APPENDIX B

ESSENTIAL FISH HABITAT ASSESSMENT

ESSENTIAL FISH HABITAT ASSESSMENT FOR THE CONNECTICUT RIVER HYDRILLA RESEARCH AND DEMONSTRATION PROJECT

MARCH 2024

Prepared by

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New England District
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1. General Project Information

Date Prepared: March 28, 2024

Project/ Application Number: N/A

Project Name: Connecticut River Hydrilla Research and Demonstration Project

Project Applicant: U.S. Army Corps of Engineers, New England District

Federal Action Agency: U.S. Army Corps of Engineers, New England District

Fast-41: No

Action Agency Contact Name: Hannah Doherty

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New England District
696 Virginia Road
Concord, Massachusetts 01742-2751

2. Project Description

Location (WGS 84): 41.4388, -72.4458

Body of Water (HUC-12): Deep River-Connecticut River (010802050901)

Project Purpose:

The purpose of the proposed project is to provide a field-scale demonstration of technology developed under the Aquatic Plant Control Research Program (APCRP) that is evaluating the effectiveness of an aquatic herbicide to manage monoecious hydrilla in high water exchange environments. This field demonstration will provide valuable information for developing future guidance on how to manage this invasive aquatic plant which is expanding in high water exchange systems throughout the northeastern U.S. In addition, this field demonstration will be evaluating herbicide efficacy where monoecious hydrilla is most problematic, optimal timing of treatment, and length of exposure required for effective control of hydrilla.

Various methods have been used for control and eradication of hydrilla, including physical, biological, and chemical means. The most effective and economical method of control for well established, large-scale populations is typically a chemical approach by using tested and approved aquatic herbicides. Several herbicides have been used to control hydrilla throughout the country. Treatment and monitoring data from the New York Croton River, Cayuga Lake Inlet, Tonawanda Creek/Erie Canal, and management projects in other states show that several consecutive seasons of chemical treatments are necessary to control hydrilla populations since tubers and turions can persist in the benthic substrate. Within the Connecticut River system, hydrilla is found in both high flow and quiescent river conditions with control of hydrilla in high flow areas posing a complex challenge. The Connecticut River hydrilla has been discovered outside of the river in ponds and lakes. Factors such as water flow, suspended silt, tidal flow, and salinity contribute to the complexity of controlling hydrilla in a system like the Connecticut River. Investigations into herbicide application methods and techniques that address the conditions specific to the Connecticut River will allow for more effective hydrilla control to prevent further spread and impact to other parts of the river and watershed.

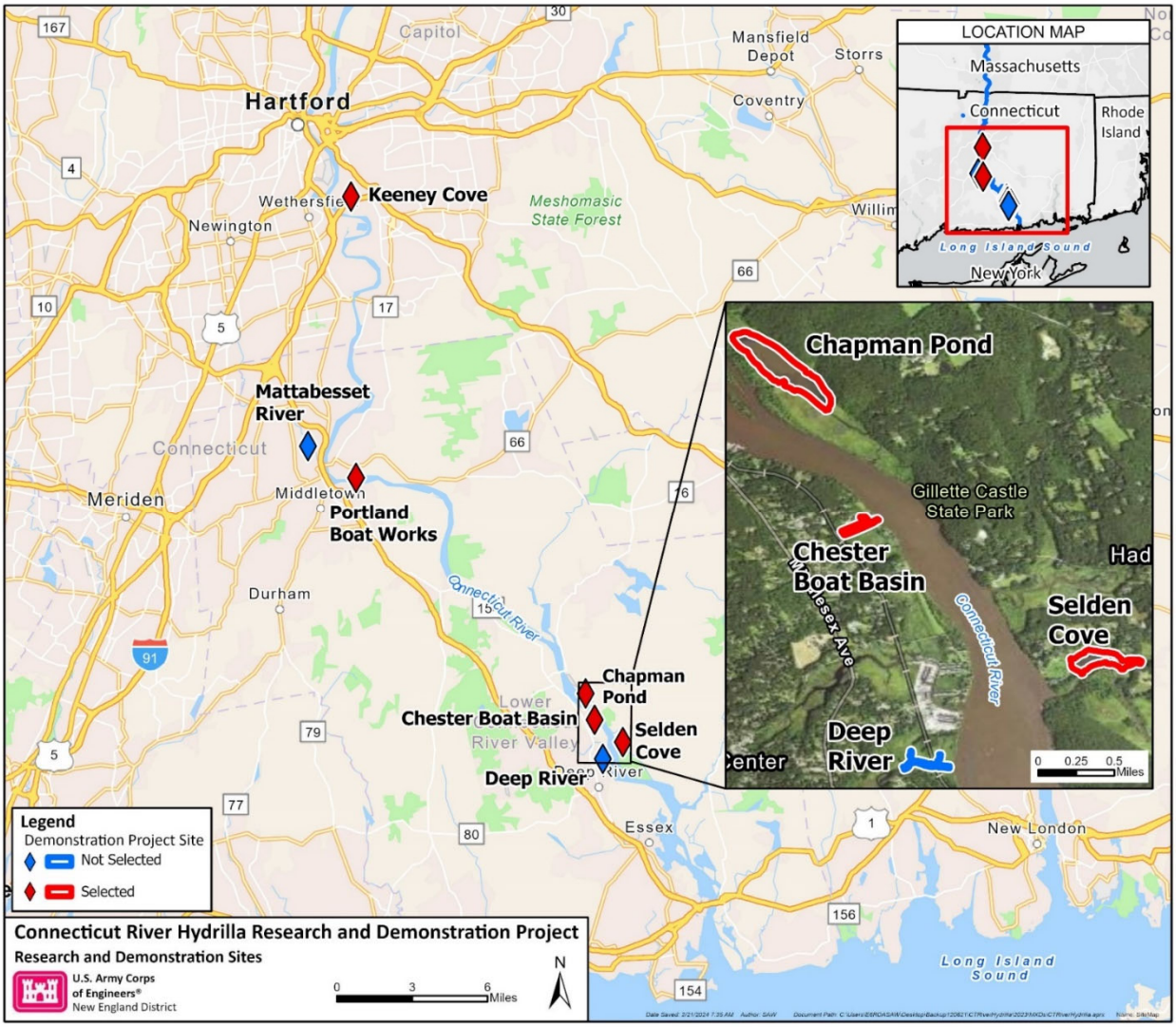

Figure 1. Potential demonstration sites within the Connecticut River watershed for treatment in summer 2024.

Project Description:

The proposed action is the application of herbicide to the waters the Connecticut River watershed for the control of hydrilla. Site specific treatments will be developed, considering the environmental characteristics of the site (e.g., water movement and retention and native species presence) and chemical properties of the herbicides (e.g., target plants and concentrations) needed for control. The herbicides proposed for use include diquat dibromide, dipotassium salt of endothall, and florpyrauxifen-benzyl or a combination of these chemicals. Chapman Pond will be treated with florpyrauxifen-benzyl at 48 parts per billion (ppb) after July 4, 2024, by a licensed aquatic herbicide applicator.

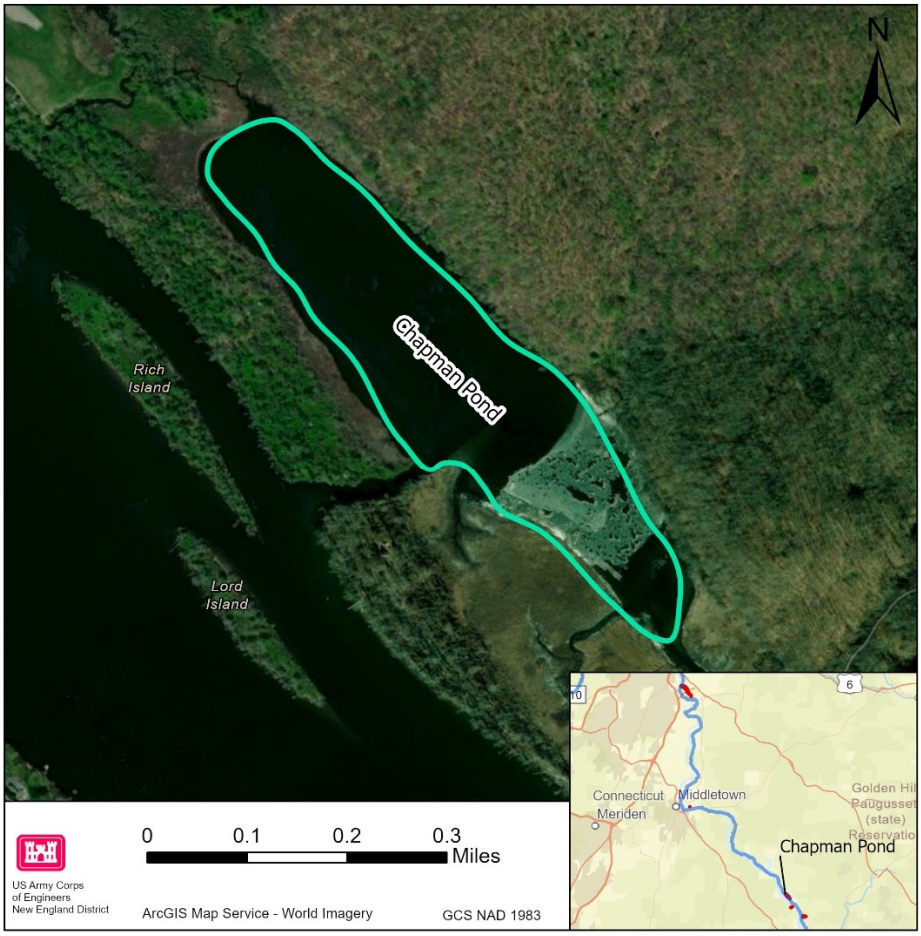

Figure 2. Chapman Pond located in East Haddam, CT

Site Description

Is the project in designated EFH?	Yes
Is the project in designated HAPC?	Yes
Does the project contain any Special Aquatic Sites?	No
Is this coordination under FWCA only?	No

Total area of impact to EFH:

The total area of herbicide treatment is approximately 47.2 acres. Since it is not a closed system with tidal influence, herbicide is expected to flow to areas outside the treatment polygon.

Total area of impact to HAPC:

The project area is approximately 47.2 acres, but impacts may extend outside of the treatment area based on site conditions at the time of treatment.

Current range of water depths:

According to the bathymetric survey conducted by USACE in April 2023, the current water depth within Chapman Pond ranges between 0 and 16 feet deep at MLLW.

Salinity range:

Chapman Pond is located upstream of the northern extent of the Connecticut River estuary's salt wedge; therefore, it is freshwater and has relatively low salinity.

Water temperature range:

Temperature data was sourced from the U.S. Geological Survey's Water Data portal (https://waterdata.usgs.gov).

Surface water temperature in the Connecticut River at Middle Haddam, CT, approximately 10 river miles upstream of Chapman Pond, ranged from approximately 32°F in February 2023 to 80°F in September in 2023, and is likely a good estimate of the range of surface water temperatures within Chapman Pond.

3. Habitat Types

Habitat Location	Habitat Type	Total Impacts	Temporary Impacts	Permanent Impacts	Restored to pre-existing conditions?
Freshwater	Submerged aquatic vegetation	47.2 acres	47.2 acres	47.2 acres	No

Submerged Aquatic Vegetation (SAV)

SAV Present? Yes

Details:

SAV that is present includes hydrilla (*Hydrilla verticillata*), waterweed (*Elodea canadensis*), coontail (*Ceratophyllum demersum*), and American eelgrass (*Valisneria americana*) (Figure 3). Approximately 80% of the 47 acres has SAV coverage, primarily hydrilla.

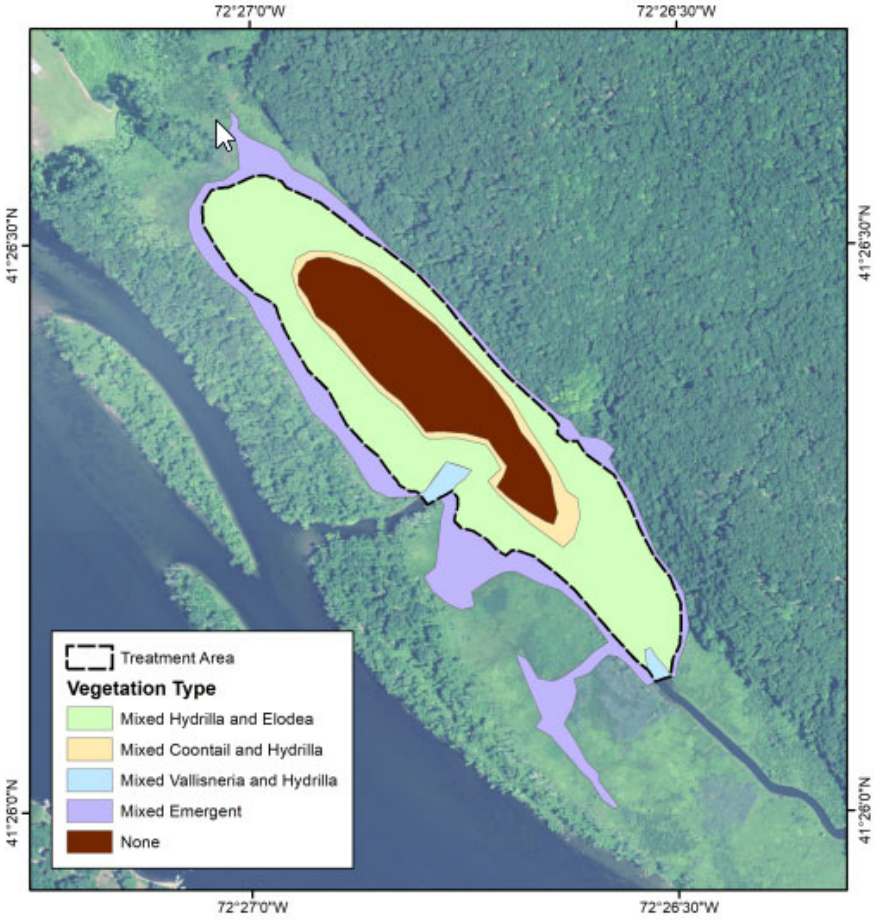

Figure 3. Vegetation assemblage at Chapman Pond.

Sediment Characteristics

General Description of the Sediment Composition:

Based on site observations, sediment is composed of silt/mud.

Diadromous Fish (Migratory or Spawning Habitat)

Diadromous Fish Habitat?: Yes

4. EFH and HAPC Designations

The following table provides a summary of Essential Fish Habitat Designations in Chapman Pond (denoted with an "X") (NMFS, 2023b).

Species	Eggs	Larvae	Juveniles	Adults
Atlantic Butterfish (*Peprilus triacanthus*)	X	X		X
Atlantic Herring (*Clupea harengus*)			X	X
Atlantic mackerel (*Scomber scombrus*)	X	X	X	X
Black Sea Bass (*Centropristis striata*)			X	
Bluefish (*Pomatomus saltatrix*)			X	X
Little Skate (*Leucoraja erinacea*)			X	X
Longfin inshore squid (*Doryteuthis pealeii*)	X		X	X
Pollock (*Pollachius virens*)			X	X
Red Hake (*Urophycis chuss*)	X	X	X	X
Scup (*Stenotomus chrysops*)	X	X	X	X
Summer Flounder (*Paralichthys dentatus*)			X	X
Windowpane Flounder (*Scophthalmus aquosus*)	X	X	X	X

Winter Flounder (*Psuedopleuronectes americanus*)	X	X	X	X
Winter Skate (*Leucoraja ocellata*)			X	X

5. Habitat Areas of Particular Concern (HAPCs)

Select all that apply	HAPC Designation	Select all that apply	HAPC Designation
X	Summer flounder: SAV		Alvin & Atlantis Canyons
	Sandbar shark		Baltimore Canyon
	Sand Tiger Shark (Delaware Bay)		Bear Seamount
	Sand Tiger Shark (Plymouth-Duxbury-Kingston Bay)		Heezen Canyon
	Inshore 20m Juvenile Cod		Hudson Canyon
	Great South Channel Juvenile Cod		Hydrographer Canyon
	Northern Edge Juvenile Cod		Jeffreys & Stellwagen
	Lydonia Canyon		Lydonia, Gilbert & Oceanographer Canyons
	Norfolk Canyon (Mid-Atlantic)		Norfolk Canyon (New England)
	Oceanographer Canyon		Retriever Seamount
	Veatch Canyon (Mid-Atlantic)		Toms, Middle Toms & Hendrickson Canyons
	Veatch Canyon (New England)		Washington Canyon
	Cashes Ledge		Wilmington Canyon
	Atlantic Salmon		

Chapman Pond falls within the regional HAPC for summer flounder. The summer flounder HAPC consists of areas with SAV. The specific designation of summer flounder HAPC is:

> "All native species of macroalgae, seagrasses, and freshwater and tidal macrophytes in any size bed, as well as loose aggregations, within adult and juvenile summer flounder EFH is HAPC. If native species of SAV are eliminated then exotic species should be protected because of functional value, however, all efforts should be made to restore native species (MAFMC, 1998)."

Chapman Pond primarily contains exotic freshwater and tidal macrophytes. This project will control the exotic macrophytes, with the goal of restoring native SAV benefiting native fish and wildlife, and the entire ecosystem. Consequently, this project is expected to have a positive impact to the HAPC for summer flounder.

6. Activity Details

Select all that apply	Project Type/Category
	Agriculture
	Aquaculture
	Bank/shoreline stabilization (e.g., living shoreline, groin, breakwater, bulkhead)
	Beach renourishment
	Dredging/excavation
	Energy development/use e.g., hydropower, oil and gas, pipeline, transmission line, tidal or wave power, wind
	Fill
	Forestry
	Infrastructure/transportation (e.g., culvert construction, bridge repair, highway, port, railroad)
	Intake/outfall
	Military (e.g., acoustic testing, training exercises)
	Mining (e.g., sand, gravel)
	Overboard dredged material placement
	Piers, ramps, floats, and other structures
	Restoration or fish/wildlife enhancement (e.g., fish passage, wetlands, mitigation bank/ILF creation)
	Survey (e.g., geotechnical, geophysical, habitat, fisheries)
	Water quality (e.g., storm water drainage, NPDES, TMDL, wastewater, sediment remediation)
X	Other: aquatic herbicide application

7. Effects Evaluation

Potential Stressors

Select all that apply	Potential Stressors Caused by the Activity
	Underwater noise
X	Water quality/turbidity/ contaminant release
	Vessel traffic/barge grounding
	Impingement/entrainment
	Prevent fish passage/spawning
X	Benthic community disturbance
X	Impacts to prey species

Select all that apply		Potential Stressors Caused by the Activity
Temp	Perm	
		Water depth change
		Tidal flow change
		Fill
X		Habitat type conversion
		Other:

Project Impacts and Mitigation

Project Impacts to EFH by Species

EFH for **Atlantic butterfish** eggs, larvae, and adults is designated at the project area. In Long Island Sound, butterfish spawn from June to late August with a peak in late July. The principal spawning areas are in the eastern part of the sound. They have a seasonal inshore-offshore migration dependent on water temperature. In summer, they move north and inshore to feed on planktonic fish, squid, crustaceans, and jellyfish and then move south and offshore in the winter (NMFS, 1999a). Based on this species' diet, migration pattern, and spawning times, the project will have no effect to Atlantic butterfish EFH.

EFH for **Atlantic herring** juvenile, and adults is designated at the project area. Juveniles are sometimes abundant in fall while adults are abundant in Long Island Sound during the spring. In the Connecticut River, juveniles have a rare abundance only in the mixing zone (NMFS, 1999b). Juveniles and adults are pelagic, with adults only becoming demersal during spawning. Atlantic sea herring prey on pelagic zooplankton. Atlantic herring larvae metamorphose into early-stage juveniles in the spring within intertidal and subtidal habitats out to 985 feet. Given that the project will take place

outside of the time of year that the species is likely present within the project area, construction is not anticipated to cause adverse effects to Atlantic herring nursery habitat.

Atlantic mackerel EFH for all life stages is designated in the project area. Atlantic mackerel spawn pelagic eggs from roughly mid-April to June. The pelagic eggs hatch into planktonic larvae 4-5 days post-fertilization. Atlantic mackerel gain the ability to swim and school after approximately 1-2 months. During the winter, Atlantic mackerel migrate to deep water offshore and eventually move back inshore in the spring. Mackerel feed on a variety of prey during their life cycles, including zooplankton, crustaceans, copepods, and small fish. They are never found in the Connecticut River, and their eggs have high mortality rates at low salinities (NMFS, 1999c). Based the fact that Atlantic mackerel are unlikely to be found north of the Connecticut River estuary, the project will have no effect to this species' EFH.

Black sea bass EFH is designated at the project area for juveniles. In Southern New England, both juvenile and adult black sea bass migrate offshore to over-wintering areas at depths greater than 250 feet when waters begin to cool in the fall. Within estuaries, black sea bass juveniles use shallow shellfish, sponge, amphipod (e.g., *Ampelisca abdita*), seagrass, and cobble habitats as well as manmade structures such as wharves, pilings, and wrecks. Juveniles are generalist carnivores that feed on a variety of infaunal and epifaunal invertebrates, small fish, and squid (NMFS, 1999d). Because black sea bass are unlikely to occur north of the Connecticut River estuary, no adverse effects to EFH is expected as a result of this project.

Juvenile and adult EFH for **bluefish** is designated for the project area. Juveniles are abundant in the Connecticut River estuary but are not known to move into freshwater. Spawning occurs in the spring and summer when adults and juveniles are present inshore. Bluefish feed primarily on small prey fish but may forage for benthic prey on oyster bar and reef habitats when prey availability is limited (NMFS, 1999e). The project is located in areas that do not support bluefish and the action will not impact any prey species.

EFH for **little skate** and **winter skate** juveniles and adults is designated for the project area. Little skate and winter skate are sympatric species with similar habitat requirements. Their EFH occurs on sand, gravel, and mud substrates. Both species are benthic feeders, with crustaceans and polychaetes being important food sources. Both winter skate and little skate move inshore and offshore seasonally, moving into shallower inshore waters during spring and then into deeper waters in winter from roughly November to April (NMFS, 2003a; NMFS, 2003b). The project is located in areas that do not support little skate and winter skate; therefore, the action will not impact EFH.

Longfin inshore squid eggs, juvenile, and adult EFH is designated at the project area. Longfin inshore squid migrate offshore during late autumn and overwinter in deeper, warmer waters along the edge of the continental shelf. They return inshore during the

spring and early summer to feed on planktonic organisms, crustaceans, and small fish. Most spawning occurs in May and hatching occurs in July. Egg masses are commonly found attached to rocks and small boulders on sandy/muddy bottom and on submerged aquatic vegetation (NMFS, 1999f). Longfin inshore squid are not known to use the Connecticut River for habitat so there will be no impact to longfin inshore squid EFH.

Pollock EFH for juveniles, and adults is designated at the project are. Larvae are pelagic, most are found at depths of 164 to 295 feet (50-90 m). The juveniles have been reported over a wide variety of substrates, including sand, mud, or rocky bottom, and vegetation. Most commonly juveniles are found at depths of 82 to 246 feet (25-75 m) although they can be found from the surface to 410 feet deep (125 m). Adults show little preference for bottom type, and they inhabit a wide range of depths from 115 to 1197 feet (35-365 m) (NMFS, 1999g). Pollock are not known to travel up the Connecticut River; therefore, this project is not expected to have impacts.

EFH for all life stages of **red hake** is designated in the project area. Spawning of pelagic eggs occurs in the summer along the continental shelf and is concentrated off southern New England. Red hake larvae have been collected on the middle to outer continental shelf of the Middle Atlantic Bight, but few larvae were collected in the Gulf of Maine. North of Cape Cod, where waters are cooler, juveniles can remain inshore throughout the summer. Both juveniles and adults have primarily been found over muddy substrate (NMFS, 1999h). Red hake will not be present in this area because they are marine fish and not known to travel up the Connecticut River. Therefore, there will be no impacts to red hake EFH.

Scup EFH for all life stages is designated at the project area. Juvenile and adult scup migrate from estuaries to the edge of the continental shelf as water temperatures decline in the winter and return from the edge of the continental shelf to inshore areas as water temperatures rise in the spring. Inshore, summer habitat includes intertidal and subtidal habitats, over sand, silty-sand, shell, mud, mussel beds and eelgrass (*Zostera marina*) as well as rocky ledges, wrecks, artificial reefs, and mussel beds (NMFS, 1999i). Due to the project location north of the Connecticut River estuary, no adverse impacts to scup EFH are expected as a result of this project.

EFH for **summer flounder** juveniles and adults is designated at the project area. Summer flounder inhabit shallow coastal and estuarine waters between May and October, moving offshore to the outer continental shelf during winter months. It is believed that spawning occurs in offshore waters of southern New England, with peak offshore spawning occurring during October and November. Summer flounder juveniles and adults are benthic feeders, with polychaetes, crustaceans, and bivalves being important food sources (NMFS, 1999j). Due to the location of the project being upstream of the Connecticut River estuary, no adverse effects to adult summer flounder spawning EFH are expected.

EFH for all life stages of **windowpane flounder** is designated for the project area. Egg and larval EFH is described as pelagic habitats on the continental shelf from Georges

Bank to Cape Hatteras and in mixed and high salinity zones of coastal bays and estuaries throughout the region. Juvenile and adult EFH occurs in intertidal and sub-tidal muddy or sandy benthic habitats in estuarine, coastal marine, and continental shelf waters from the Gulf of Maine south (NMFS, 1999k). Windowpane flounder habitat is not expected north of the Connecticut River estuary. Therefore, no adverse impacts on all life stages of windowpane flounder EFH would be anticipated as a result of this project.

Winter flounder EFH for all life stages is designated at all project locations. Winter flounder are found in a variety of habitats from brackish riverine waters to saline coastal environments and have been documented from depths of less than 3 feet in coastal embayments, up to approximately 90 feet in Cape Cod Bay and Stellwagen Bank and up to 270 feet on George's Bank. Except for the Georges Bank population, adult winter flounder migrate inshore in the fall and early winter. Spawning occurs in late winter and early spring with peak spawning between February and March in Massachusetts Bay. The diet of juvenile and adult winter flounder consists of benthic fauna; mostly polychaetes and amphipods (NMFS, 1999l). Winter flounder are not expected to inhabit areas north of the Connecticut River estuary. Therefore, no impacts on all life stages of the winter flounder EFH would be anticipated as a result of this project.

Avoidance, Minimization, and Mitigation

Specific measures taken to avoid and minimize impacts to EFH:

The project area does not contain viable EFH for the identified species because it is a tidal freshwater pond and is upstream of the Connecticut River estuary.

Is compensatory mitigation proposed?

No compensatory mitigation proposed.

Compensatory mitigation details:

No significant adverse effects to any species' EFH are expected as a result of this project. Therefore, no compensatory mitigation is proposed.

8. Effects of Climate Change

Could species or habitats be adversely affected by the proposed action due to projected changes in the climate?

No adverse effects to species or habitat are expected as a result of the project and projected climate change.

Is the expected lifespan of the action greater than 10 years?

No, however, use of aquatic herbicides for control of the invasive hydrilla are likely to continue in other parts of the Connecticut River. The project is expected to impact hydrilla to allow for native SAV to replace it.

Is climate change currently affecting vulnerable species or habitats, and would the effects of a proposed action be amplified by climate change?

Vulnerable species and habitats are currently affected by climate change, but the effects of the proposed action are not likely to be amplified by climate change.

Do the results of the assessment indicate the effects of the action on habitats and species will be amplified by climate change?

No.

Can adaptive management strategies (AMS) be integrated into the action to avoid or minimize adverse effects of the proposed action as a result of climate?

Due to negligible impacts to species EFH, the effects of the proposed action are not likely to be amplified by climate change; thus, adaptive management strategies would not help avoid or minimize adverse impacts of the proposed action.

9. Federal Agency Determination

Federal Action Agency's EFH determination	
	There is no adverse effect on EFH or EFH is not designated at the project site. EFH Consultation is not required. This is a FWCA only request.
X	The adverse effect on EFH is not substantial. This means that the adverse effects are no more than minimal, temporary, or can be alleviated with minor project modifications or conservation recommendations. This is a request for an abbreviated EFH consultation.
	The adverse effect on EFH is substantial. This is a request for an expanded EFH consultation.

10. Fish and Wildlife Coordination Act

Fish and Wildlife Coordination Act Resources

Species known to occur at site	**Habitat impact type**
alewife	Temporary impacts to SAV.
American eel	Temporary impacts to SAV.
American shad	Temporary impacts to SAV.
Atlantic menhaden	N/A
blue crab	N/A
blue mussel	N/A
blueback herring	Temporary impacts to SAV.
Eastern oyster	N/A
horseshoe crab	N/A
quahog	N/A
soft-shell clams	N/A
striped bass	Temporary impacts to SAV.
other species:	

11. References

National Marine Fisheries Service (NMFS). 2022. Essential Fish Habitat Mapper. Retrieved August 2022, from https://www.fisheries.noaa.gov/resource/map/essential-fish-habitat-mapper

NMFS. 1999a. Essential Fish Habitat Source Document: Atlantic Butterfish, *Peprilus triacanthus*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 1999b. Essential Fish Habitat Source Document: Atlantic Herring, *Clupea harengus*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 1999c. Essential Fish Habitat Source Document: Atlantic Mackerel, *Scomber scobrus*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 1999d. Essential Fish Habitat Source Document: Black Sea Bass, *Centropristis striata*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 1999e. Essential Fish Habitat Source Document: Bluefish, *Pomatomus saltatrix*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 1999f. Essential Fish Habitat Source Document: Longfin Inshore Squid, *Loligo pealeii*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 1999g. Essential Fish Habitat Source Document: Pollock, *Pollachius virens*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 1999h. Essential Fish Habitat Source Document: Red Hake, *Urophycis chuss*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 1999i. Essential Fish Habitat Source Document: Scup, *Stenotomus chrysops*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 1999j. Essential Fish Habitat Source Document: Summer Flounder, *Paralichthys dentatus*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 1999k. Essential Fish Habitat Source Document: Windowpane Flounder, *Scophthalmus aquosus*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 1999l. Essential Fish Habitat Source Document: Winter Flounder, *Psuedopleuronectes americanus*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 2003a. Essential Fish Habitat Source Document: Little Skate, *Leucoraja erinacea*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 2003b. Essential Fish Habitat Source Document: Winter Skate, *Leucoraja ocellata*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

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NOAA. 2017. Amendment 10 to the 2006 Consolidated Atlantic Highly Migratory Species Fishery Management Plan Plan: Essential Fish Habitat and Environmental Assessment. Office of Sustainable Fisheries, Atlantic Highly Migratory Species Management Division.

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Date Prepared: March 28, 2024

Project/ Application Number: N/A

Project Name: Connecticut River Hydrilla Research and Demonstration Project

Project Applicant: U.S. Army Corps of Engineers, New England District

Federal Action Agency: U.S. Army Corps of Engineers, New England District

Fast-41: No

Action Agency Contact Name: Hannah Doherty

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Concord, Massachusetts 01742-2751

2. Project Description

Location (WGS 84): 41.4241, -72.4391

Body of Water (HUC-12): Deep River-Connecticut River (010802050901)

Project Purpose:

The purpose of the proposed project is to provide a field-scale demonstration of technology developed under the Aquatic Plant Control Research Program (APCRP) that is evaluating the effectiveness of an aquatic herbicide to manage monoecious hydrilla in high water exchange environments. This field demonstration will provide valuable information for developing future guidance on how to manage this invasive aquatic plant which is expanding in high water exchange systems throughout the northeastern U.S. In addition, this field demonstration will be evaluating herbicide efficacy where monoecious hydrilla is most problematic, optimal timing of treatment, and length of exposure required for effective control of hydrilla.

Various methods have been used for control and eradication of hydrilla, including physical, biological, and chemical means. The most effective and economical method of control for well established, large-scale populations is typically a chemical approach by using tested and approved aquatic herbicides. Several herbicides have been used to control hydrilla throughout the country. Treatment and monitoring data from the New York Croton River, Cayuga Lake Inlet, Tonawanda Creek/Erie Canal, and management projects in other states show that several consecutive seasons of chemical treatments are necessary to control hydrilla populations since tubers and turions can persist in the benthic substrate. Within the Connecticut River system, hydrilla is found in both high flow and quiescent river conditions with control of hydrilla in high flow areas posing a complex challenge. The Connecticut River hydrilla has been discovered outside of the river in ponds and lakes. Factors such as water flow, suspended silt, tidal flow, and salinity contribute to the complexity of controlling hydrilla in a system like the Connecticut River. Investigations into herbicide application methods and techniques that address the conditions specific to the Connecticut River will allow for more effective hydrilla control to prevent further spread and impact to other parts of the river and watershed.

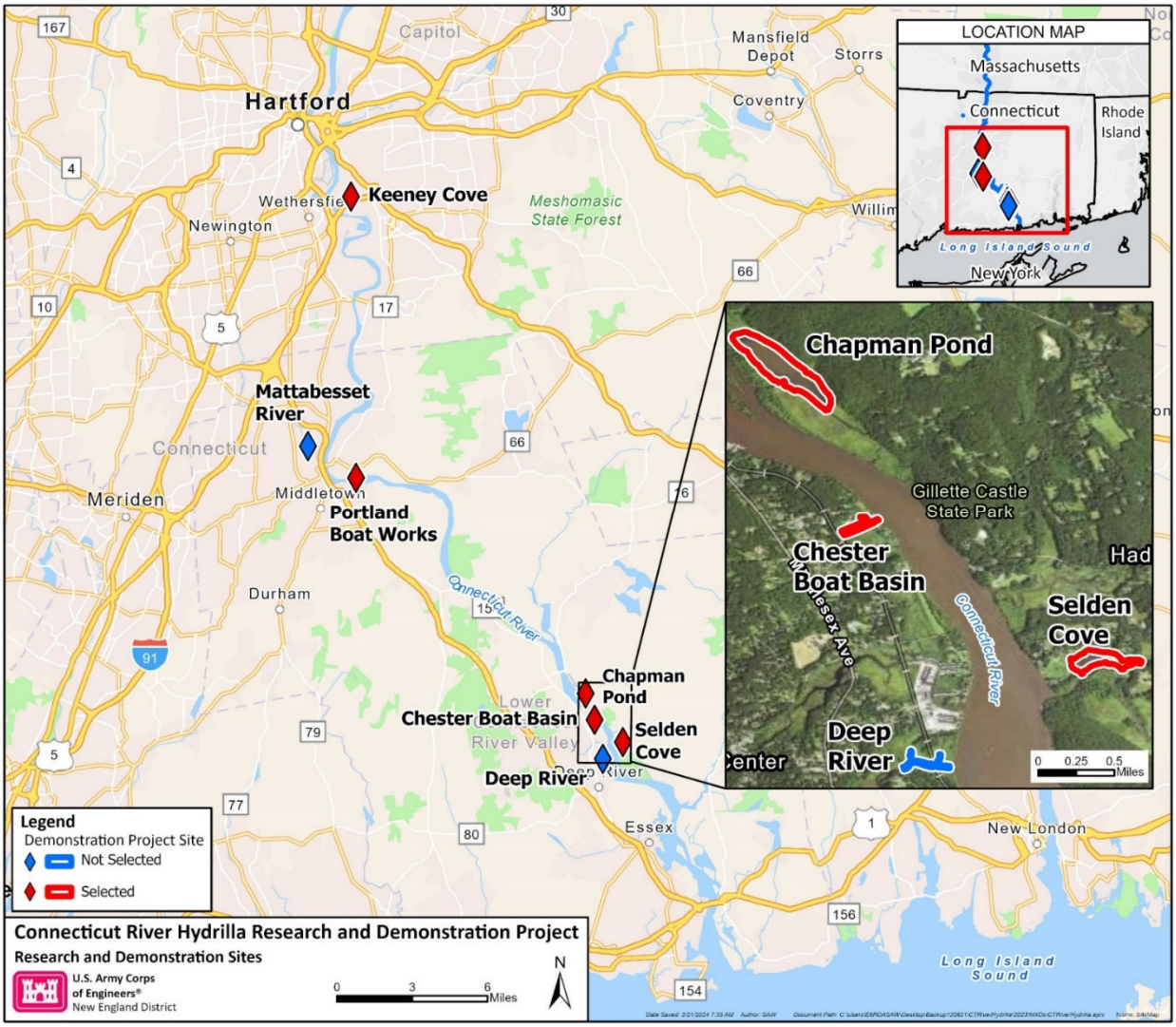

Figure 1. Potential demonstration sites within the Connecticut River watershed for treatment in summer 2024.

Project Description:

The proposed action is the application of herbicide to the waters the Connecticut River watershed for the control of hydrilla. Site specific treatments will be developed, considering the environmental characteristics of the site (e.g., water movement and retention and native species presence) and chemical properties of the herbicides (e.g., target plants and concentrations) needed for control. The herbicides proposed for use include diquat dibromide, dipotassium salt of endothall, and florpyrauxifen-benzyl or a combination of these chemicals. Chester Boat Basin will be treated with a mixture of potassium salt of endothall and diquat dibromide at 1.8 parts per million (ppm) and 0.36 ppm, respectively, after July 4, 2024, by a licensed aquatic herbicide applicator.

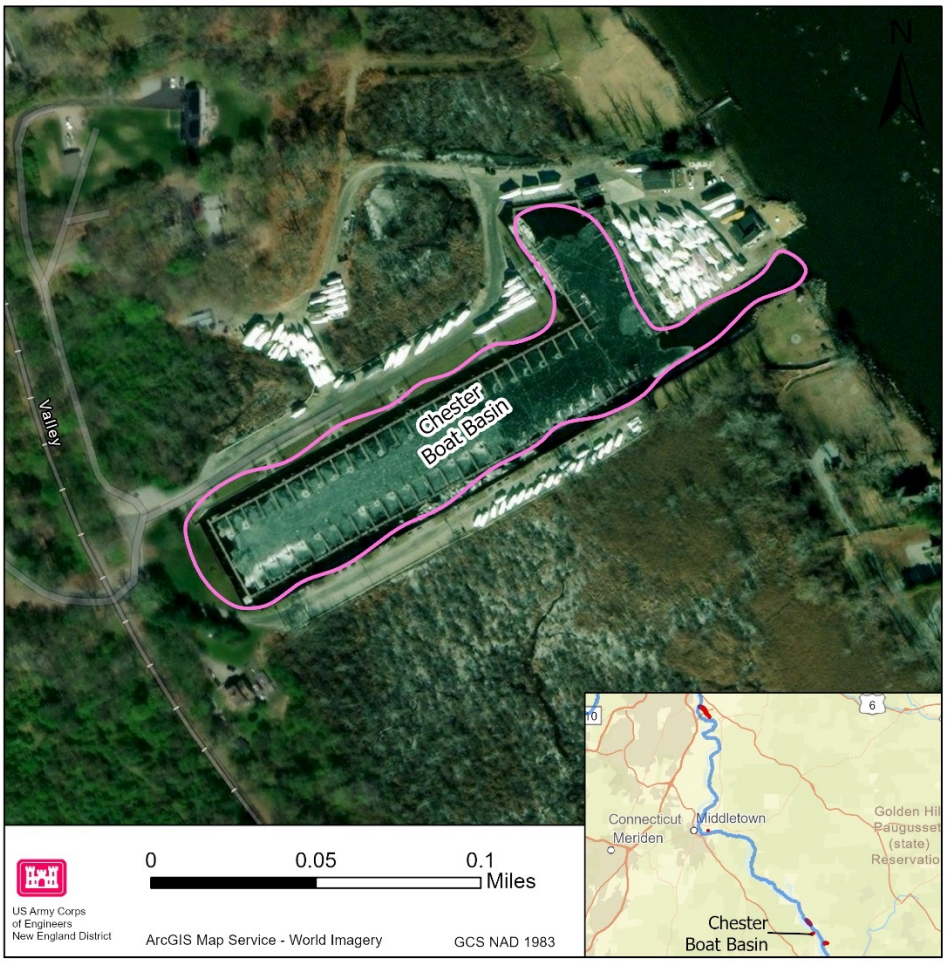

Figure 2. Chester Boat Basin located in Chester, CT

Site Description

Is the project in designated EFH?	Yes
Is the project in designated HAPC?	Yes
Does the project contain any Special Aquatic Sites?	No
Is this coordination under FWCA only?	No

Total area of impact to EFH:

The total area of herbicide treatment is approximately 4.1 acres. Since it is not a closed system with tidal influence, herbicide is expected to flow to areas outside the treatment polygon.

Total area of impact to HAPC:

The project area is approximately 4.1 acres but impacts may extend outside of the treatment area based on site conditions at the time of treatment.

Current range of water depths:

According to the bathymetric survey conducted by USACE in April 2023, the current water depth within Chester Boat Basin ranges between 0 and 9 feet deep at MLLW.

Salinity range:

Chester Boat Basin is located upstream of the northern extent of the Connecticut River estuary's salt wedge; therefore, it is freshwater and has relatively low salinity.

Water temperature range:

Temperature data was sourced from the U.S. Geological Survey's Water Data portal (https://waterdata.usgs.gov).

Surface water temperature in the Connecticut River at Middle Haddam, CT, approximately 10 river miles upstream of Chester Boat Basin, ranged from approximately 32°F in February 2023 to 80°F in September in 2023, and is likely a good estimate of the range of surface water temperatures within Chester Boat Basin.

3. Habitat Types

Habitat Location	Habitat Type	Total Impacts	Temporary Impacts	Permanent Impacts	Restored to pre-existing conditions?
Freshwater	Submerged aquatic vegetation	4.1 acres	4.1 acres	4.1 acres	No

Submerged Aquatic Vegetation (SAV)

SAV Present? Yes

Details:

SAV that is present includes hydrilla (*Hydrilla verticillata*), fanwort (*Cabomba caroliniana*), Eurasian milfoil (*Myriophyllum spicatum*), with some native vegetation. (Figure 3). Most of the 4.1 acres has SAV coverage, primarily hydrilla and other invasive plants.

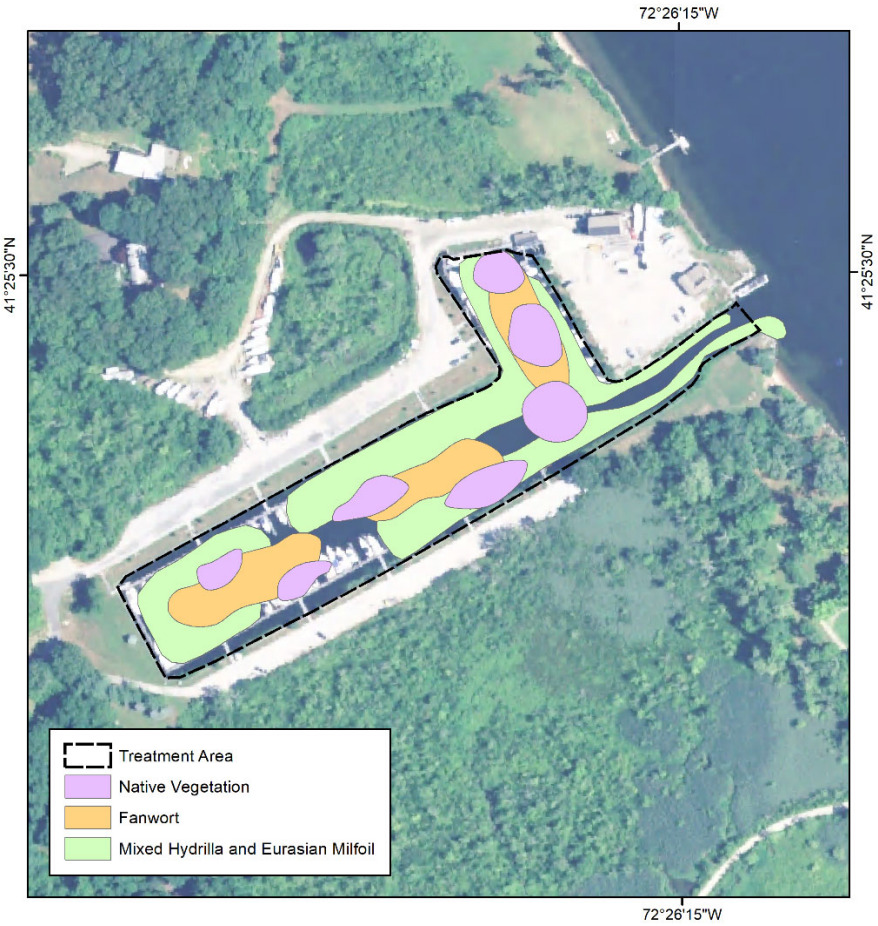

Figure 3. Vegetation assemblage at Chester Boat Basin.

Sediment Characteristics

General Description of the Sediment Composition:

Based on site observations, sediment is composed of silt/mud.

Diadromous Fish (Migratory or Spawning Habitat)

Diadromous Fish Habitat?: Yes

4. EFH and HAPC Designations

The following table provides a summary of Essential Fish Habitat Designations in Chester Boat Basin (denoted with an "X") (NMFS, 2023b).

Species	Eggs	Larvae	Juveniles	Adults
Atlantic Butterfish (*Peprilus triacanthus*)	X	X		X
Atlantic Herring (*Clupea harengus*)			X	X
Atlantic mackerel (*Scomber scombrus*)	X	X	X	X
Black Sea Bass (*Centropristis striata*)			X	
Bluefish (*Pomatomus saltatrix*)			X	X
Little Skate (*Leucoraja erinacea*)			X	X
Longfin inshore squid (*Doryteuthis pealeii*)	X		X	X
Pollock (*Pollachius virens*)			X	X
Red Hake (*Urophycis chuss*)	X	X	X	X
Scup (*Stenotomus chrysops*)	X	X	X	X
Summer Flounder (*Paralichthys dentatus*)			X	X
Windowpane Flounder (*Scophthalmus aquosus*)	X	X	X	X

Winter Flounder (*Psuedopleuronectes americanus*)	X	X	X	X
Winter Skate (*Leucoraja ocellata*)			X	X

5. Habitat Areas of Particular Concern (HAPCs)

Select all that apply	HAPC Designation	Select all that apply	HAPC Designation
X	Summer flounder: SAV		Alvin & Atlantis Canyons
	Sandbar shark		Baltimore Canyon
	Sand Tiger Shark (Delaware Bay)		Bear Seamount
	Sand Tiger Shark (Plymouth-Duxbury-Kingston Bay)		Heezen Canyon
	Inshore 20m Juvenile Cod		Hudson Canyon
	Great South Channel Juvenile Cod		Hydrographer Canyon
	Northern Edge Juvenile Cod		Jeffreys & Stellwagen
	Lydonia Canyon		Lydonia, Gilbert & Oceanographer Canyons
	Norfolk Canyon (Mid-Atlantic)		Norfolk Canyon (New England)
	Oceanographer Canyon		Retriever Seamount
	Veatch Canyon (Mid-Atlantic)		Toms, Middle Toms & Hendrickson Canyons
	Veatch Canyon (New England)		Washington Canyon
	Cashes Ledge		Wilmington Canyon
	Atlantic Salmon		

Chester Boat Basin falls within the regional HAPC for summer flounder. The summer flounder HAPC consists of areas with SAV. The specific designation of summer flounder HAPC is:

> "All native species of macroalgae, seagrasses, and freshwater and tidal macrophytes in any size bed, as well as loose aggregations, within adult and juvenile summer flounder EFH is HAPC. If native species of SAV are eliminated then exotic species should be protected because of functional value, however, all efforts should be made to restore native species (MAFMC, 1998)."

Chester Boat Basin primarily contains exotic freshwater and tidal macrophytes. This project will control the exotic macrophytes, with the goal of restoring native SAV benefitting native fish and wildlife, and the entire ecosystem. Consequently, this project is expected to have a positive impact to the HAPC for summer flounder.

6. Activity Details

Select all that apply	Project Type/Category
	Agriculture
	Aquaculture
	Bank/shoreline stabilization (e.g., living shoreline, groin, breakwater, bulkhead)
	Beach renourishment
	Dredging/excavation
	Energy development/use e.g., hydropower, oil and gas, pipeline, transmission line, tidal or wave power, wind
	Fill
	Forestry
	Infrastructure/transportation (e.g., culvert construction, bridge repair, highway, port, railroad)
	Intake/outfall
	Military (e.g., acoustic testing, training exercises)
	Mining (e.g., sand, gravel)
	Overboard dredged material placement
	Piers, ramps, floats, and other structures
	Restoration or fish/wildlife enhancement (e.g., fish passage, wetlands, mitigation bank/ILF creation)
	Survey (e.g., geotechnical, geophysical, habitat, fisheries)
	Water quality (e.g., storm water drainage, NPDES, TMDL, wastewater, sediment remediation)
X	Other: aquatic herbicide application

7. Effects Evaluation

Potential Stressors

Select all that apply	Potential Stressors Caused by the Activity
	Underwater noise
X	Water quality/turbidity/ contaminant release
	Vessel traffic/barge grounding
	Impingement/entrainment
	Prevent fish passage/spawning
X	Benthic community disturbance
X	Impacts to prey species

Select all that apply		Potential Stressors Caused by the Activity
Temp	Perm	
		Water depth change
		Tidal flow change
		Fill
X		Habitat type conversion
		Other:

Project Impacts and Mitigation

Project Impacts to EFH by Species

EFH for **Atlantic butterfish** eggs, larvae, and adults is designated at the project area. In Long Island Sound, butterfish spawn from June to late August with a peak in late July. The principal spawning areas are in the eastern part of the sound. They have a seasonal inshore-offshore migration dependent on water temperature. In summer, they move north and inshore to feed on planktonic fish, squid, crustaceans, and jellyfish and then move south and offshore in the winter (NMFS, 1999a). Based on this species' diet, migration pattern, and spawning times, the project will have no effect to Atlantic butterfish EFH.

EFH for **Atlantic herring** juvenile, and adults is designated at the project area. Juveniles are sometimes abundant in fall while adults are abundant in Long Island Sound during the spring. In the Connecticut River, juveniles have a rare abundance only in the mixing zone (NMFS, 1999b). Juveniles and adults are pelagic, with adults only becoming demersal during spawning. Atlantic sea herring prey on pelagic zooplankton. Atlantic herring larvae metamorphose into early-stage juveniles in the spring within intertidal and subtidal habitats out to 985 feet. Given that the project will take place

outside of the time of year that the species is likely present within the project area, construction is not anticipated to cause adverse effects to Atlantic herring nursery habitat.

Atlantic mackerel EFH for all life stages is designated in the project area. Atlantic mackerel spawn pelagic eggs from roughly mid-April to June. The pelagic eggs hatch into planktonic larvae 4-5 days post-fertilization. Atlantic mackerel gain the ability to swim and school after approximately 1-2 months. During the winter, Atlantic mackerel migrate to deep water offshore and eventually move back inshore in the spring. Mackerel feed on a variety of prey during their life cycles, including zooplankton, crustaceans, copepods, and small fish. They are never found in the Connecticut River, and their eggs have high mortality rates at low salinities (NMFS, 1999c). Based the fact that Atlantic mackerel are unlikely to be found north of the Connecticut River estuary, the project will have no effect to this species' EFH.

Black sea bass EFH is designated at the project area for juveniles. In Southern New England, both juvenile and adult black sea bass migrate offshore to over-wintering areas at depths greater than 250 feet when waters begin to cool in the fall. Within estuaries, black sea bass juveniles use shallow shellfish, sponge, amphipod (e.g., *Ampelisca abdita*), seagrass, and cobble habitats as well as manmade structures such as wharves, pilings, and wrecks. Juveniles are generalist carnivores that feed on a variety of infaunal and epifaunal invertebrates, small fish, and squid (NMFS, 1999d). Because black sea bass are unlikely to occur north of the Connecticut River estuary, no adverse effects to EFH is expected as a result of this project.

Juvenile and adult EFH for **bluefish** is designated for the project area. Juveniles are abundant in the Connecticut River estuary but are not known to move into freshwater. Spawning occurs in the spring and summer when adults and juveniles are present inshore. Bluefish feed primarily on small prey fish but may forage for benthic prey on oyster bar and reef habitats when prey availability is limited (NMFS, 1999e). The project is located in areas that do not support bluefish and the action will not impact any prey species.

EFH for **little skate** and **winter skate** juveniles and adults is designated for the project area. Little skate and winter skate are sympatric species with similar habitat requirements. Their EFH occurs on sand, gravel, and mud substrates. Both species are benthic feeders, with crustaceans and polychaetes being important food sources. Both winter skate and little skate move inshore and offshore seasonally, moving into shallower inshore waters during spring and then into deeper waters in winter from roughly November to April (NMFS, 2003a; NMFS, 2003b). The project is located in areas that do not support little skate and winter skate; therefore, the action will not impact EFH.

Longfin inshore squid eggs, juvenile, and adult EFH is designated at the project area. Longfin inshore squid migrate offshore during late autumn and overwinter in deeper, warmer waters along the edge of the continental shelf. They return inshore during the

spring and early summer to feed on planktonic organisms, crustaceans, and small fish. Most spawning occurs in May and hatching occurs in July. Egg masses are commonly found attached to rocks and small boulders on sandy/muddy bottom and on submerged aquatic vegetation (NMFS, 1999f). Longfin inshore squid are not known to use the Connecticut River for habitat so there will be no impact to longfin inshore squid EFH.

Pollock EFH for juveniles, and adults is designated at the project are. Larvae are pelagic, most are found at depths of 164 to 295 feet (50-90 m). The juveniles have been reported over a wide variety of substrates, including sand, mud, or rocky bottom, and vegetation. Most commonly juveniles are found at depths of 82 to 246 feet (25-75 m) although they can be found from the surface to 410 feet deep (125 m). Adults show little preference for bottom type, and they inhabit a wide range of depths from 115 to 1197 feet (35-365 m) (NMFS, 1999g). Pollock are not known to travel up the Connecticut River; therefore, this project is not expected to have impacts.

EFH for all life stages of **red hake** is designated in the project area. Spawning of pelagic eggs occurs in the summer along the continental shelf and is concentrated off southern New England. Red hake larvae have been collected on the middle to outer continental shelf of the Middle Atlantic Bight, but few larvae were collected in the Gulf of Maine. North of Cape Cod, where waters are cooler, juveniles can remain inshore throughout the summer. Both juveniles and adults have primarily been found over muddy substrate (NMFS, 1999h). Red hake will not be present in this area because they are marine fish and not known to travel up the Connecticut River. Therefore, there will be no impacts to red hake EFH.

Scup EFH for all life stages is designated at the project area. Juvenile and adult scup migrate from estuaries to the edge of the continental shelf as water temperatures decline in the winter and return from the edge of the continental shelf to inshore areas as water temperatures rise in the spring. Inshore, summer habitat includes intertidal and subtidal habitats, over sand, silty-sand, shell, mud, mussel beds and eelgrass (*Zosteria marina*) as well as rocky ledges, wrecks, artificial reefs, and mussel beds (NMFS, 1999i). Due to the project location north of the Connecticut River estuary, no adverse impacts to scup EFH are expected as a result of this project.

EFH for **summer flounder** juveniles and adults is designated at the project area. Summer flounder inhabit shallow coastal and estuarine waters between May and October, moving offshore to the outer continental shelf during winter months. It is believed that spawning occurs in offshore waters of southern New England, with peak offshore spawning occurring during October and November. Summer flounder juveniles and adults are benthic feeders, with polychaetes, crustaceans, and bivalves being important food sources (NMFS, 1999j). Due to the location of the project being upstream of the Connecticut River estuary, no adverse effects to adult summer flounder spawning EFH are expected.

EFH for all life stages of **windowpane flounder** is designated for the project area. Egg and larval EFH is described as pelagic habitats on the continental shelf from Georges

Bank to Cape Hatteras and in mixed and high salinity zones of coastal bays and estuaries throughout the region. Windowpane flounder spawn year-round. Juvenile and adult EFH occurs in intertidal and sub-tidal muddy or sandy benthic habitats in estuarine, coastal marine, and continental shelf waters from the Gulf of Maine south (NMFS, 1999k). Windowpane flounder habitat is not expected north of the Connecitcut River estuary. Therefore, no adverse impacts on all life stages of windowpane flounder EFH would be anticipated as a result of this project.

Winter flounder EFH for all life stages is designated at all project locations. Winter flounder are found in a variety of habitats from brackish riverine waters to saline coastal environments and have been documented from depths of less than 3 feet in coastal embayments, up to approximately 90 feet in Cape Cod Bay and Stellwagen Bank and up to 270 feet on George's Bank. Except for the Georges Bank population, adult winter flounder migrate inshore in the fall and early winter. Spawning occurs in late winter and early spring with peak spawning between February and March in Massachusetts Bay. The diet of juvenile and adult winter flounder consists of benthic fauna; mostly polychaetes and amphipods (NMFS, 1999l). Winter flounder are not expected to inhabit areas north of the Connecticut River estuary. Therefore, no impacts on all life stages of the winter flounder EFH would be anticipated as a result of this project.

Avoidance, Minimization, and Mitigation

Specific measures taken to avoid and minimize impacts to EFH:

The project area does not contain viable EFH for the identified species because it is a tidal freshwater pond and is upstream of the Connecticut River estuary.

Is compensatory mitigation proposed?

No compensatory mitigation proposed.

Compensatory mitigation details:

No significant adverse effects to any species' EFH are expected as a result of this project. Therefore, no compensatory mitigation is proposed.

8. Effects of Climate Change

Could species or habitats be adversely affected by the proposed action due to projected changes in the climate?

No adverse effects to species or habitat are expected as a result of the project and projected climate change.

Is the expected lifespan of the action greater than 10 years?

No, however, use of aquatic herbicides for control of the invasive hydrilla are likely to continue in other parts of the Connecticut River. The project is expected to impact hydrilla to allow for native SAV to replace it.

Is climate change currently affecting vulnerable species or habitats, and would the effects of a proposed action be amplified by climate change?

Vulnerable species and habitats are currently affected by climate change, but the effects of the proposed action are not likely to be amplified by climate change.

Do the results of the assessment indicate the effects of the action on habitats and species will be amplified by climate change?

No.

Can adaptive management strategies (AMS) be integrated into the action to avoid or minimize adverse effects of the proposed action as a result of climate?

Due to negligible impacts to species EFH, the effects of the proposed action are not likely to be amplified by climate change; thus, adaptive management strategies would not help avoid or minimize adverse impacts of the proposed action.

9. Federal Agency Determination

Federal Action Agency's EFH determination	
	There is no adverse effect on EFH or EFH is not designated at the project site. EFH Consultation is not required. This is a FWCA only request.
X	The adverse effect on EFH is not substantial. This means that the adverse effects are no more than minimal, temporary, or can be alleviated with minor project modifications or conservation recommendations. This is a request for an abbreviated EFH consultation.
	The adverse effect on EFH is substantial. This is a request for an expanded EFH consultation.

10. Fish and Wildlife Coordination Act

Fish and Wildlife Coordination Act Resources

Species known to occur at site	**Habitat impact type**
alewife	Temporary impacts to SAV.
American eel	Temporary impacts to SAV.
American shad	Temporary impacts to SAV.
Atlantic menhaden	N/A
blue crab	N/A
blue mussel	N/A
blueback herring	Temporary impacts to SAV.
Eastern oyster	N/A
horseshoe crab	N/A
quahog	N/A
soft-shell clams	N/A
striped bass	Temporary impacts to SAV.
other species:	

11. References

National Marine Fisheries Service (NMFS). 2022. Essential Fish Habitat Mapper. Retrieved August 2022, from https://www.fisheries.noaa.gov/resource/map/essential-fish-habitat-mapper

NMFS. 1999a. Essential Fish Habitat Source Document: Atlantic Butterfish, *Peprilus triacanthus*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 1999b. Essential Fish Habitat Source Document: Atlantic Herring, *Clupea harengus*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 1999c. Essential Fish Habitat Source Document: Atlantic Mackerel, *Scomber scobrus*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 1999d. Essential Fish Habitat Source Document: Black Sea Bass, *Centropristis striata*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 1999e. Essential Fish Habitat Source Document: Bluefish, *Pomatomus saltatrix*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 1999f. Essential Fish Habitat Source Document: Longfin Inshore Squid, *Loligo pealeii*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 1999g. Essential Fish Habitat Source Document: Pollock, *Pollachius virens*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 1999h. Essential Fish Habitat Source Document: Red Hake, *Urophycis chuss*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 1999i. Essential Fish Habitat Source Document: Scup, *Stenotomus chrysops*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 1999j. Essential Fish Habitat Source Document: Summer Flounder, *Paralichthys dentatus*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 1999k. Essential Fish Habitat Source Document: Windowpane Flounder, *Scophthalmus aquosus*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 1999l. Essential Fish Habitat Source Document: Winter Flounder, *Psuedopleuronectes americanus*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 2003a. Essential Fish Habitat Source Document: Little Skate, *Leucoraja erinacea*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 2003b. Essential Fish Habitat Source Document: Winter Skate, *Leucoraja ocellata*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

National Oceanic and Atmospheric Administration (NOAA) Northeast Fisheries Service. n.d. Northeast Fisheries Science Center (NEFSC) Essential Fish Habitat Source Documents: Life History and Habitat Characteristics. Available at https://www.nefsc.noaa.gov/nefsc/habitat/efh/#list

NOAA. 2017. Amendment 10 to the 2006 Consolidated Atlantic Highly Migratory Species Fishery Management Plan Plan: Essential Fish Habitat and Environmental Assessment. Office of Sustainable Fisheries, Atlantic Highly Migratory Species Management Division.

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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1. General Project Information

Date Prepared: March 28, 2024

Project/ Application Number: N/A

Project Name: Connecticut River Hydrilla Research and Demonstration Project

Project Applicant: U.S. Army Corps of Engineers, New England District

Federal Action Agency: U.S. Army Corps of Engineers, New England District

Fast-41: No

Action Agency Contact Name: Hannah Doherty

Contact Phone: 978-318-8685

Contact Email: Hannah.L.Doherty@usace.army.mil

Address: U.S. Army Corps of Engineers
New England District
696 Virginia Road
Concord, Massachusetts 01742-2751

2. Project Description

Location (WGS 84): 41.7215, -72.6291

Body of Water (HUC-12): Salmon Brook (010802050503)

Project Purpose:

The purpose of the proposed project is to provide a field-scale demonstration of technology developed under the Aquatic Plant Control Research Program (APCRP) that is evaluating the effectiveness of an aquatic herbicide to manage monoecious hydrilla in high water exchange environments. This field demonstration will provide valuable information for developing future guidance on how to manage this invasive aquatic plant which is expanding in high water exchange systems throughout the northeastern U.S. In addition, this field demonstration will be evaluating herbicide efficacy where monoecious hydrilla is most problematic, optimal timing of treatment, and length of exposure required for effective control of hydrilla.

Various methods have been used for control and eradication of hydrilla, including physical, biological, and chemical means. The most effective and economical method of control for well established, large-scale populations is typically a chemical approach by using tested and approved aquatic herbicides. Several herbicides have been used to control hydrilla throughout the country. Treatment and monitoring data from the New York Croton River, Cayuga Lake Inlet, Tonawanda Creek/Erie Canal and management projects in other states show that several consecutive seasons of chemical treatments are necessary to control hydrilla populations since tubers and turions can persist in the benthic substrate. Within the Connecticut River system, hydrilla is found in both high flow and quiescent river conditions with control of hydrilla in high flow areas posing a complex challenge. The Connecticut River hydrilla has been discovered outside of the river in ponds and lakes. Factors such as water flow, suspended silt, tidal flow, and salinity contribute to the complexity of controlling hydrilla in a system like the Connecticut River. Investigations into herbicide application methods and techniques that address the conditions specific to the Connecticut River will allow for more effective hydrilla control to prevent further spread and impact to other parts of the river and watershed.

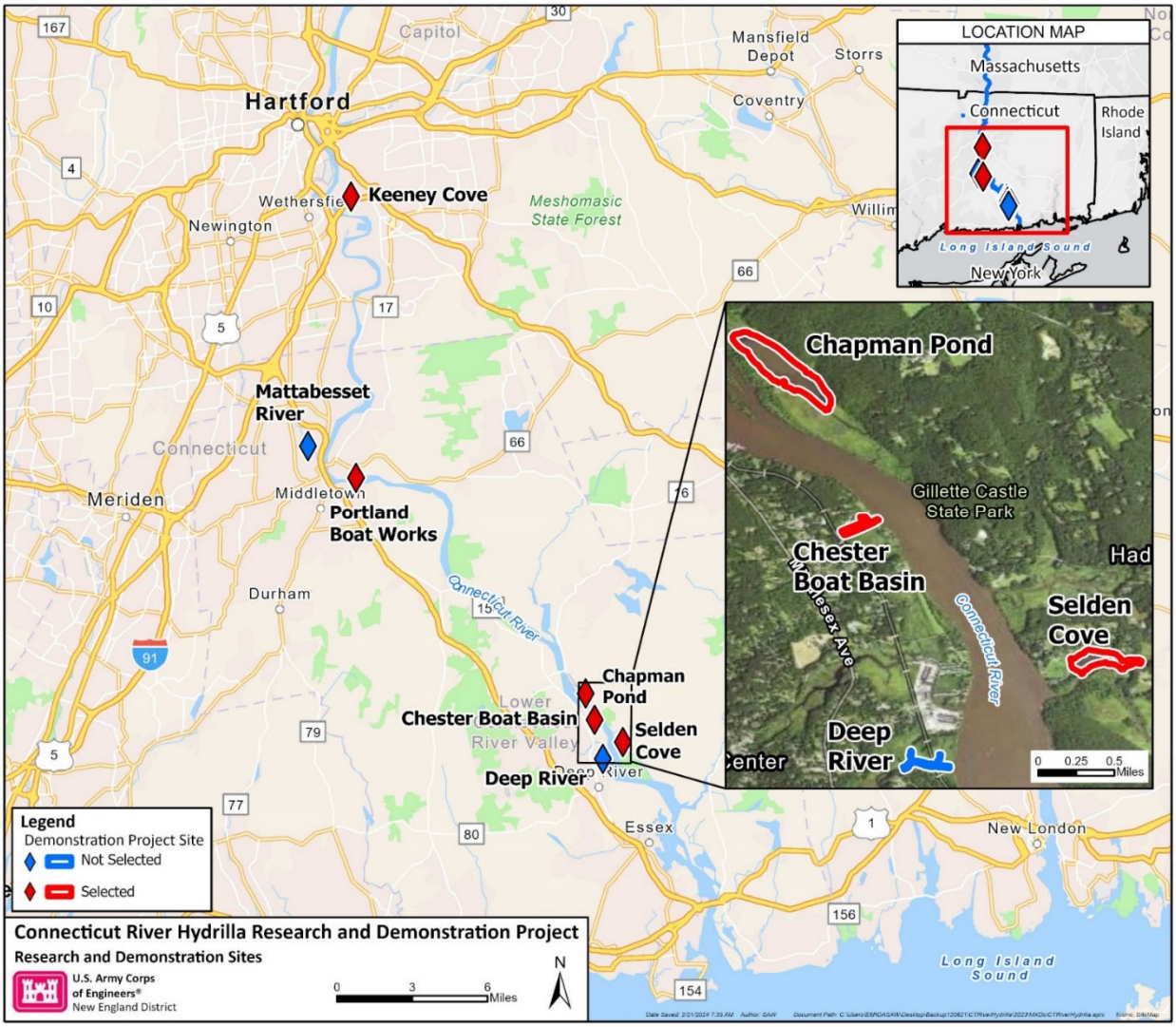

Figure 1. Potential demonstration sites within the Connecticut River watershed for treatment in summer 2024.

Project Description:

The proposed action is the application of herbicide to the waters the Connecticut River watershed for the control of hydrilla. Site specific treatments will be developed, considering the environmental characteristics of the site (e.g., water movement and retention and native species presence) and chemical properties of the herbicides (e.g., target plants and concentrations) needed for control. The herbicides proposed for use include diquat dibromide, dipotassium salt of endothall, and florpyrauxifen-benzyl or a combination of these chemicals. Keeney Cove will be treated with florpyrauxifen-benzyl at 48 parts per billion after July 4, 2024, by a licensed aquatic herbicide applicator.

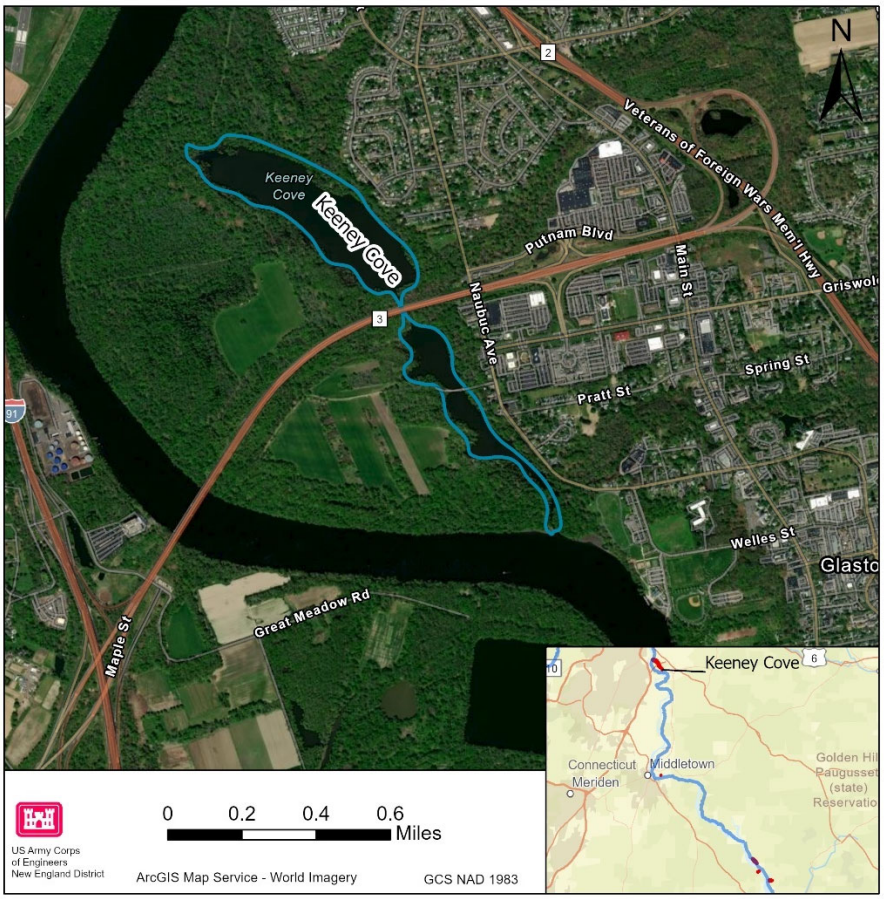

Figure 2. Keeney Cove located in Glastonbury, CT

Site Description

Is the project in designated EFH?	Yes
Is the project in designated HAPC?	Yes
Does the project contain any Special Aquatic Sites?	No
Is this coordination under FWCA only?	No

Total area of impact to EFH:

The total area of herbicide treatment is approximately 95.3 acres. Since it is not a closed system with tidal influence, herbicide is expected to flow to areas outside the treatment polygon.

Total area of impact to HAPC:

The project area is approximately 95.3 acres but impacts may extend outside of the treatment area based on site conditions at the time of treatment.

Current range of water depths:

According to the bathymetric survey conducted by USACE in April 2023, the current water depth within Keeney Cove ranges between 0 and 21 feet deep at MLLW.

Salinity range:

Keeney Cove is located upstream of the northern extent of the Connecticut River estuary's salt wedge; therefore, it is freshwater and has relatively low salinity.

Water temperature range:

Temperature data was sourced from the U.S. Geological Survey's Water Data portal (https://waterdata.usgs.gov).

Surface water temperature in the Connecticut River at Middle Haddam, CT, approximately 20 river miles downstream of Keeney Cove, ranged from approximately 32°F in February 2023 to 80°F in September in 2023, and is likely a good estimate of the range of surface water temperatures at Keeney Cove.

3. Habitat Types

Habitat Location	Habitat Type	Total Impacts	Temporary Impacts	Permanent Impacts	Restored to pre-existing conditions?
Freshwater	Submerged aquatic vegetation	95.3 acres	95.3 acres	95.3 acres	No

Submerged Aquatic Vegetation (SAV)

SAV Present? Yes

Details:

SAV that is present includes hydrilla (*Hydrilla verticillata*), and coontail (*Ceratophyllum demersum*) (Figure 3). Almost all of the 95.3 acres has SAV coverage, primarily hydrilla.

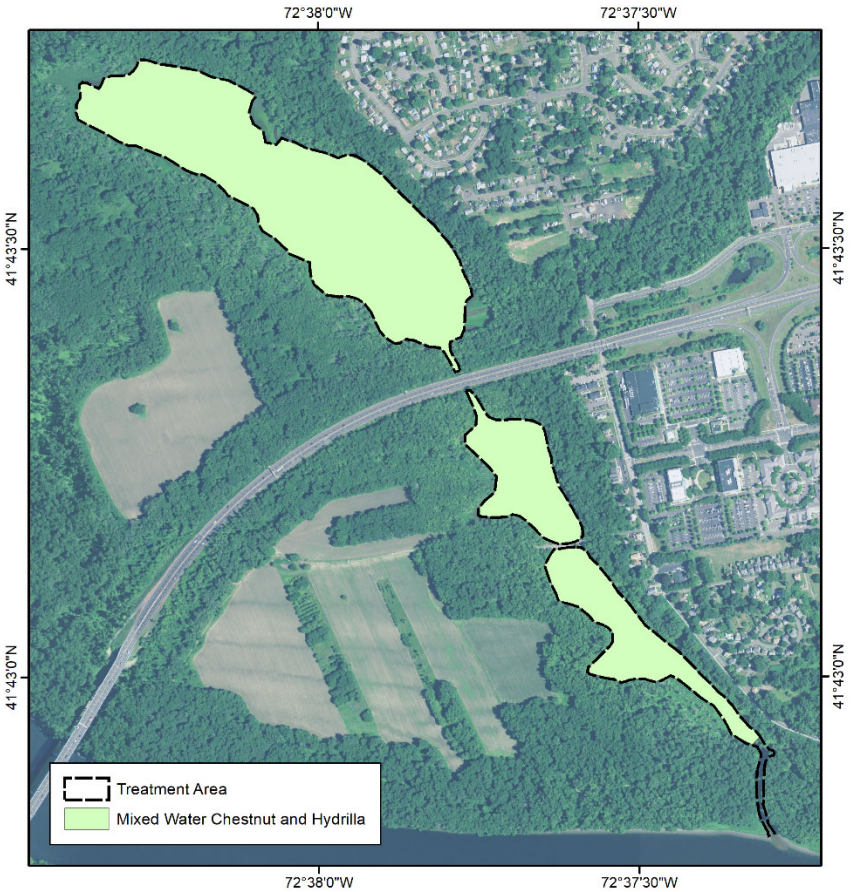

Figure 3. Vegetation assemblage at Keeney Cove.

Sediment Characteristics

General Description of the Sediment Composition:

Based on site observations, sediment is composed of silt/mud.

Diadromous Fish (Migratory or Spawning Habitat)

Diadromous Fish Habitat?: Yes

4. EFH and HAPC Designations

The following table provides a summary of Essential Fish Habitat Designations in Keeney Cove (denoted with an "X") (NMFS, 2023b).

Species	Eggs	Larvae	Juveniles	Adults
Atlantic Butterfish (*Peprilus triacanthus*)	X	X		X
Atlantic Herring (*Clupea harengus*)			X	X
Atlantic mackerel (*Scomber scombrus*)	X	X	X	X
Black Sea Bass (*Centropristis striata*)			X	
Bluefish (*Pomatomus saltatrix*)			X	X
Little Skate (*Leucoraja erinacea*)			X	X
Longfin inshore squid (*Doryteuthis pealeii*)	X		X	X
Pollock (*Pollachius virens*)			X	X
Red Hake (*Urophycis chuss*)	X	X	X	X
Scup (*Stenotomus chrysops*)	X	X	X	X
Summer Flounder (*Paralichthys dentatus*)			X	X
Windowpane Flounder (*Scophthalmus aquosus*)	X	X	X	X

Winter Flounder (*Psuedopleuronectes americanus*)	X	X	X	X
Winter Skate (*Leucoraja ocellata*)			X	X

5. Habitat Areas of Particular Concern (HAPCs)

Select all that apply	HAPC Designation	Select all that apply	HAPC Designation
X	Summer flounder: SAV		Alvin & Atlantis Canyons
	Sandbar shark		Baltimore Canyon
	Sand Tiger Shark (Delaware Bay)		Bear Seamount
	Sand Tiger Shark (Plymouth-Duxbury-Kingston Bay)		Heezen Canyon
	Inshore 20m Juvenile Cod		Hudson Canyon
	Great South Channel Juvenile Cod		Hydrographer Canyon
	Northern Edge Juvenile Cod		Jeffreys & Stellwagen
	Lydonia Canyon		Lydonia, Gilbert & Oceanographer Canyons
	Norfolk Canyon (Mid-Atlantic)		Norfolk Canyon (New England)
	Oceanographer Canyon		Retriever Seamount
	Veatch Canyon (Mid-Atlantic)		Toms, Middle Toms & Hendrickson Canyons
	Veatch Canyon (New England)		Washington Canyon
	Cashes Ledge		Wilmington Canyon
	Atlantic Salmon		

Keeney Cove falls within the regional HAPC for summer flounder. The summer flounder HAPC consists of areas with SAV. The specific designation of summer flounder HAPC is:

> "All native species of macroalgae, seagrasses, and freshwater and tidal macrophytes in any size bed, as well as loose aggregations, within adult and juvenile summer flounder EFH is HAPC. If native species of SAV are eliminated then exotic species should be protected because of functional value, however, all efforts should be made to restore native species (MAFMC, 1998)."

Keeney Cove primarily contains exotic freshwater and tidal macrophytes. This project will control the exotic macrophytes, with the goal of restoring native SAV benefitting native fish and wildlife, and the entire ecosystem. Consequently, this project is expected to have a positive impact to the HAPC for summer flounder.

6. Activity Details

Select all that apply	Project Type/Category
	Agriculture
	Aquaculture
	Bank/shoreline stabilization (e.g., living shoreline, groin, breakwater, bulkhead)
	Beach renourishment
	Dredging/excavation
	Energy development/use e.g., hydropower, oil and gas, pipeline, transmission line, tidal or wave power, wind
	Fill
	Forestry
	Infrastructure/transportation (e.g., culvert construction, bridge repair, highway, port, railroad)
	Intake/outfall
	Military (e.g., acoustic testing, training exercises)
	Mining (e.g., sand, gravel)
	Overboard dredged material placement
	Piers, ramps, floats, and other structures
	Restoration or fish/wildlife enhancement (e.g., fish passage, wetlands, mitigation bank/ILF creation)
	Survey (e.g., geotechnical, geophysical, habitat, fisheries)
	Water quality (e.g., storm water drainage, NPDES, TMDL, wastewater, sediment remediation)
X	Other: aquatic herbicide application

7. Effects Evaluation

Potential Stressors

Select all that apply	Potential Stressors Caused by the Activity
	Underwater noise
X	Water quality/turbidity/ contaminant release
	Vessel traffic/barge grounding
	Impingement/entrainment
	Prevent fish passage/spawning
X	Benthic community disturbance
X	Impacts to prey species

Select all that apply		Potential Stressors Caused by the Activity
Temp	Perm	
		Water depth change
		Tidal flow change
		Fill
X		Habitat type conversion
		Other:

Project Impacts and Mitigation

Project Impacts to EFH by Species

EFH for **Atlantic butterfish** eggs, larvae, and adults is designated at the project area. In Long Island Sound, butterfish spawn from June to late August with a peak in late July. The principal spawning areas are in the eastern part of the sound. They have a seasonal inshore-offshore migration dependent on water temperature. In summer, they move north and inshore to feed on planktonic fish, squid, crustaceans, and jellyfish and then move south and offshore in the winter (NMFS, 1999a). Based on this species' diet, migration pattern, and spawning times, the project will have no effect to Atlantic butterfish EFH.

EFH for **Atlantic herring** juvenile, and adults is designated at the project area. Juveniles are sometimes abundant in fall while adults are abundant in Long Island Sound during the spring. In the Connecticut River, juveniles have a rare abundance only in the mixing zone (NMFS, 1999b). Juveniles and adults are pelagic, with adults only becoming demersal during spawning. Atlantic sea herring prey on pelagic zooplankton. Atlantic herring larvae metamorphose into early-stage juveniles in the spring within intertidal and subtidal habitats out to 985 feet. Given that the project will take place

outside of the time of year that the species is likely present within the project area, construction is not anticipated to cause adverse effects to Atlantic herring nursery habitat.

Atlantic mackerel EFH for all life stages is designated in the project area. Atlantic mackerel spawn pelagic eggs from roughly mid-April to June. The pelagic eggs hatch into planktonic larvae 4-5 days post-fertilization. Atlantic mackerel gain the ability to swim and school after approximately 1-2 months. During the winter, Atlantic mackerel migrate to deep water offshore and eventually move back inshore in the spring. Mackerel feed on a variety of prey during their life cycles, including zooplankton, crustaceans, copepods, and small fish. They are never found in the Connecticut River, and their eggs have high mortality rates at low salinities (NMFS, 1999c). Based the fact that Atlantic mackerel are unlikely to be found north of the Connecticut River estuary, the project will have no effect to this species' EFH.

Black sea bass EFH is designated at the project area for juveniles. In Southern New England, both juvenile and adult black sea bass migrate offshore to over-wintering areas at depths greater than 250 feet when waters begin to cool in the fall. Within estuaries, black sea bass juveniles use shallow shellfish, sponge, amphipod (e.g., *Ampelisca abdita*), seagrass, and cobble habitats as well as manmade structures such as wharves, pilings, and wrecks. Juveniles are generalist carnivores that feed on a variety of infaunal and epifaunal invertebrates, small fish, and squid (NMFS, 1999d). Because black sea bass are unlikely to occur north of the Connecticut River estuary, no adverse effects to EFH is expected as a result of this project.

Juvenile and adult EFH for **bluefish** is designated for the project area. Juveniles are abundant in the Connecticut River estuary but are not known to move into freshwater. Spawning occurs in the spring and summer when adults and juveniles are present inshore. Bluefish feed primarily on small prey fish but may forage for benthic prey on oyster bar and reef habitats when prey availability is limited (NMFS, 1999e). The project is located in areas that do not support bluefish and the action will not impact any prey species.

EFH for **little skate** and **winter skate** juveniles and adults is designated for the project area. Little skate and winter skate are sympatric species with similar habitat requirements. Their EFH occurs on sand, gravel, and mud substrates. Both species are benthic feeders, with crustaceans and polychaetes being important food sources. Both winter skate and little skate move inshore and offshore seasonally, moving into shallower inshore waters during spring and then into deeper waters in winter from roughly November to April (NMFS, 2003a; NMFS, 2003b). The project is located in areas that do not support little skate and winter skate; therefore, the action will not impact EFH.

Longfin inshore squid eggs, juvenile, and adult EFH is designated at the project area. Longfin inshore squid migrate offshore during late autumn and overwinter in deeper, warmer waters along the edge of the continental shelf. They return inshore during the

spring and early summer to feed on planktonic organisms, crustaceans, and small fish. Most spawning occurs in May and hatching occurs in July. Egg masses are commonly found attached to rocks and small boulders on sandy/muddy bottom and on submerged aquatic vegetation (NMFS, 1999f). Longfin inshore squid are not known to use the Connecticut River for habitat so there will be no impact to longfin inshore squid EFH.

Pollock EFH for juveniles, and adults is designated at the project are. Larvae are pelagic, most are found at depths of 164 to 295 feet (50-90 m). The juveniles have been reported over a wide variety of substrates, including sand, mud, or rocky bottom, and vegetation. Most commonly juveniles are found at depths of 82 to 246 feet (25-75 m) although they can be found from the surface to 410 feet deep (125 m). Adults show little preference for bottom type, and they inhabit a wide range of depths from 115 to 1197 feet (35-365 m) (NMFS, 1999g). Pollock are not known to travel up the Connecticut River; therefore, this project is not expected to have impacts.

EFH for all life stages of **red hake** is designated in the project area. Spawning of pelagic eggs occurs in the summer along the continental shelf and is concentrated off southern New England. Red hake larvae have been collected on the middle to outer continental shelf of the Middle Atlantic Bight, but few larvae were collected in the Gulf of Maine. North of Cape Cod, where waters are cooler, juveniles can remain inshore throughout the summer. Both juveniles and adults have primarily been found over muddy substrate (NMFS, 1999h). Red hake will not be present in this area because they are marine fish and not known to travel up the Connecticut River. Therefore, there will be no impacts to red hake EFH.

Scup EFH for all life stages is designated at the project area. Juvenile and adult scup migrate from estuaries to the edge of the continental shelf as water temperatures decline in the winter and return from the edge of the continental shelf to inshore areas as water temperatures rise in the spring. Inshore, summer habitat includes intertidal and subtidal habitats, over sand, silty-sand, shell, mud, mussel beds and eelgrass (*Zosteria marina*) as well as rocky ledges, wrecks, artificial reefs, and mussel beds (NMFS, 1999i). Due to the project location north of the Connecticut River estuary, no adverse impacts to scup EFH are expected as a result of this project.

EFH for **summer flounder** juveniles and adults is designated at the project area. Summer flounder inhabit shallow coastal and estuarine waters between May and October, moving offshore to the outer continental shelf during winter months. It is believed that spawning occurs in offshore waters of southern New England, with peak offshore spawning occurring during October and November. Summer flounder juveniles and adults are benthic feeders, with polychaetes, crustaceans, and bivalves being important food sources (NMFS, 1999j). Due to the location of the project being upstream of the Connecticut River estuary, no adverse effects to adult summer flounder spawning EFH are expected.

EFH for all life stages of **windowpane flounder** is designated for the project area. Egg and larval EFH is described as pelagic habitats on the continental shelf from Georges

Bank to Cape Hatteras and in mixed and high salinity zones of coastal bays and estuaries throughout the region. Windowpane flounder spawn year-round. Juvenile and adult EFH occurs in intertidal and sub-tidal muddy or sandy benthic habitats in estuarine, coastal marine, and continental shelf waters from the Gulf of Maine south (NMFS, 1999k). Windowpane flounder habitat is not expected north of the Connecticut River estuary. Therefore, no adverse impacts on all life stages of windowpane flounder EFH would be anticipated as a result of this project.

Winter flounder EFH for all life stages is designated at all project locations. Winter flounder are found in a variety of habitats from brackish riverine waters to saline coastal environments and have been documented from depths of less than 3 feet in coastal embayments, up to approximately 90 feet in Cape Cod Bay and Stellwagen Bank and up to 270 feet on George's Bank. Except for the Georges Bank population, adult winter flounder migrate inshore in the fall and early winter. Spawning occurs in late winter and early spring with peak spawning between February and March in Massachusetts Bay. The diet of juvenile and adult winter flounder consists of benthic fauna; mostly polychaetes and amphipods (NMFS, 1999l). Winter flounder are not expected to inhabit areas north of the Connecticut River estuary. Therefore, no impacts on all life stages of the winter flounder EFH would be anticipated as a result of this project.

Avoidance, Minimization, and Mitigation

Specific measures taken to avoid and minimize impacts to EFH:

The project area does not contain viable EFH for the identified species because it is a tidal freshwater pond and is upstream of the Connecticut River estuary.

Is compensatory mitigation proposed?

No compensatory mitigation proposed.

Compensatory mitigation details:

No significant adverse effects to any species' EFH are expected as a result of this project. Therefore, no compensatory mitigation is proposed.

8. Effects of Climate Change

Could species or habitats be adversely affected by the proposed action due to projected changes in the climate?

No adverse effects to species or habitat are expected as a result of the project and projected climate change.

Is the expected lifespan of the action greater than 10 years?

No, however, use of aquatic herbicides for control of the invasive hydrilla are likely to continue in other parts of the Connecticut River. The project is expected to impact hydrilla to allow for native SAV to replace it.

Is climate change currently affecting vulnerable species or habitats, and would the effects of a proposed action be amplified by climate change?

Vulnerable species and habitats are currently affected by climate change, but the effects of the proposed action are not likely to be amplified by climate change.

Do the results of the assessment indicate the effects of the action on habitats and species will be amplified by climate change?

No.

Can adaptive management strategies (AMS) be integrated into the action to avoid or minimize adverse effects of the proposed action as a result of climate?

Due to negligible impacts to species EFH, the effects of the proposed action are not likely to be amplified by climate change; thus, adaptive management strategies would not help avoid or minimize adverse impacts of the proposed action.

9. Federal Agency Determination

Federal Action Agency's EFH determination	
	There is no adverse effect on EFH or EFH is not designated at the project site. EFH Consultation is not required. This is a FWCA only request.
X	The adverse effect on EFH is not substantial. This means that the adverse effects are no more than minimal, temporary, or can be alleviated with minor project modifications or conservation recommendations. This is a request for an abbreviated EFH consultation.
	The adverse effect on EFH is substantial. This is a request for an expanded EFH consultation.

10. Fish and Wildlife Coordination Act

Fish and Wildlife Coordination Act Resources

Species known to occur at site	**Habitat impact type**
alewife	Temporary impacts to SAV.
American eel	Temporary impacts to SAV.
American shad	Temporary impacts to SAV.
Atlantic menhaden	N/A
blue crab	N/A
blue mussel	N/A
blueback herring	Temporary impacts to SAV.
Eastern oyster	N/A
horseshoe crab	N/A
quahog	N/A
soft-shell clams	N/A
striped bass	Temporary impacts to SAV.
other species:	

11. References

National Marine Fisheries Service (NMFS). 2022. Essential Fish Habitat Mapper. Retrieved August 2022, from https://www.fisheries.noaa.gov/resource/map/essential-fish-habitat-mapper

NMFS. 1999a. Essential Fish Habitat Source Document: Atlantic Butterfish, *Peprilus triacanthus*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 1999b. Essential Fish Habitat Source Document: Atlantic Herring, *Clupea harengus*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 1999c. Essential Fish Habitat Source Document: Atlantic Mackerel, *Scomber scobrus*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 1999d. Essential Fish Habitat Source Document: Black Sea Bass, *Centropristis striata*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 1999e. Essential Fish Habitat Source Document: Bluefish, *Pomatomus saltatrix*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 1999f. Essential Fish Habitat Source Document: Longfin Inshore Squid, *Loligo pealeii*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 1999g. Essential Fish Habitat Source Document: Pollock, *Pollachius virens*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 1999h. Essential Fish Habitat Source Document: Red Hake, *Urophycis chuss*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 1999i. Essential Fish Habitat Source Document: Scup, *Stenotomus chrysops*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 1999j. Essential Fish Habitat Source Document: Summer Flounder, *Paralichthys dentatus*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 1999k. Essential Fish Habitat Source Document: Windowpane Flounder, *Scophthalmus aquosus*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 1999l. Essential Fish Habitat Source Document: Winter Flounder, *Psuedopleuronectes americanus*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 2003a. Essential Fish Habitat Source Document: Little Skate, *Leucoraja erinacea*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 2003b. Essential Fish Habitat Source Document: Winter Skate, *Leucoraja ocellata*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

National Oceanic and Atmospheric Administration (NOAA) Northeast Fisheries Service. n.d. Northeast Fisheries Science Center (NEFSC) Essential Fish Habitat Source Documents: Life History and Habitat Characteristics. Available at https://www.nefsc.noaa.gov/nefsc/habitat/efh/#list

NOAA. 2017. Amendment 10 to the 2006 Consolidated Atlantic Highly Migratory Species Fishery Management Plan Plan: Essential Fish Habitat and Environmental Assessment. Office of Sustainable Fisheries, Atlantic Highly Migratory Species Management Division.

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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1. General Project Information

Date Prepared: March 28, 2024

Project/ Application Number: N/A

Project Name: Connecticut River Hydrilla Research and Demonstration Project

Project Applicant: U.S. Army Corps of Engineers, New England District

Federal Action Agency: U.S. Army Corps of Engineers, New England District

Fast-41: No

Action Agency Contact Name: Hannah Doherty

Contact Phone: 978-318-8685

Contact Email: Hannah.L.Doherty@usace.army.mil

Address: U.S. Army Corps of Engineers
New England District
696 Virginia Road
Concord, Massachusetts 01742-2751

2. Project Description

Location (WGS 84): 41.5624, -72.6244

Body of Water (HUC-12): Mill Creek-Connecticut River (010802050702)

Project Purpose:

The purpose of the proposed project is to provide a field-scale demonstration of technology developed under the Aquatic Plant Control Research Program (APCRP) that is evaluating the effectiveness of an aquatic herbicide to manage monoecious hydrilla in high water exchange environments. This field demonstration will provide valuable information for developing future guidance on how to manage this invasive aquatic plant which is expanding in high water exchange systems throughout the northeastern U.S. In addition, this field demonstration will be evaluating herbicide efficacy where monoecious hydrilla is most problematic, optimal timing of treatment, and length of exposure required for effective control of hydrilla.

Various methods have been used for control and eradication of hydrilla, including physical, biological, and chemical means. The most effective and economical method of control for well established, large-scale populations is typically a chemical approach by using tested and approved aquatic herbicides. Several herbicides have been used to control hydrilla throughout the country. Treatment and monitoring data from the New York Croton River, Cayuga Lake Inlet, Tonawanda Creek/Erie Canal and management projects in other states show that several consecutive seasons of chemical treatments are necessary to control hydrilla populations since tubers and turions can persist in the benthic substrate. Within the Connecticut River system, hydrilla is found in both high flow and quiescent river conditions with control of hydrilla in high flow areas posing a complex challenge. The Connecticut River hydrilla has been discovered outside of the river in ponds and lakes. Factors such as water flow, suspended silt, tidal flow, and salinity contribute to the complexity of controlling hydrilla in a system like the Connecticut River. Investigations into herbicide application methods and techniques that address the conditions specific to the Connecticut River will allow for more effective hydrilla control to prevent further spread and impact to other parts of the river and watershed.

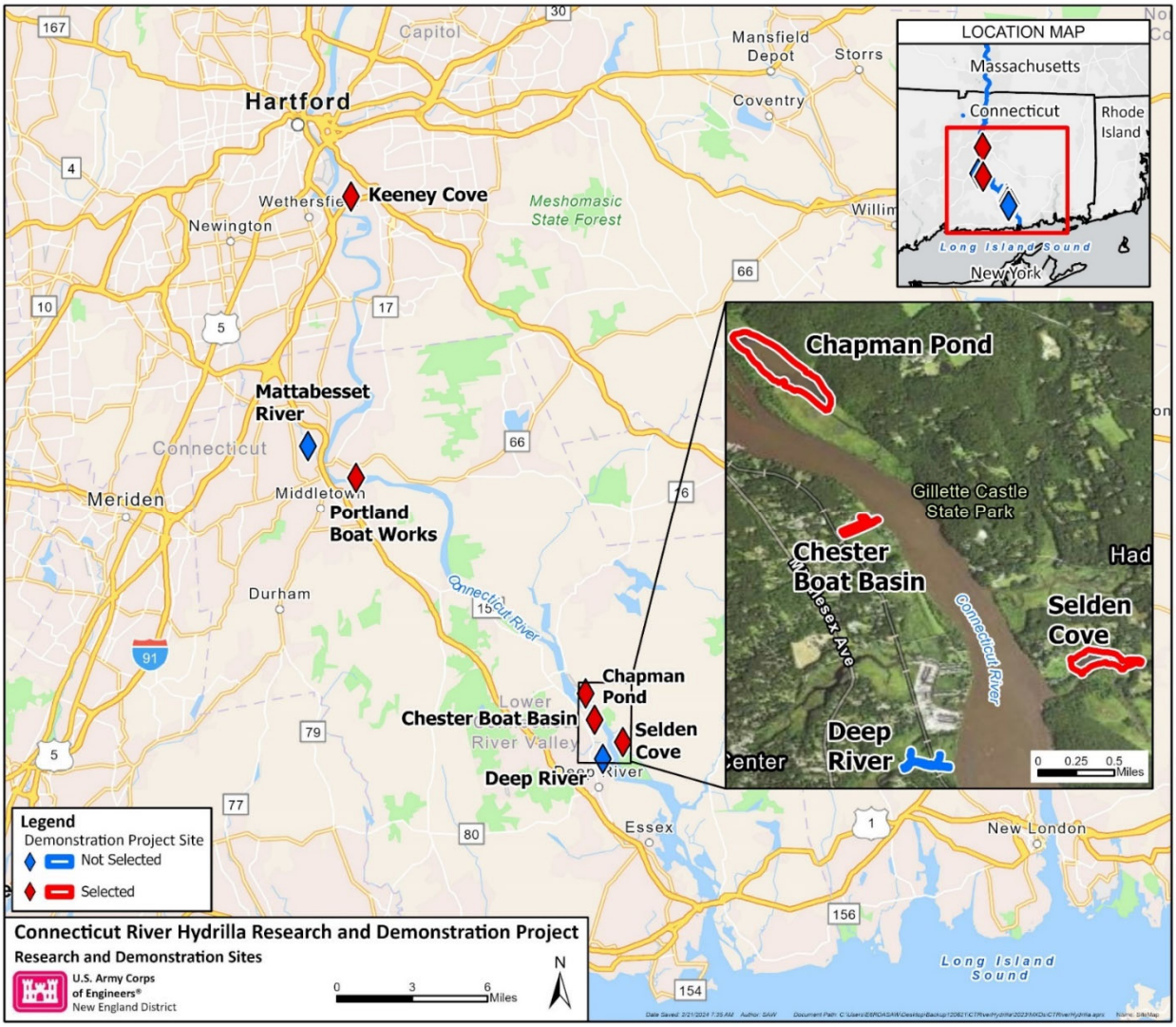

Figure 1. Potential demonstration sites within the Connecticut River watershed for treatment in summer 2024.

Project Description:

The proposed action is the application of herbicide to the waters the Connecticut River watershed for the control of hydrilla. Site specific treatments will be developed, considering the environmental characteristics of the site (e.g., water movement and retention and native species presence) and chemical properties of the herbicides (e.g., target plants and concentrations) needed for control. The herbicides proposed for use include diquat dibromide, dipotassium salt of endothall, and florpyrauxifen-benzyl or a combination of these chemicals. Portland Boat Works will be treated with two sequential diquat dibromide treatments at 370 parts per billion, two weeks apart after July 4, 2024, by a licensed aquatic herbicide applicator.

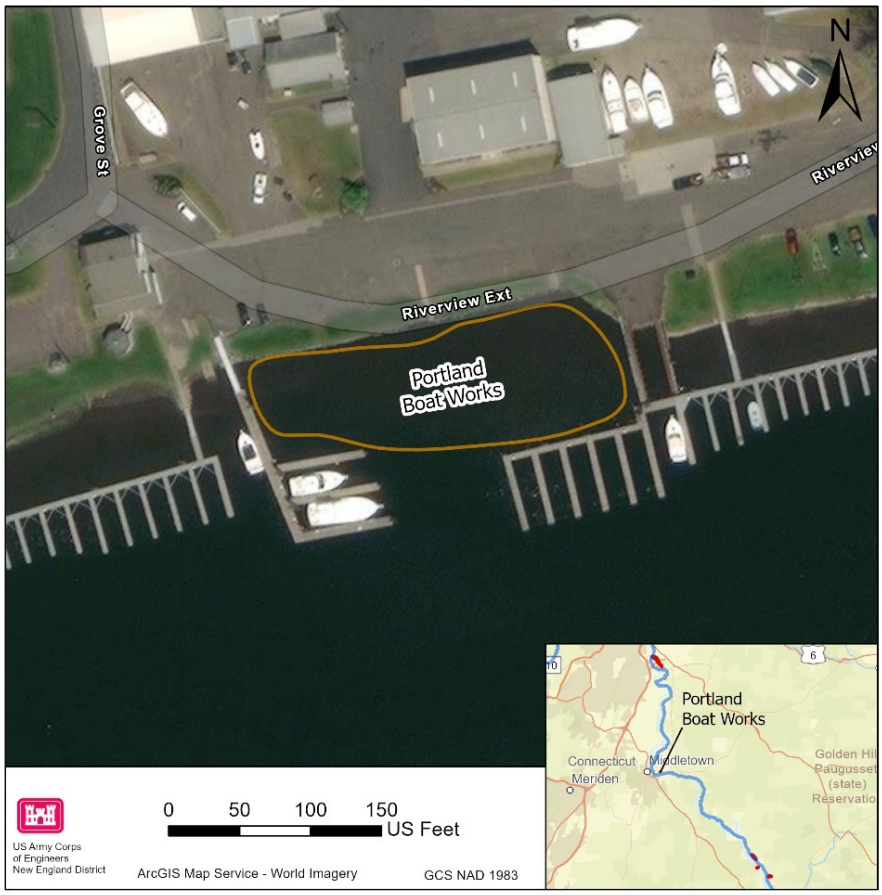

Figure 2. Portland Boat Works located in Portland, CT

Site Description

Is the project in designated EFH?	Yes
Is the project in designated HAPC?	Yes
Does the project contain any Special Aquatic Sites?	No
Is this coordination under FWCA only?	No

Total area of impact to EFH:

The total area of herbicide treatment is approximately 0.5 acres. Since it is not a closed system with tidal influence, herbicide is expected to flow to areas outside the treatment polygon.

Total area of impact to HAPC:

The project area is approximately 0.5 acres but impacts may extend outside of the treatment area based on site conditions at the time of treatment.

Current range of water depths:

According to the bathymetric survey conducted by USACE in April 2023, the current water depth within Portland Boat Works ranges between 0 and 5 feet deep at MLLW.

Salinity range:

Portland Boat Works is located upstream of the northern extent of the Connecticut River estuary's salt wedge; therefore, it is freshwater and has relatively low salinity.

Water temperature range:

Temperature data was sourced from the U.S. Geological Survey's Water Data portal (https://waterdata.usgs.gov).

Surface water temperature in the Connecticut River at Middle Haddam, CT, approximately 5 river miles downstream of Portland Boat Works, ranged from approximately 32°F in February 2023 to 80°F in September in 2023, and is likely a good estimate of the range of surface water temperatures at Portland Boat Works .

3. Habitat Types

Habitat Location	Habitat Type	Total Impacts	Temporary Impacts	Permanent Impacts	Restored to pre-existing conditions?
Freshwater	Submerged aquatic vegetation	0.5 acres	0.5 acres	0.5 acres	No

Submerged Aquatic Vegetation (SAV)

SAV Present? Yes

Details:

SAV that is present includes hydrilla (*Hydrilla verticillata*), water chestnut (*Trapa natans*), and intermittent native SAV (Figure 3). Almost all of the 0.5 acres has SAV coverage, primarily hydrilla.

Figure 3. Vegetation assemblage at Portland Boat Works.

Sediment Characteristics

General Description of the Sediment Composition:

Based on site observations, sediment is composed of silt/mud.

Diadromous Fish (Migratory or Spawning Habitat)

Diadromous Fish Habitat?: Yes

4. EFH and HAPC Designations

The following table provides a summary of Essential Fish Habitat Designations in Portland Boat Works (denoted with an "X") (NMFS, 2023b).

Species	Eggs	Larvae	Juveniles	Adults
Atlantic Butterfish (*Peprilus triacanthus*)	X	X	X	X
Atlantic Herring (*Clupea harengus*)			X	X
Atlantic mackerel (*Scomber scombrus*)	X	X	X	X
Atlantic salmon (*Salmo salar*)	X	X	X	X
Black Sea Bass (*Centropristis striata*)			X	
Bluefish (*Pomatomus saltatrix*)			X	X
Little Skate (*Leucoraja erinacea*)			X	X
Longfin inshore squid (*Doryteuthis pealeii*)	X		X	X
Pollock (*Pollachius virens*)			X	X
Red Hake (*Urophycis chuss*)	X	X	X	X
Scup (*Stenotomus chrysops*)	X	X	X	X
Summer Flounder (*Paralichthys dentatus*)			X	X
Windowpane Flounder (*Scophthalmus aquosus*)	X	X	X	X

Winter Flounder (*Psuedopleuronectes americanus*)	X	X	X	X
Winter Skate (*Leucoraja ocellata*)			X	X

5. Habitat Areas of Particular Concern (HAPCs)

Select all that apply	HAPC Designation	Select all that apply	HAPC Designation
X	Summer flounder: SAV		Alvin & Atlantis Canyons
	Sandbar shark		Baltimore Canyon
	Sand Tiger Shark (Delaware Bay)		Bear Seamount
	Sand Tiger Shark (Plymouth-Duxbury-Kingston Bay)		Heezen Canyon
	Inshore 20m Juvenile Cod		Hudson Canyon
	Great South Channel Juvenile Cod		Hydrographer Canyon
	Northern Edge Juvenile Cod		Jeffreys & Stellwagen
	Lydonia Canyon		Lydonia, Gilbert & Oceanographer Canyons
	Norfolk Canyon (Mid-Atlantic)		Norfolk Canyon (New England)
	Oceanographer Canyon		Retriever Seamount
	Veatch Canyon (Mid-Atlantic)		Toms, Middle Toms & Hendrickson Canyons
	Veatch Canyon (New England)		Washington Canyon
	Cashes Ledge		Wilmington Canyon
	Atlantic Salmon		

Portland Boat Works falls within the regional HAPC for summer flounder. The summer flounder HAPC consists of areas with SAV. The specific designation of summer flounder HAPC is:

> "All native species of macroalgae, seagrasses, and freshwater and tidal macrophytes in any size bed, as well as loose aggregations, within adult and juvenile summer flounder EFH is HAPC. If native species of SAV are eliminated then exotic species should be protected because of functional value, however, all efforts should be made to restore native species (MAFMC, 1998)."

Portland Boat Works primarily contains exotic freshwater and tidal macrophytes. This project will control the exotic macrophytes, with the goal of restoring native SAV benefitting native fish and wildlife, and the entire ecosystem. Consequently, this project is expected to have a positive impact to the HAPC for summer flounder.

6. Activity Details

Select all that apply	Project Type/Category
	Agriculture
	Aquaculture
	Bank/shoreline stabilization (e.g., living shoreline, groin, breakwater, bulkhead)
	Beach renourishment
	Dredging/excavation
	Energy development/use e.g., hydropower, oil and gas, pipeline, transmission line, tidal or wave power, wind
	Fill
	Forestry
	Infrastructure/transportation (e.g., culvert construction, bridge repair, highway, port, railroad)
	Intake/outfall
	Military (e.g., acoustic testing, training exercises)
	Mining (e.g., sand, gravel)
	Overboard dredged material placement
	Piers, ramps, floats, and other structures
	Restoration or fish/wildlife enhancement (e.g., fish passage, wetlands, mitigation bank/ILF creation)
	Survey (e.g., geotechnical, geophysical, habitat, fisheries)
	Water quality (e.g., storm water drainage, NPDES, TMDL, wastewater, sediment remediation)
X	Other: aquatic herbicide application

7. Effects Evaluation

Potential Stressors

Select all that apply	Potential Stressors Caused by the Activity
	Underwater noise
X	Water quality/turbidity/ contaminant release
	Vessel traffic/barge grounding
	Impingement/entrainment
	Prevent fish passage/spawning
X	Benthic community disturbance
X	Impacts to prey species

Select all that apply		Potential Stressors Caused by the Activity
Temp	Perm	
		Water depth change
		Tidal flow change
		Fill
X		Habitat type conversion
		Other:

Project Impacts and Mitigation

Project Impacts to EFH by Species

EFH for all life stages of **Atlantic butterfish** is designated at the project area. In Long Island Sound, butterfish spawn from June to late August with a peak in late July. The principal spawning areas are in the eastern part of the sound. They have a seasonal inshore-offshore migration dependent on water temperature. In summer, they move north and inshore to feed on planktonic fish, squid, crustaceans, and jellyfish and then move south and offshore in the winter (NMFS, 1999a). Based on this species' diet, migration pattern, and spawning times, the project will have no effect to Atlantic butterfish EFH.

EFH for **Atlantic herring** juvenile, and adults is designated at the project area. Juveniles are sometimes abundant in fall while adults are abundant in Long Island Sound during the spring. In the Connecticut River, juveniles have a rare abundance only in the mixing zone (NMFS, 1999b). Juveniles and adults are pelagic, with adults only becoming demersal during spawning. Atlantic sea herring prey on pelagic zooplankton. Atlantic herring larvae metamorphose into early-stage juveniles in the spring within intertidal and subtidal habitats out to 985 feet. Given that the project will take place

outside of the time of year that the species is likely present within the project area, construction is not anticipated to cause adverse effects to Atlantic herring nursery habitat.

Atlantic mackerel EFH for all life stages is designated in the project area. Atlantic mackerel spawn pelagic eggs from roughly mid-April to June. The pelagic eggs hatch into planktonic larvae 4-5 days post-fertilization. Atlantic mackerel gain the ability to swim and school after approximately 1-2 months. During the winter, Atlantic mackerel migrate to deep water offshore and eventually move back inshore in the spring. Mackerel feed on a variety of prey during their life cycles, including zooplankton, crustaceans, copepods, and small fish. They are never found in the Connecticut River, and their eggs have high mortality rates at low salinities (NMFS, 1999c). Based the fact that Atlantic mackerel are unlikely to be found north of the Connecticut River estuary, the project will have no effect to this species' EFH.

EFH for all life stages of **Atlantic salmon** is designated in the project area. All life stages of Atlantic salmon use freshwater habitats either exclusively or at some point during their life history. The streambed is important for eggs and larvae while the juveniles and adults use the river itself. Eggs are deposited and buried in the substrate in late October to November and hatch after about 6 months in the spring. Juveniles begin smolting in freshwater before migration downstream into brackish water and seawater. The Connecticut River forms a direct connection to the sea and provides access to adult Atlantic salmon to spawning habitat. Adults prefer riffle and run habitats in shallow, freshwater streams with gravel/rocky substrates with pools or vegetated riverine areas of low velocity (NEFMC, 2017). Although the project will impact SAV in a low velocity riverine environment, the objective of the project is to decrease levels of exotic vegetation for native SAV to reestablish, providing more natural habitat for the adults. Therefore, the project is expected to have beneficial impacts to EFH for Atlantic salmon.

Black sea bass EFH is designated at the project area for juveniles. In Southern New England, both juvenile and adult black sea bass migrate offshore to over-wintering areas at depths greater than 250 feet when waters begin to cool in the fall. Within estuaries, black sea bass juveniles use shallow shellfish, sponge, amphipod (e.g., *Ampelisca abdita*), seagrass, and cobble habitats as well as manmade structures such as wharves, pilings, and wrecks. Juveniles are generalist carnivores that feed on a variety of infaunal and epifaunal invertebrates, small fish, and squid (NMFS, 1999d). Because black sea bass are unlikely to occur north of the Connecticut River estuary, no adverse effects to EFH is expected as a result of this project.

Juvenile and adult EFH for **bluefish** is designated for the project area. Juveniles are abundant in the Connecticut River estuary but are not known to move into freshwater. Spawning occurs in the spring and summer when adults and juveniles are present inshore. Bluefish feed primarily on small prey fish but may forage for benthic prey on oyster bar and reef habitats when prey availability is limited (NMFS, 1999e). The project

is located in areas that do not support bluefish and the action will not impact any prey species.

EFH for **little skate** and **winter skate** juveniles and adults is designated for the project area. Little skate and winter skate are sympatric species with similar habitat requirements. Their EFH occurs on sand, gravel, and mud substrates. Both species are benthic feeders, with crustaceans and polychaetes being important food sources. Both winter skate and little skate move inshore and offshore seasonally, moving into shallower inshore waters during spring and then into deeper waters in winter from roughly November to April (NMFS, 2003a; NMFS, 2003b). The project is located in areas that do not support little skate and winter skate; therefore, the action will not impact EFH.

Longfin inshore squid eggs, juvenile, and adult EFH is designated at the project area. Longfin inshore squid migrate offshore during late autumn and overwinter in deeper, warmer waters along the edge of the continental shelf. They return inshore during the spring and early summer to feed on planktonic organisms, crustaceans, and small fish. Most spawning occurs in May and hatching occurs in July. Egg masses are commonly found attached to rocks and small boulders on sandy/muddy bottom and on submerged aquatic vegetation (NMFS, 1999f). Longfin inshore squid are not known to use the Connecticut River for habitat so there will be no impact to longfin inshore squid EFH.

Pollock EFH for juveniles, and adults is designated at the project are. Larvae are pelagic, most are found at depths of 164 to 295 feet (50-90 m). The juveniles have been reported over a wide variety of substrates, including sand, mud, or rocky bottom, and vegetation. Most commonly juveniles are found at depths of 82 to 246 feet (25-75 m) although they can be found from the surface to 410 feet deep (125 m). Adults show little preference for bottom type, and they inhabit a wide range of depths from 115 to 1197 feet (35-365 m) (NMFS, 1999g). Pollock are not known to travel up the Connecticut River; therefore, this project is not expected to have impacts.

EFH for all life stages of **red hake** is designated in the project area. Spawning of pelagic eggs occurs in the summer along the continental shelf and is concentrated off southern New England. Red hake larvae have been collected on the middle to outer continental shelf of the Middle Atlantic Bight, but few larvae were collected in the Gulf of Maine. North of Cape Cod, where waters are cooler, juveniles can remain inshore throughout the summer. Both juveniles and adults have primarily been found over muddy substrate (NMFS, 1999h). Red hake will not be present in this area because they are marine fish and not known to travel up the Connecticut River. Therefore, there will be no impacts to red hake EFH.

Scup EFH for all life stages is designated at the project area. Juvenile and adult scup migrate from estuaries to the edge of the continental shelf as water temperatures decline in the winter and return from the edge of the continental shelf to inshore areas as water temperatures rise in the spring. Inshore, summer habitat includes intertidal and subtidal habitats, over sand, silty-sand, shell, mud, mussel beds and eelgrass (*Zosteria*

marina) as well as rocky ledges, wrecks, artificial reefs, and mussel beds (NMFS, 1999i). Due to the project location north of the Connecticut River estuary, no adverse impacts to scup EFH are expected as a result of this project.

EFH for **summer flounder** juveniles and adults is designated at the project area. Summer flounder inhabit shallow coastal and estuarine waters between May and October, moving offshore to the outer continental shelf during winter months. It is believed that spawning occurs in offshore waters of southern New England, with peak offshore spawning occurring during October and November. Summer flounder juveniles and adults are benthic feeders, with polychaetes, crustaceans, and bivalves being important food sources (NMFS, 1999j). Due to the location of the project being upstream of the Connecticut River estuary, no adverse effects to adult summer flounder spawning EFH are expected.

EFH for all life stages of **windowpane flounder** is designated for the project area. Egg and larval EFH is described as pelagic habitats on the continental shelf from Georges Bank to Cape Hatteras and in mixed and high salinity zones of coastal bays and estuaries throughout the region. Windowpane flounder spawn year-round. Juvenile and adult EFH occurs in intertidal and sub-tidal muddy or sandy benthic habitats in estuarine, coastal marine, and continental shelf waters from the Gulf of Maine south (NMFS, 1999k). Windowpane flounder habitat is not expected north of the Connecitcut River estuary. Therefore, no adverse impacts on all life stages of windowpane flounder EFH would be anticipated as a result of this project.

Winter flounder EFH for all life stages is designated at all project locations. Winter flounder are found in a variety of habitats from brackish riverine waters to saline coastal environments and have been documented from depths of less than 3 feet in coastal embayments, up to approximately 90 feet in Cape Cod Bay and Stellwagen Bank and up to 270 feet on George's Bank. Except for the Georges Bank population, adult winter flounder migrate inshore in the fall and early winter. Spawning occurs in late winter and early spring with peak spawning between February and March in Massachusetts Bay. The diet of juvenile and adult winter flounder consists of benthic fauna; mostly polychaetes and amphipods (NMFS, 1999l). Winter flounder are not expected to inhabit areas north of the Connecticut River estuary. Therefore, no impacts on all life stages of the winter flounder EFH would be anticipated as a result of this project.

Avoidance, Minimization, and Mitigation

Specific measures taken to avoid and minimize impacts to EFH:

The project area does not contain viable EFH for the identified species because it is a tidal freshwater pond and is upstream of the Connecticut River estuary.

Is compensatory mitigation proposed?

No compensatory mitigation proposed.

Compensatory mitigation details:

No significant adverse effects to any species' EFH are expected as a result of this project. Therefore, no compensatory mitigation is proposed.

8. Effects of Climate Change

Could species or habitats be adversely affected by the proposed action due to projected changes in the climate?

No adverse effects to species or habitat are expected as a result of the project and projected climate change.

Is the expected lifespan of the action greater than 10 years?

No, however, use of aquatic herbicides for control of the invasive hydrilla are likely to continue in other parts of the Connecticut River. The project is expected to impact hydrilla to allow for native SAV to replace it.

Is climate change currently affecting vulnerable species or habitats, and would the effects of a proposed action be amplified by climate change?

Vulnerable species and habitats are currently affected by climate change but the effects of the proposed action are not likely to be amplified by climate change.

Do the results of the assessment indicate the effects of the action on habitats and species will be amplified by climate change?

No.

Can adaptive management strategies (AMS) be integrated into the action to avoid or minimize adverse effects of the proposed action as a result of climate?

Due to negligible impacts to species EFH, the effects of the proposed action are not likely to be amplified by climate change; thus, adaptive management strategies would not help avoid or minimize adverse impacts of the proposed action.

9. Federal Agency Determination

Federal Action Agency's EFH determination	
	There is no adverse effect on EFH or EFH is not designated at the project site. EFH Consultation is not required. This is a FWCA only request.
X	The adverse effect on EFH is not substantial. This means that the adverse effects are no more than minimal, temporary, or can be alleviated with minor project modifications or conservation recommendations. This is a request for an abbreviated EFH consultation.
	The adverse effect on EFH is substantial. This is a request for an expanded EFH consultation.

10. Fish and Wildlife Coordination Act

Fish and Wildlife Coordination Act Resources

Species known to occur at site	**Habitat impact type**
alewife	Temporary impacts to SAV.
American eel	Temporary impacts to SAV.
American shad	Temporary impacts to SAV.
Atlantic menhaden	N/A
blue crab	N/A
blue mussel	N/A
blueback herring	Temporary impacts to SAV.
Eastern oyster	N/A
horseshoe crab	N/A
quahog	N/A
soft-shell clams	N/A
striped bass	Temporary impacts to SAV.
other species:	

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NMFS. 1999b. Essential Fish Habitat Source Document: Atlantic Herring, *Clupea harengus*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 1999c. Essential Fish Habitat Source Document: Atlantic Mackerel, *Scomber scobrus*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 1999d. Essential Fish Habitat Source Document: Black Sea Bass, *Centropristis striata*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 1999e. Essential Fish Habitat Source Document: Bluefish, *Pomatomus saltatrix*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 1999f. Essential Fish Habitat Source Document: Longfin Inshore Squid, *Loligo pealeii*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 1999g. Essential Fish Habitat Source Document: Pollock, *Pollachius virens*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 1999h. Essential Fish Habitat Source Document: Red Hake, *Urophycis chuss*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 1999i. Essential Fish Habitat Source Document: Scup, *Stenotomus chrysops*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

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NMFS. 1999k. Essential Fish Habitat Source Document: Windowpane Flounder, *Scophthalmus aquosus*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 1999l. Essential Fish Habitat Source Document: Winter Flounder, *Psuedopleuronectes americanus*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 2003a. Essential Fish Habitat Source Document: Little Skate, *Leucoraja erinacea*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

NMFS. 2003b. Essential Fish Habitat Source Document: Winter Skate, *Leucoraja ocellata*, Life History and Habitat Characteristics. Northeast Region, Northeast Fisheries Science Center.

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NOAA. 2017. Amendment 10 to the 2006 Consolidated Atlantic Highly Migratory Species Fishery Management Plan Plan: Essential Fish Habitat and Environmental Assessment. Office of Sustainable Fisheries, Atlantic Highly Migratory Species Management Division.

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1. General Project Information

Date Prepared: March 28, 2024

Project/ Application Number: N/A

Project Name: Connecticut River Hydrilla Research and Demonstration Project

Project Applicant: U.S. Army Corps of Engineers, New England District

Federal Action Agency: U.S. Army Corps of Engineers, New England District

Fast-41: No

Action Agency Contact Name: Hannah Doherty

Contact Phone: 978-318-8685

Contact Email: Hannah.L.Doherty@usace.army.mil

Address: U.S. Army Corps of Engineers
New England District
696 Virginia Road
Concord, Massachusetts 01742-2751

2. Project Description

Location (WGS 84): 41.4115, -72.4166

Body of Water (HUC-12): Deep River-Connecticut River (010802050901)

Project Purpose:

The purpose of the proposed project is to provide a field-scale demonstration of technology developed under the Aquatic Plant Control Research Program (APCRP) that is evaluating the effectiveness of an aquatic herbicide to manage monoecious hydrilla in high water exchange environments. This field demonstration will provide valuable information for developing future guidance on how to manage this invasive aquatic plant which is expanding in high water exchange systems throughout the northeastern U.S. In addition, this field demonstration will be evaluating herbicide efficacy where monoecious hydrilla is most problematic, optimal timing of treatment, and length of exposure required for effective control of hydrilla.

Various methods have been used for control and eradication of hydrilla, including physical, biological, and chemical means. The most effective and economical method of control for well established, large-scale populations is typically a chemical approach by using tested and approved aquatic herbicides. Several herbicides have been used to control hydrilla throughout the country. Treatment and monitoring data from the New York Croton River, Cayuga Lake Inlet, Tonawanda Creek/Erie Canal and management projects in other states show that several consecutive seasons of chemical treatments are necessary to control hydrilla populations since tubers and turions can persist in the benthic substrate. Within the Connecticut River system, hydrilla is found in both high flow and quiescent river conditions with control of hydrilla in high flow areas posing a complex challenge. The Connecticut River hydrilla has been discovered outside of the river in ponds and lakes. Factors such as water flow, suspended silt, tidal flow, and salinity contribute to the complexity of controlling hydrilla in a system like the Connecticut River. Investigations into herbicide application methods and techniques that address the conditions specific to the Connecticut River will allow for more effective hydrilla control to prevent further spread and impact to other parts of the river and watershed.

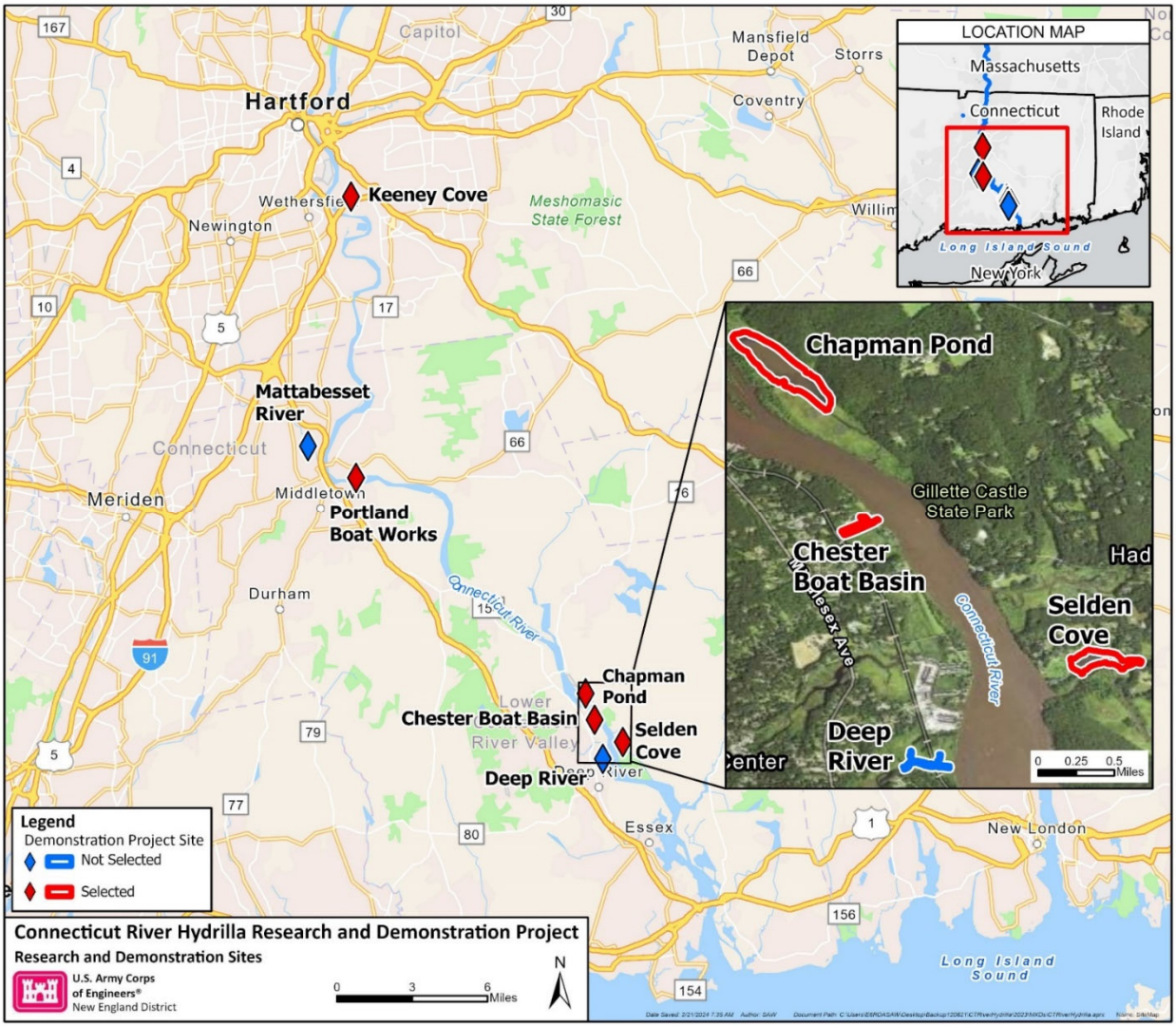

Figure 1. Potential demonstration sites within the Connecticut River watershed for treatment in summer 2024.

Project Description:

The proposed action is the application of herbicide to the waters the Connecticut River watershed for the control of hydrilla. Site specific treatments will be developed, considering the environmental characteristics of the site (e.g., water movement and retention and native species presence) and chemical properties of the herbicides (e.g., target plants and concentrations) needed for control. The herbicides proposed for use include diquat dibromide, dipotassium salt of endothall, and florpyrauxifen-benzyl or a combination of these chemicals. Selden Cove will be treated with dipotassium salt of endothall at 5.0 parts per million after July 4, 2024, by a licensed aquatic herbicide applicator.

Figure 2. Selden Cove located in Lyme, CT

Site Description

Is the project in designated EFH?	Yes
Is the project in designated HAPC?	Yes
Does the project contain any Special Aquatic Sites?	No
Is this coordination under FWCA only?	No

Total area of impact to EFH:

The total area of herbicide treatment is approximately 16.2 acres. Since it is not a closed system with tidal influence, herbicide is expected to flow to areas outside the treatment polygon.

Total area of impact to HAPC:

The project area is approximately 16.2 acres but impacts may extend outside of the treatment area based on site conditions at the time of treatment.

Current range of water depths:

According to the bathymetric survey conducted by USACE in April 2023, the current water depth within Selden Cove ranges between 0 and 2 feet deep at MLLW.

Salinity range:

Selden Cove is located upstream of the northern extent of the Connecticut River estuary's salt wedge; therefore, it is freshwater and has relatively low salinity.

Water temperature range:

Temperature data was sourced from the U.S. Geological Survey's Water Data portal (https://waterdata.usgs.gov).

Surface water temperature in the Connecticut River at Middle Haddam, CT, approximately 13 river miles upstream of Selden Cove, ranged from approximately 32°F in February 2023 to 80°F in September in 2023, and is likely a good estimate of the range of surface water temperatures at Selden Cove.

3. Habitat Types

Habitat Location	Habitat Type	Total Impacts	Temporary Impacts	Permanent Impacts	Restored to pre-existing conditions?
Freshwater	Submerged aquatic vegetation	16.2 acres	16.2 acres	16.2 acres	No

Submerged Aquatic Vegetation (SAV)

SAV Present? Yes

Details:

SAV that is present includes hydrilla (*Hydrilla verticillata*), coontail (*Cerotophyllum demersum*), American eelgrass (*Vallisneria americana*), spongy leaved arrowhead (*Sagittaria montevidensis spongiosa*), and Eurasian watermilfoil (*Myriophyllum spicatum*) (Figure 3). Almost all of the 16.2 acres has SAV coverage, primarily hydrilla.

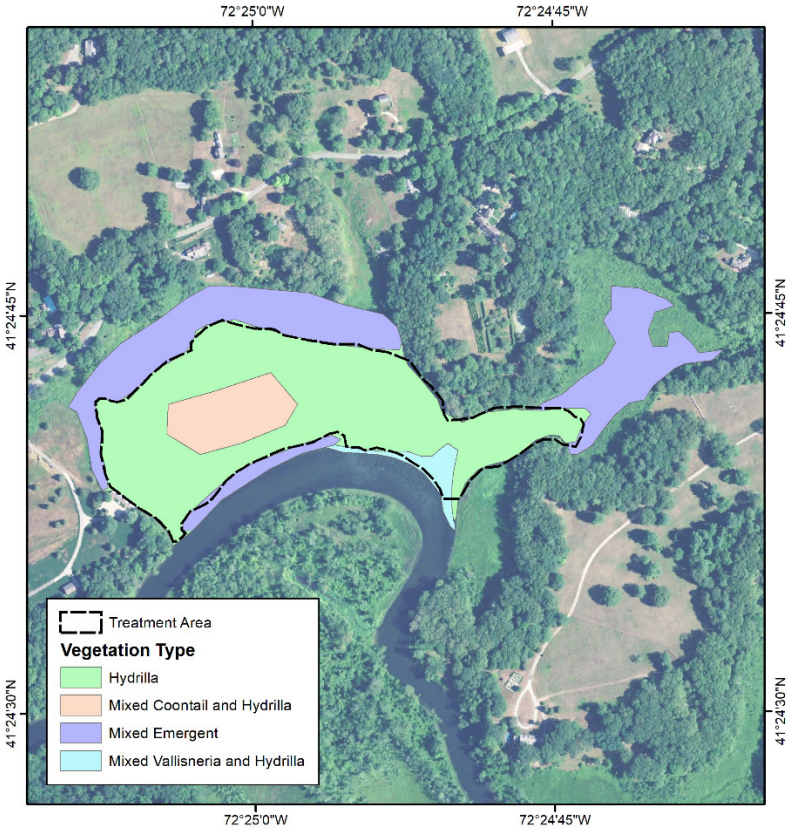

Figure 3. Vegetation assemblage at Selden Cove.

Sediment Characteristics

General Description of the Sediment Composition:

Based on site observations, sediment is composed of silt/mud.

Diadromous Fish (Migratory or Spawning Habitat)

Diadromous Fish Habitat?: Yes

4. EFH and HAPC Designations

The following table provides a summary of Essential Fish Habitat Designations in Selden Cove (denoted with an "X") (NMFS, 2023b).

Species	Eggs	Larvae	Juveniles	Adults
Atlantic Butterfish (*Peprilus triacanthus*)	X	X		X
Atlantic Herring (*Clupea harengus*)			X	X
Atlantic mackerel (*Scomber scombrus*)	X	X	X	X
Black Sea Bass (*Centropristis striata*)			X	
Bluefish (*Pomatomus saltatrix*)			X	X
Little Skate (*Leucoraja erinacea*)			X	X
Longfin inshore squid (*Doryteuthis pealeii*)	X		X	X
Pollock (*Pollachius virens*)			X	X
Red Hake (*Urophycis chuss*)	X	X	X	X
Scup (*Stenotomus chrysops*)	X	X	X	X
Summer Flounder (*Paralichthys dentatus*)			X	X
Windowpane Flounder (*Scophthalmus aquosus*)	X	X	X	X

Winter Flounder (*Psuedopleuronectes americanus*)	X	X	X	X
Winter Skate (*Leucoraja ocellata*)			X	X

5. Habitat Areas of Particular Concern (HAPCs)

Select all that apply	HAPC Designation	Select all that apply	HAPC Designation
X	Summer flounder: SAV		Alvin & Atlantis Canyons
	Sandbar shark		Baltimore Canyon
	Sand Tiger Shark (Delaware Bay)		Bear Seamount
	Sand Tiger Shark (Plymouth-Duxbury-Kingston Bay)		Heezen Canyon
	Inshore 20m Juvenile Cod		Hudson Canyon
	Great South Channel Juvenile Cod		Hydrographer Canyon
	Northern Edge Juvenile Cod		Jeffreys & Stellwagen
	Lydonia Canyon		Lydonia, Gilbert & Oceanographer Canyons
	Norfolk Canyon (Mid-Atlantic)		Norfolk Canyon (New England)
	Oceanographer Canyon		Retriever Seamount
	Veatch Canyon (Mid-Atlantic)		Toms, Middle Toms & Hendrickson Canyons
	Veatch Canyon (New England)		Washington Canyon
	Cashes Ledge		Wilmington Canyon
	Atlantic Salmon		

Selden Cove falls within the regional HAPC for summer flounder. The summer flounder HAPC consists of areas with SAV. The specific designation of summer flounder HAPC is:

> "All native species of macroalgae, seagrasses, and freshwater and tidal macrophytes in any size bed, as well as loose aggregations, within adult and juvenile summer flounder EFH is HAPC. If native species of SAV are eliminated then exotic species should be protected because of functional value, however, all efforts should be made to restore native species (MAFMC, 1998)."

Selden Cove primarily contains exotic freshwater and tidal macrophytes. This project will control the exotic macrophytes, with the goal of restoring native SAV benefitting native fish and wildlife, and the entire ecosystem. Consequently, this project is expected to have a positive impact to the HAPC for summer flounder.

6. Activity Details

Select all that apply	Project Type/Category
	Agriculture
	Aquaculture
	Bank/shoreline stabilization (e.g., living shoreline, groin, breakwater, bulkhead)
	Beach renourishment
	Dredging/excavation
	Energy development/use e.g., hydropower, oil and gas, pipeline, transmission line, tidal or wave power, wind
	Fill
	Forestry
	Infrastructure/transportation (e.g., culvert construction, bridge repair, highway, port, railroad)
	Intake/outfall
	Military (e.g., acoustic testing, training exercises)
	Mining (e.g., sand, gravel)
	Overboard dredged material placement
	Piers, ramps, floats, and other structures
	Restoration or fish/wildlife enhancement (e.g., fish passage, wetlands, mitigation bank/ILF creation)
	Survey (e.g., geotechnical, geophysical, habitat, fisheries)
	Water quality (e.g., storm water drainage, NPDES, TMDL, wastewater, sediment remediation)
X	Other: aquatic herbicide application

7. Effects Evaluation

Potential Stressors

Select all that apply	Potential Stressors Caused by the Activity
	Underwater noise
X	Water quality/turbidity/ contaminant release
	Vessel traffic/barge grounding
	Impingement/entrainment
	Prevent fish passage/spawning
X	Benthic community disturbance
X	Impacts to prey species

Select all that apply		Potential Stressors Caused by the Activity
Temp	Perm	
		Water depth change
		Tidal flow change
		Fill
X		Habitat type conversion
		Other:

Project Impacts and Mitigation

Project Impacts to EFH by Species

EFH for **Atlantic butterfish** eggs, larvae, and adults is designated at the project area. In Long Island Sound, butterfish spawn from June to late August with a peak in late July. The principal spawning areas are in the eastern part of the sound. They have a seasonal inshore-offshore migration dependent on water temperature. In summer, they move north and inshore to feed on planktonic fish, squid, crustaceans, and jellyfish and then move south and offshore in the winter (NMFS, 1999a). Based on this species' diet, migration pattern, and spawning times, the project will have no effect to Atlantic butterfish EFH.

EFH for **Atlantic herring** juvenile, and adults is designated at the project area. Juveniles are sometimes abundant in fall while adults are abundant in Long Island Sound during the spring. In the Connecticut River, juveniles have a rare abundance only in the mixing zone (NMFS, 1999b). Juveniles and adults are pelagic, with adults only becoming demersal during spawning. Atlantic sea herring prey on pelagic zooplankton. Atlantic herring larvae metamorphose into early-stage juveniles in the spring within intertidal and subtidal habitats out to 985 feet. Given that the project will take place

outside of the time of year that the species is likely present within the project area, construction is not anticipated to cause adverse effects to Atlantic herring nursery habitat.

Atlantic mackerel EFH for all life stages is designated in the project area. Atlantic mackerel spawn pelagic eggs from roughly mid-April to June. The pelagic eggs hatch into planktonic larvae 4-5 days post-fertilization. Atlantic mackerel gain the ability to swim and school after approximately 1-2 months. During the winter, Atlantic mackerel migrate to deep water offshore and eventually move back inshore in the spring. Mackerel feed on a variety of prey during their life cycles, including zooplankton, crustaceans, copepods, and small fish. They are never found in the Connecticut River, and their eggs have high mortality rates at low salinities (NMFS, 1999c). Based the fact that Atlantic mackerel are unlikely to be found north of the Connecticut River estuary, the project will have no effect to this species' EFH.

Black sea bass EFH is designated at the project area for juveniles. In Southern New England, both juvenile and adult black sea bass migrate offshore to over-wintering areas at depths greater than 250 feet when waters begin to cool in the fall. Within estuaries, black sea bass juveniles use shallow shellfish, sponge, amphipod (e.g., *Ampelisca abdita*), seagrass, and cobble habitats as well as manmade structures such as wharves, pilings, and wrecks. Juveniles are generalist carnivores that feed on a variety of infaunal and epifaunal invertebrates, small fish, and squid (NMFS, 1999d). Because black sea bass are unlikely to occur north of the Connecticut River estuary, no adverse effects to EFH is expected as a result of this project.

Juvenile and adult EFH for **bluefish** is designated for the project area. Juveniles are abundant in the Connecticut River estuary but are not known to move into freshwater. Spawning occurs in the spring and summer when adults and juveniles are present inshore. Bluefish feed primarily on small prey fish but may forage for benthic prey on oyster bar and reef habitats when prey availability is limited (NMFS, 1999e). The project is located in areas that do not support bluefish and the action will not impact any prey species.

EFH for **little skate** and **winter skate** juveniles and adults is designated for the project area. Little skate and winter skate are sympatric species with similar habitat requirements. Their EFH occurs on sand, gravel, and mud substrates. Both species are benthic feeders, with crustaceans and polychaetes being important food sources. Both winter skate and little skate move inshore and offshore seasonally, moving into shallower inshore waters during spring and then into deeper waters in winter from roughly November to April (NMFS, 2003a; NMFS, 2003b). The project is located in areas that do not support little skate and winter skate; therefore, the action will not impact EFH.

Longfin inshore squid eggs, juvenile, and adult EFH is designated at the project area. Longfin inshore squid migrate offshore during late autumn and overwinter in deeper, warmer waters along the edge of the continental shelf. They return inshore during the

spring and early summer to feed on planktonic organisms, crustaceans, and small fish. Most spawning occurs in May and hatching occurs in July. Egg masses are commonly found attached to rocks and small boulders on sandy/muddy bottom and on submerged aquatic vegetation (NMFS, 1999f). Longfin inshore squid are not known to use the Connecticut River for habitat so there will be no impact to longfin inshore squid EFH.

Pollock EFH for juveniles, and adults is designated at the project are. Larvae are pelagic, most are found at depths of 164 to 295 feet (50-90 m). The juveniles have been reported over a wide variety of substrates, including sand, mud, or rocky bottom, and vegetation. Most commonly juveniles are found at depths of 82 to 246 feet (25-75 m) although they can be found from the surface to 410 feet deep (125 m). Adults show little preference for bottom type, and they inhabit a wide range of depths from 115 to 1197 feet (35-365 m) (NMFS, 1999g). Pollock are not known to travel up the Connecticut River; therefore, this project is not expected to have impacts.

EFH for all life stages of **red hake** is designated in the project area. Spawning of pelagic eggs occurs in the summer along the continental shelf and is concentrated off southern New England. Red hake larvae have been collected on the middle to outer continental shelf of the Middle Atlantic Bight, but few larvae were collected in the Gulf of Maine. North of Cape Cod, where waters are cooler, juveniles can remain inshore throughout the summer. Both juveniles and adults have primarily been found over muddy substrate (NMFS, 1999h). Red hake will not be present in this area because they are marine fish and not known to travel up the Connecticut River. Therefore, there will be no impacts to red hake EFH.

Scup EFH for all life stages is designated at the project area. Juvenile and adult scup migrate from estuaries to the edge of the continental shelf as water temperatures decline in the winter and return from the edge of the continental shelf to inshore areas as water temperatures rise in the spring. Inshore, summer habitat includes intertidal and subtidal habitats, over sand, silty-sand, shell, mud, mussel beds and eelgrass (*Zostera marina*) as well as rocky ledges, wrecks, artificial reefs, and mussel beds (NMFS, 1999i). Due to the project location north of the Connecticut River estuary, no adverse impacts to scup EFH are expected as a result of this project.

EFH for **summer flounder** juveniles and adults is designated at the project area. Summer flounder inhabit shallow coastal and estuarine waters between May and October, moving offshore to the outer continental shelf during winter months. It is believed that spawning occurs in offshore waters of southern New England, with peak offshore spawning occurring during October and November. Summer flounder juveniles and adults are benthic feeders, with polychaetes, crustaceans, and bivalves being important food sources (NMFS, 1999j). Due to the location of the project being upstream of the Connecticut River estuary, no adverse effects to adult summer flounder spawning EFH are expected.

EFH for all life stages of **windowpane flounder** is designated for the project area. Egg and larval EFH is described as pelagic habitats on the continental shelf from Georges

Bank to Cape Hatteras and in mixed and high salinity zones of coastal bays and estuaries throughout the region. Windowpane flounder spawn year-round. Juvenile and adult EFH occurs in intertidal and sub-tidal muddy or sandy benthic habitats in estuarine, coastal marine, and continental shelf waters from the Gulf of Maine south (NMFS, 1999k). Windowpane flounder habitat is not expected north of the Connecticut River estuary. Therefore, no adverse impacts on all life stages of windowpane flounder EFH would be anticipated as a result of this project.

Winter flounder EFH for all life stages is designated at all project locations. Winter flounder are found in a variety of habitats from brackish riverine waters to saline coastal environments and have been documented from depths of less than 3 feet in coastal embayments, up to approximately 90 feet in Cape Cod Bay and Stellwagen Bank and up to 270 feet on George's Bank. Except for the Georges Bank population, adult winter flounder migrate inshore in the fall and early winter. Spawning occurs in late winter and early spring with peak spawning between February and March in Massachusetts Bay. The diet of juvenile and adult winter flounder consists of benthic fauna; mostly polychaetes and amphipods (NMFS, 1999l). Winter flounder are not expected to inhabit areas north of the Connecticut River estuary. Therefore, no impacts on all life stages of the winter flounder EFH would be anticipated as a result of this project.

Avoidance, Minimization, and Mitigation

Specific measures taken to avoid and minimize impacts to EFH:

The project area does not contain viable EFH for the identified species because it is a tidal freshwater pond and is upstream of the Connecticut River estuary.

Is compensatory mitigation proposed?

No compensatory mitigation proposed.

Compensatory mitigation details:

No significant adverse effects to any species' EFH are expected as a result of this project. Therefore, no compensatory mitigation is proposed.

8. Effects of Climate Change

Could species or habitats be adversely affected by the proposed action due to projected changes in the climate?

No adverse effects to species or habitat are expected as a result of the project and projected climate change.

Is the expected lifespan of the action greater than 10 years?

No, however, use of aquatic herbicides for control of the invasive hydrilla are likely to continue in other parts of the Connecticut River. The project is expected to impact hydrilla to allow for native SAV to replace it.

Is climate change currently affecting vulnerable species or habitats, and would the effects of a proposed action be amplified by climate change?

Vulnerable species and habitats are currently affected by climate change, but the effects of the proposed action are not likely to be amplified by climate change.

Do the results of the assessment indicate the effects of the action on habitats and species will be amplified by climate change?

No.

Can adaptive management strategies (AMS) be integrated into the action to avoid or minimize adverse effects of the proposed action as a result of climate?

Due to negligible impacts to species EFH, the effects of the proposed action are not likely to be amplified by climate change; thus, adaptive management strategies would not help avoid or minimize adverse impacts of the proposed action.

9. Federal Agency Determination

Federal Action Agency's EFH determination	
	There is no adverse effect on EFH or EFH is not designated at the project site. EFH Consultation is not required. This is a FWCA only request.
X	The adverse effect on EFH is not substantial. This means that the adverse effects are no more than minimal, temporary, or can be alleviated with minor project modifications or conservation recommendations. This is a request for an abbreviated EFH consultation.
	The adverse effect on EFH is substantial. This is a request for an expanded EFH consultation.

10. Fish and Wildlife Coordination Act

Fish and Wildlife Coordination Act Resources

Species known to occur at site	**Habitat impact type**
alewife	Temporary impacts to SAV.
American eel	Temporary impacts to SAV.
American shad	Temporary impacts to SAV.
Atlantic menhaden	N/A
blue crab	N/A
blue mussel	N/A
blueback herring	Temporary impacts to SAV.
Eastern oyster	N/A
horseshoe crab	N/A
quahog	N/A
soft-shell clams	N/A
striped bass	Temporary impacts to SAV.
other species:	

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