Holton and Kimball Hills Historic District	Chittenden
Hougtonville Historic District	Windham
Huntington Center Historic District	Chittenden
Hyde Park Historic District	Lamoille
Hydeville Historic District	Rutland
Jeffersonville Historic District	Lamoille
Jericho Corners	Chittenden
Jericho Corners	Chittenden
Jericho Depot Historic District	Chittenden
Johnson Historic District	Lamoille
Kent's Corner-Old West Church Historic District	Washington
Kirby Farm	Chittenden
Lincoln Street Historic District	Chittenden
Lincoln Village Historic District	Addison
Lincoln-Chestnut Street Historic District	Orange
Long Point Historic District	Addison
Lowell Lake Camps	Windham
Lower Cabot Historic District	Washington
Lower Graniteville Historic District	Washington
Lower Granville Historic District	Addison
Mackville Historic District	Caledonia
Main Street Historic District	Windham
Main Street Historic District	Windsor
Main Street Neighborhood Historic District	Addison
Manchester Center Historic District	Bennington
Manchester Depot Historic District	Bennington
Manchester Village Historic District	Bennington
Maple Corner Historic District	Washington
Maple Road Farm	Chittenden
Maple Street Historic District	Chittenden
Marble Street Historic District	Rutland
Marshfield Village Historic District	Washington
Maurice Brown Farm	Chittenden
Mechanicsville Historic District	Windham
Mechanicsville Historic District	Chittenden
Medical Center Hospital of Vermont Complex	Chittenden
Michniewich & Bishop Cottages	Chittenden
Middlesex Historic District	Washington
Middletown Springs Historic District	Rutland

Miles Farm	Chittenden
Mill Village Historic District	Washington
Milton Boro Historic District	Chittenden
Milton Falls Historic District	Chittenden
Monkton Ridge Historic District	Addison
Monktonboro Historic District	Addison
Montgomery Center Historic District	Franklin
Montgomery Road Historic District	Franklin
Montgomery Village Historic District	Franklin
Moscow Historic District	Lamoille
Mt. Philo Inn Complex	Chittenden
Neshobe Island Historic District	Rutland
New Haven Village Historic District	Addison
Newbury Village Historic District	Orange
North Calais Historic District	Washington
North Cove Historic District	Addison
North Ferrisburgh Historic District	Addison
North Ferrisburgh Historic District	Addison
North Hero Village	Grand Isle
North Hyde Park Historic District	Lamoille
North Main Street Historic District	Orange
North Main Street Historic District	Chittenden
North Manchester Center Historic District	Bennington
North Montpelier Historic District	Washington
North Pleasant Street Historic District	Addison
North Pownal Historic District	Bennington
North Shrewsbury Village Historic District	Rutland
North Winooski Avenue Bus Barns	Chittenden
Northfield Falls Village Historic District	Washington
Northwest Village Historic District	Rutland
Norwich Village Historic District	Windsor
Oak Street Historic District	Chittenden
Old Route 7 Historic District	Chittenden
Orwell Village Historic District	Addison
Oxbow Historic District	Orange
Panton Historic District	Addison
Park Street Historic District	Rutland
Park Street Historic District	Chittenden
Park-Central Streets Historic District	Orange
Patton Shore Historic District	Franklin
Pawlet Village Historic District	Rutland
Pearl Street Historic District	Chittenden

Peru Village Historic District	Bennington
Pioneer Mechanics' Shops	Chittenden
Pittsfield Village Historic District	Rutland
Pittsford Mills Historic District	Rutland
Plainfield Village Historic District	Washington
Plant & Griffith Lumber Co.	Chittenden
Pleasant Street Historic District	Chittenden
Point of Pines Historic District	Rutland
Pownal Center Historic District	Bennington
Proctor Village Historic District	Rutland
Proctorsville Historic District	Windsor
Prospect Point Historic District	Rutland
Putnamville Historic District	Washington
Putney Village Historic District	Windham
Quechee Village Historic District	Windsor
Randolph Ave. Historic District	Orange
Randolph Camp Historic District	Orleans
Ransomvale Farms Historic District	Rutland
Raymond Aube Farm	Chittenden
Redmond Farm	Chittenden
Rhodes Farm	Chittenden
Ripton Village Historic District	Addison
Riverside Greek Revival Complex	Chittenden
Rochester Village Green Historic District	Windsor
Rossiter Street Historic District	Rutland
Roxbury Village Historic District	Washington
Royalton Common Historic District	Windsor
Saberville Railroad Workers Historic District	Grand Isle
Salisbury Historic District	Addison
Sand Bar Historic District	Grand Isle
Sanderson Farm	Chittenden
School St. Neighborhood Historic District	Orange
School Street Historic District	Chittenden
School Street/Park Terrace Historic District	Chittenden
Seager-Dean Farms Historic District	Rutland
Seymour Historic District	Franklin
Shelburne Shipyard	Chittenden
Shelburne Village Historic District	Chittenden
Sheldon Creek Historic District	Franklin
Sheldon Springs Historic District	Franklin
Shoreham Village Historic District	Addison
Shrewsbury Center Historic District	Rutland

Smith Farm Historic District	Orange
Smithville Historic District	Windsor
South Barre Village Historic District	Washington
South Hero Village Center Historic District	Grand Isle
South Main Street Historic District	Addison
South Main to South Pleasant Historic District	Orange
South Main-Central St Historic District	Washington
South Newbury Historic District	Orange
South Randolph Village Historic District	Orange
South Shore Historic District	Orleans
South Strafford Village Historic District	Orange
South Street Historic District	Addison
South Tunbridge Village Historic District	Orange
South Wallingford Historic District	Rutland
South Woodbury Historic District	Washington
South Woodstock Historic District	Windsor
Southeastern Lakeside Historic District	Rutland
Southeastern Lakeside Historic District	Rutland
Spruce Gum Historic District	Rutland
St. Albans Bay Historic District #1	Franklin
St. Albans Bay Historic District #2	Franklin
St. Joseph's Church & Rectory	Chittenden
Starksboro Village Historic District	Addison
Sterling Mill Historic District	Lamoille
Stevens Mill Historic District	Chittenden
Stockbridge Common Historic District	Windsor
Stone Village Historic District	Windsor
Stowe Lower Village Historic District	Lamoille
Sumner Farr Farm	Chittenden
Swanton Village Historic District	Franklin
Swiss Host Motel and Village	Chittenden
The Lake Elmore East Historic Camp District	Lamoille
The Lake Elmore Historic District	Lamoille
The Lake Elmore West Historic Camp District	Lamoille
The Meadow Historic District	Washington
The Wolcott School Street Historic District	Chittenden
Thetford Center Historic District	Orange
Thetford Hill Historic District	Orange
Thompson Farm	Chittenden
Thompson's Point Historic District	Chittenden
Townshend Historic District	Windham
Tree Camps District	Windsor

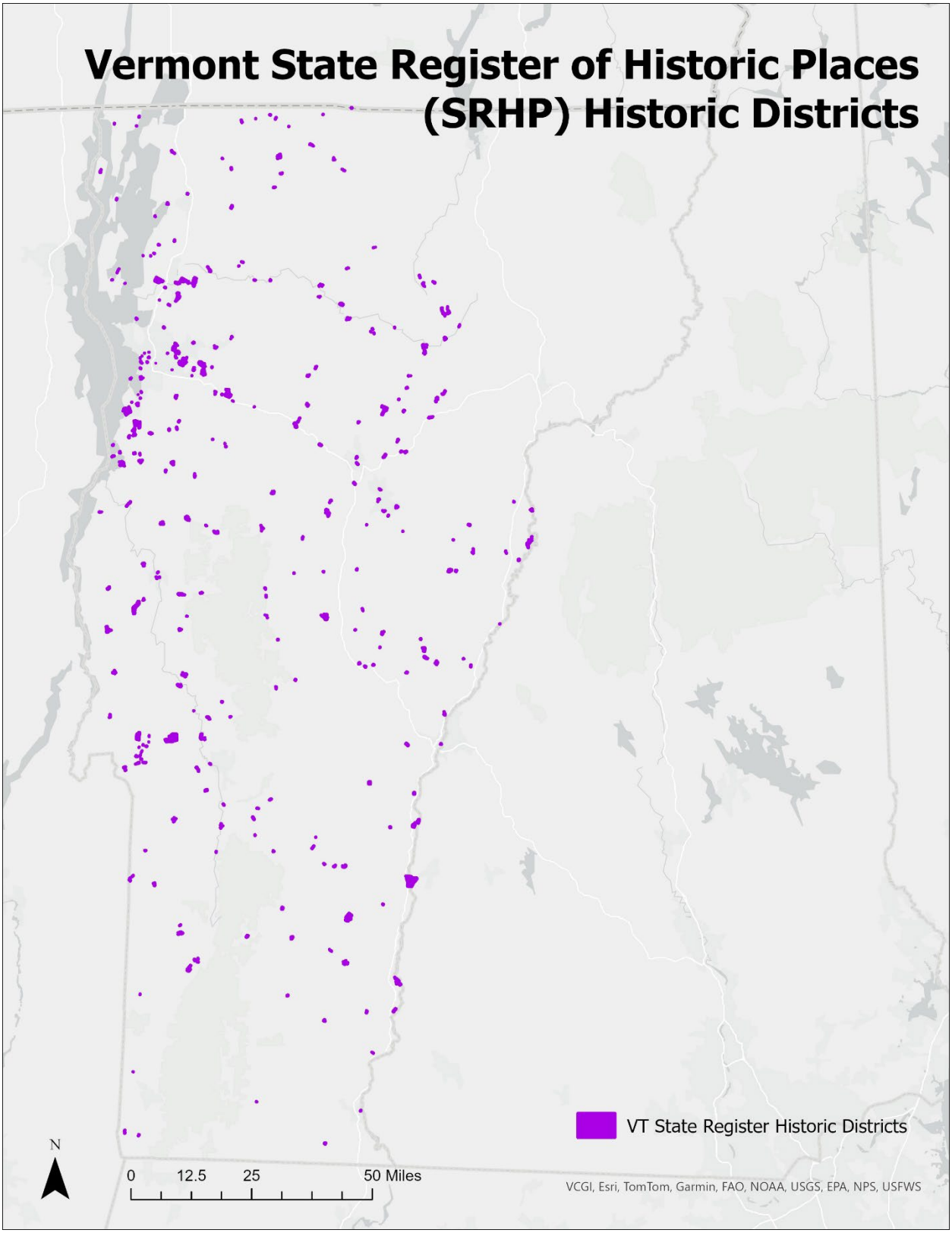
Tunbridge Village Historic District	Orange
Underhill Flats Historic District	Chittenden
Upper Graniteville Historic District	Orange
Upper Main Street Historic District	Windsor
UVM Redstone Campus	Chittenden
Venture Farm	Chittenden
Vergennes Residential Historic District	Addison
Vergennes West Main Street Historic District	Addison
Vermont Hardware Co.	Chittenden
Vermont Milk Chocolate Co.	Chittenden
Vermont Railway Inc.	Chittenden
Village Center District	Grand Isle
Vine Street Historic District	Washington
Virgin Avenue Historic District	Addison
Waits River Village Historic District	Orange
Waitsfield Village Historic District	Washington
Wakefield Farm Historic District	Chittenden
Wallingford Village Historic District	Rutland
Warren Village Historic District	Washington
Washington Village Historic District	Orange
Water Street Historic District	Windham
Waterbury Village Historic District	Washington
Waterbury Center Historic District	Washington
Waterbury Center- Village Park District	Washington
Water-Pleasant St Historic District	Washington
Weathersfield Bow Historic District	Windsor
Wells River Historic District	Orange
Wells Village Historic District	Rutland
West Arlington Green Historic District	Bennington
West Berkshire Historic District	Franklin
West Brookfield Historic District	Orange
West Castleton Slate Houses Historic District	Rutland
West Church Street Historic District	Caledonia
West Cornwall Historic District	Addison
West Cornwall Historic District	Addison
West End Montgomery Center Historic District	Franklin
West Enosburg Village Historic District	Franklin
West Kibbe Point Historic District	Grand Isle
West Lincoln Historic District	Addison
West Newbury Village Historic District	Orange
West Pawlet Village Historic District	Rutland
West Rutland Historic District	Rutland

Westminster Historic District	Windham
Westminster West Historic District	Windham
Weston Street Historic District	Orange
Weston Village Historic District	Windsor
Weybridge Hill Historic District	Addison
Whitcomb Farm	Chittenden
White River Junction Historic District	Windsor
Williams Street Historic District	Rutland
Williamstown Village Historic District	Orange
Wilmington Historic District	Windham
Windmill Motor Court	Chittenden
Winnimere Historic District	Orleans
Woodbury Center Village Historic District	Washington

Table 4: Recorded Shipwrecks in the Study Area

County	**Number of Wrecks**	**Location**
Addison	2	Lake Champlain
Chittenden	22	Lake Champlain
Grand Isle	5	Lake Champlain
Rutland	5	Lake Champlain
Total	34	

Figure 10: SRHP Historic Districts in the Study Area



6. Effects to Cultural Resources

In order to determine the program's effect to cultural resources at the programmatic level the District evaluated each measure to determine the potential for the undertaking to adversely affect cultural resources. Section 6.1 provides an overview of the alternative measures under consideration.

6.1 Alternative Evaluation

Alternative 1: No Change to Current Practice (No Action)

A No Action Alternative is required as part of this study. Alternative 1 represents a continuation of Vermont's current practice, in which USACE would not participate in expanding the APCP throughout the entire State. Since VTDEC currently manages several APCP measures throughout the Lake Champlain Basin, the potential to effect cultural resources may exist. However, given that Alternative 1 would only result in the continuation of current control measures which impose no potential for ground disturbance, and no additional measures would be implemented, the District has determined that Alternative 1 is unlikely to impact cultural resources. If potential adverse impacts are identified at any point during the continuation of current practices, additional investigation and consultation will be required in accordance with Section 106 of the NHPA.

Alternative 2 – Expanded APCP Cost Sharing Program (Proposed Action)

Alternative 2, the Proposed Action, consists of expanding the APCP throughout the entire State of Vermont. By sharing the costs of the expanded APCP, USACE and VTDEC would more effectively be able to implement the Program. The Proposed Action would include the use of mechanical control measures, watercraft inspection and decontamination stations, early detection and rapid response measures, drone surveys, eDNA sampling and detection, chemical control, as well as public awareness and education.

a) Measure 1 – Mechanical Control

Upon review of Measure 1, the District has determined, in accordance with NEPA and Section 106 of the NHPA, that the proposed activities are unlikely to adversely affect cultural resources. Since activities associated with hand harvesting, mechanical harvesting, and benthic matting are unlikely to result in ground disturbance and are expected to be temporary in nature, no adverse effects are anticipated for nearby historic properties, districts, or potentially intact archaeological resources that may exist in the APE.

At this time, the District is making a Determination of No Effect on cultural resources for Measure 1 as long as no ground disturbance occurs within previously undisturbed areas.

Additional consultation may be carried out with the relevant SHPO if this proposed measure has a potential to result in ground disturbance within previously undisturbed areas. In accordance with Section 106, the State of Vermont will initiate further consultation with the appropriate SHPOs if required.

b) Measure 2 – Expanded Watercraft Inspection and Decontamination Stations

Upon review of Measure 2, the District has determined, in accordance with NEPA and Section 106 of the NHPA, that the proposed activities are unlikely to adversely affect cultural resources. The activities associated with expanding watercraft inspection and decontamination stations are expected to be temporary in nature, will occur in previously disturbed areas, will not involve the construction of new infrastructure, and are unlikely to result in ground disturbance. Therefore, no adverse effects are anticipated for nearby historic properties, districts, or potentially intact archaeological resources that may exist in the APE.

At this time, the District is making a Determination of No Effect on cultural resources for Measure 2 as long as no ground disturbance occurs within previously undisturbed areas. Additional consultation may be carried out with the relevant SHPO if this proposed measure has a potential to result in ground disturbance within previously undisturbed areas. In accordance with Section 106, the State of Vermont will initiate further consultation with the appropriate SHPOs if required.

c) Measure 3 – Monitoring for Early Detection

Upon review of Measure 3, the District has determined, in accordance with NEPA and Section 106 of the NHPA, that the proposed activities are unlikely to adversely affect cultural resources. Any potential impacts resulting from the use of hand tools during early detection investigations are expected to be minimal and temporary in nature, will not result in ground disturbance and will likely occur in previously disturbed areas. Therefore, no adverse effects are anticipated for nearby historic properties, districts, or potentially intact archaeological resources that may exist in the APE. The District is making a Determination of No Effect on cultural resources for Measure 3. Additional consultation may be carried out with the relevant SHPO if this proposed measure has a potential to result in ground disturbance within previously undisturbed areas. In accordance with Section 106, the State of Vermont will initiate further consultation with the appropriate SHPOs if required.

d) Measure 4 – Drone Surveys

Upon review of Measure 4, the District has determined, in accordance with NEPA and Section 106 of the NHPA, that the proposed activities are unlikely to adversely affect cultural resources. No activities associated with the drone surveys have the potential for ground disturbance. Therefore, no adverse effects are anticipated for nearby historic properties, districts, or potentially intact archaeological resources that may exist in the APE. The District is making a Determination of No Effect on cultural resources for Measure 4.

e) Measure 5 – eDNA Sampling and Detection

Upon review of Measure 5, the District has determined, in accordance with NEPA and Section 106 of the NHPA, that the proposed activities are unlikely to adversely affect cultural resources. eDNA sampling is limited to non-intrusive water sampling and does not have the potential for ground disturbance. Therefore, no adverse effects are anticipated for nearby historic properties, districts, or potentially intact archaeological resources that may exist in the APE. The District is making a Determination of No Effect on cultural resources for Measure 5.

f) Measure 6 – Increased Public Awareness and Education

Upon review of Measure 6, the District has determined, in accordance with NEPA and Section 106 of the NHPA, that the proposed activities are unlikely to adversely affect cultural resources. Public awareness and education are administrative in nature and therefore will not result in adverse effects for nearby historic properties, districts, or potentially intact archaeological resources that may exist in the APE. The District is making a Determination of No Effect on cultural resources for Measure 6.

g) Measure 7 – Chemical Control

Upon review of Measure 7, the District has determined, in accordance with NEPA and Section 106 of the NHPA, that the proposed activities are unlikely to adversely affect cultural resources. Pesticide use does not result in ground disturbance and therefore will not result in adverse effects for nearby historic properties, districts, or potentially intact archaeological resources that may exist in the APE. The District is making a Determination of No Effect on cultural resources for Measure 7.

7. Summary and Recommendations

In accordance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, its implementing regulation 36 CFR Part 800, and the National Environmental Policy Act (NEPA), a Phase IA investigation was conducted and consisted of historic map analysis, historic property inventory, review of archaeological and historic contexts, and an assessment of archaeological and historic sensitivity in the Study Area. The District has reviewed previous investigations carried out in the Study Area and information available on the Vermont State Historic Preservation Office's (VTSHPO) cultural resources database and has identified several National and State Register of Historic Places (NRHP/SRHP) properties and districts in the Study Area. Due to the large size of the Study Area, the District has not conducted additional cultural resource studies as part of this EA. The scale and scope of the program has yet to be narrowed down to specific waterbodies, which will be selected for plant control measures at a later date. The purpose of this Phase IA investigation was to identify known cultural resources within the proposed study area. Cultural resources include archaeological sites, buildings, structures, objects, or districts. A determination of the potential for additional cultural resources was considered based on the prehistory, history, and topography of each site; however, site-specific testing and assessment of effects will need to be addressed on a site-by-site basis.

As designs are formulated, the District will be conducting an evaluation of the Area of Potential Effect (APE) for all proposed measures to identify cultural resources that may be affected by the APCP directly and indirectly and assess the effect each measure may have on cultural resources. The Area of Potential Effect (APE) consists of areas that will be directly affected by the proposed undertaking as well as areas that are visually affected. The District is required to identify historic properties within the APE and determine if the proposed project will potentially adversely impact those properties. Additional cultural resources assessments may include further review of information, site files, and archival materials held by the VT SHPO, local historical societies, libraries, municipal offices, tribal nations, the Vermont Archaeology Heritage Center, and the Vermont History Museum.

The Study Area has been occupied for approximately 10,000 years and has been subject to significant changes in land use for centuries, namely due to deforestation and agriculture. The remains of this occupation may be encountered in many forms throughout the region and may include standing historic structures, Pre-Contact Period and historic archaeological sites, and historic landscapes. In general, waterbodies to be included in this program may contain a variety of potentially significant resources depending upon the historic land use of the properties and current site conditions. Based on available VT SHPO data, a total of 368 SRHP historic districts, 18 National Historic Landmarks (NHLs), and more than 8,000 archaeological sites have been recorded in the Study Area. Although the locational data for archaeological sites in the Study Area is currently restricted, GIS data suggests that more than 60 SRHP historic districts are located on or adjacent to waterbodies and their shorelines in the Study Area that may be subject to plant control measures as part of the APCP. Because the specific location and

scale of the Proposed Action are not known at this time, it is possible that they will overlap with NRHP/SRHP historic districts, properties, or archaeological sites located in and around waterbodies throughout Vermont and the surrounding states. However, the District has determined that the proposed measures are not likely to have an adverse effect on historic properties because they are expected to be short term and temporary in nature and not likely to create ground disturbance. Based on the District's assessment, no additional work is recommended at this time.

Because the program is based on the locations of waterbodies – some of which cross state borders – the measures may be implemented in the surrounding states (Massachusetts, New Hampshire, and New York). In accordance with Section 106, the District is coordinating with the Vermont, New York, New Hampshire, and Massachusetts SHPOs. The District is also coordinating with the Delaware Nation, the Delaware Tribe of Indians, the Stockbridge Munsee Community, as well as several potential consulting parties, including but not limited to state-recognized tribes and statewide historical groups (Appendix D.1). Continued coordination will determine whether the SHPOs, Consulting Tribal Nations, or other consulting parties have concerns with the findings of this report or concur with the recommendation for further investigations to properly understand any impacts to the cultural resources that exist within the APE. Future opportunities to identify additional stakeholders will arise at a later date as the program is further developed. Additional public involvement will be conducted as part of the public review of the EA under NEPA and will serve as the District's Section 106 public coordination. The final EA document will incorporate comments from SHPOs, tribes, or consulting parties as appropriate.

As control measures and locations become definitively determined, they will undergo studies to ensure NEPA compliance. At that time, each measure and location will also be subject to appropriate culture resource studies to ensure compliance with Section 106 of the NHPA. This work will be coordinated the appropriate SHPO(s). As a result, it is the opinion of the District that a Memorandum of Agreement (MOA) or Programmatic Agreement (PA) would not be appropriate for the current programmatic EA. Individual agreement documents may be produced as the result of either the initiation of a feasibility study or cultural resource studies at the selected locations. In accordance with the NEPA, Section 106 (54 U.S.C.USC Section 306108) of the National Historic Preservation Act of 1966, as amended (54 USC Section 306108), and its implementing regulation 36 Code of Federal Regulations (CFR) Part 800 (Protection of Historic Properties), the District has determined that the planning activities associated with the expansion of the Vermont APCP will not have an effect on historic properties eligible, or potentially eligible for listing on the NRHP.

If a PA or MOA is required, it would stipulate the actions the USACE would take regarding cultural resources as the program proceeds. The PA or MOA would serve as a binding agreement between the USACE, SHPO(s), and any other invited signatories or interested consulting parties and will be used to ensure that the USACE satisfies its responsibilities under Section 106 of the NHPA and other applicable laws and regulations. A draft of the PA or MOA would be provided to the SHPO(s), Advisory Council on Historic Preservation (ACHP), the

Delaware Tribe of Indians, the Delaware Nation, the Stockbridge Munsee Community, and interested consulting parties for their review and participation. Cultural resources mitigation would include but would not be limited to, background research, consultation, oral history interviews, sample field investigation, field survey, phased archaeological survey, and intensive level architectural survey in selected locations. Cultural resources mitigation estimates include costs to study a site (should one be encountered through mitigation), testing of areas directly impacted by activities required to construct project features (i.e., construction access and staging areas), and, as required, environmental mitigation measures. Should a site be encountered through archaeological survey or investigation, additional study or archaeological mitigation may be needed. These measures, if determined necessary, will be developed in coordination with the appropriate SHPO(s) and tribes.

Should an activity be proposed within an SR/NR-eligible or listed site for an extended period of time or involve ground disturbance within an area not previously disturbed by modern development, additional investigations may be required to determine the potential for specific activities to adversely affect cultural resources. If such activities are proposed the District, in cooperation with the VT DEP shall carry out consultation with the appropriate SHPO and relevant stakeholders to determine what is required to evaluate the activity under Section 106 of the NRHP and depending on the results of that consultation and additional investigations, if needed, the District and the VT DEP shall consider measures to avoid, minimize or mitigate for adverse effects. Avoidance and minimization measures may include the removal of proposed control measures near eligible historic properties from the program or adjusting measures to be less invasive to nearby eligible historic properties, if appropriate. Some mitigation measures to be considered include HABS/HAER documentation of historic structures, archaeological data collection, monitoring during construction, and enhancement of historic districts through signage and public outreach. Treatment plans or mitigation agreements would include, but not be limited to, specialized design guidelines for historic structures to ensure that plant control measures are consistent with the historic fabric of the buildings, the design of program elements to fit the character of historic districts, and the scope of data recovery for archaeological sites that cannot be avoided. Treatment plans and agreements for archaeological sites identified within the APE for plant control measures would also be included.

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Appendix E

Distribution List

Draft Integrated Letter Report/Programmatic Environmental Assessment Distribution List

Federal Agencies	
Attn: Susan Pasko U.S. Fish and Wildlife Service Aquatic Nuisance Species Task Force susan_pasko@fws.gov anstaskforce@fws.gov	Attn: Chris Smith Fish and Wildlife Biologist U.S. Fish and Wildlife Service Lake Champlain Reginal Office 11 Lincoln Street Essex Junction, VT 05452 chris_e_smith@fws.gov
Attn: Ken Sturm Refuge Manager U.S. Fish and Wildlife Service Missisquoi National Wildlife Refuge 29 Tabor Road Swanton, VT 05488 ken_sturm@fws.gov missisquoi@fws.gov	Attn: Audrey Mayer, Ph.D Field Office Supervisor U.S. Fish and Wildlife Service New England Field Office 70 Commercial Street, Suite 300 Concord, NH 03301 audrey_mayer@usfws.gov newengland@fws.gov
Attn: Ian Drew Field Office Supervisor U.S. Fish and Wildlife Service New York Ecological Services Field Office 3817 Luker Road Cortland, NY 13045-9385 Ian_drew@fws.gov	Attn: Ken Sprankle U.S. Fish and Wildlife Service Connecticut River Conservation Office 103 East Plumtree Road Sunderland, MA 01375 ken_sprankle@usfws.gov
Attn: Lou Chiarella US Department of Commerce National Oceanic and Atmospheric Administration National Marine Fisheries Service Greater Atlantic Fisheries Office 55 Republic Drive Gloucester, Massachusetts 01930-2276 jessie_murray@noaa.gov karen_greene@noaa.gov	Attn: Alessia Brugnara ESA Section 7 Biologist NOAA-Affiliate in support of: NOAA Fisheries- Greater Atlantic Region Protected Resources Division 55 Great Republic Drive Gloucester, MA 01930 alessia.brugnara@noaa.gov

Federal Agencies	
Attn: Timothy Timmerman Director Office of Environmental Review U.S. EPA Region 1 5 Post Office Square, Suite 100 (mail code: 06-3) Boston, MA 02109-3912 timmermann.timothy@epa.gov	

Federally Recognized Tribes	
Attn: Katelyn Lucas THPO Delaware Nation P.O. Box 825 Anadarko, OK 73005 klucas@delawarenation-nsn.gov	Attn: Martina Thomas THPO Delaware Tribe of Indians 126 University Circle Stroud Hall, Rm. 437 East Stroudsburg, PA 18301 mthomas@delawaretribe.org his.pres@delawaretribe.org
Attn: Darren Bonaparte THPO Saint Regis Mohawk Tribe 71 Margaret Terrace Memorial Way Akwesasne, NY 13655 darren.bonaparte@srmt-nsn.gov	Attn: Jeff Bendremer THPO Stockbridge Munsee Community 86 Spring Street Williamstown, MA 01267 thpo@mohican-nsn.gov

Federally Recognized Tribes	
Attn: Kimberly Jensen Vermont Department of Environmental Conservation Watershed Management Division 1 National Life Drive, Davis 3 Montpelier, VT 05620 Kimberly.Jensen@vermont.gov	Attn: Andrea Shortsleeve; Abigal Connolly Commissioner; Assistant Vermont Fish and Wildlife Department Commissioner; Assistant 1 National Life Drive, Davis 2 Montpelier, VT 05620 andrea.shortsleeve@vermont.gov abigail.connolly@vermont.gov

Federally Recognized Tribes	
Attn: Danielle Fitzko; Steve Gomez Commissioner; Special Projects Manager Vermont Department of Forests, Parks & Recreation 1 National Life Drive, Davis 2 Montpelier, VT 05620 danielle.fitzko@vermont.gov Steve.Gomez@vermont.gov	Attn: Anson Tebbetts; Steve Dwinell Commissioner; Public Health & Agricultural Resource Management Division Director Vermont Agency of Agriculture, Food and Markets 116 State Street Montpelier, VT 05620 anson.tebbetts@vermont.gov steve.dwinell@vermont.gov
Attn: Breanna Sheehan Administrative Director Vermont Commission on Native American Affairs 1 National Life Drive, Davis 6 Montpelier, VT 05620 breanna.sheehan@vermont.gov	Attn: Amy Smagula Exotic Species Program Coordinator New Hampshire Department of Environmental Services 29 Hazen Drive Concord, NH 03302 amy.p.smagula@des.nh.gov
Attn: Catherine McGlynn New York Department of Environmental Conservation Bureau of Invasive Species and Ecosystem Health Invasive Species Coordination Section 625 Broadway Albany, NY 12233 catherine.mcglynn@dec.ny.gov	Attn: R. Scott Dillon Senior Historic Preservation Review Coordinator Vermont Division for Historic Preservation 1 National Life Dr, Davis Bldg, 6th Floor Montpelier, VT 05620-0501 scott.dillon@vermont.gov

Non-Government Organizations	
Attn: Eric Howe; Meg Modley Director; Aquatic Invasive Species Management Coordinator Lake Champlain Basin Program 54 West Shore Road Grand Isle, VT 05458 erichowe@lcbp.org MModley@lcbp.org	Attn: Jenny Patterson Director Lake Champlain Committee 208 Flynn Avenue, Building 3, Studio 3F Burlington, Vermont 05401 jennyp@lakechamplaincommittee.org lcc@lakechamplaincommittee.org
Attn: Kris Stepenuck Lake Champlain Sea Grant 81 Carrigan Drive Burlington, Vermont 05405 kris.stepenuck@uvm.edu	Attn: Pat Suozzi Director Federation of Vermont Lakes and Ponds PO Box 766 Montpelier, VT 05601 pasuozzi@gmail.com

Non-Government Organizations	
Attn: Mary Pat Goulding Secretary Memphremagog Watershed Association PO Box 513 Newport, Vermont 05855 marypat@mwavt.org	Attn: Ellen Marsden Professor Emeritus University of Vermont 3 College Street Burlington, VT 05401 ellen.marsden@uvm.edu
Attn: Gwen Kozlowski Outreach & Education Coordinator University of Vermont Extension 140 Kennedy Drive, Suite 201 South Burlington, Vermont 05403 gwen.kozlowski@uvm.edu	Attn: Murray McHugh Senior Stewardship Manager The Nature Conservancy 575 Stone Cutters Way, Suite 102 Montpelier, Vermont 05602 mmchugh@tnc.org
Attn: Rebecca Todd; Kathy Urffer Executive Director; Director of Policy and Advocacy Connecticut River Conservancy 15 Bank Row Greenfield, MA 01301 rtodd@ctriver.org kurffer@ctriver.org	Attn: Hilary Solomon Program Director Poultney Mettowee Natural Resources Conservation District PO Box 209 Poultney, VT 05764 pmnrcd@gmail.com
Attn: Cory Ross Program Director Windam County Natural Resources Conservation District 28 Vernon Street, Suite 332 Brattleboro, VT 05301 ross.wcnrcd@gmail.com	Attn: Margot Burns Senior Environmental Planner Connecticut River Council of Governments 145 Dennison Road Essex, CT 06426 MBurns@rivercog.org

Non-Government Organizations	
Attn: Jacob Reed Senior Environmental Specialist Vermont Electric Power Company 366 Pinnacle Ridge Road Rutland, VT 05701 jreed@velco.com	Attn: Jason Farnsworth Project Manager U.S. Army Corps of Engineers North Springfield Reservoir 98 Reservoir Rd Springfield, VT 05156 jason.farnsworth@usace.army.mil
Attn: Bill Anderson Interim Water Quality Project Manager Vermont Youth Conservation Corps 1949 East Main Street Richmond, VT 05477 bill.anderson@vycc.org	Attn: Brenda Gagne Abenaki Nation of Missisquoi 100 Grand Avenue Swanton, VT 05488 info@abenakination.com
Attn: Roger Longtoe Sheehan Elnu Abenaki Tribe 350 Putney Road Brattleboro, VT 05301 gitceedadann@yahoo.com	Attn: Shirly Hook and Colin Wood Koasek Traditional Band of the Koas Abenaki Nation 188 Allen Bent Road West Braintree VT 05669 info@koasek.org
Attn: Don Stevens Nulhegan Abenaki Tribe 156 Bacon Drive Shelburne, VT 05482 chiefdonstevens@comcast.net	Attn: Nathan Allison Vermont Archaeological Society P.O. Box 663 Burlington, VT 05402-0663 info@vtarchaeology.org
Attn: Steve Perkins Vermont Historical Society 60 Washington St, Suite 1 Barre, VT 05641 info@vermonthistory.org	Attn: Steve Miyamoto Vermont Covered Bridge Society PO Box 97, Jeffersonville, VT 05464 vermontcoveredbridgesociety@gmail.com

Appendix F

Draft Finding of No Significant Impact

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT
JACOB K. JAVITS FEDERAL BUILDING
26 FEDERAL PLAZA
NEW YORK NEW YORK 10278-0090

DRAFT FINDING OF NO SIGNIFICANT IMPACT

FEDERAL PARTICIPATION IN EXPANSION OF THE AQUATIC PLANT CONTROL PROGRAM IN THE STATE OF VERMONT
VERMONT STATE

The U.S. Army Corps of Engineers, New York District (Corps or USACE) has conducted an environmental analysis in accordance with the National Environmental Policy Act of 1969, as amended. The draft Integrated Letter Report and Programmatic Environmental Assessment (ILR/Programmatic EA) dated 23 June 2025, for the Federal Participation in Expansion of the Aquatic Plant Control Program (APCP) in the State of Vermont Project addresses gaps in the current statewide management strategies of aquatic invasive plant species (AIPS) and discusses the Project opportunities and feasibility in the State of Vermont. This Finding of No Significant Impact (FONSI) summarizes the results of the USACE evaluation and documents the USACE's conclusions.

The Final ILR/Programmatic EA, incorporated herein by reference, evaluated various alternatives that would most effectively manage AIPS and their associated negative impacts in the study area. The Recommended Alternative consists of the Federal government cost sharing in the expanded APCP with the State of Vermont to best manage the threat of AIPS throughout the State. The Recommended Alternative includes the following measures: mechanical control, watercraft inspection and decontamination stations, early detection and rapid response measures, and public awareness and education.

In addition to the Recommended Alternative, the ILR/Programmatic EA evaluated the No Action Alternative (also referred to as Alternative 1). The No Action Alternative represented the continuation of the current APCP, in which the USACE would not participate in expanding the APCP outside of the Lake Champlain Basin.

For all alternatives, the potential effects were evaluated, as appropriate. A summary assessment of the potential effects of the Recommended Alternative are listed in Table 1:

Table 1: Summary of Potential Effects of the Recommended Plan

Environmental Resource Considered	Less than significant effects	Less than significant effects as a result of mitigation*	Resource unaffected by action
Water Quality	☒	☐	☐
Wetlands and Native Aquatic Vegetation	☒	☐	☐
Fisheries and Aquatic Resources	☒	☐	☐
Wildlife and Terrestrial Resources	☒	☐	☐
Threatened and Endangered Species	☒	☐	☐
Cultural and Historic Resources	☒	☐	☐
Aesthetics and Visual Resources	☒	☐	☐

Environmental Resource Considered	Less than significant effects	Less than significant effects as a result of mitigation*	Resource unaffected by action
Recreation	☒	☐	☐
Hazardous, Toxic, and Radioactive Waste	☒	☐	☐
Economically Disadvantaged Communities	☒	☐	☐

All practicable and appropriate means to avoid or minimize adverse environmental effects were analyzed and incorporated into the Recommended Alternative. Best management practices (BMPs) as detailed in the ILR/Programmatic EA will be implemented, if appropriate, to minimize impacts.

No compensatory mitigation is required as part of the recommended plan.

Public review of the draft IFR/EA and FONSI was completed on July 22. All comments submitted during the public review period were responded to in the final IFR/EA and FONSI.

Pursuant to Section 7 of the Endangered Species Act of 1973, as amended, the USACE has determined that the recommended plan may affect but is not likely to affect the following federally listed species or their designated critical habitat: shortnose sturgeon, dwarf wedgemussel, northeastern bulrush, and Jesup's milkvetch. NOAA-Fisheries concurred with the Corps' determination for shortnose sturgeon on TBD. USFWS concurred with the Corps' determination for dwarf wedgemussel, northeastern bulrush, and Jesup's milkvetch on TBD.

Pursuant to section 7 of the Endangered Species Act of 1973, as amended, the U.S. Army Corps of Engineers determined that the recommended plan will have no effect on Indiana bat, northern long-eared bat, tri-colored bat, and Canada lynx.

Pursuant to Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, the USACE determined that implementation of the Recommended Alternative is unlikely to adversely affect historic properties in the Area of Potential Effect (APE). However, if additional measures requiring ground-disturbing activities are proposed, supplemental NHPA Section 106 review would be required before approval. The Massachusetts, New Hampshire, and New York State Historic Preservation Offices (SHPOs) and the Stockbridge Munsee Community Tribal Historic Preservation Officer (THPO) have elected to participate as Consulting Parties at this time.

Pursuant to the Clean Water Act of 1972, as amended, the discharge of dredged or fill material associated with the Recommended Alternative has been found to be compliant with Section 404(b)(1) Guidelines (40 CFR 230). The Clean Water Act Section 404(b)(1) Guidelines evaluation is found in Appendix G of the ILR/Programmatic EA.

Section 402 of the Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) program, pertains to discharge of pollutants. Aquatic pesticide application would require approval for use under a NPDES permit. Pesticide application will continue to be operated under the Vermont Department of Environmental Conservation's NPDES General Permit for the Application of Pesticides. A Construction General Permit would not be required

for construction of permanent watercraft inspection stations because ground disturbance is expected to be less than an acre.

Technical, environmental, and economic criteria used in the formulation of alternative plans were those specified in the Water Resources Council's 1983 Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies. All applicable laws, executive orders, regulations, and local government plans were considered in evaluation of alternatives. Based on this report, the reviews by other Federal, State and local agencies, Tribes, input of the public, and the review by my staff, it is my determination that the Recommended Alternative would not cause significant adverse effects on the quality of the human environment; therefore, preparation of an Environmental Impact Statement is not required.

_____ _____

Date

ALEXANDER L. YOUNG
COL, Corps of Engineers
District Commander

Appendix G

Clean Water Act Section 404(b)(1) Evaluation

1 Introduction and Proposed Action

The United States Army Corp of Engineers (USACE), New York District (District) has prepared a Draft Integrated Letter Report/Programmatic Environmental Assessment (DILR/PEA) to document the evaluation conducted to determine federal interest in expanding the APCP and the environmental effects resulting from the proposed expansion. Alternatives evaluated in the Draft ILR/PEA include 1) Alternative #1: No Action; and 2) Alternative #2: Expansion of the APCP. Based on the evaluation, Alternative #2 was identified as the Recommended Plan hereinafter referred to as the Proposed Action.

The Proposed Action involves expanding the existing Aquatic Plant Control Program within the Lake Champlain Basin to the entire state of Vermont. The expanded APCP will be cost-shared between the USACE and the State of Vermont. Under the expanded APCP, USACE provides annual funding to the Vermont Department of Environmental Conservation as the managing authority overseeing program implementation.

Aquatic invasive plant species (AIPS) to be managed under the Proposed Action include the following:

- Eurasian watermilfoil (*Myriophyllum spicatum)*
- Starry stonewart (*Nitellopsis obtuse*)
- European frogbit (*Hydrocharis morsus-ranae*)
- Water chestnut (*Trapa natans L*)
- Hydrilla (*Hydrilla verticillata*)
- Giant salvinia (*Salvinia molesta*)
- Water hyacinth (*Eichornia crassipe*)
- Brazilian elodea (*Egeria densa*)

The Proposed Action includes the following aquatic invasive plant species (AIPS) control measures:

- Measure 1 – Mechanical Control (hand-pulling, benthic barrier, mechanical harvesting)
- Measure 2 – Expanded Watercraft Inspection and Decontamination Stations
- Measure 3 – Monitoring for Early Detection
- Measure 4 – Drone Surveys
- Measure 5 – eDNA Sampling and Detection
- Measure 6 – Increased Public Awareness and Education
- Measure 7 – Chemical Control (herbicide/aquatic pesticide)

USACE proposed projects involving the discharge of dredged or fill material into waters of the United States shall be developed in accordance with guidelines promulgated by the Administrator of the Environmental Protection Agency (EPA) in conjunction with the Secretary of the Army under the authority of Section 404(b)(1) of the Clean Water Act (CWA) of 1972. The purpose of Section 404(b)(1) CWA Guidelines is to restore and maintain the chemical, physical, and biological integrity of waters of the United States through the control of discharges of dredged or fill material (40 CFR 230.1(a)).

Measure 1 – Mechanical Control includes the potential use of benthic barriers which are installed along the bottom of a waterbody to prevent the growth of undesired plant species. As the benthic barrier is considered as fill, this 404(b)(1) Evaluation focuses on summarizing the assessment of effects this particularly AIPS control method will have on water resources pursuant to the Clean Water Act Section 404(b)(1) guidelines. Neither the other methods in Measure 1 nor Measures 2 through 7 involve fill actions that would require analysis in this 404(b)(1) Evaluation.

1.1 Authority and Purpose

The project is authorized under Section 104 of the River and Harbor Act (RHA) of 1958 (Public Law [PL] 85-500), as amended by Section 1039(d) of the Water Resources Reform and Development Act (WRRDA) of 2014 (PL 113-121), Section 1178(b) of the Water Infrastructure Improvements for the Nation (WIIN) Act of 2016 (PL 114-322), Section 1170 of the Water Resources Development Act (WRDA) of 2018 (PL 115-270), Section 505 of the WRDA of 2020 (PL 116-260), and by Section 8305(b) of the WRDA of 2022 (PL 117-263), codified as amended at 33 United States Code (USC) § 610.

The purpose of the proposed action is to increase the effectiveness of future and ongoing invasive aquatic plant control for the protection of public health, water-related infrastructure and commerce, and the enhancement of aquatic ecosystem and water quality. Expansion of the APCP is needed to ensure there are minimal opportunities for AIPS to spread throughout the State and that any existing AIPS can be treated effectively limiting further negative impacts.

2 Project Area

The project area consists of federal, state and local government owned waterbodies, their immediate shorelines and vehicle access points, and reservoirs of cooperating water-related infrastructure facilities (e.g., hydroelectric generation) within the State of Vermont. It also includes the approximate 255-mile length of the Connecticut River serving as the boundary between Vermont and New Hampshire.

3 General Construction and Material Descriptions

Benthic matting is mainly utilized around boat launches, docks and marinas. Construction involves assembling the barrier frame, installation and weights. In water work involves slowly draping the benthic barrier over the substrate and applying the weights and/or installing anchors. Coverage is on average less than 0.25 acres. The matting is then slowly draped over the substrate. The benthic barrier will remove access to aquatic animal and plant species to the in-situ substrate for approximately 3 months before being removed.

3.1 General Characteristics of Fill Material

The benthic barrier typically consists of a non-woven fabric made from plastic, fiberglass, or nylon. Barriers may or may not include a wooden frame designed to help with deployment. The weights usually consist of rebar or cement block.

3.2 Quantity of Material

Quantities will vary depending on location where the need for the use of benthic barriers has been identified. As this is an annual program with multiple locations, the quantity could vary from year to year.

3.3 Source of Material

The benthic barriers and materials associated with its installation and anchoring will be obtained from a reputable manufacturer and will meet any required specifications as stipulated by the conditions established in the Aquatic Nuisance Permit issued by the state of Vermont.

3.4 Description of Proposed Discharge Site

Benthic barriers could potentially be applied in freshwater riverine unconsolidated bottom and freshwater lacustrine littoral zone and unconsolidated bottom habitat types. The average size of benthic mats can range from 1,800 – 7,500 sq ft with the average coverage area being under 0.25 acres.

The exact location placement of the benthic barrier will be determined annually and as deemed to be the appropriate measure for a particular location.

3.5 Time and Duration of Disposal

Per Vermont aquatic nuisance control regulations, application of benthic matting is restricted from July 1 through October 30. ANC permit conditions require all benthic matting and its associated weight and anchoring components be removed from the water by October 30.

3.6 Disposal Method

Due to their size and location in which they are deployed, the disposal method varies. For wadeable locations, the barriers can be installed by foot. For locations where non-wadeable locations, non-motorized to motorized boats assist with transport and are deployed by divers. As the construction method simply requires laying and anchoring the barrier on the in-situ substrate, no excavation or mechanical equipment is required.

3.7 Construction Sequence and Actions to Minimize Impacts

The project construction sequence will be determined during implementation of the expanded APCP. Generally, the barriers are either first assembled on land prior to deployment or deployed within the water by divers.

An Aquatic Nuisance Control (ANC) Permit from the state of Vermont in accordance with 10.V.S.A. 1455 is obtained prior to installation. Conditions within the ANC permit to minimize adverse effects to the aquatic environment can include, but not be limited to the following:

- Installation no earlier than July 1, must be removed no later than October 30.
- Barrier material and weighting devices materials must be of such quality and fabrication as to not deteriorate during use and potentially leave debris within the water.
- Barrier material and weighting devices cannot discharge contaminants into the waters of the State.
- Prior to installing barriers, the control location will be surveyed for all rare, threatened, or endangered aquatic plant species known to occur in the waterbody. Barriers shall not be installed overtop rare, threatened, or endangered aquatic plant species.
- Prior to installing barriers, the control location shall be searched for turtles, mussels, or other aquatic wildlife. Observed animals shall be safely moved to a location immediately outside of the control location within the same waterbody when possible.
- Rocks, boulders, or woody debris shall not be removed from the lake bottom.
- Removal of all barriers and weighing devices by the stipulated timeframe stipulated in the Aquatic Nuisance Control Permit issued by the State.

4 Factual Determination

Table 4-1: Review of Compliance – Section 230.10(a)-(d)

	YES	NO
a. The discharge represents the least environmentally damaging practicable alternative and, if in a special aquatic site, the activity associate with the discharge must have direct access or proximity to, or be located in the aquatic ecosystem to fulfill its basic purpose.	X	
b. The activity does not appear to: 1) violate applicable state water quality standards or effluent standards prohibited under Section 307 of the CWA; 2) jeopardize the existence of Federally- listed threatened and endangered species or their habitat; and 3) violate requirements of any Federally designated marine sanctuary.	X	
c. The activity will not cause or contribute to significant degradation of waters of the U.S. including adverse effects on human health, life stages of organisms dependent on the aquatic ecosystem, ecosystem diversity, productivity and stability, and recreational, aesthetic and economic values.	X	
d. Appropriate and practicable steps have been taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem.	X	

Table 4-2: Technical Evaluation Factors (Subparts C-F)

	N/A	NOT SIGNIFICANT	SIGNIFICANT
a. Potential Impacts on Physical and Chemical Characteristics of the Aquatic Ecosystem (Subpart C)			
1) Substrate		X	
2) Suspended particulates/turbidity		X	
3) Water column impacts		X	
4) Current patterns and water circulation	X		
5) Normal water circulations		X	
6) Salinity gradients	X		
b. Potential Impacts on Biological Characteristics of the Aquatic Ecosystem (Subpart D)			
1) Threatened and endangered species		X	
2) Fish, crustaceans, mollusks, and other organisms in the aquatic food web		X	

		N/A	NOT SIGNIFICANT	SIGNIFICANT
	3) Other wildlife (mammals, birds, reptiles and amphibians)		X	
c. Potential Impacts on Special Aquatic Sites (Subpart E)				
	1) Sanctuaries and refuges		X	
	2) Wetlands		X	
	3) Mud Flats	X		
	4) Vegetated Shallows		X	
	5) Coral Reefs	X		
	6) Riffle and pool complexes	X		
d. Potential Effects on Human Use Characteristics (Subpart F)				
	1) Municipal and private water supplies	X		
	2) Recreational and commercial fisheries		X	
	3) Water-related recreation		X	
	4) Aesthetic impacts		X	
	5) Parks, national and historic monuments, national seashores, wilderness areas, research sites and similar preserves		X	

Table 4-3: Evaluation and Testing - Subpart G

A. THE FOLLOWING INFORMATION HAS BEEN CONSIDERED IN EVALUATING THE BIOLOGICAL AVAILABILITY OF POSSIBLE CONTAMINANTS IN DREDGED OR FILL MATERIAL. (CHECK ONLY THOSE APPROPRIATE).		
	1) Physical characteristics	X
	2) Hydrography in relation to known or anticipated sources of contaminants	X
	3) Results from previous testing of the material or similar material in the vicinity of the project.	X
	4) Known, significant sources of persistent pesticides from land runoff or percolation	N/A

	5) Spill records for petroleum products or designated hazardous substances (Section 311 of CWA)	X
	6) Public records of significant introduction of contaminants from industries, municipalities or other sources	X
	7) Known existence of substantial material deposits of substances which could be released in harmful quantities to the aquatic environment by man-induced discharge activities	X
	8) Other sources (specify)	N/A
List appropriate references – See Tier 1 EIS		

	YES	NO
b. An evaluation of the appropriate information factors in 3a above indicates that there is reason to believe the proposed dredge material is not a carrier of contaminants, or that levels of contaminants are substantively similar at extraction and disposal sites and not likely to require constraints.	X	

Table 4-4: Disposal Site Delineation - Section 230.11(f)

A. THE FOLLOWING INFORMATION HAS BEEN CONSIDERED IN EVALUATING THE BIOLOGICAL AVAILABILITY OF POSSIBLE CONTAMINANTS IN DREDGED OR FILL MATERIAL. (CHECK ONLY THOSE APPROPRIATE).		
	1) Depth of water at disposal site	Yes
	2) Current velocity, direction, variability at disposal site	Yes
	3) Degree of turbulence	Yes
	4) Water column stratification	Yes
	5) Discharge of vessel speed and direction	Yes
	6) Rate of discharge	Yes
	7) Dredged material characteristics (constituents, amount, and type of material, settling velocities)	Yes
	8) Number of discharges per unit of time	Yes
	9) Other factors affecting rates and patterns of mixing (specify)	Yes
List appropriate references – See Integrated Letter Report/Programmatic EA		

	YES	NO

b. An evaluation of the appropriate information factors in 4a above indicated that the disposal sites and/or size of mixing zones are acceptable.	X	

Table 4-5: Actions to Minimize Adverse Effects (Subpart H)

	YES	NO
All appropriate and practicable steps have been taken, through application of recommendation of Section 230.70-230.77 to ensure minimal adverse effects of the proposed discharge.	X	

Table 4-6: Factual Determination - Section 230.11

A REVIEW OF APPROPRIATE INFORMATION, AS IDENTIFIED IN ITEMS 2-5 ABOVE, INDICATES THERE IS MINIMAL POTENTIAL FOR SHORT OR LONG TERM ENVIRONMENTAL EFFECTS OF THE PROPOSED DISCHARGE AS RELATED TO:		
	YES	**NO**
a. Physical substrate at the disposal site (review Section 2a, 3, 4, and 5 above)	X	
b. Water circulation, fluctuation and salinity (review Sections 2a, 3, 4, and 5)	X	
c. Suspended particulates/turbidity (review Sections 2a, 3, 4, and 5)	X	
d. Contaminant availability (review Sections 2a, 3, and 4)	X	
e. Aquatic ecosystem structure, function, and organisms (review Sections 2b, 2c, 3, and 5)	X	
f. Proposed disposal site (review Section 2, 4, and 5)	X	
g. Cumulative effects on the aquatic ecosystem	X	
h. Secondary effects on the aquatic ecosystem	X	

Table 4-7: Findings of Compliance or Non-Compliance

	YES	NO
The proposed disposal site for discharge of dredged or fill material complies with Section 404(b)(1) guidelines	X	

In summary, based on the DILR/PEA review, the implementation of benthic barriers as part of the expanded Aquatic Plant Control Program to manage and reduce the presence and proliferation of aquatic invasive plant species involves multiple control measure will be coordinated with or directed by the State of Vermont and:

- Will have no significant adverse effects of the discharge of pollutants on human health or welfare, including but not limited to effects on municipal water supplies, plankton, fish, shellfish, wildlife, and special aquatic sites.

- Will have no significant adverse effects of the discharge of pollutants on life stages of aquatic life and other wildlife dependent on aquatic ecosystems, including the transfer, concentration, and spread of pollutants or their byproducts outside of the disposal site through biological, physical, and chemical processes;

- Will have no significant adverse effects of the discharge of pollutants on aquatic ecosystem diversity, productivity, and stability.

- Will have no significant adverse effects of discharge of pollutants on recreational, aesthetic, and economic values.

Table 1

Gross Benefit Calculations

Table 1
Gross Benefit Calculation

Lake ID	Area (acres)	Aquatic Invasive Species									Total Historical Survey Detections	Lake Size Relative to Lake Champlain (acres/acres)	AIS Detections Relative to Lake Champlain (Det./Det.)	Lake Size & AIS Detections Weighted Average (50%/50%)	Weight Adjusted Benefit (Dollars)
		FR	EF	PL	VLM	EWM	EN	YFH	CLP	WC					
ARROWHEAD MOUNTAIN	720					3					3	0.0155	0.014	0.015	$20,000
AUSTIN	33					1					1	0.0007	0.005	0.003	$4,000
BAKER (BRKFLD)	38					1					1	0.0008	0.005	0.003	$4,000
BEEBE (HUBDTN)	112					16			6		22	0.0024	0.101	0.052	$69,000
BERLIN	290					8					8	0.0062	0.037	0.021	$29,000
BLACK (HUBDTN)	25					15			3		18	0.0005	0.083	0.042	$56,000
BOMOSEEN	2,415		1			38	3		21	3	66	0.0519	0.303	0.177	$237,000
BROOKSIDE	14		1								1	0.0003	0.005	0.002	$3,000
BROWNINGTON	137					5					5	0.0030	0.023	0.013	$17,000
BULLIS	13								2	9	11	0.0003	0.050	0.025	$34,000
BURR (SUDBRY)	85					33			5		38	0.0018	0.174	0.088	$118,000
CARMI	1,415					8			1	1	10	0.0304	0.046	0.038	$51,000
CEDAR	128			1		67					68	0.0027	0.312	0.157	$211,000
CHAMP-MAIN LAKE	40,368		2			20			10	7	39	0.8672	0.179	0.523	$700,000
CHAMP-SOUTH LAKE	6,183	2	10		1	55	2	14	31	64	179	0.1328	0.821	0.477	$638,000
CHITTENDEN	748			1							1	0.0161	0.005	0.010	$14,000
CHIPMAN	80					12					12	0.0017	0.055	0.028	$38,000
CLYDE	186					2			1		3	0.0040	0.014	0.009	$12,000
COGGMAN	27		1			4			2	3	10	0.0006	0.046	0.023	$31,000
CRYSTAL (BARTON)	772					6					6	0.0166	0.028	0.022	$30,000
DANIELS	65								1		1	0.0014	0.005	0.003	$4,000
DERBY	212					2					2	0.0045	0.009	0.007	$9,000
DEWEYS MILL	54					4					4	0.0012	0.018	0.010	$13,000
DUNMORE	1,040					11					11	0.0223	0.050	0.036	$49,000
EAST LONG	185				1						1	0.0040	0.005	0.004	$6,000
ECHO (HUBDTN)	55					9					9	0.0012	0.041	0.021	$28,000
EDEN	198					2					2	0.0043	0.009	0.007	$9,000
ELLIGO	182					12					12	0.0039	0.055	0.029	$39,000
ELMORE	222					4					4	0.0048	0.018	0.012	$15,000
FAIRFIELD	463					9					9	0.0100	0.041	0.026	$34,000
FAIRFIELD SWAMP	132					3					3	0.0028	0.014	0.008	$11,000
FAIRLEE	462					25	1				26	0.0099	0.119	0.065	$86,000
FERN	67					7			1		8	0.0014	0.037	0.019	$26,000
FOREST (CALAIS)	135								1		1	0.0029	0.005	0.004	$5,000
GALE MEADOWS	195					2					2	0.0042	0.009	0.007	$9,000
GLEN	205					14			3		17	0.0044	0.078	0.041	$55,000
GREAT HOSMER	147					27					27	0.0031	0.124	0.064	$85,000
GROUT	86				1						1	0.0018	0.005	0.003	$4,000
HALF MOON	26								1		1	0.0006	0.005	0.003	$3,000
HALLS	85				3	19					22	0.0018	0.101	0.051	$69,000
HINKUM	59					15					15	0.0013	0.069	0.035	$47,000
HORTONIA	501		1			41	8		24		74	0.0108	0.339	0.175	$234,000
HOUGH	38					3			1		4	0.0008	0.018	0.010	$13,000
INDIAN BROOK (ESSEX)	58					11					11	0.0012	0.050	0.026	$35,000
IROQUOIS	247					89			45		134	0.0053	0.615	0.310	$415,000
ISLAND	614								1		1	0.0132	0.005	0.009	$12,000
KENT	102					3					3	0.0022	0.014	0.008	$11,000
LILY (POULTY)	20					24			13	4	41	0.0004	0.188	0.094	$126,000
LINE (BARNRD)	9					1					1	0.0002	0.005	0.002	$3,000
LITTLE (WELLS)	179			1		87			11	1	100	0.0038	0.459	0.231	$309,000
LONG (EDEN)	101					1					1	0.0022	0.005	0.003	$5,000
LOVES MARSH	69					2					2	0.0015	0.009	0.005	$7,000
LOWER	45		1			5					6	0.0010	0.028	0.014	$19,000
MEMPHREMAGOG	5,929					7			4		11	0.1274	0.050	0.089	$119,000
METCALF	84					12					12	0.0018	0.055	0.028	$38,000
MILL (BENSON)	44					3			2	3	8	0.0009	0.037	0.019	$25,000
MILL (WINDSR)	56					6					6	0.0012	0.028	0.014	$19,000
MOREY	550					26					26	0.0118	0.119	0.066	$88,000
NINEVAH	176					1	1				2	0.0038	0.009	0.006	$9,000
NORTH HARTLAND	168					1					1	0.0036	0.005	0.004	$5,000
NORTH MONTPELIER	42					8					8	0.0009	0.037	0.019	$25,000
NORTH SPRINGFIELD	96	2				1				3	6	0.0021	0.028	0.015	$20,000
NORTON	659					1					1	0.0141	0.005	0.009	$13,000
OLD MARSH	116								1		1	0.0025	0.005	0.004	$5,000
PARAN	35					31			6	15	52	0.0008	0.239	0.120	$160,000
PINNEO	46					1					1	0.0010	0.005	0.003	$4,000
PORTER	21					2			2	2	6	0.0005	0.028	0.014	$19,000
RESCUE	189					2					2	0.0041	0.009	0.007	$9,000
RICHVILLE	113	6	1	1		29			5	2	44	0.0024	0.202	0.102	$137,000

Notes:
FR - Flowering rush (*Butomus umbellatus*)
EF - European Frog-bit (*Hydrocharis morsus-ranae*)
PL - Purple loosestrife (*Lythrum salicaria*)
VLM - Variable-leaf milfoil (*Myriophyllum heterophyllum*)
EWM - Eurasian watermilfoil (*Myriophyllum spicatum*)
EN - European naiad (*Najas minor*)
YFH - Yellow floating-heart (*Nymphoides peltata*)
CLP - Curly-leaf Pondweed (*Potamogeton crispus*)
WC - Water chestnut (Trapa natans)
AIS = Aquatic Invasive Species
Det. = Detections
Lake Champlain Total Size is 46,552 acres (sum of Main and South Lake)
Survey data provided by VTDEC and collected between 1960's and 2010's
Weight adjusted benefits rounded to thousands

Table 1
Gross Benefit Calculation

Lake ID	Area (acres)	Aquatic Invasive Species									Total Historical Survey Detections	Lake Size Relative to Lake Champlain (acres/acres)	AIS Detections Relative to Lake Champlain (Det./Det.)	Lake Size & AIS Detections Weighted Average (50%/50%)	Weight Adjusted Benefit (Dollars)
		FR	EF	PL	VLM	EWM	EN	YFH	CLP	WC					
ROOT	21								1	1	2	0.0005	0.009	0.005	$6,000
ROUND (NEWBRY)	30					5					5	0.0006	0.023	0.012	$16,000
RUTLAND CITY	13					31	2				33	0.0003	0.151	0.076	$101,000
SADAWGA	191					4			1		5	0.0041	0.023	0.014	$18,000
SALEM	776			1		3					4	0.0167	0.018	0.018	$23,000
SEYMOUR	1,777					1					1	0.0382	0.005	0.021	$29,000
SHADOW (GLOVER)	217					16					16	0.0047	0.073	0.039	$52,000
SHAFTSBURY	24									3	3	0.0005	0.014	0.007	$10,000
SHELBURNE	479		3			25			20		48	0.0103	0.220	0.115	$154,000
SOUTH BAY	710				1	40			1		42	0.0152	0.193	0.104	$139,000
SPECTACLE	102						1				1	0.0022	0.005	0.003	$5,000
ST. CATHERINE	885					31	3		17		51	0.0190	0.234	0.126	$169,000
STAR	62					9					9	0.0013	0.041	0.021	$29,000
SUNRISE	61			1		41	3		1		46	0.0013	0.211	0.106	$142,000
SUNSET (BENSON)	205					6	2		1		9	0.0044	0.041	0.023	$31,000
TICKLENAKED	55					16					16	0.0012	0.073	0.037	$50,000
VERGENNES WATERSHED	11					5					5	0.0002	0.023	0.012	$16,000
WATERBURY	869						4				4	0.0187	0.018	0.019	$25,000
WEST MOUNTAIN	60				2						2	0.0013	0.009	0.005	$7,000
WILLOUGHBY	1,734					10					10	0.0372	0.046	0.042	$56,000
WINONA	274		1			4					5	0.0059	0.023	0.014	$19,000
Total	**76,930**	**10**	**22**	**6**	**9**	**1,104**	**30**	**14**	**246**	**121**	**1,562**				**$5,903,000**

Notes:
FR - Flowering rush (*Butomus umbellatus*)
EF - European Frog-bit (*Hydrocharis morsus-ranae*)
PL - Purple loosestrife (*Lythrum salicaria*)
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