Notice of Intent Application
Manchaug Pond
Aquatic Management Program

Douglas, MA
Sutton, MA

March 2018

Prepared for:
Town of Sutton Board of Selectmen
Sutton Town Hall
4 Uxbridge Road
Sutton, MA 01590

Manchaug Pond Foundation
c/o Bill Langlois
PO BOX 154
Manchaug, MA 01526

Prepared by:
SŌLitude Lake Management
590 Lake Street
Shrewsbury, MA 01545

SŌLITUDE
LAKE MANAGEMENT

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Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

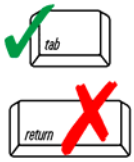
Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Sutton
City/Town

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



Note: Before completing this form consult your local Conservation Commission regarding any municipal bylaw or ordinance.

A. General Information

1. Project Location (**Note:** electronic filers will click on button to locate project site):

Manchaug Pond	Douglas/Sutton	01516 / 01590
a. Street Address	b. City/Town	c. Zip Code

Latitude and Longitude:

42.09875	-71.77579
d. Latitude	e. Longitude

-	-
f. Assessors Map/Plat Number	g. Parcel /Lot Number

2. Applicant:

a. First Name	b. Last Name

Town of Sutton Board of Selectmen
c. Organization

4 Uxbridge Road
d. Street Address

Sutton	MA	01590
e. City/Town	f. State	g. Zip Code

508-865-8727	508-865-8721	
h. Phone Number	i. Fax Number	j. Email Address

3. Property owner (required if different from applicant): ☐ Check if more than one owner

a. First Name	b. Last Name

Commonwealth of MA
c. Organization

d. Street Address

e. City/Town	f. State	g. Zip Code

h. Phone Number	i. Fax Number	j. Email address

4. Representative (if any):

Matthew	Salem
a. First Name	b. Last Name

SOLitude Lake Management
c. Company

590 Lake Street
d. Street Address

Shrewsbury	MA	01545
e. City/Town	f. State	g. Zip Code

508-865-1000	508-865-1220	msalem@solitudelake.com
h. Phone Number	i. Fax Number	j. Email address

5. Total WPA Fee Paid (from NOI Wetland Fee Transmittal Form):

-	-	-
a. Total Fee Paid	b. State Fee Paid	c. City/Town Fee Paid

A. General Information (continued)

6. General Project Description:

The applicant is seeking an Order of Conditions for an Aquatic Management Program at Manchaug Pond to control nuisance and non-native plant growth utilizing treatment with USEPA/MA State registered aquatic herbicides, algaecides, diver-assisted suction harvesting, and other BMP's (see Attachment B -Project Description)

7a. Project Type Checklist: (Limited Project Types see Section A. 7b.)

1. ☐ Single Family Home
2. ☐ Residential Subdivision
3. ☐ Commercial/Industrial
4. ☐ Dock/Pier
5. ☐ Utilities
6. ☐ Coastal engineering Structure
7. ☐ Agriculture (e.g., cranberries, forestry)
8. ☐ Transportation
9. ☒ Other

7b. Is any portion of the proposed activity eligible to be treated as a limited project (including Ecological Restoration Limited Project) subject to 310 CMR 10.24 (coastal) or 310 CMR 10.53 (inland)?

1. ☒ Yes ☐ No

If yes, describe which limited project applies to this project. (See 310 CMR 10.24 and 10.53 for a complete list and description of limited project types)

310 CMR 10.53(4)(e)(5) Improving the natural capacity of a Resource Area through the removal of aquatic nuisance vegetation to retard pond and lake eutrophication

2. Limited Project Type

If the proposed activity is eligible to be treated as an Ecological Restoration Limited Project (310 CMR10.24(8), 310 CMR 10.53(4)), complete and attach Appendix A: Ecological Restoration Limited Project Checklist and Signed Certification.

8. Property recorded at the Registry of Deeds for:

a. County | b. Certificate # (if registered land)

c. Book | d. Page Number

B. Buffer Zone & Resource Area Impacts (temporary & permanent)

1. ☐ Buffer Zone Only – Check if the project is located only in the Buffer Zone of a Bordering Vegetated Wetland, Inland Bank, or Coastal Resource Area.
2. ☒ Inland Resource Areas (see 310 CMR 10.54-10.58; if not applicable, go to Section B.3, Coastal Resource Areas).

Check all that apply below. Attach narrative and any supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.

B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)

For all projects affecting other Resource Areas, please attach a narrative explaining how the resource area was delineated.

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
a. ☐ Bank	1. linear feet	2. linear feet
b. ☐ Bordering Vegetated Wetland	1. square feet	2. square feet
c. ☒ Land Under Waterbodies and Waterways	9034344 1. square feet 3. cubic yards dredged	2. square feet

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
d. ☐ Bordering Land Subject to Flooding	1. square feet 3. cubic feet of flood storage lost	2. square feet 4. cubic feet replaced
e. ☐ Isolated Land Subject to Flooding	1. square feet 2. cubic feet of flood storage lost	3. cubic feet replaced
f. ☐ Riverfront Area	1. Name of Waterway (if available) - **specify coastal or inland**	

2. Width of Riverfront Area (check one):

☐ 25 ft. - Designated Densely Developed Areas only

☐ 100 ft. - New agricultural projects only

☐ 200 ft. - All other projects

3. Total area of Riverfront Area on the site of the proposed project: _____ square feet

4. Proposed alteration of the Riverfront Area:

a. total square feet _____ b. square feet within 100 ft. _____ c. square feet between 100 ft. and 200 ft. _____

5. Has an alternatives analysis been done and is it attached to this NOI? ☐ Yes ☐ No

6. Was the lot where the activity is proposed created prior to August 1, 1996? ☐ Yes ☐ No

3. ☐ Coastal Resource Areas: (See 310 CMR 10.25-10.35)

Note: for coastal riverfront areas, please complete **Section B.2.f**. above.

B. Buffer Zone & Resource Area Impacts **(temporary & permanent)** (cont'd)

Check all that apply below. Attach narrative and supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.

Online Users: Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
a. ☐ Designated Port Areas	Indicate size under Land Under the Ocean, below	
b. ☐ Land Under the Ocean	1. square feet 2. cubic yards dredged	
c. ☐ Barrier Beach	Indicate size under Coastal Beaches and/or Coastal Dunes below	
d. ☐ Coastal Beaches	1. square feet	2. cubic yards beach nourishment
e. ☐ Coastal Dunes	1. square feet	2. cubic yards dune nourishment

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
f. ☐ Coastal Banks	1. linear feet	
g. ☐ Rocky Intertidal Shores	1. square feet	
h. ☐ Salt Marshes	1. square feet	2. sq ft restoration, rehab., creation
i. ☐ Land Under Salt Ponds	1. square feet 2. cubic yards dredged	
j. ☐ Land Containing Shellfish	1. square feet	
k. ☐ Fish Runs	Indicate size under Coastal Banks, inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above 1. cubic yards dredged	
l. ☐ Land Subject to Coastal Storm Flowage	1. square feet	

4. ☐ Restoration/Enhancement
If the project is for the purpose of restoring or enhancing a wetland resource area in addition to the square footage that has been entered in Section B.2.b or B.3.h above, please enter the additional amount here.

a. square feet of BVW | b. square feet of Salt Marsh

5. ☐ Project Involves Stream Crossings

a. number of new stream crossings | b. number of replacement stream crossings

C. Other Applicable Standards and Requirements

☐ This is a proposal for an Ecological Restoration Limited Project. Skip Section C and complete Appendix A: Ecological Restoration Limited Project Checklists – Required Actions (310 CMR 10.11).

Streamlined Massachusetts Endangered Species Act/Wetlands Protection Act Review

1. Is any portion of the proposed project located in **Estimated Habitat of Rare Wildlife** as indicated on the most recent Estimated Habitat Map of State-Listed Rare Wetland Wildlife published by the Natural Heritage and Endangered Species Program (NHESP)? To view habitat maps, see the *Massachusetts Natural Heritage Atlas* or go to http://maps.massgis.state.ma.us/PRI_EST_HAB/viewer.htm.

   a. ☐ Yes ☐ No

   If yes, include proof of mailing or hand delivery of NOI to:

   Natural Heritage and Endangered Species Program
   Division of Fisheries and Wildlife
   1 Rabbit Hill Road
   Westborough, MA 01581

   b. Date of map

   If *yes*, the project is also subject to Massachusetts Endangered Species Act (MESA) review (321 CMR 10.18). To qualify for a streamlined, 30-day, MESA/Wetlands Protection Act review, please complete Section C.1.c, and include requested materials with this Notice of Intent (NOI); *OR* complete Section C.2.f, if applicable. *If MESA supplemental information is not included with the NOI, by completing Section 1 of this form, the NHESP will require a separate MESA filing which may take up to 90 days to review (unless noted exceptions in Section 2 apply, see below).*

   c. Submit Supplemental Information for Endangered Species Review*

      1. ☐ Percentage/acreage of property to be altered:

         (a) within wetland Resource Area _____ percentage/acreage

         (b) outside Resource Area _____ percentage/acreage

      2. ☐ Assessor's Map or right-of-way plan of site

2. ☐ Project plans for entire project site, including wetland resource areas and areas outside of wetlands jurisdiction, showing existing and proposed conditions, existing and proposed tree/vegetation clearing line, and clearly demarcated limits of work **

   (a) ☐ Project description (including description of impacts outside of wetland resource area & buffer zone)

   (b) ☐ Photographs representative of the site

* Some projects **not** in Estimated Habitat may be located in Priority Habitat, and require NHESP review (see http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/regulatory-review/). Priority Habitat includes habitat for state-listed plants and strictly upland species not protected by the Wetlands Protection Act.

** MESA projects may not be segmented (321 CMR 10.16). The applicant must disclose full development plans even if such plans are not required as part of the Notice of Intent process.

C. Other Applicable Standards and Requirements (cont'd)

(c) ☐ MESA filing fee (fee information available at http://www.mass.gov/dfwele/dfw/nhesp/regulatory_review/mesa/mesa_fee_schedule.htm). Make check payable to "Commonwealth of Massachusetts - NHESP" and ***mail to NHESP*** at above address

*Projects altering **10 or more acres** of land, also submit:*

(d) ☐ Vegetation cover type map of site

(e) ☐ Project plans showing Priority & Estimated Habitat boundaries

(f) OR Check One of the Following

1. ☐ Project is exempt from MESA review.
Attach applicant letter indicating which MESA exemption applies. (See 321 CMR 10.14, http://www.mass.gov/dfwele/dfw/nhesp/regulatory_review/mesa/mesa_exemptions.htm; the NOI must still be sent to NHESP if the project is within estimated habitat pursuant to 310 CMR 10.37 and 10.59.)

2. ☐ Separate MESA review ongoing. a. NHESP Tracking # b. Date submitted to NHESP

3. ☐ Separate MESA review completed.
Include copy of NHESP "no Take" determination or valid Conservation & Management Permit with approved plan.

3. For coastal projects only, is any portion of the proposed project located below the mean high water line or in a fish run?

a. ☐ Not applicable – project is in inland resource area only b. ☐ Yes ☐ No

If yes, include proof of mailing, hand delivery, or electronic delivery of NOI to either:

South Shore - Cohasset to Rhode Island border, and the Cape & Islands:

Division of Marine Fisheries -
Southeast Marine Fisheries Station
Attn: Environmental Reviewer
1213 Purchase Street – 3rd Floor
New Bedford, MA 02740-6694
Email: DMF.EnvReview-South@state.ma.us

North Shore - Hull to New Hampshire border:

Division of Marine Fisheries -
North Shore Office
Attn: Environmental Reviewer
30 Emerson Avenue
Gloucester, MA 01930
Email: DMF.EnvReview-North@state.ma.us

Also if yes, the project may require a Chapter 91 license. For coastal towns in the Northeast Region, please contact MassDEP's Boston Office. For coastal towns in the Southeast Region, please contact MassDEP's Southeast Regional Office.

C. Other Applicable Standards and Requirements (cont'd)

Online Users: Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.

4. Is any portion of the proposed project within an Area of Critical Environmental Concern (ACEC)?

   a. ☐ Yes ☐ No If yes, provide name of ACEC (see instructions to WPA Form 3 or MassDEP Website for ACEC locations). **Note:** electronic filers click on Website.

   b. ACEC

5. Is any portion of the proposed project within an area designated as an Outstanding Resource Water (ORW) as designated in the Massachusetts Surface Water Quality Standards, 314 CMR 4.00?

   a. ☐ Yes ☐ No

6. Is any portion of the site subject to a Wetlands Restriction Order under the Inland Wetlands Restriction Act (M.G.L. c. 131, § 40A) or the Coastal Wetlands Restriction Act (M.G.L. c. 130, § 105)?

   a. ☐ Yes ☐ No

7. Is this project subject to provisions of the MassDEP Stormwater Management Standards?

   a. ☐ Yes. Attach a copy of the Stormwater Report as required by the Stormwater Management Standards per 310 CMR 10.05(6)(k)-(q) and check if:
      1. ☐ Applying for Low Impact Development (LID) site design credits (as described in Stormwater Management Handbook Vol. 2, Chapter 3)
      2. ☐ A portion of the site constitutes redevelopment
      3. ☐ Proprietary BMPs are included in the Stormwater Management System.

   b. ☐ No. Check why the project is exempt:
      1. ☐ Single-family house
      2. ☐ Emergency road repair
      3. ☐ Small Residential Subdivision (less than or equal to 4 single-family houses or less than or equal to 4 units in multi-family housing project) with no discharge to Critical Areas.

D. Additional Information

☒ This is a proposal for an Ecological Restoration Limited Project. Skip Section D and complete Appendix A: Ecological Restoration Notice of Intent – Minimum Required Documents (310 CMR 10.12).

Applicants must include the following with this Notice of Intent (NOI). See instructions for details.

Online Users: Attach the document transaction number (provided on your receipt page) for any of the following information you submit to the Department.

1. ☐ USGS or other map of the area (along with a narrative description, if necessary) containing sufficient information for the Conservation Commission and the Department to locate the site. (Electronic filers may omit this item.)

2. ☐ Plans identifying the location of proposed activities (including activities proposed to serve as a Bordering Vegetated Wetland [BVW] replication area or other mitigating measure) relative to the boundaries of each affected resource area.

D. Additional Information (cont'd)

3. ☐ Identify the method for BVW and other resource area boundary delineations (MassDEP BVW Field Data Form(s), Determination of Applicability, Order of Resource Area Delineation, etc.), and attach documentation of the methodology.

4. ☐ List the titles and dates for all plans and other materials submitted with this NOI.

a. Plan Title

b. Prepared By

c. Signed and Stamped by

d. Final Revision Date

e. Scale

f. Additional Plan or Document Title

g. Date

5. ☐ If there is more than one property owner, please attach a list of these property owners not listed on this form.

6. ☐ Attach proof of mailing for Natural Heritage and Endangered Species Program, if needed.

7. ☐ Attach proof of mailing for Massachusetts Division of Marine Fisheries, if needed.

8. ☐ Attach NOI Wetland Fee Transmittal Form

9. ☐ Attach Stormwater Report, if needed.

E. Fees

1. ■ Fee Exempt: No filing fee shall be assessed for projects of any city, town, county, or district of the Commonwealth, federally recognized Indian tribe housing authority, municipal housing authority, or the Massachusetts Bay Transportation Authority.

Applicants must submit the following information (in addition to pages 1 and 2 of the NOI Wetland Fee Transmittal Form) to confirm fee payment:

2. Municipal Check Number

3. Check date

4. State Check Number

5. Check date

6. Payor name on check: First Name

7. Payor name on check: Last Name

F. Signatures and Submittal Requirements

I hereby certify under the penalties of perjury that the foregoing Notice of Intent and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge. I understand that the Conservation Commission will place notification of this Notice in a local newspaper at the expense of the applicant in accordance with the wetlands regulations, 310 CMR 10.05(5)(a).

I further certify under penalties of perjury that all abutters were notified of this application, pursuant to the requirements of M.G.L. c. 131, § 40. Notice must be made by Certificate of Mailing or in writing by hand delivery or certified mail (return receipt requested) to all abutters within 100 feet of the property line of the project location.

1. Signature of Applicant	2. Date
3. Signature of Property Owner (if different)	4. Date
5. Signature of Representative (if any)	6. Date

For Conservation Commission:
Two copies of the completed Notice of Intent (Form 3), including supporting plans and documents, two copies of the NOI Wetland Fee Transmittal Form, and the city/town fee payment, to the Conservation Commission by certified mail or hand delivery.

For MassDEP:
One copy of the completed Notice of Intent (Form 3), including supporting plans and documents, one copy of the NOI Wetland Fee Transmittal Form, and a **copy** of the state fee payment to the MassDEP Regional Office (see Instructions) by certified mail or hand delivery.

Other:
If the applicant has checked the “yes” box in any part of Section C, Item 3, above, refer to that section and the Instructions for additional submittal requirements.

The original and copies must be sent simultaneously. Failure by the applicant to send copies in a timely manner may result in dismissal of the Notice of Intent.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent
Appendix A: Ecological Restoration Limited Project Checklists

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Eligibility Checklist

Provided by MassDEP:

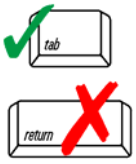
MassDEP File Number

Document Transaction Number

Sutton
City/Town

This Ecological Restoration Limited Project Eligibility Checklist guides the applicant in determining if their project is eligible to file as an Inland or Coastal Ecological Restoration Limited Project (310 CMR 10.53(4) or 310 CMR 10.24(8) respectively). These criteria must be met when submitting the Ecological Restoration Limited Project Notice of Intent to ensure that the restoration and improvement of the natural capacity of a Resource Area(s) to protect and sustain the interests identified in the WPA is **necessary** to achieve the project's ecological restoration goals.

Important:
When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



Regulatory Features of All Coastal and Inland Ecological Restoration Limited Projects

(a) May result in the temporary or permanent loss of/or conversion of Resource Area: An Ecological Restoration Limited Project that meets the requirements of 310 CMR 10.24(8) may result in the temporary or permanent loss of Resource Areas and/or the conversion of one Resource Area to another when such loss is necessary to the achievement of the project's ecological restoration goals.

(b) Exemption from wildlife habitat evaluation: A NOI for an Ecological Restoration Limited Project that meets the minimum requirements for Ecological Restoration Projects and for a MassDEP Combined Application outlined in 310 CMR 10.12(1) and (2) is exempt from providing a wildlife habitat evaluation (310 CMR 10.60).

Note:
Before completing this form consult your local Conservation Commission regarding any municipal bylaw or ordinance.

(c) The following are considerations for applicants filing an Ecological Restoration Limited Project NOI and for the issuing authority approving a project as an Ecological Restoration Limited Project:

- ■ The condition of existing and historic Resource Areas proposed for restoration.
- ■ Evidence of the extent and severity of the impairment(s) that reduce the capacity of the Resource Areas to protect and sustain the interests identified in M.G.L. c. 131, § 40.
- ■ The magnitude and significance of the benefits of the Ecological Restoration Project in improving the capacity of the affected Resource Areas to protect and sustain the other interests identified in M.G.L. c. 131, § 40.
- ■ The magnitude and significance of the impacts of the Ecological Restoration Project on existing Resource Areas that may be modified, converted and/or lost and the interests for which said Resource Areas are presumed significant in 310 CMR 10.00, and the extent to which the project will:
  a. avoid adverse impacts to Resource Areas and the interests identified in M.G.L. c. 131, § 40, that can be avoided without impeding the achievement of the project's ecological restoration goals.
  b. minimize adverse impacts to Resource Areas and the interests identified in M.G.L. c. 131, § 40, that are necessary to the achievement of the project's ecological restoration goals.
  c. utilize best management practices such as erosion and siltation controls and proper construction sequencing to avoid and minimize adverse construction impacts to resource areas and the interests identified in M.G.L. c. 131, § 40.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent
Appendix A: Ecological Restoration Limited Project Checklists

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

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Eligibility Criteria - Coastal Ecological Restoration Limited Projects (310 CMR 10.24(8))

Complete this Eligibility Criteria Checklist ***before*** filling out a Notice of Intent Application to determine if your project qualifies as a Coastal Ecological Restoration Limited Project. (310 CMR 10.24(8)) Sign the Eligibility Certification at the end of Appendix A, and attach the checklist with supporting documentation and the Eligibility Certification to your Notice of Intent Application.

General Eligibility Criteria for All Coastal Ecological Restoration Limited Projects

Notwithstanding the requirements of 310 CMR 10.25 through 10.35, 310 CMR 10.54 through 10.58, and the Wildlife Habitat evaluations in 310 CMR 10.60, the Issuing Authority may issue an Order of Conditions permitting an Ecological Restoration Project listed in 310 CMR 10.24(8)(e) as an Ecological Restoration Limited Project and impose such conditions as will contribute to the interests identified in the WPA M.G.L. provided that the project meets all the requirements in 310 CMR 10.24 (8).

☐ The project is an Ecological Restoration Project as defined in 310 CMR 10.04 and is a project type listed below [310 CMR 10.24(8)(e)].

☐ Tidal Restoration.

☐ Shellfish Habitat Restoration.

☐ Other Ecological Restoration Limited Project Type.

☐ The project will further at least one of the WPA (M.G.L. c. 131, § 40) interests identified below.

- ☐ Protection of public or private water supply.
- ☐ Protection of ground water supply.
- ☐ Flood control.
- ☐ Storm damage prevention.
- ☐ Prevention of pollution.
- ☐ Protection of land containing shellfish.
- ☐ Protection of fisheries.
- ☐ Protection of wildlife habitat.

☐ If the project will impact an area located within estimated habitat which is indicated on the most recent Estimated Habitat Map of State-Listed Rare Wetlands, a NHESP preliminary written determination is attached to the NOI submittal that the project will not have any adverse long-term and short-term effects on specified habitat sites of Rare Species or the project will be carried out in accordance with an approved NHESP habitat management plan.

Eligibility Criteria - Coastal Ecological Restoration Limited Projects (310 CMR 10.24(8)) (Cont.)

General Eligibility Criteria for All Coastal Ecological Restoration Limited Projects (cont.)

☐ If the project is located in a Coastal Dune or Barrier Beach, the project avoids and minimizes armoring of the Coastal Dune or Barrier Beach to the maximum extent practicable.

☐ The project complies with all applicable provisions of 310 CMR 10.24(1) through (6) and 310 CMR 10.24(9) and (10).

Additional Eligibility Criteria for Specific Coastal Ecological Restoration Limited Project Types

These additional criteria must be met to qualify as an Ecological Restoration Limited Project to ensure that the restoration and improvement of the natural capacity of a Resource Area to protect and sustain the interests identified in the WPA is **necessary** to achieve the project's ecological restoration goals.

☐ This Ecological Restoration Limited Project application meets the eligibility criteria for Ecological Restoration Limited Project [310 CMR 10.24(8)(a) through (d) and as proposed, furthers at least one of the WPA interests is for the project type identified below.

☐ **Tidal Restoration Projects**

☐ A project to restore tidal flow that will not significantly increase flooding or storm damage impacts to the built environment, including without limitation, buildings, wells, septic systems, roads or other man-made structures or infrastructure.

☐ **Shellfish Habitat Restoration Projects**

☐ The project has received a Special Projects Permit from the Division of Marine Fisheries or, if a municipality, has received a shellfish propagation permit.

☐ The project is made of cultch (e.g., shellfish shells from oyster, surf or ocean clam) or is a structure manufactured specifically for shellfish enhancement (e.g., reef blocks, reef balls, racks, floats, rafts, suspended gear).

☐ **Other Ecological Restoration Projects** that meet the criteria set forth in 310 CMR 10.24(8)(a) through (d).

☐ Restoration, enhancement, or management of Rare Species habitat.

☐ Restoration of hydrologic and habitat connectivity.

☐ Removal of aquatic nuisance vegetation to impede eutrophication.

☐ Thinning or planting of vegetation to improve habitat value.

☐ Fill removal and re-grading.

☐ Riparian corridor re-naturalization.

☐ River floodplain re-connection.

Eligibility Criteria - Coastal Ecological Restoration Limited Projects (310 CMR 10.24(8)) (Cont.)

Additional Eligibility Criteria for Specific Coastal Ecological Restoration Limited Project Types

- ☐ In-stream habitat enhancement.
- ☐ Remediation of historic tidal wetland ditching.
- ☐ Eelgrass restoration.
- ☐ Invasive species management.
- ☐ Installation of fish passage structures.
- ☐ Other. Describe: _____

☐ This project involves the construction, repair, replacement or expansion of public or private infrastructure (310 CMR 10.24(9).

- ☐ The NOI attachment labeled _____ is an operation and maintenance plan to ensure that the infrastructure will continue to function as designed.
- ☐ The operation and maintenance plan will be implemented as a continuing condition in the Order of Conditions and the Certificate of Compliance.
- ☐ This project proposes to replace an existing stream crossing (310 CMR 10.24(10). The crossing complies with the Massachusetts Stream Crossing Standards to the maximum extent practicable with details provided in the NOI. The crossing type:
  - ☐ Replaces an existing non-tidal crossing that is part of an Anadromous/Catadromous Fish Run (310 CMR 10.35)
  - ☐ Replaces an existing tidal crossing that restricts tidal flow. The tidal restriction will be eliminated to the maximum extent practicable.
- ☐ At a minimum, in evaluating the potential to comply with the standards to the maximum extent practicable the following criteria have been consider site constraints in meeting the standard, undesirable effects or risk in meeting the standard, and the environmental benefit of meeting the standard compared to the cost, by evaluating the following:
  - ☐ The potential for downstream flooding;
  - ☐ Upstream and downstream habitat (in-stream habitat, wetlands);
  - ☐ Potential for erosion and head-cutting;
  - ☐ Stream stability;
  - ☐ Habitat fragmentation caused by the crossing;
  - ☐ The amount of stream mileage made accessible by the improvements;
  - ☐ Storm flow conveyance;

Eligibility Criteria - Coastal Ecological Restoration Limited Projects (310 CMR 10.24(8)) (Cont.)

Additional Eligibility Criteria for Specific Coastal Ecological Restoration Limited Project Types

- ☐ Engineering design constraints specific to the crossing;
- ☐ Hydrologic constraints specific to the crossing;
- ☐ Impacts to wetlands that would occur by improving the crossing;
- ☐ Potential to affect property and infrastructure; and
- ☐ Cost of replacement.

Eligibility Criteria - Inland Ecological Restoration Limited Project (310 CMR 10.53(4))

Complete this Eligibility Criteria Checklist ***before*** filling out a Notice of Intent Application to determine if your project qualifies as an Inland Ecological Restoration Limited Project. (310 CMR 10.53(4)) Sign the Eligibility Certification at the end of Appendix A, and attach the checklist with supporting documentation and the Eligibility Certification to your Notice of Intent Application.

General Eligibility Criteria for All Inland Ecological Restoration Limited Projects

Notwithstanding the requirements of any other provision of 310 CMR 10.25 through 10.35, 310 CMR 10.54 through 10.58, and 310 CMR 10.60, the Issuing Authority may issue an Order of Conditions permitting an Ecological Restoration Project listed in 310 CMR 10.53(4)(e) as an Ecological Restoration Limited Project and impose such conditions as will contribute to the interests identified in M.G.L. c. 131, § 40, provided that:

- ■ The project is an Ecological Restoration Project as defined in 310 CMR 10.04 and is a project type listed below [310 CMR 10.53(4)(e)].
  - ☐ Dam Removal
  - ☐ Freshwater Stream Crossing Repair and Replacement
  - ☐ Stream Daylighting
  - ☐ Tidal Restoration
  - ☐ Rare Species Habitat Restoration
  - ☐ Restoring Fish Passageways
  - ■ Other (describe project type): Aquatic Vegetation Management

Eligibility Criteria - Inland Ecological Restoration Limited Project (310 CMR 10.53(4)) (cont.)

General Eligibility Criteria for All Inland Ecological Restoration Limited Projects

☒ The project will further at least one of the WPA (M.G.L. c. 131, § 40) interests identified below.

- ☐ Protection of public or private water supply
- ☐ Protection of ground water supply
- ☐ Flood control
- ☐ Storm damage prevention
- ☐ Prevention of pollution
- ☐ Protection of land containing shellfish
- ☒ Protection of fisheries
- ☒ Protection of wildlife habitat

☐ If the project will impact an area located within estimated habitat which is indicated on the most recent Estimated Habitat Map of State-Listed Rare Wetlands, a NHESP preliminary written determination is attached to the NOI submittal that the project will have no adverse long-term and short-term effects on specified habitat sites of Rare Species or the project will be carried out in accordance with an approved NHESP habitat management plan.

☐ The project will be carried out in accordance with any time of year restrictions or other conditions recommended by the Division of Marine Fisheries for coastal waters and the Division of Fisheries and Wildlife in accordance with 310 CMR 10.11(3).

☐ If the project involves the dredging of 100 cubic yards of sediment or more or dredging of any amount in an Outstanding Resource Water, a Water Quality Certification has been applied for or obtained.

☐ The project complies with all applicable provisions of 310 CMR 10.53(1), (2), (7), and (8).

Eligibility Criteria - Inland Ecological Restoration Limited Project (310 CMR 10.53(4)) (cont.)

Additional Eligibility Criteria for Specific Inland Ecological Restoration Limited Project Types

These additional criteria must be met to qualify as an Ecological Restoration Limited Project to ensure that the restoration and improvement of the natural capacity of a Resource Area to protect and sustain the interests identified in the WPA is **necessary** to achieve the project's ecological restoration goals.

☒ This project application meets the eligibility criteria for Ecological Restoration Limited Project in accordance with [310 CMR 10.53(4)(a) through (d) and as proposed, furthers at least one of the WPA interests is for the project type identified below:

☐ **Dam Removal**

☐ Project is consistent with MassDEP's 2007 Dam Removal Guidance.

☐ **Freshwater Stream Crossing Repair and Replacement**. The project as proposed and the NOI describes how:

☐ Meeting the eligibility criteria set forth in 310 CMR 10.13 would result in significant stream instability or flooding hazard that cannot otherwise be mitigated, and site constraints make it impossible to meet said criteria.

☐ The project design ensures that the stability of the bank is NOT impaired.

☐ To the maximum extent practicable, the project provides for the restoration of the stream upstream and downstream of the structure as needed to restore stream continuity and eliminate barriers to aquatic organism movement.

☐ The project complies with the requirements of 310 CMR 10.53(7) and (8).

☐ **Stream Daylighting Projects**

☐ The project meets the eligibility criteria for Ecological Restoration Limited Project [310 CMR 10.53(4)(a) through (d)] and as proposed the NOI describes how the proposed project meets to the maximum extent practicable, consistent with the project's ecological restoration goals, all the performance standards for Bank and Land Under Water Bodies and Waterways.

☐ The project meets the requirements of 310 CMR 10.12(1) and (2) and a wildlife habitat evaluation is not included in the NOI.

☐ **Tidal Restoration Project**

☐ Restores tidal flow.

☐ the project, including any proposed flood mitigation measures, will not significantly increase flooding or storm damage to the built environment, including without limitation, buildings, wells, septic systems, roads or other man-made structures or infrastructure.

Eligibility Criteria - Inland Ecological Restoration Limited Project (310 CMR 10.53(4)) (cont.)

- ☒ **Other Ecological Restoration Projects** that meet the criteria set forth in 310 CMR 10.53 (4) (a) through (d).
  - ☐ Restoration, enhancement, or management of Rare Species habitat.
  - ☐ Restoration of hydrologic and habitat connectivity.
  - ☒ Removal of aquatic nuisance vegetation to impede eutrophication.
  - ☒ Thinning or planting of vegetation to improve habitat value.
  - ☐ Riparian corridor re-naturalization.
  - ☐ River floodplain re-connection.
  - ☐ In-stream habitat enhancement.
  - ☐ Fill removal and re-grading.
  - ☐ Flow restoration.
  - ☐ Installation of fish passage structures.
  - ☒ Invasive species management.
  - ☐ Other. Describe: _____

- ☐ This project involves the construction, repair, replacement or expansion of public or private infrastructure. (310 CMR 10.53(7))
  - ☐ The NOI attachment labeled _____ is an operation and maintenance plan to ensure that the infrastructure will continue to function as designed.
  - ☐ The operation and maintenance plan will be implemented as a continuing condition in the Order of Conditions and the Certificate of Compliance.

- ☐ This project replaces an existing stream crossing (310 CMR 10.53(8)). The crossing type:
  - ☐ Replaces an existing non-tidal crossing designed to comply with the Massachusetts Stream Crossing Standards to the maximum extent practicable with details provided in the NOI.
  - ☐ Replaces an existing tidal crossing that restricts tidal flow. The tidal restriction will be eliminated to the maximum extent practicable.

Eligibility Criteria - Inland Ecological Restoration Limited Project (310 CMR 10.53(4)) (cont.)

☐ At a minimum, in evaluating the potential to comply with the standards to the maximum extent practicable the following criteria have been consider site constraints in meeting the standard, undesirable effects or risk in meeting the standard, and the environmental benefit of meeting the standard compared to the cost, by evaluating the following:

- ☐ The potential for downstream flooding;
- ☐ Upstream and downstream habitat (in-stream habitat, wetlands);
- ☐ Potential for erosion and head-cutting;
- ☐ Stream stability;
- ☐ Habitat fragmentation caused by the crossing;
- ☐ The amount of stream mileage made accessible by the improvements;
- ☐ Storm flow conveyance;
- ☐ Engineering design constraints specific to the crossing;
- ☐ Hydrologic constraints specific to the crossing;
- ☐ Impacts to wetlands that would occur by improving the crossing;
- ☐ Potential to affect property and infrastructure; and
- ☐ Cost of replacement.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent
Appendix A: Ecological Restoration Limited Project Checklists

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

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City/Town

Required Actions (310 CMR 10.11)

Complete the Required Actions before submitting a Notice of Intent Application for an Ecological Restoration Project and submit a completed copy of this Checklist with the Notice of Intent.

☒ **Massachusetts Environmental Policy Act (MEPA) / Environmental Monitor**
http://www.mass.gov/eea/agencies/mepa/submitting-notices-to-the-environmental-monitor.html

For Ecological Restoration Limited Projects, there are no changes to MEPA requirements.

☒ Submit written notification at least 14 days prior to the filing of a Notice of Intent (NOI) to the Environmental Monitor for publication. A copy of the written notification is attached and provides at minimum:

- ☒ A brief description of the proposed project.
- ☒ The anticipated NOI submission date to the conservation commission.
- ☒ The name and address of the conservation commission that will review the NOI.
- ☒ Specific details as to where copies of the NOI may be examined or acquired and where to obtain the date, time, and location of the public hearing.

☐ **Massachusetts Endangered Species Act (MESA) /Wetlands Protection Act Review**

☐ Preliminary Massachusetts Endangered Species Act Review from the Natural Heritage and Endangered Species Program (NHESP) has been met and the written determination is attached.

☐ Supplemental Information for Endangered Species Review has been submitted.

1. ☐ Percentage/acreage of property to be altered:
   a. Within Wetland Resource Area _____ Percentage/acreage
   b. Outside Wetland Resource Area _____ Percentage/acreage
2. ☐ Assessor's Map or right-of-way plan of site
3. ☐ Project plans for entire project site, including wetland resource areas and areas outside of wetlands jurisdiction, showing existing and proposed conditions, existing and proposed tree/vegetation clearing line, and clearly demarcated limits of work.
4. ☐ Project description (including description of impacts outside of wetland resource area & buffer zone)
5. ☐ Photographs representative of the site
6. ☐ MESA filing fee (fee information available at http://www.mass.gov/dfwele/dfw/nhesp/regulatory_review/mesa/mesa_fee_schedule.htm)

Required Actions (310 CMR 10.11) (cont.)

Make check payable to "Commonwealth of Massachusetts - NHESP" and mail to NHESP:

Natural Heritage & Endangered Species Program
MA Division of Fisheries & Wildlife
1 Rabbit Hill Road
Westborough, MA 01581

7. Projects altering 10 or more acres of land, also submit:

   a. ☐ Vegetation cover type map of site

   b. ☐ Project plans showing Priority & Estimated Habitat boundaries

OR Check One of the Following:

1. ☐ Project is exempt from MESA review.

Attach applicant letter indicating which MESA exemption applies. (See 321 CMR 10.14, http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/regulatory-review/mass-endangered-species-act-mesa/; the NOI must still be sent to NHESP if the project is within estimated habitat pursuant to 310 CMR 10.37 and 10.59 – see C4 below)

2. ☐ Separate MESA review ongoing.

a. NHESP Tracking # _____ b. Date submitted to NHESP _____

3. ☐ Separate MESA review completed. Include copy of NHESP "no Take" determination or valid Conservation & Management Permit with approved plan.

☐ **Estimated Habitat Map of State-Listed Rare Wetlands Wildlife**

If a portion of the proposed project is located in **Estimated Habitat of Rare Wildlife** as indicated on the most recent Estimated Habitat Map of State-Listed Rare Wetland Wildlife published by the Natural Heritage and Endangered Species Program (NHESP), complete the portion below. To view habitat maps, see the **Massachusetts Natural Heritage Atlas** or view the maps electronically at: http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/regulatory-review

☐ A preliminary written determination from Natural Heritage and Endangered Species Program (NHESP) must be obtained indicating that:

☐ Project will NOT have long- or short-term adverse effect on the actual Resource Area located within estimated habitat indicated on the most recent Estimated Habitat Map of State-Listed Rare Wetlands Wildlife published by NHESP.

☐ Project will have long- or short-term adverse effect on the actual Resource Area located within estimated habitat indicated on the most recent Estimated Habitat Map of State-Listed Rare Wetlands Wildlife published by NHESP. A copy of NHESP's written preliminary determination in accordance with 310 CMR 10.11(2) is attached. This specifies:

☐ Date of the map: _____

Required Actions (310 CMR 10.11) (cont.)

☐ If the Rare Species identified is/are likely to continue to be located on or near the project, and if so, whether the Resource Area to be altered is in fact part of the habitat of the Rare Species.

☐ That if the project alters Resource Area(s) within the habitat of a Rare Species:

☐ The Rare Species is identified;

☐ NHESP's recommended changes or conditions necessary to ensure that the project will have no short or long term adverse effect on the habitat of the local population of the Rare Species is provided; or

☐ An approved NHESP habitat management plan is attached with this Notice of Intent.

Send the request for a preliminary determination to:
Natural Heritage & Endangered Species Program
MA Division of Fisheries & Wildlife
1 Rabbit Hill Road
Westborough, MA 01581

☐ **Division of Marine Fisheries**

☐ If the project will occur within a coastal waterbody with a restricted Time of Year, [see Appendix B of the Division of Marine Fisheries (DMF) Technical Report TR 47 "Marine Fisheries Time of Year Restrictions (TOYs) for Coastal Alteration Projects" dated April 2011 http://www.nae.usace.army.mil/Portals/74/docs/regulatory/StateGeneralPermits/NEGP/MADMFTR-47.pdf].

☐ Obtain a DMF written determination stating:

☐ The proposed work does NOT require a TOY restriction.

☐ The proposed work requires a TOY restriction. Specific recommended TOY restriction and recommended conditions on the proposed work is attached.

☐ If the project may affect a diadromous fish run [re: Division of Marine Fisheries (DMF) Technical Reports TR 15 through 18, dated 2004: http://www.mass.gov/eea/agencies/dfg/dmf/publications/technical.html]

☐ Obtain a DMF written determination stating:

☐ The design specifications and operational plan for the project are compatible with the passage requirements of the fish run.

☐ The design specifications and operational plan for the project are not compatible with the passage requirements of the fish run.

WPA Form 3 – Notice of Intent
Appendix A: Ecological Restoration Limited Project Checklists

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Required Actions (310 CMR 10.11) (cont.)

Send the request for a written or electronic determination to:

South Shore – Cohasset to Rhode Island border, and the Cape & Islands:
Division of Marine Fisheries –
South Coast Field Station
Attn: Environmental Reviewer
1213 Purchase Street – 3rd Floor
New Bedford, MA 02740-6694
Email: DMF.EnvReview-South@state.ma.us

North Shore – Hull to New Hampshire border:
Division of Marine Fisheries –
North Shore Field Station
Attn: Environmental Reviewer
30 Emerson Avenue
Gloucester, MA 01930
Email: DMF.EnvReview-North@state.ma.us

☐ **Division of Fisheries and Wildlife –** http://www.mass.gov/eea/agencies/dfg/dfw/

☐ Projects that involve silt-generating, in-water work that will impact a non-tidal perennial river or stream and the in-water work will not occur between May 1 and August 30.

☐ Obtain a written determination from the Division of Fisheries and Wildlife (DFW) as to whether the proposed work requires a TOY restriction.

☐ The proposed work does NOT require a TOY restriction.

☐ The proposed work requires a TOY restriction. The DFW determination with TOY restriction and other conditions is attached.

☐ **MassDEP Water Quality Certification**

☐ Project involves dredging of 100 cubic yards or more in a Resource Area or dredging of any amount in an Outstanding Resource Water (ORW). A copy and proof of the MassDEP Water Quality Certification pursuant to 314 CMR 9.00 is attached to the NOI.

☐ This project is a Combined Permit Application for 401 Dredging and Restoration (BRP WW 26).

☐ **MassDEP Wetlands Restriction Order**

Is any portion of the site subject to a Wetlands Restriction Order under the Inland Wetlands Restriction Act (M.G.L. c. 131, § 40A) or the Coastal Wetlands Restriction Act (M.G.L. c. 130, § 105)?

☐ Yes ☐ No

☐ **Department of Conservation and Recreation**

Office of Dam Safety

☐ For Dam Removal Projects, obtain a written determination from the Department of Conservation and Recreation Office of Dam Safety that the dam is not subject to the jurisdiction of the Office under 302 CMR 10.00, a written determination that the dam removal does not require a permit under 302 CMR 10.00 or a permit authorizing the dam removal in accordance with 302 CMR 10.00 has been issued.

WPA Form 3 – Notice of Intent
Appendix A: Ecological Restoration Limited Project Checklists

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

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Required Actions (310 CMR 10.11) (cont.)

Areas of Critical Environmental Concern (ACECs)

Is any portion of the proposed project within an Area of Critical Environmental Concern (ACEC)?

☐ Yes ☐ No If yes, provide name of ACEC (see instructions to WPA Form 3 or MassDEP Website for ACEC locations).

Name of ACEC

Minimum Required Documents (310 CMR 10.12)

Complete the Required Documents Checklist below and provide supporting materials before submitting a Notice of Intent Application for an Ecological Restoration Project.

■ This Notice of Intent meets all applicable requirements outlined in for Ecological Restoration Projects in 310 CMR 10.12. Use the checklist below to insure that all documentation is included with the NOI.

At a minimum, a Notice of Intent for an Ecological Restoration Project shall include the following:

■ Description of the project's ecological restoration goals;

■ The location of the Ecological Restoration Project;

☐ Description of the construction sequence for completing the project;

☐ A map of the Areas Subject to Protection Under M.G.L. c. 131, § 40, that will be temporarily or permanently altered by the project or include habitat for Rare Species, Habitat of Potential Regional and Statewide Importance, eel grass beds, or Shellfish Suitability Areas.

☐ The method for BVW and other resource area boundary delineations (MassDEP BVW Field Data Form(s), Determination of Applicability, Order of Resource Area Delineation, etc.) is attached with documentation methodology.

■ List the titles and dates for all plans and other materials submitted with this NOI.

a. Plan Title

SOLitude Lake Management

b. Prepared by

c. Signed and Stamped by

d. Final Revision Date

e. Scale

f. Additional Plan or Document Title

g. Date

☐ If there is more than one property owner, attach a list of these property owners not listed on this form.

■ Attach NOI Wetland Fee Transmittal Form.

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WPA Form 3 – Notice of Intent
Appendix A: Ecological Restoration Limited Project Checklists

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

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Minimum Required Documents (310 CMR 10.12)

- ☐ An evaluation of any flood impacts that may affect the built environment, including without limitation, buildings, wells, septic systems, roads or other man-made structures or infrastructure as well as any proposed flood impact mitigation measures;
- ■ A plan for invasive species prevention and control;
- ☐ The Natural Heritage and Endangered Species Program written determination in accordance with 310 CMR 10.11(2), if needed;
- ☐ Any Time of Year restrictions and/or other conditions recommended by the Division of Marine Fisheries or the Division of Fisheries and Wildlife in accordance with 310 CMR 10.11(3), (4), (5), if needed;
- ■ Proof that notice was published in the Environmental Monitor as required by 310 CMR 10.11(1;
- ■ A certification by the applicant under the penalties of perjury that the project meets the eligibility criteria set forth in 310 CMR 10.13;
- ☐ If the Ecological Restoration Project involves the construction, repair, replacement or expansion of infrastructure, an operation and maintenance plan to ensure that the infrastructure will continue to function as designed;
- ☐ If the project involves dredging of 100 cubic yards or more or dredging of any amount in an Outstanding Resource Water, a Water Quality Certification issued by the Department pursuant to 314 CMR 9.00;
- ☐ If the Ecological Restoration Project involves work on a stream crossing, information sufficient to make the showing required by 310 CMR 10.24(10) for work in a coastal resource area and 310 CMR 10.53(8) for work in an inland resource area; and
- ☐ If the Ecological Restoration Project involves work on a stream crossing, baseline photo-points that capture longitudinal views of the crossing inlet, the crossing outlet and the upstream and downstream channel beds during low flow conditions. The latitude and longitude coordinates of the photo-points shall be included in the baseline data.
- ☐ This project is subject to provisions of the MassDEP Stormwater Management Standards. A copy of the Stormwater Report as required by the Stormwater Management Standards per 310 CMR 10.05(6)(k)-(q) is attached.
- ■ Provide information as the whether the project has the potential to impact private water supply wells including agricultural or aquacultural wells or surface water withdrawal points.

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Appendix A: Ecological Restoration Limited Project Checklists

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

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Certification that the Ecological Restoration Project Meets the Eligibility Criteria

I hereby certify under penalties of perjury that the Ecological Restoration Project Notice of Intent application does not meet the Eligibility criteria for an Ecological Restoration Order of Conditions set forth in 310 CMR 10.13, but does meet the Eligibility Criteria for a Ecological Restoration Limited Project set forth in 10.24(8) or 10.53(4) whichever is applicable. I certify that I am familiar with the information contained in the application, and that to the best of my knowledge and belief such information is true, complete, and accurate. I further certify that I possess the authority to undertake the proposed activities.

Signature of Applicant or Authorized Agent

Matthew Salem — Printed Name of Applicant or Authorized Agent

3/16/18 — Date

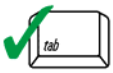
The certification must be signed by the applicant; however, it may be signed by a duly authorized agent (named in Item 2) if this form is accompanied by a statement by the applicant designating the agent and agreeing to furnish upon request, supplemental information in support of the application.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

NOI Wetland Fee Transmittal Form

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A. Applicant Information

1. Location of Project:

a. Street Address	b. City/Town
Manchaug Pond	Douglas/Sutton
c. Check number	d. Fee amount

2. Applicant Mailing Address:

a. First Name	b. Last Name
c. Organization	
Town of Sutton Board of Selectmen	
d. Mailing Address	
4 Uxbridge Road	
e. City/Town	f. State	g. Zip Code
Sutton	MA	01590
h. Phone Number	i. Fax Number	j. Email Address
508-865-8727	508-865-8721	

3. Property Owner (if different):

a. First Name	b. Last Name
c. Organization	
Commonwealth of MA	
d. Mailing Address	
e. City/Town	f. State	g. Zip Code
h. Phone Number	i. Fax Number	j. Email Address

B. Fees

To calculate filing fees, refer to the category fee list and examples in the instructions for filling out WPA Form 3 (Notice of Intent).

Fee should be calculated using the following process & worksheet. ***Please see Instructions before filling out worksheet.***

Step 1/Type of Activity: Describe each type of activity that will occur in wetland resource area and buffer zone.

Step 2/Number of Activities: Identify the number of each type of activity.

Step 3/Individual Activity Fee: Identify each activity fee from the six project categories listed in the instructions.

Step 4/Subtotal Activity Fee: Multiply the number of activities (identified in Step 2) times the fee per category (identified in Step 3) to reach a subtotal fee amount. Note: If any of these activities are in a Riverfront Area in addition to another Resource Area or the Buffer Zone, the fee per activity should be multiplied by 1.5 and then added to the subtotal amount.

Step 5/Total Project Fee: Determine the total project fee by adding the subtotal amounts from Step 4.

Step 6/Fee Payments: To calculate the state share of the fee, divide the total fee in half and subtract $12.50. To calculate the city/town share of the fee, divide the total fee in half and add $12.50.

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NOI Wetland Fee Transmittal Form

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

B. Fees (continued)

Step 1/Type of Activity	Step 2/Number of Activities	Step 3/Individual Activity Fee	Step 4/Subtotal Activity Fee
Cat. 2e: Inland Limited Project			
- Fee Exempt: Municipal	1	$0	$0

Step 5/Total Project Fee: $0

Step 6/Fee Payments:

Total Project Fee:	$0
	a. Total Fee from Step 5
State share of filing Fee:	$0
	b. 1/2 Total Fee **less $**12.50
City/Town share of filling Fee:	$0
	c. 1/2 Total Fee **plus** $12.50

C. Submittal Requirements

a.) Complete pages 1 and 2 and send with a check or money order for the state share of the fee, payable to the Commonwealth of Massachusetts.

Department of Environmental Protection
Box 4062
Boston, MA 02211

b.) **To the Conservation Commission:** Send the Notice of Intent or Abbreviated Notice of Intent; a **copy** of this form; and the city/town fee payment.

To MassDEP Regional Office (see Instructions): Send a copy of the Notice of Intent or Abbreviated Notice of Intent; a **copy** of this form; and a **copy** of the state fee payment. (E-filers of Notices of Intent may submit these electronically.)

ATTACHMENT A

Abutter Notification

To: The Environmental Monitor

From: SŌLitude Lake Management

Date: February 26, 2018

Re: Notification of filing an NOI for Manchaug Pond

Anticipated date of submission: March 12, 2018

The proposed project is seeking approval to initiate an Aquatic Management Program at Manchaug Pond in Douglas and Sutton, MA. USEPA/State registered herbicides and/or algaecides, diver-assisted suction harvesting, and/or other BMPs will be applied to manage nuisance aquatic vegetation and algae to protect the interests of the Wetlands Protection Act by impeding eutrophication and improving habitat value.

Reviewing Conservation Commission(s):

Douglas Conservation Commission
29 Depot Street
Douglas, MA 01516

Sutton Conservation Commission
Town Hall
4 Uxbridge Road
Sutton, MA 01590

Copies of the NOI may be examined or acquired from the Conservation Commission, or by contacting the applicant's representative, SŌLitude Lake Management, at info@solitudelake.com, or 508-865-1000, Monday and Friday between 9AM and 4PM.

See Conservation Commission website for the meeting schedule for exact dates and agendas.

AFFIDAVIT OF SERVICE

Under the Massachusetts Wetlands Protection Act I, Matthew Salem, hereby certify under the pains and penalty of perjury that on _____, 2018, I mailed a Notification to Abutters in compliance with the second paragraph of the Massachusetts General Laws, Chapter 131, s.40, and the DEP Guide to Abutter Notification dated April 8, 1994, in connection with the following matter:

> A Notice of Intent was filed under the Massachusetts Wetlands Protection Act by SŌLitude Lake Management with the Sutton Conservation Commission on _____, 2018, for an Aquatic Management Program at Manchaug Pond in Douglas/Sutton, MA.

This form of the notification, and a list of the abutters to whom it was given and their addresses, are attached to this Affidavit of Service.

_____ _____

Name Date

CONSERVATION COMMISSION MEETING

Notification to Abutters Under the
Massachusetts Wetlands Protection Act

In accordance with the second paragraph of Massachusetts General Laws Chapter 111, Section 40, you are hereby notified of the following:

A. The name of the applicant is: The Town of Sutton Board of Selectmen

B. The applicant has filed a Notice of Intent with the Conservation Commission for the municipality of: Sutton

C. The street address of the lot where the activity is proposed is: Manchaug Pond

D. Copies of the Notice of Intent may be examined at: The Conservation Office between the hours of 8:00am and 3:00pm, on the following days of the week, Monday to Thursday, Tuesday night from 6:30pm to 8:30pm.

E. The project involves: An integrated Aquatic Management Program at Manchaug Pond to monitor, assess, and implement measures for control of non-native/nuisance aquatic vegetation, with the use of Diver-Assisted Suction Harvesting and USEPA/State registered aquatic herbicides/algaecides. For more information, please call (check One): The Applicant( ), The Representative(X), or Other( ) specify SŌLitude Lake Management, at: 508-865-1000.

F. Copies of the Request may be obtained from either (check one) the applicant, or the applicant's representative, by calling this telephone number 508-865-1000 between the hours of 8am – 4pm on the following days of the week, Monday – Friday.

G. Information regarding the date, time, and place of the Public Hearing may be obtained from:
SŌLitude Lake Management by calling this telephone number 508-865-1000 between the hours of 8am – 4pm on the following days of the week Monday – Friday
Check one, this is the Applicant ( ), Representative (X), or Other ( ), specify _____

Note: Notice of the Public Hearing, including its date, time, and place, will be published at least five (5) days in advance in the Millbury Sutton Chronicle.

Note: Notice of the Public Hearing including its date, time, and place will be posted in the City or Town Hall not less than forty-eight (48) hours in advance.

Note: You also may contact your local Conservation Commission or the nearest Department of Environmental Protection Regional Office for more information about this application or the Wetlands Protection Act. To contact DEP, call: Central Region: 508-792-7650

ATTACHMENT B

Project Description

1.0 Introduction

The "Applicant", the Town of Sutton Board of Selectmen, in concert with the Manchaug Pond Foundation, are seeking approval to initiate an Aquatic Management Program at Manchaug Pond. The objective of the management program is to control growth of nuisance and non-native aquatic plant and algae species, including fanwort (*Cabomba caroliniana*), variable watermilfoil (*Myriophyllum heterophyllum*) and common reed (*Phragmites australis*), to improve and maintain open water habitat, maintain water quality, promote growth of less pervasive native plant species, and provide safe recreational access to the pond. Based on the type, distribution, and density of vegetation within Manchaug Pond, it has been concluded the restoration goals of the Applicant can best be achieved through diver-assisted suction harvesting and the prudent use of USEPA/MA DAR registered herbicides and algaecides.

The proposed project has been filed as an Ecological Restoration Limited Project under 310 CMR 10.53(4) and will protect the interest of the Wetland Protection Act by controlling a nuisance species, improving fish habitat, improving water quality and slowing lake eutrophication.[1]

2.0 Problem Statement:

Manchaug Pond is a 364-acre, impounded waterbody located within the towns of Douglas and Sutton (Attachment C – Figures 1 & 2). A majority of the pond would be considered littoral area, where sunlight penetrates through the water to the sediment and can support dense aquatic macrophyte growth. During the point-intercept survey performed by SŌLitude Lake Management, the waterbody was toured and moderate to dense growth fanwort and variable watermilfoil was documented in two coves of the pond, in addition to smaller, isolated patches in the main basin. Additionally, sparse to dense growth of native aquatic macrophyte species was present throughout the majority of the waterbody. Unmanaged, dense growth of invasive and native vegetation can degrade water quality, fish/wildlife habitat, and reduce recreational access to the pond. Based on the goals of the Applicant, a management program focusing chemical treatment with USEPA/MA DAR approved herbicides and algaecides and targeted diver-assisted suction harvesting is proposed to control the non-native and nuisance plant and algae species to maintain open water conditions and maintain desirable water quality.

3.0 Site Description:

Manchaug Pond is a 364-acre waterbody created by the impoundment of the headwaters of the Mumford River. The pond's watershed is large, covering approximately 6.9 square miles, draining the area north to Central Turnpike and west to Northwest Main Street (Attachment C – Figure 3). The three main inlets to the pond are located at the northwestern end after leaving the pond at the Sutton Falls Camping Area, the middle of the western shoreline, and at the southwestern cove. Past the public boat ramp on Torrey Road, water exits to Stevens Pond through a controllable outlet structure adjacent. The shoreline of the pond supports dense pockets of residential growth on the eastern and southern shorelines with the majority of the

Manchaug Pond[2]	
Surface Area (acres)	364
Est. Mean Depth (feet)	13.0
Maximum Reported Depth (feet)	30.0
Estimated Volume	4,732 ac-ft. (1.54 billion gal.)
Dominant Plant Species	Naiad Bladderwort Fanwort Variable watermilfoil Pondweeds

[1] Department of Environmental Protection. Guidance for Aquatic Plant Management in Lake and Ponds as it Relates to the Wetlands Protection Act: April 2004, 1p.

[2] Estimates based on observed and reported conditions

western shoreline being sparsely populated. The pond is utilized for boating, fishing, swimming, and passive wildlife viewing.

4.0 Existing Conditions:

A survey of the waterbody and the current conditions was performed by a SŌLitude Biologist in July 2017 to document and assess the aquatic vegetation community. During the survey, two invasive species, fanwort and variable watermilfoil were observed dominating the community in the northwestern and southwestern coves (Attachment C – Figure 4). A couple small, isolated patches of each species was noted along the eastern shoreline. The dominant aquatic macrophyte species commonly observed throughout the littoral zone were northern naiad (*Najas flexilis*) and bladderwort (*Utricularia radiata*). Many native species of pondweeds were documented, including variable-leaf pondweed (*Potamogeton gramineus*), large-leaf pondweed (*P. amplifolius*), and clasping-leaf pondweed (*P. perfoliatus*). Other species observed include coontail (*Ceratophyllum demersum*), southern naiad (*Najas guadalupensis*), and tapegrass (*Vallisneria americana*) (Attachment D). Common reed was observed beginning to infest small portions of the shoreline adjacent to the State Boat Launch.

5.0 In-Lake Management Recommendations:

5.1 Program Overview:

Multiple-year (5) approval is requested for the implementation of the Aquatic Management Program at Manchaug Pond. The goal of the management program is to control growth of fanwort, variable watermilfoil, common reed, and dense, nuisance native vegetation and algae in targeted areas, to improve and maintain open water habitat, promote the growth of less pervasive native plant species, and provide safe recreational access to the pond through an integrated management program. This management program has been developed to be compatible with the goals of Applicant keeping in mind the regulatory responsibilities of the Douglas and Sutton Conservation Commissions and MA DEP.

As with any dynamic system, the ability to change and modify the management program is paramount to its success. The top priority of the program is to reduce the invasive vegetation infestations. This and the additional objectives of improving water quality and maintaining open water habitat can be achieved through regular monitoring supplemented by targeted diver-assisted suction harvesting and the prudent use of USEPA/MA DAR registered aquatic herbicides and algaecides. Specifically, we are requesting approval for the use of fluridone (trade name: Sonar), diquat (Reward), flumioxazin (Clipper), glyphosate (AquaPro) and copper-based algaecides; additionally, we are seeking conditional approval to implement benthic matting, hand-pulling, and diver-assisted suction harvesting (DASH) should conditions within the waterbody require different management techniques in future years. The proposed herbicides and algaecides specifically affect the target species to be controlled and have a negligible effect on the non-target species and wildlife when applied in accordance with the label directions. All chemicals are applied at or below suggested does according to the product label. All doses are based on plant types and densities, so that a minimum amount of the chemicals is introduced into the waterbody.

No significant alteration to the wetland resource areas will occur as a result of the proposed pond management program; instead, the resource areas will be enhanced by controlling a non-native, invasive aquatic plant species, dense native vegetation, and improving water quality.

5.2 Proposed Products and Management Techniques

Fluridone (Sonar® – EPA # 67690-4 or equivalent)

Fluridone is a systemic herbicide that offers long-term control on invasive and nuisance aquatic vegetation. This herbicide hinders the ability of susceptible plants to produce carotene which protects chlorophyll from photodegradation, which results in mortality and subsequent long-term control of the targeted species (i.e.,

directly impacts the standing population and prevents future spread). This process is known as chlorosis and may be observed visually as the plant begins to lose its green color and take on a white or pink shade. Fluridone requires an extended contact time (45-60 days), so it has historically been used for low-dose, whole-pond treatments where dilution and contact time are more predictable, however, new granular formulations do allow for more effective spot-treatment.

Fluridone, when applied at recommended dosages is generally viewed as having one of the most environmentally friendly toxicology profiles of all products currently on the market. In fact, the US EPA has approved a limit of 150 ppb to be allowed in water used for drinking. Ideally, fluridone treatments are initiated early in the growing season when target vegetation is low or starting emergence. Presently, liquid and granular formations of this herbicide are available and included under this management plan. For aqueous applications, this chemical will be placed into an onboard mixing tank, mixed with pond water and evenly distributed throughout the surface of the treatment area via boat. This herbicide will be injected under the water surface through trailing hoses, minimizing the chance of chemical drift and assuring accurate placement of over the target species. For granular applications, the herbicide will be placed into a Heard spreader mounted to the bow of the treatment vessel and evenly distributed over the surface of the treatment area.

Fluridone water use restrictions, include no application within one-quarter mile of a potable water intake and no use of treated water for irrigation purposes within 30 days of application. Although there are no restrictions on swimming, boating, or fishing, prudent use suggests that we close the treated portion of the pond on the day of treatment. The shoreline of the pond will be posted with signs warning of these temporary water uses restrictions, prior to treatment.

Impacts Specific to the Wetlands Protection Act using Fluridone[3]

- Protection of public and private water supply – Generally neutral, but may have detriment at high doses (prohibition within 0.25-mi. of drinking water intakes at doses >20 ppb)
- Protection of groundwater supply – Generally neutral (no significant interaction)
- Storm damage prevention – Neutral (no significant interaction)
- Prevention of pollution – Generally neutral (no significant interaction)
- Protection of land containing shellfish - Generally neutral (no significant interaction)
- Protection of fisheries - Possible benefit (habitat enhancement) and possible detriment (food source alteration, temporary loss of cover)
- Protection of wildlife habitat – Possible benefit (habitat enhancement) and possible detriment (food source alteration, loss of cover)

Diquat (Reward® - EPA # 100-1091 or equivalent)

Reward (diquat) is an effective herbicide for partial-pond treatments due to its rapid mode of action and short herbicide concentration-exposure-time requirements. Even though diquat is considered to be a contact-herbicide, longer term control may be seen as plants' root crowns will not be allowed to develop.

The USEPA/MA registered herbicide diquat dibromide will be applied to the area at or below the permissible label dose. Reward is a widely used herbicide, applied to greater than 500 lakes and ponds annually, throughout the northeast, to control nuisance submersed aquatic plants. Diquat would be applied to control milfoil and other nuisance submersed plants at the application rate of 1.0-2.0 gal/acre, if necessary. Temporary water use restrictions for diquat are now: 1) No drinking or cooking for 3 days. 2) No irrigation of turf for 3 days and of food crops for 5 days, and 3) No livestock watering for 1 day. There are no restrictions on swimming, boating, or fishing, but prudent herbicide/algaecide management, suggest that we close the pond on the day of treatment. The shoreline of the pond will be posted with signs warning of these temporary water use restrictions, prior to treatment.

[3] Commonwealth of Massachusetts Executive Office of Environmental Affairs. *Practical Guide to Lake Management*: 2004. 133 p.

Diquat is translocated to some extent within the plant. Its rapid action tends to disrupt the leaf cuticle of plants and acts by interfering with photosynthesis. Upon contact with the soil, it is adsorbed immediately and thereby biologically inactivated. Residual levels of diquat in treated water decline rapidly and their reduction is due to the uptake by the targeted vegetation and adsorption to suspended soil particles in the water or on the bottom mud. Photochemical degradation accounts for some loss under conditions of high sunlight and clear waters.

Impacts Specific to the Wetlands Protection Act using Diquat[4]

- Protection of public and private water supply – Benefit (water quality improvement)
- Protection of groundwater supply – Neutral no interaction as diquat is absorbed to soil particles
- Flood control - Neutral (no significant interaction)
- Storm damage prevention – Neutral (no significant interaction)
- Prevention of pollution – Generally neutral (no significant interaction), but could be a detriment if plant die-off causes low oxygen at the bottom of the lake
- Protection of land containing shellfish - Generally neutral (no significant interaction), but reduced algae might reduce food resources for shellfish, and direct toxicity is possible under unusual circumstances
- Protection of fisheries - Possible benefit (habitat enhancement) and possible detriment (food source alteration, loss of cover)
- Protection of wildlife habitat – Possible benefit (habitat enhancement) and possible detriment (food source alteration, loss of cover)

Flumioxazin (Clipper® - EPA # 59639-161 or equivalent)

The USEPA/MA registered herbicide flumioxazin (Clipper) is the only contact herbicide currently approved for use in Massachusetts that can provide effective control of fanwort, as well as filamentous algae. Flumioxazin was recently registered in Massachusetts and its use carries a number of restrictions which limit its use potential. Until flumioxazin is more widely used in the State and more data is collected it is unlikely that these restrictions will change, so its use would be reserved for small spot-treatments within the pond.

Clipper herbicide is classified as a PPO (Protoporphyrinogen oxidase) inhibitor that initiates cell membrane disruption providing control of a broad range of susceptible plants. Clipper is a true contact herbicide that provides quick and effective control of target plant species. Although Clipper is not shown to have systemic activity, one or more years of reasonable control have been observed at other projects in New England where Clipper has been applied. Flumioxazin is extremely fast-acting and has a very short half-life so it is perfect for spot/site specific treatments.

Impacts Specific to the Wetlands Protection Act using Flumioxazin

- Protection of public and private water supply – Benefit (water quality improvement)
- Protection of groundwater supply – Neutral no interaction as flumioxazin has a low leaching potential
- Flood control - Neutral (no significant interaction)
- Storm damage prevention – Neutral (no significant interaction)
- Prevention of pollution – Generally neutral (no significant interaction), but could be a detriment if plant die-off causes low oxygen at the bottom of the lake
- Protection of land containing shellfish - Generally neutral (no significant interaction), but reduced algae might reduce food resources for shellfish, and direct toxicity is possible under unusual circumstances

[4] Commonwealth of Massachusetts Executive Office of Environmental Affairs. *Practical Guide to Lake Management*: 2004. 124 p.

- Protection of fisheries - Possible benefit (habitat enhancement) and possible detriment (food source alteration, loss of cover)
- Protection of wildlife habitat – Possible benefit (habitat enhancement) and possible detriment (food source alteration, loss of cover)

Glyphosate (AquaPro® - EPA # 62719-324-67690, Rodeo – EPA # 62719-324 or equivalent)

Glyphosate is used to control waterlilies, watershield and emergent plants such as purple loosestrife and common reed. It is typically applied in August/September for control of emergent species. Glyphosate would be applied at the recommended Federal/State concentration of 3 quarts/acre. There are no water-use restrictions associated with the use of glyphosate other than use in the vicinity of potable water intakes, but prudent practice calls for restriction of water usage on the day of treatment as an additional safeguard. These restrictions are consistent with good pesticide practice and Massachusetts guidelines for aquatic treatments.

Glyphosate is a systemic herbicide and is foliar active. This means the herbicide is active only on contact with the plant. It has no activity in surrounding soil or water. The chemical is applied to the leaves of the target plant and is translocated down into the rhizomes or roots of the plant. Glyphosate is absorbed by plant foliage and moves throughout plant tissues. Once inside the plant, the active ingredient in glyphosate interrupts the plant's ability to produce a protein it needs to live. The protein that glyphosate targets is found only in plants. It does not exist in humans, wildlife or fish. Glyphosate binds tightly to most types of soil particles and is unavailable for root uptake. There is low potential for leaching or contamination of groundwater with glyphosate herbicide. Microorganisms in the soil and water break down into its natural components.

Impacts Specific to the Wetlands Protection Act using Glyphosate[5]

- Protection of public and private water supply – Protection of public and private water supply – Detriment (prohibition within one quarter mile of surface drinking water supplies due to toxicity), but generally neutral where allowed
- Protection of groundwater supply – Neutral (no interaction)
- Flood control - Neutral (no significant interaction)
- Storm damage prevention – Neutral (no significant interaction)
- Prevention of pollution – Generally neutral (no significant interaction), but could be a detriment if plant die-off causes low oxygen at the bottom of the lake
- Protection of land containing shellfish - Neutral (no significant interaction)
- Protection of fisheries - Possible benefit (habitat enhancement) and possible detriment (food source alteration, loss of cover)
- Protection of wildlife habitat – Possible benefit (habitat enhancement) and possible detriment (food source alteration, loss of cover)

Algaecides (Captain – EPA # 67690-9, SeClear – EPA # 67690-55, GreenClean PRO – EPA #70299-15, or equivilant)

Approval for the use of a copper or peroxide based algaecide is requested in the event that nuisance algae conditions develop, warranting treatment.

Copper based algaecides (i.e. CuSO4, Captain, SeClear) are widely used and are applied to lakes and ponds throughout North America to control nuisance filamentous and microscopic algae. There are no water use restrictions associated with copper-based algaecides and SŌLitude treats several direct, potable (drinking) water reservoirs and a number of recreation waterbodies in the Commonwealth with these

[5] Commonwealth of Massachusetts Executive Office of Environmental Affairs. *Practical Guide to Lake Management*: 2004. 128 p.

algaecides, on a yearly basis. The concentrated liquid algaecides are first diluted with pond water and are then sprayed throughout the pond area. The application rate is generally 0.2 ppm or less for algae control. If applied, treatment will not exceed 50% of the pond volume.

Peroxide based algaecides (e.i. GreenClean PRO, GreenClean Liquid) are a recent addition to algae management. Similar to copper algaecides, there are no water use restrictions. The concentrated products are diluted with pond water and then sprayed evenly throughout the treatment area. The application rate is 0.5 – 1.5 gallons per acre-foot for algae control. If applied, treatment will not exceed 50% of the pond volume.

Impacts Specific to the Wetlands Protection Act using Copper[6] and Peroxide algaecides

- Protection of public and private water supply – Benefit (used to control algae)
- Protection of groundwater supply – Neutral (no significant interaction)
- Flood control - Neutral (no significant interaction)
- Storm damage prevention – Neutral (no significant interaction)
- Prevention of pollution - Generally neutral (no significant interaction), but could be a detriment if algae/plant die-off causes low oxygen at the bottom of the lake or causes release of taste and odor compounds or toxins
- Protection of land containing shellfish - Generally neutral (no significant interaction), but reduced algae might reduce food resources for shellfish, and direct toxicity is possible under unusual circumstances.
- Protection of fisheries - Possible benefit (habitat enhancement) and possible detriment (food source alteration, direct toxicity)
- Protection of wildlife habitat – Possible benefit (habitat enhancement) and possible detriment (food source alteration, direct toxicity)

Benthic Barriers

The use of benthic barriers is predicated upon the principles that rooted plants require light and cannot grow through physical barriers. Applications of clay, silt, sand, and gravel originally were utilized for many years, although plants often would become rooted in the new substrate; artificial sediment covering materials have be created in recent years are more practicable. The materials can be solid or porous and are negatively buoyant. They are most effectively used in small areas such as dock spaces and swimming beaches to suppress plant growth. This method is not utilized for large areas because the cost of materials, application, and maintenance is high.

Impacts Specific to the Wetlands Protection Act using Benthic Barriers[7]

- Protection of public and private water supply – Neutral (no significant interaction)
- Protection of groundwater supply – Neutral (no significant interaction)
- Flood control - Neutral (no significant interaction)
- Storm damage prevention – Neutral (no significant interaction)
- Prevention of pollution - Generally neutral (no significant interaction), but could be detriment if nutrient cycling promotes algal blooms
- Protection of land containing shellfish - Generally neutral (no significant interaction), but covering of significant shellfish resources must be avoided
- Protection of fisheries - Possible benefit (habitat enhancement) and possible detriment (food source alteration, loss of cover)
- Protection of wildlife habitat – Possible benefit (habitat enhancement) and possible detriment (food source alteration, loss of cover) to different species in the same relatively small area

[6] Commonwealth of Massachusetts Executive Office of Environmental Affairs. *Practical Guide to Lake Management*: 2004. 122 p.

[7] Commonwealth of Massachusetts Executive Office of Environmental Affairs. *Practical Guide to Lake Management*: 2004. 114 p.

Hand-Harvesting/Diver-Assisted Suction Harvesting (DASH)

A snorkeler or diver surveys an area and selectively pulls out unwanted plants on an individual basis. This is a highly selective technique, and a labor intensive one. It is well suited to vigilant efforts to keep out invasive species that have not yet become established or after large-scale systemic herbicide treatment efforts. It can effectively address non-dominant growths of undesirable species in mixed assemblages. This technique is not well suited for large-scale efforts, especially when the target species or assemblage occurs in dense or expansive beds.

Suction harvesting is also used to augment hand harvesting, allowing for a higher rate of pulling in a targeted area, as the diver/snorkeler does not have to carry pulled plants to a disposal point. It is recommended for localized infestations. The effectiveness is limited to small areas, typically less than one-half acre. Potentially this could be utilized in future years to remove localized areas of fanwort and variable milfoil growth.

Impacts Specific to the Wetlands Protection Act using Hand Harvesting[8]

- Protection of public and private water supply – Neutral (no significant interaction)
- Protection of groundwater supply – Neutral (no significant interaction)
- Flood control - Neutral (no significant interaction)
- Storm damage prevention – Neutral (no significant interaction)
- Prevention of pollution - Generally neutral (no significant interaction), but could be detriment if sediment disruption and resultant turbidity are high
- Protection of land containing shellfish - Generally neutral (no significant interaction)
- Protection of fisheries – Generally neutral (no significant interaction)
- Protection of wildlife habitat – Generally neutral (no significant interaction), but may have benefit and detriment to different species

Proper herbicide application allows for targeted plant control without posing an unreasonable adverse risk to non-target species and wildlife. Written approval from the Commission will be sought should alternate products be considered in future years. All products proposed for use will be registered for aquatic use in Massachusetts.

Management Technique Descriptions

Detailed information on all the approaches proposed in this NOI can be found at the **Massachusetts Department of Conservation and Recreation, Lakes and Ponds Program website**. There are links under the Publications tab to the "Generic Environmental Impact Report for Eutrophication and Lake Management in Massachusetts" and the "Practical Guide to Lake Management in Massachusetts."

<http://www.mass.gov/eea/agencies/dcr/water-res-protection/lakes-and-ponds/eutrophication-and-aquatic-plant-management.html>

Additional information on the herbicides and algaecides can be found at the **Massachusetts Department of Agricultural Resources website**: <http://www.mass.gov/eea/agencies/agr/pesticides/aquatic-vegetation-management.html>

5.3 Management Justification:

The tenets of the management program focus on regular monitoring supplemented with timely herbicide and/or algaecide treatments. Flumioxazin, fluridone, and diquat will be utilized to manage targeted areas of fanwort, variable watermilfoil, and dense, nuisance vegetation growth. Glyphosate will be

[8] Commonwealth of Massachusetts Executive Office of Environmental Affairs. *Practical Guide to Lake Management*: 2004. 104 p.

utilized to foliarly spot-treat the common reed growth. Copper-based algaecides will be applied to manage problematic microscopic and filamentous algae growth.

Conditional approval for utilizing benthic barriers and hand harvesting is requested should localized areas of vegetation management be required. Written approval from the Commission will be sought should alternate products be considered for use in future years.

5.4 Monitoring:

Regular inspections will be conducted in order to assess the growth phase of the target plant species and overall pond conditions. Post-management inspections will be conducted in order to assess the efficacy of the management efforts and any impacts on non-target species so future applications can be properly adjusted to minimize non-target impacts. Year-End Reports documenting our annual management efforts, observed conditions, management efficacy, and future recommendations can be provided to the Commission.

6.0 Alternatives Analysis:

Alternatives to the proposed Aquatic Plant Management Plan were considered. SŌLitude evaluated all available strategies for management of Manchaug Pond. Findings and recommendations are based on direct experience and discussions found in the *Eutrophication and Aquatic Plant Management in Massachusetts Final Generic Environmental Impact Review* (FGEIR, EOEA 2004).

Hydro-Raking: Not Recommended

The mechanical Hydro-Rake can best be described as a "floating backhoe" with a York Rake attachment. The barge is paddle wheel driven to facilitate operation in shallow water (<2 feet) and it can effectively work to depths of about 12 feet. It works from the water, thereby avoiding damage to sensitive shoreline habitat and property. This machine "rakes" the upper sediment layer, collecting plants and their root systems. The Hydro-Rake is well suited for the removal of plants large rhizome structures and in that case, can provide multiple years of control. Variable watermilfoil and fanwort have comparatively small root structures, and as such, control is likely to be annual at best, with considerable temporary disturbance. Milfoil and fanwort also reproduces through fragmentation, so mechanical removal is not typically recommended because of increased potential for fragmentation and accelerated spread.

Harvesting: Not Recommended

Harvesting of milfoil and fanwort is not recommended because of their ability to reproduce through vegetative fragmentation, leading to increased spread into previously un-infested areas or further intensifying growth rates. Additionally, harvesting would be costly and at best would only provide a season of relief from the vegetation growth with no guarantee of success. The disruption and non-target impacts would be more significant than with spot-treatments using aquatic herbicides.

Biological: Not Recommended

There are no proven biological controls available or approved by the State for the control of the invasive aquatic plant species present at Manchaug Pond.

Sediment Excavation/Dredging: Not Recommended

Dredging nutrient rich bottom sediment is sometimes used as a strategy to control excessive weed growth. Conventional (dry) or hydraulic dredging would require the expenditure of hundreds of thousands of dollars in design and permitting fees alone. Dredging may also have severe impacts to aquatic organisms (i.e. fish and macroinvertebrates) in the ponds with no guarantees of elimination of invasive vegetation.

Do Nothing: Not Recommended

If the invasive and nuisance plant and algae growth is allowed to continue unabated, eutrophication and filling-in at the pond will continue to occur at an accelerated rate due to the annual decomposition of excessive plant material. Anoxic conditions would degrade water quality and potentially impact fish and other aquatic organisms. Stagnant conditions will also increase water temperatures promoting both algae and bacterial growth as well as providing extensive mosquito breeding habitat.

7.0 Compliance

Massachusetts Wetlands Protection Act:

The objective of this project is to control invasive vegetation species. Managing densities of native species will typically not adversely affect wildlife habitat and will not negatively impact other interests of the Massachusetts Wetlands Protection Act. No significant alteration to wetland resources areas will occur as a result of the proposed management program; instead the resource areas will be enhanced by controlling the nuisance plant and algae growth, thereby maintaining native plant communities. The proposed management activities are consistent with the guidelines in the following documents:

- Final Generic Environmental Impact Report: Eutrophication and Aquatic Plant Management in Massachusetts (June 2004)
- Guidance for Aquatic Plant Management in Lakes and Ponds: As it Relates to the Wetlands Protection Act (April 2004 – DEP Policy/SOP/Guideline # BRP/DWM/WW/G04-1)
- The Practical Guide to Lake Management in Massachusetts (2004)

DEP License To Apply Chemicals:

All chemical applications will be performed by Certified Applicators. The USEPA/MA registered aquatic herbicides will be applied at recommended label rates, in accordance with the "Order of Conditions" and DEP "License to Apply Chemicals" permits (BRP WM04). Prior to treatment, the shoreline will be posted with signs warning of all temporary water use restrictions. A site specific "License to Apply Chemicals" for the proposed treatment will be filed with Massachusetts DEP, Office of Watershed Management.

Massachusetts Environmental Policy Act:

The strategies proposed in this NOI are options approved under the Massachusetts Environmental Protection Act (MEPA) process that was approved in 2004 with the issuance of the FGEIR and the *Practical Guide to Lake and Pond Management in Massachusetts*. These approaches do not require individual MEPA review.

Massachusetts Endangered Species Act:

According to the most recent Natural Heritage maps provided by MA GIS (Attachment C - Figure 5), Manchaug Pond is not located within areas designated as Priority Habitats of Rare Species and Estimated Habitats of Rare Wildlife as determined by the Massachusetts Natural Heritage & Endangered Species Program (NHESP). A formal review by NHESP is not required.

8.0 Impacts of the Proposed Management Plan Specific to the Wetlands Protection Act:

Protection of public and private water supply – Manchaug Pond is not used directly as a drinking water supply. Aquatic herbicide treatment at the pond will not have any adverse impacts on the public or private water supply, when used in accordance with the product label and conditions of the MA DEP License to Apply Chemicals. Fluridone can be applied to water supplies up to 150 ppb, well above the potential maximum concentration planned.

Protection of groundwater supply – According to available studies, there is no reason to believe that the groundwater supply will be adversely impacted by the proposed management strategies, specifically the application of the chemicals at the proposed rates to Manchaug Pond, when used in accordance with the product labels. Contamination of groundwater by aquatic herbicides is limited by their low rate of application, rapid rate of degradation, and uptake by target plants. SŌLitude's State licensed applicators take all necessary precautions when mixing and disposing of all chemical containers. Fluridone residue samples have been collected from wells adjacent to treated waterbodies with every sample below the minimum detection threshold of the lab.

Flood control and storm damage prevention – No construction, dredging or alterations of the existing floodplain and storm damage prevention characteristics of the pond are proposed. However, in some instances, abundant and excessive aquatic plant growth can contribute to high water and flooding. Most commonly this occurs in the vicinity of waterbody outlets or water conveyance channels and structures. The unmanaged, annual growth and decomposition of abundant plant growth is also known to increase sediment deposition at an accelerated rate. Therefore, the proposed management approaches may increase the capacity of the resource area over the long-term to provide flood protection.

Prevention of pollution – No degradation of water quality or increased pollution is expected by the proposed management approaches. The proposed herbicides are relatively slow acting in controlling the target vegetation. This results in a slow release of nutrients from the decaying plants, reducing the potential for increases in nutrients that can cause algae blooms. Removal of the excessive growth of aquatic vegetation will contribute to improved water circulation and a reduction in the potential for anoxic conditions. The post-treatment decrease in plant biomass will help to decrease the rate of eutrophication currently caused by the decomposing of excessive plant material.

Protection of fisheries and shellfisheries – Contiguous, dense beds of aquatic vegetation provide poor habitat for most species of fish. Dense plant cover frequently results in significant diurnal fluctuations in dissolved oxygen as well as oxygen depletion during certain times of the year. While temporary effects on some desirable submersed and floating-leafed species may occur following the application of an aquatic herbicide, non-target plants typically rebound quickly. Shoreline emergent plants will not be impacted following the use of aquatic herbicides.

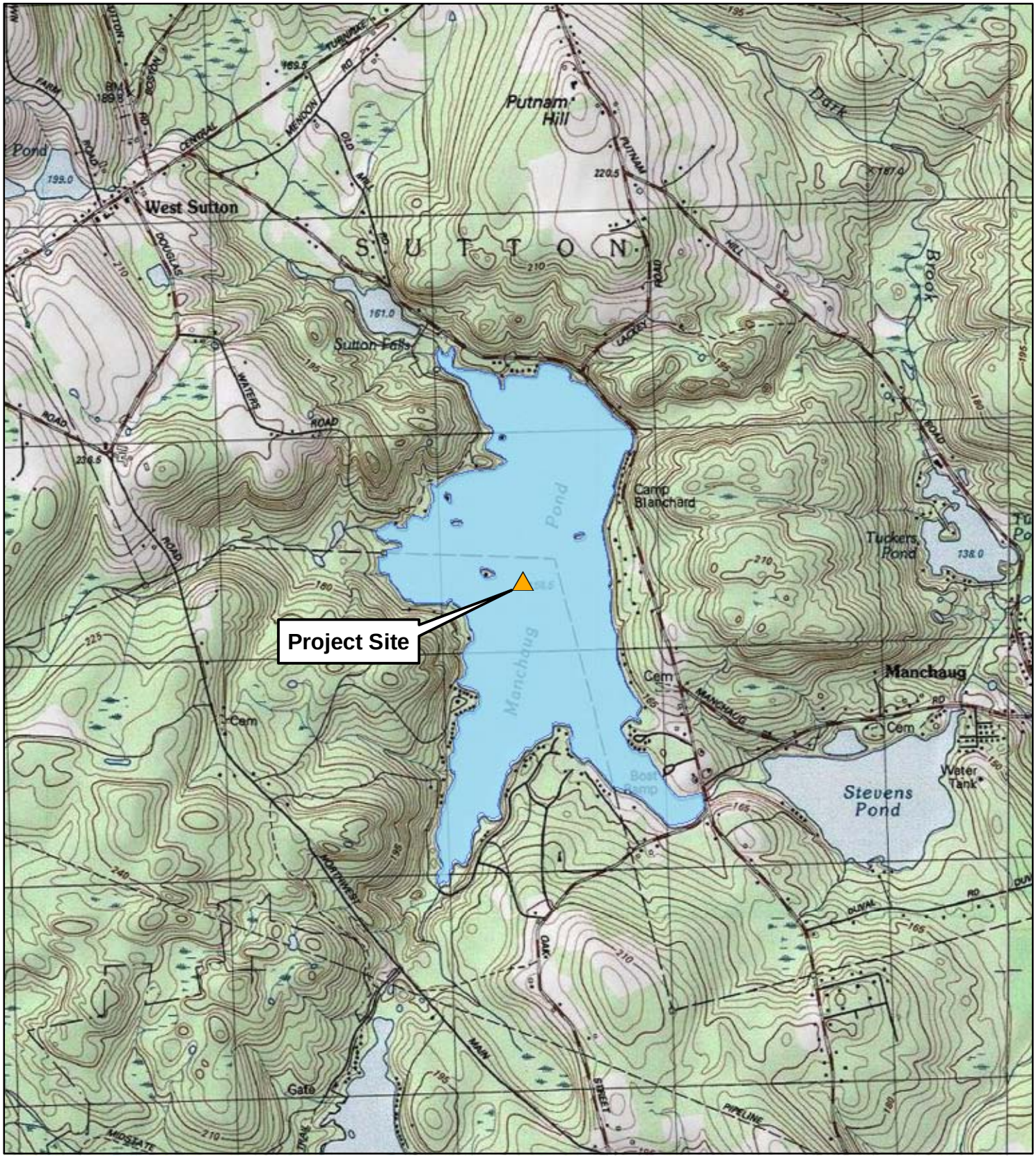
Protection of wildlife and wildlife habitat – In general, excessive and abundant plant growth, especially non-native plants, provides poor wildlife habitat for fish and other wildlife. The proposed management plan is expected to help prevent further degradation of the waterbody through excessive weed growth and improve the wildlife habitat value of the pond in the long-term. Maintaining a balance of open water and vegetated areas is intended.

ATTACHMENT C

Figures

FIGURE 1: Site Locus

SOLITUDE LAKE MANAGEMENT
888.480.5253
solitudelakemanagement.com



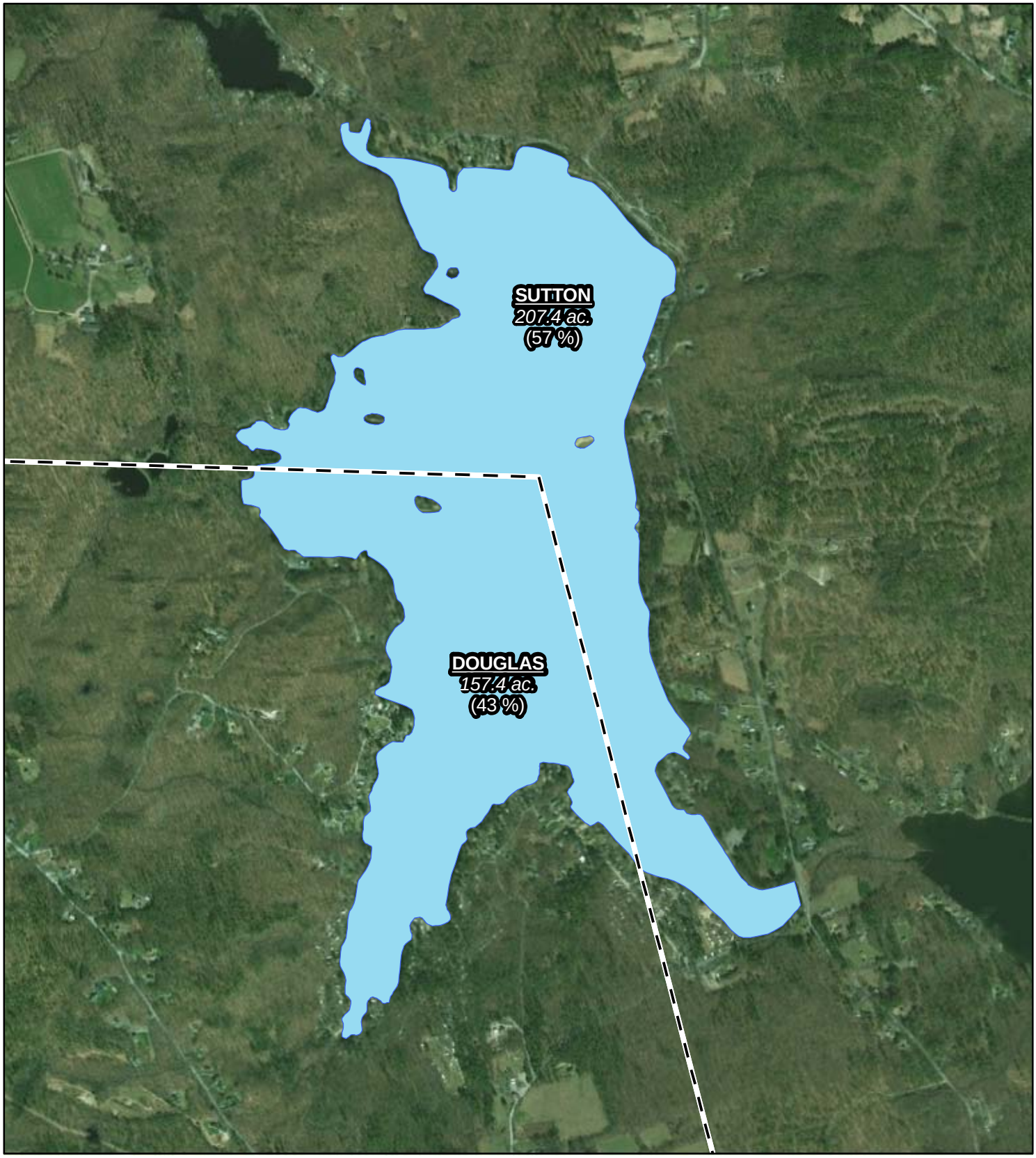
Manchaug Pond
Douglas/Sutton, MA
Worcester County
42.09875°, -71.77579°

Manchaug Pond
0 1,500 3,000 Feet
1:24,000
N

Map Date: 03/14/18
Prepared by: MS
Office: SHREWSBURY, MA

FIGURE 2: Waterbody Area by Town

SOLITUDE LAKE MANAGEMENT
888.480.5253
solitudelakemanagement.com



Manchaug Pond
Douglas/Sutton, MA
Worcester County
42.09875°, -71.77579°

Manchaug Pond

0 500 1,000 1,500 2,000 Feet

1:14,000

N

Map Date: 03/14/18
Prepared by: MS
Office: SHREWSBURY, MA

FIGURE 3: Watershed (USGS Streamstats)

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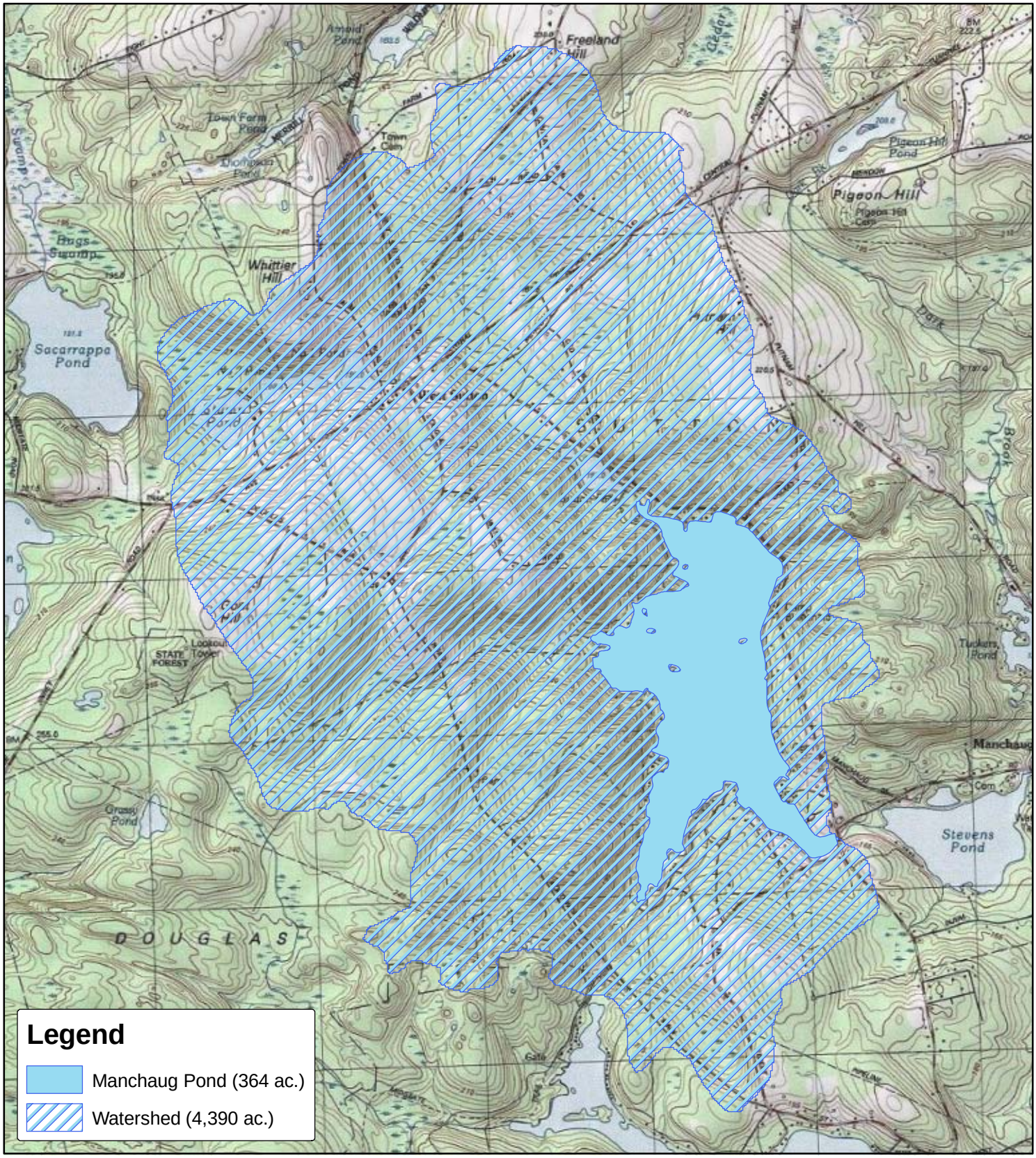
888.480.5253
solitudelakemanagement.com



Manchaug Pond
Douglas/Sutton, MA
Worcester County
42.09875°, -71.77579°

Manchaug Pond

0 1,500 3,000 4,500 Feet

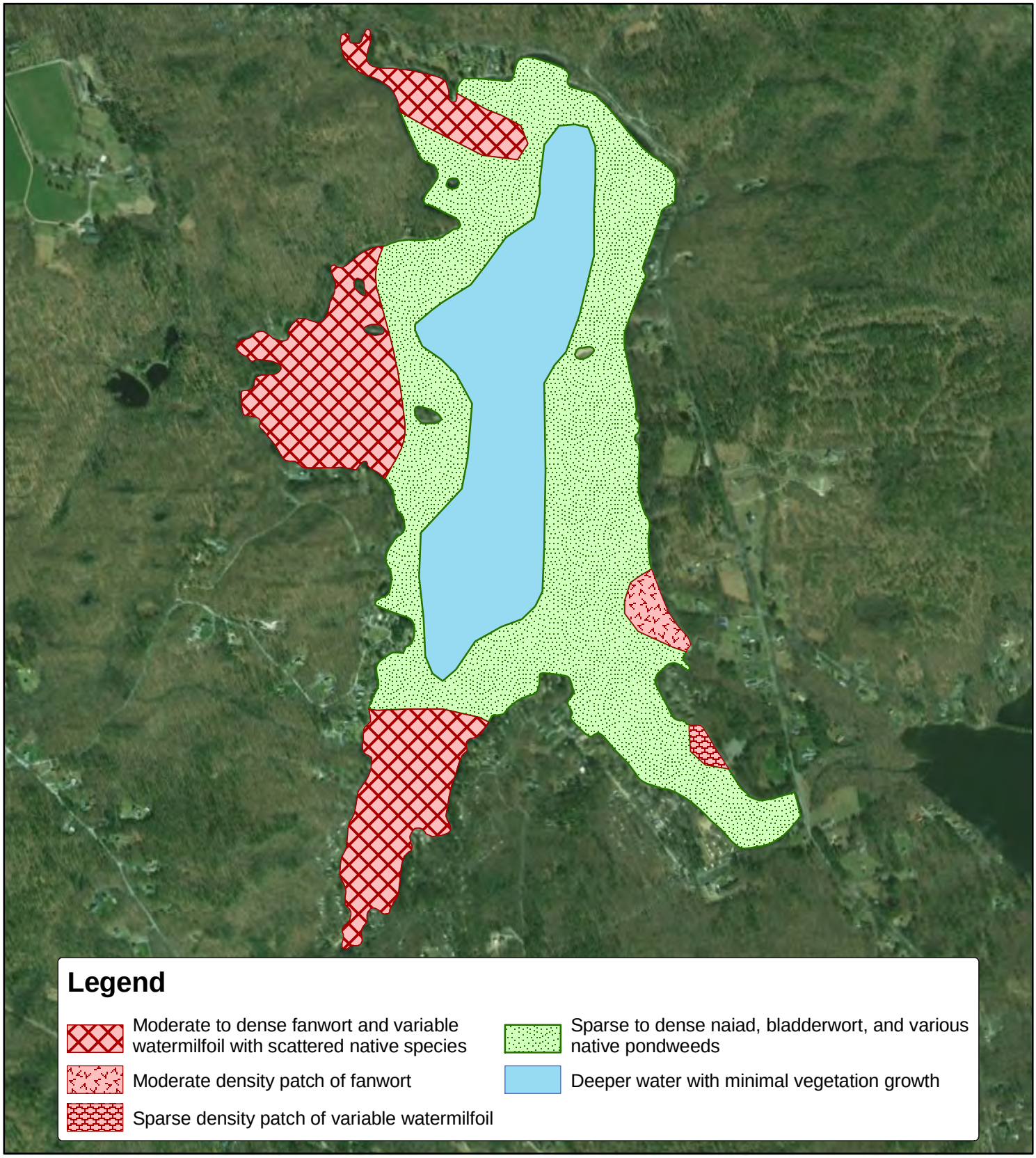
1:32,000

N

Map Date: 03/14/18
Prepared by: MS
Office: SHREWSBURY, MA

FIGURE 4: Vegetation Assemblage (July 2017)

SOLITUDE
LAKE MANAGEMENT
888.480.5253
solitudelakemanagement.com



Manchaug Pond
Douglas/Sutton, MA
Worcester County
42.09875°, -71.77579°

Manchaug Pond

0 500 1,000 1,500 2,000 Feet

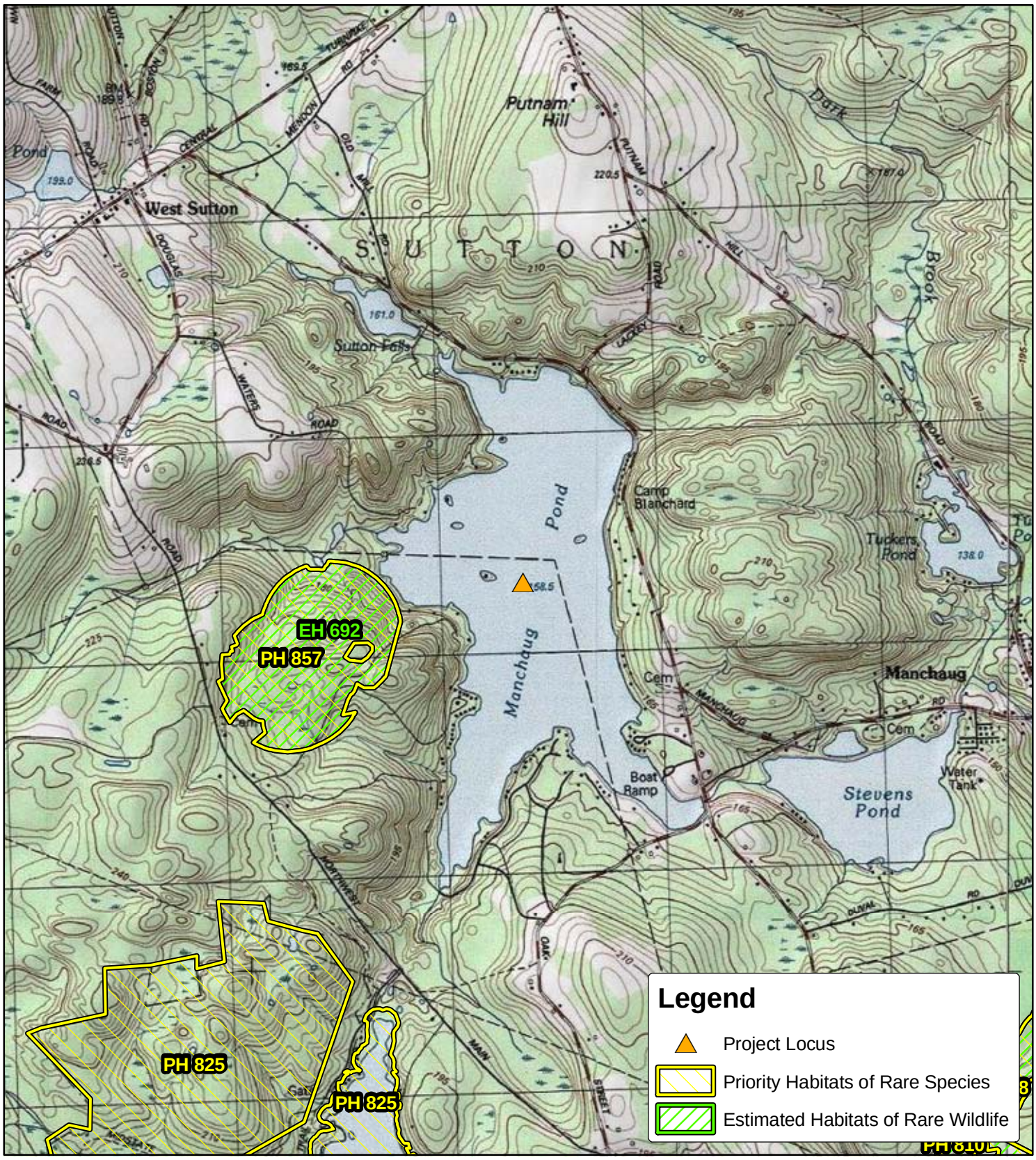
1:14,000

N

Map Date: 03/19/18
Prepared by: MS
Office: SHREWSBURY, MA

FIGURE 5: Natural Heritage & Endangered Species Program Habitat

SOLITUDE LAKE MANAGEMENT
888.480.5253
solitudelakemanagement.com



Manchaug Pond
Douglas/Sutton, MA
Worcester County
42.09875°, -71.77579°

Manchaug Pond
0 1,500 3,000 Feet
1:24,000
N

Map Date: 03/14/18
Prepared by: MS
Office: SHREWSBURY, MA

ATTACHMENT D

2017 Aquatic Vegetation Survey Report

2017 Aquatic Vegetation Survey Report
Manchaug Pond
Sutton/Douglas, Massachusetts

Date: October 30, 2017

Prepared by: SOLitude Lake Management
590 Lake Street
Shrewsbury, MA 01545

Prepared for: Manchaug Pond Foundation
c/o Bill Langlois
Sutton/Douglas, MA

The Project Completion Report documents the aquatic vegetation survey of Manchaug Pond conducted in July of 2017. The program objective was to replicate the point-intercept survey performed by Lycott Environmental in 2009 and determine the current extent of aquatic vegetation, with special regard to exotic, invasive species in Manchaug Pond.

1.0 INTRODUCTION

Manchaug Pond is a roughly 350-acre waterbody located in Sutton/Douglas Massachusetts. Manchaug Pond is utilized heavily for recreational activities such as fishing, swimming, and paddling. It has an average depth of thirteen feet with a maximum depth of 30 feet. Please refer to Figure 2 for depths at point-intercept survey points.

On July 31, 2017, SOLitude Biologist Amanda Mahaney surveyed the plant community in Manchaug Pond utilizing a point-intercept methodology last conducted by Lycott Environmental in 2009. A 10-foot Jon boat was used to drive to pre-determined points.

2.0 METHODOLOGY

The survey involved sampling at pre-determined points, noting the types of aquatic plants present and their relative cover and density. The survey was performed using a combination of techniques: visual observation, use of a "throw-rake" and underwater camera. The point-intercept survey of Manchaug Pond was initiated by Lycott Environmental in 2009; a total of 47 points were created and uploaded to a GPS unit (Figure 1). The data was then used to create a dominant vegetation distribution map (please refer to Figures 3-6 for vegetation distribution maps).

2.1 *Point Intercept Method*

A Solitude biologist surveyed the pond using the aforementioned survey points. The following data was collected at each of the survey points.

- Water depth
- Species present
- Relative abundance of each species
- Total percentage of cover
- Biomass index
- Percent of target species

2.2 *Species Identification*

The rake toss method, based on protocols developed by Cornell University, was used to retrieve submersed aquatic vegetation from either side of the survey vessel. Two rake tosses were carried out at each point; one on either side of the survey vessel. Each species found on the rake was identified and recorded. Plant species observed in the immediate area, but not found on either rake toss was also recorded. Any species not readily identified *in situ* was placed into a plastic bag labeled with the data point number and preserved for further analysis. Once all species were recorded, the most prevalent species was noted as dominant for later use in presence/absence maps.

2.3 Relative Abundance

The abundance scale, developed by the US Army Corps of Engineers and modified by Cornell, was used to categorize total growth.

Notation	Description
Z	*Zero*: no plants on rake
T	*Trace*: fingerful on rake
S	*Sparse*: handful on rake
M	*Moderate*: rakeful of plants
D	*Dense*: difficult to bring into boat

2.4 *Percent Cover*

Percent cover was defined as the percent of bottom sediments obscured by vegetation. In general, an area in which no sediments are visible was classified at 100% cover; at times, however, bottom sediments are not visible due to water clarity, regardless of vegetative growth. These points will be given a null (∅) designation, for data recording purposes. Refer to Figure 7 for percent cover of all species at Manchaug Pond.

2.5 *Biomass Index*

The biomass for each data point was recorded on a scale from zero to four. Refer to Figure 9 for biomass index of each data point.

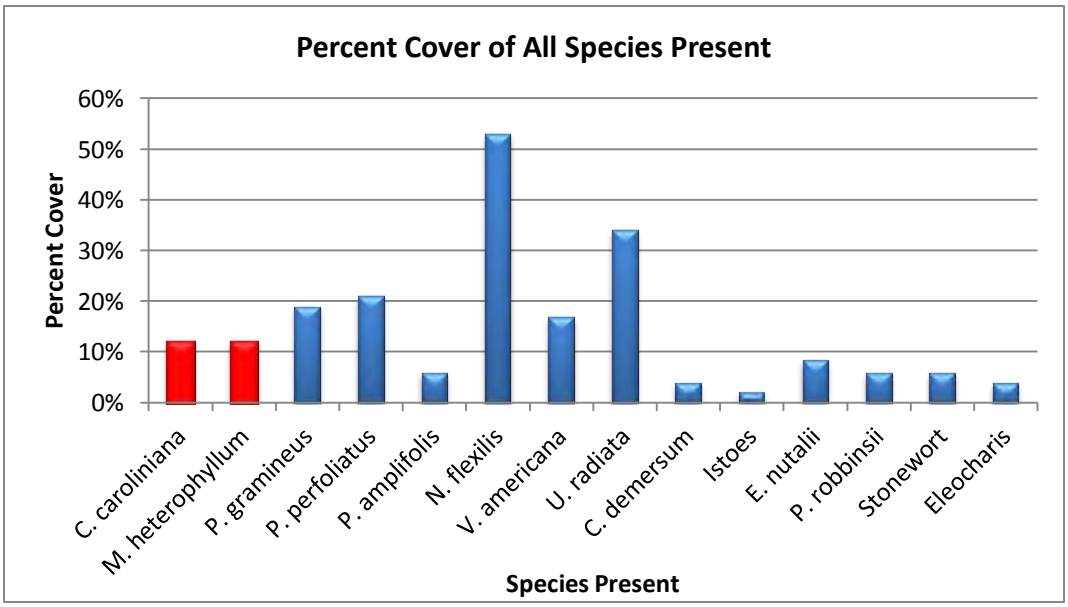
0	No biomass	No plants
1	Low biomass	Very low growth
2	Moderate biomass	Growth extending up, into water column
3	High biomass	Growth in water column and possibly to surface, may be considered a recreational or habitat nuisance
4	Very high biomass	Growth filling the water column and covering the surface

2.6 *Percentage of Target Species*

The immediate area around the boat was observed for growth of *M. heterophyllum and C. caroliniana* and any other target species. Each point was assigned the appropriate percentage. Refer to Figure 8 for percent cover of target species (Fanwort & variable watermilfoil) at Manchaug Pond.

3.0 POINT-INTERCEPT SURVEY RESULTS

A total of thirteen aquatic species and a single macro-alga (*Nitella spp.)* were identified at the time of the survey. Slender Naiad (*Najas flexilis)* was the most common species present at 53% of the survey points, followed by little floating bladderwort (*Utricularia radiata) (34%),* and clasping-leaf pondweed (*Potamogeton perfoliatus) (21%)*. Refer to Chart 1 for percent cover of all species. On average, two submersed aquatic vegetation species were present at each point with an overall bottom coverage of 39% at each survey point. Two exotic and invasive species, fanwort (*Cabomba caroliniana*) and variable watermilfoil (*Myriophyllum heterophyllum*), were both present at 12% of the survey points at an average depth of eight (8) feet. Where found, the density of fanwort and variable watermilfoil averaged 43% of the bottom coverage. Refer to the attached 2017 raw data table for complete point-intercept data recordings.



4.0 MANAGEMENT RECOMMENDATIONS

Littoral Vegetation Survey *Recommended*

Littoral vegetation surveys are used to gain a complete understanding of the distribution and relative abundance of native and non-native aquatic species. Maximum depth of submersed vegetative growth in Massachusetts is commonly between four and ten meters. Light penetration, oxygen levels, and water temperature are reduced and therefore, are a limiting factor for vegetative growth. Littoral surveys are commonly performed before and after management to determine management effectiveness.

Herbicide(s)

Recommended

US EPA/State registered herbicides can be highly effective in areas where physical methods (i.e., hand-harvesting, mechanical harvesting, or benthic barrier installation) are impractical, or when invasive species that spread quickly through fragmentation (watermilfoil & fanwort) are of concern. Herbicides manage vegetation by degrading plant structures such as cell walls or inhibiting vital processes such as photosynthesis. This allows for relatively long-term control and limits or eliminates the chance of reproduction through fragmentation. Use of herbicides can also effectively manage aquatic plants without adverse effects to non-target organisms.

Under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), herbicides must pass a rigorous review process by the Environmental Protection Agency (EPA), which includes more than 100 different scientific studies and tests from herbicide manufacturers. The results must show that the herbicide can be used with a reasonable certainty of no harm to human health and without posing unreasonable risks to the environment when used according to label specifications (EPA 2009). Products registered by the EPA undergo a continuous review process to ensure that the highest standards are met. Use of these EPA registered products is further regulated by the individual states, which may require their own approval process. As in many states, Massachusetts' pesticide laws are more restrictive than those of the EPA.

Currently, there are two chemical formulations that have shown success in controlling Fanwort infestations, Sonar (active ingredient-fluridone) and Clipper (active ingredient-flumioxazin). Clipper herbicide is classified as a PPO (Protoporphyrinogen oxidase) inhibitor that initiates cell membrane disruption providing control of a broad range of susceptible plants. Clipper is a true contact herbicide that provides quick and effective control of target plant species. Although Clipper is not shown to have systemic activity, one or more years of reasonable controls have been observed at other projects in New England where Clipper has been applied. Flumioxazin is extremely fast-acting and has a very short half-life so it is perfect for spot/site specific treatments. Sonar treatments are initiated early in the growing season when target vegetation is low or starting emergence. This herbicide hinders the ability of susceptible plants to produce carotene which protects chlorophyll from photodegradation, which results in mortality and subsequent long-term control of the targeted species (i.e., directly impacts the standing population and prevents future spread). This process is known as chlorosis and may be observed visually as the plant begins to lose its green color and take on a white or pink shade. Fluridone requires an extended contact time (45-60 days), historically used for low-dose, whole-pond treatments where dilution and contact time are more predictable, however, new granular formulations do allow for more effective spot-treatment. When applied at recommended dosages, is generally viewed as having one of the most environmentally friendly toxicology profiles of all products currently on the market.

Sonar has also been shown to be successful in managing variable watermilfoil while minimizing effects on non-target species. Reward (active ingredient – diquat) is a more common approach for partial- and whole-lake watermilfoil treatments due to its rapid mode of action and short herbicide concentration exposure-time requirements. Even though Reward is considered to be a contact herbicide, longer term control may be seen as plants' root crowns will not be allowed to develop due to the herbicide target-effect. Reward is translocated to some extent within the plant. Its rapid action tends to disrupt the leaf cuticle of plants and acts by interfering with photosynthesis. Upon contact with the soil, it is adsorbed immediately and thereby biologically inactivated. An additional herbicide, Navigate (active ingredient – 2,4-D) allows for area and species selective control of watermilfoil species, but is considered ineffective on fanwort. Navigate is a systemic herbicide that is absorbed through the roots of the plants. Following root absorption, the herbicide moves upward into the shoots of the plant affecting its enzymes, respiration and cell division. After

treatment with Navigate, plants begin to die within a week to ten days, and would be expected to fully disappear within two to three weeks following application. The vegetation actively absorbs the chemical. Navigate not taken up by plants becomes bound to the bottom sediments, where it is degraded or broken down by microbial (bacteria) and photolytic (light) processes.

Mechanical Harvesting (hydro-raking, weed harvesting)

Not recommended for V. Milfoil or Fanwort

Harvesting - Cutting and collecting aquatic vegetation with specialized equipment is termed mechanical harvesting. Mechanical harvesters are barges propelled by paddle wheels and equipped with depth-adjustable cutting heads and conveyor-mesh storage areas. Plants are typically cut near the sediment and water interface, usually to a maximum depth of 7 feet. Once a full load is collected, the harvester travels to shore to off-load. Complimentary shore-conveyors and trailer conveyors are available to transfer the harvested material directly into dump trucks, or it can be stockpiled on shore to dewater before being loaded and hauled to a permanent disposal location.

With the exception of true annual plants that only propagate from seed, harvesting typically provides temporary control of aquatic plants. Many aquatic plants re-grow rapidly after being cut (much like cutting a lawn), necessitating two or more cuttings per summer to maintain desirable open-water conditions. Fanwort growth rates have been documented at more than one inch per day and re-growth is usually fairly rapid following harvesting programs.

Hydro-Raking - Mechanical hydro-raking involves the removal of aquatic plants and their attached root structures. Hydro-rakes are best described as floating backhoes. The barge is powered by paddle wheels similar to a harvester, and it is equipped with a hydraulic arm that is fitted with a York rake attachment. The rake tines dig through the bottom sediments, dislodging the plants in water depths up to approximately 12 ft. Most hydro-rakes do not have on-board storage, so each rake full needs to be deposited directly on-shore or else onto a separate transport barge. Plants with large, well-defined root structures like waterlilies and emergent species are most efficiently removed through hydro-raking. In some cases, control of these and similar species can be attained for 2-3 years or longer. This approach is also sometimes favored for annual weed maintenance of beach and swim areas but is not a recommended approach for Manchaug Pond. Harvesting is effective at removing invasive species, such as Water Chestnut, whose reproduction is not facilitated by fragmentation.

In Manchaug Pond, these methods are deemed impractical due to the reproductive behavior of V. Watermilfoil and fanwort.

Hand Harvesting

Recommended Under Certain Circumstances for V. Milfoil and Fanwort

Hand harvesting is the removal of aquatic plant growth manually by a person from the surface, using snorkel or SCUBA gear for submersed, rooted species, V. Milfoil and Fanwort, and by kayak for floating-leaved species, the process is labor intensive and best suited for small or sparse density areas.

Due to the variability in V. Milfoil and Fanwort extents on a year-to-year basis, it is difficult to determine if this method will be practical in the near future. Regardless, small or sparse density areas of V. Milfoil and Fanwort may be successfully controlled utilizing this technique.

Benthic Barrier

Recommended Under Certain Circumstances for V. Milfoil and Fanwort

The use of benthic barrier to restrain growth is an effective management technique in lakes or coves with small pioneer infestations of rooted, submerged species (i.e., V. Milfoil and Fanwort), or locations where only a small area (typically <1 acre) is targeted for management. Benthic barriers block sunlight from reaching the bottom sediments;

thereby, inhibiting photosynthesis and preventing growth of the plants they cover. The cost of screening, installation, and maintenance, as well as possible disruption of substrate-dwelling aquatic organisms, especially if used on a larger scale, may affect the viability of this option.

Lake-Level Drawdown *Currently Implemented*

Drawdowns allow for the desiccation, freezing, and physical disruption of plants and roots. When successful, drawdowns serve as an inexpensive management tool to control nuisance aquatic plant growth within the drawdown zone. This management technique is limited, in that, it is contingent on seasonal weather conditions; therefore, efficacy varies on a year-to-year basis. Manchaug Pond Foundation (MPF) has been conducting a five-foot drawdown for 27 years with variable results. Fanwort and variable watermilfoil range in depths of two to twelve feet, and therefore, are relatively unaffected by drawdowns. If a deeper drawdown is initiated, it is unlikely to gain full control of the target species. This type of drawdown would have to be conducted on an annual basis for a specific length of time to gain moderate control of the target species and with the excellent water clarity at Manchaug Pond, it is possible for both fanwort and variable watermilfoil to be driven to grow in deeper depths. For these reasons, this technique is not recommended to control the invasive species present in Manchaug Pond.

Watershed Management *Not Feasible*

Once invasive species inundate a water body, there are no watershed management options that will lead to control. Limitation of non-point source pollution, including sediment and nutrients can reduce the speed of spread throughout the water body; however, this will not eliminate its eventual spread. Watershed-scale alternatives, such as land protection and neighborhood management (lawn fertilizer, buffer zones etc.), should be considered in combination with the recommended in-lake management procedures.

Biological Control *Not Recommended*

There is no biological control measure recommended for use in Manchaug Pond.

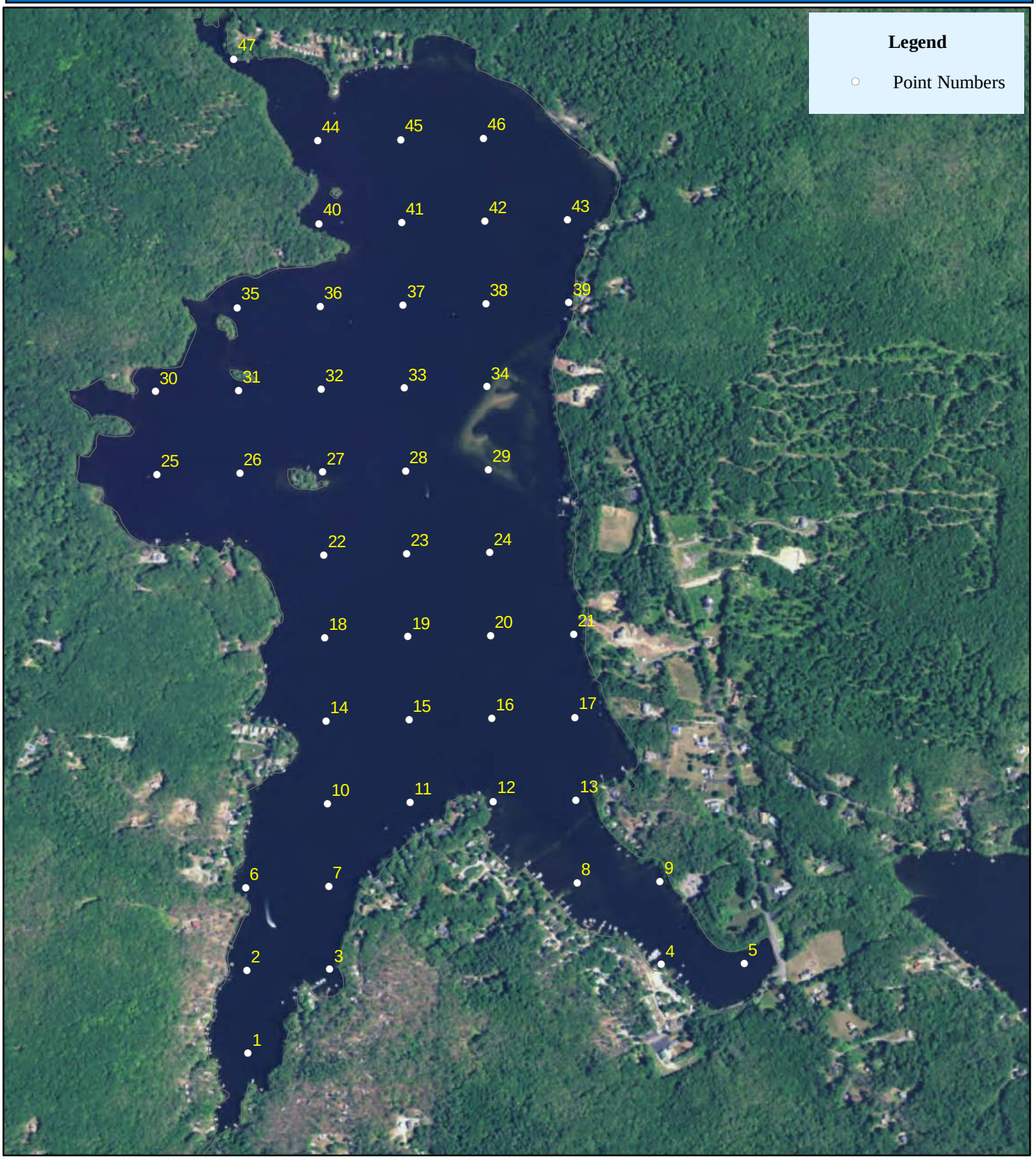
No Action *Not Recommended*

Allowing the invasive aquatic species to proliferate in Manchaug Pond should not be considered a viable option. Left unmanaged, these aggressive species will continue to proliferate throughout the littoral zone. Widespread coverage of invasive species reduces this lake's recreational resource value and also degrades the valuable open water habitat for organisms utilizing this lake. Additionally, seasonal decay of excessive vegetation may degrade water quality by reducing dissolved oxygen and also by increasing the rate of eutrophication. Furthermore, there is great potential for increased spread of these invasive species to other water bodies in the area if management is not conducted.

5.0 SUMMARY

Manchaug Pond supports a desirable assemblage of aquatic vegetation. A diverse community of aquatic vegetation provides multiple benefits for the ecosystem including a food source for aquatic animals, fish and wildlife habitat, improved water quality, shoreline stabilization, improved aesthetics, and reduced chances of establishment by exotic invasive vegetation. Fanwort and variable watermilfoil are reaching maximum growth in two coves (Mumford River outlet & Summer Ct cove) of Manchaug Pond. Access through these two areas has declined due to the thick growth and high biomass of these two species while consistent boat traffic causes regular fragmentation, which is a primary form of reproduction for both fanwort and watermilfoil. Continued monitoring and management of invasive species is recommended as described above.

FIGURE 1: Point-intercept Data Point Numbers



Manchaug Pond
Sutton, MA

Manchaug Pond

0 850 1,700

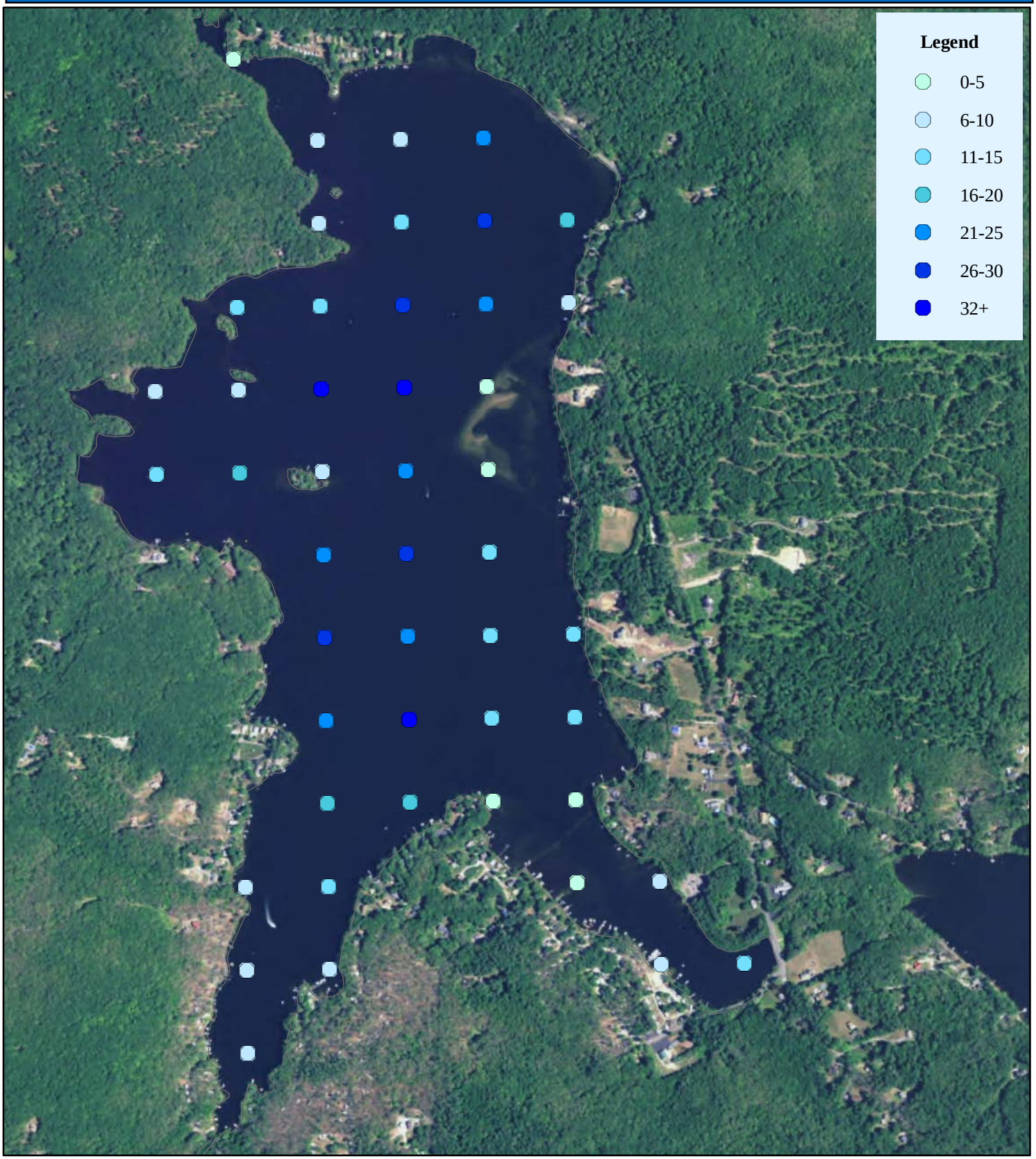
1:11,400 Feet

N

Map Date: 07/31/2017
Survey Date: 07/31/2017
Prepared by: ALM
Office: SHREWSBURY, MA

FIGURE 2: July 2017 Depth in Feet

SOLITUDE LAKE MANAGEMENT



Manchaug Pond
Sutton, MA

Manchaug Pond

0 850 1,700

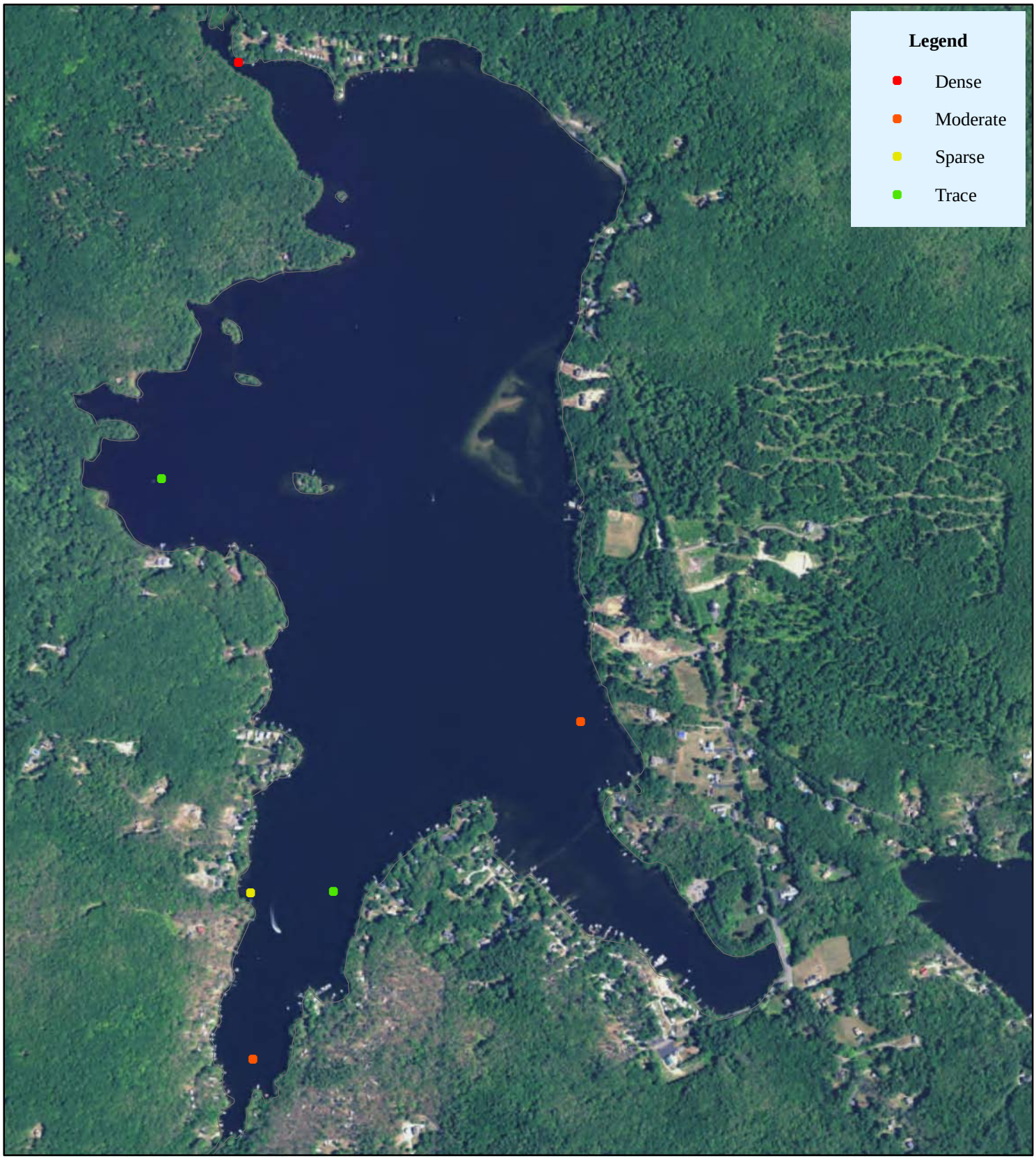
1:11,400 Feet

N

Map Date: 07/31/2017
Survey Date: 07/31/2017
Prepared by: ALM
Office: SHREWSBURY, MA

FIGURE 3: Distribution and Relative Abundance of Fanwort *(C. caroliniana)*

SOLITUDE LAKE MANAGEMENT



Manchaug Pond
Sutton, MA

Manchaug Pond

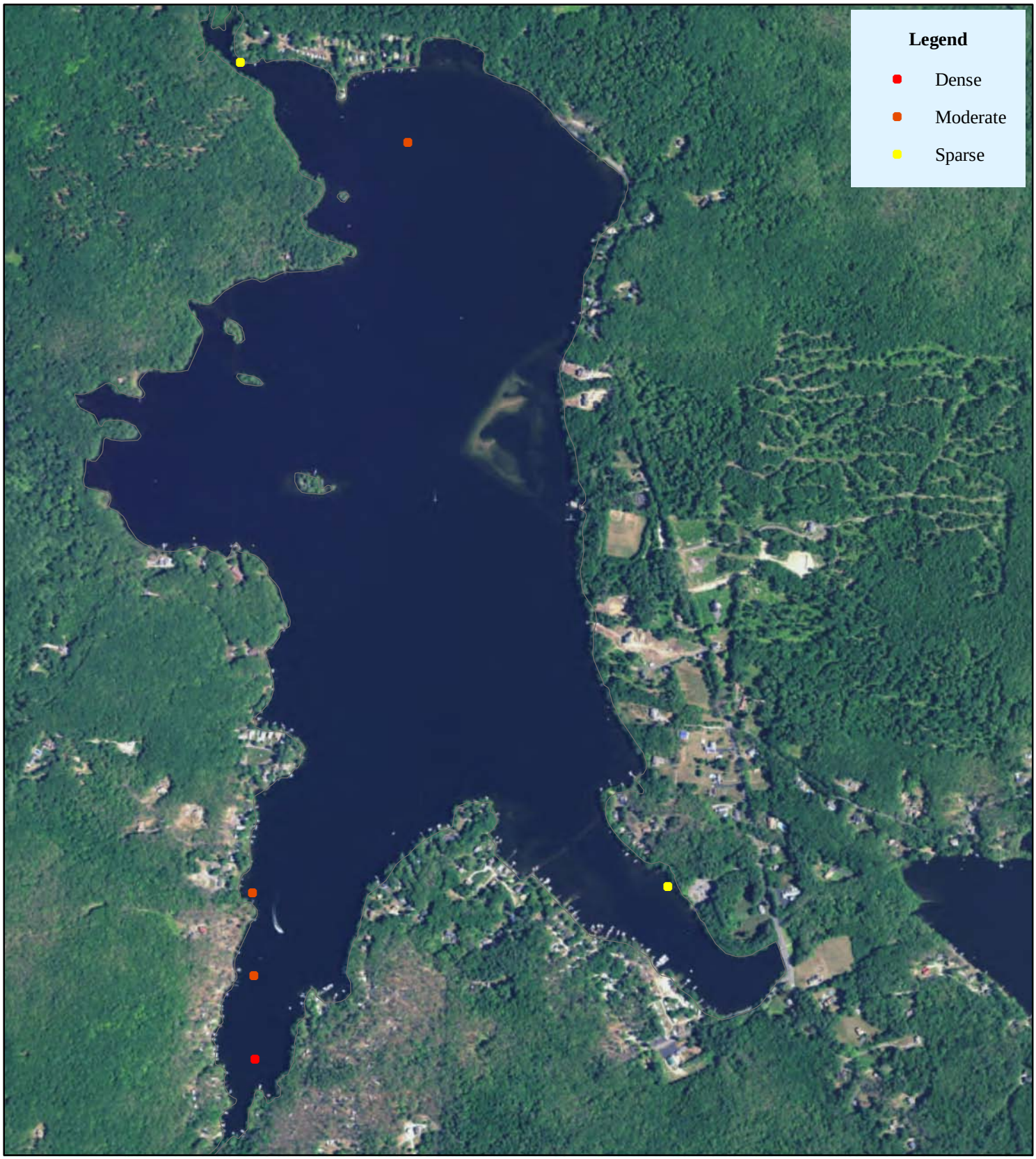
0 850 1,700

1:11,400 Feet

N

Map Date: 07/31/2017
Survey Date: 07/31/2017
Prepared by: ALM
Office: SHREWSBURY, MA

FIGURE 4: Distribution and Relative Abundance of Variable Watermilfoil *(M. heterophyllum)*



Manchaug Pond
Sutton, MA

Manchaug Pond

0 850 1,700

1:11,400 Feet

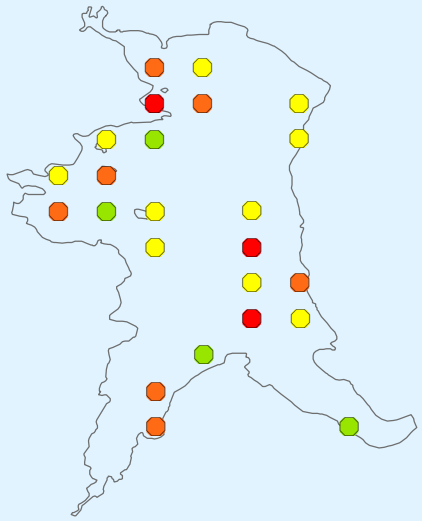
N

Map Date: 07/31/2017
Survey Date: 07/31/2017
Prepared by: ALM
Office: SHREWSBURY, MA

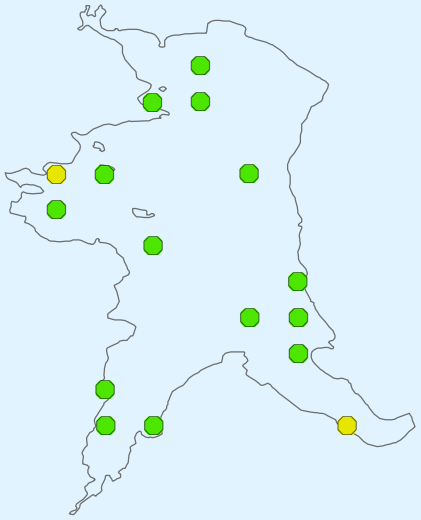
FIGURE 5: Relative Abudance of Native Aquatic Vegetation

SOLITUDE LAKE MANAGEMENT

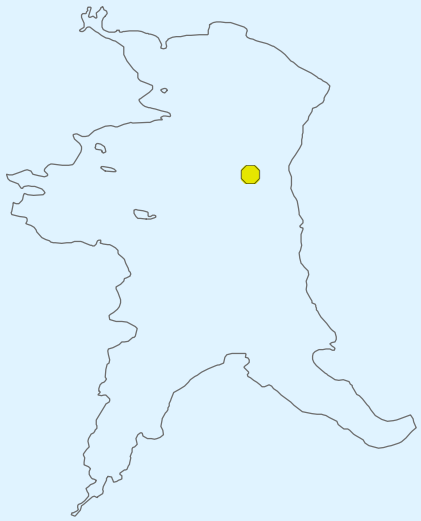
Northern Naiad
(N. flexilis)



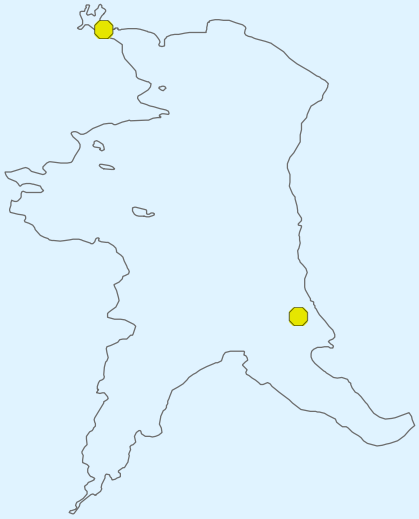
Bladderwort
(U. radiata)



Southern Naiad
(N. guadalupensis)



Coontail
(C. demersum)



Manchaug Pond
Sutton, MA
[Worcester]

Manchaug Pond

0 1,250 2,500 5,000

1:37,900 Feet

N

Legend

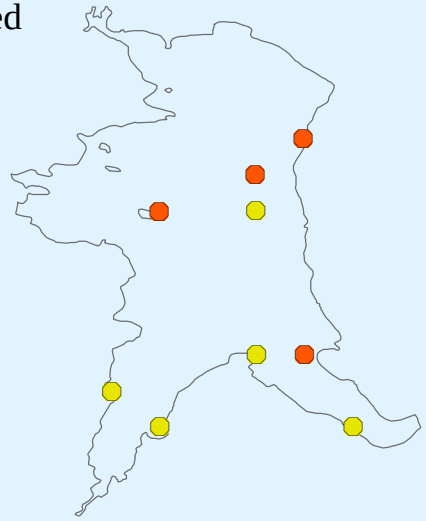
Dense
Sparse
Moderate
Trace

Map Date: 7/31/2017
File: ManchaugPd17_0731_NatVeg_Fig5
Prepared by: ALM
Office: Shrewsbury, MA

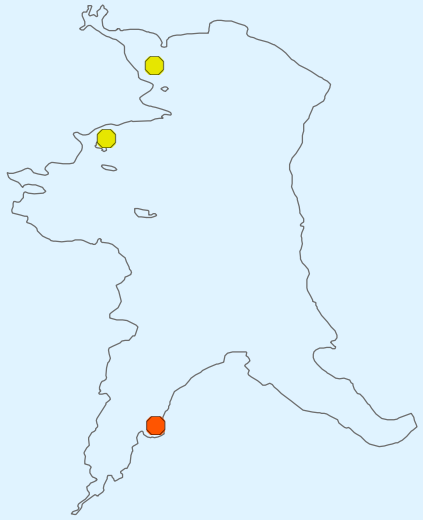
FIGURE 6: Relative Abudance of Native Aquatic Vegetation

SOLITUDE LAKE MANAGEMENT

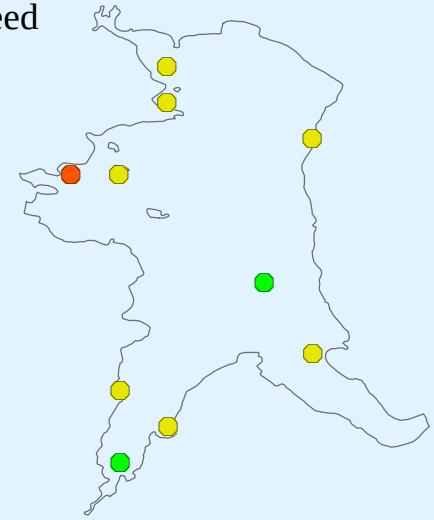
Variable-leaf Pondweed
(P. gramineus)



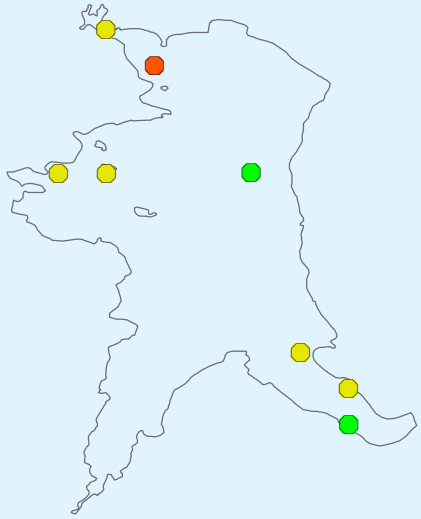
Big-leaf Pondweed
(P. amplifoilus)



Clasping-leaf Pondweed
(P. perfoliatus)



Tapegrass
(V. americana)



Manchaug Pond
Sutton, MA
[Worcester]

Manchaug Pond

0 1,150 2,300 4,600

1:37,900 Feet

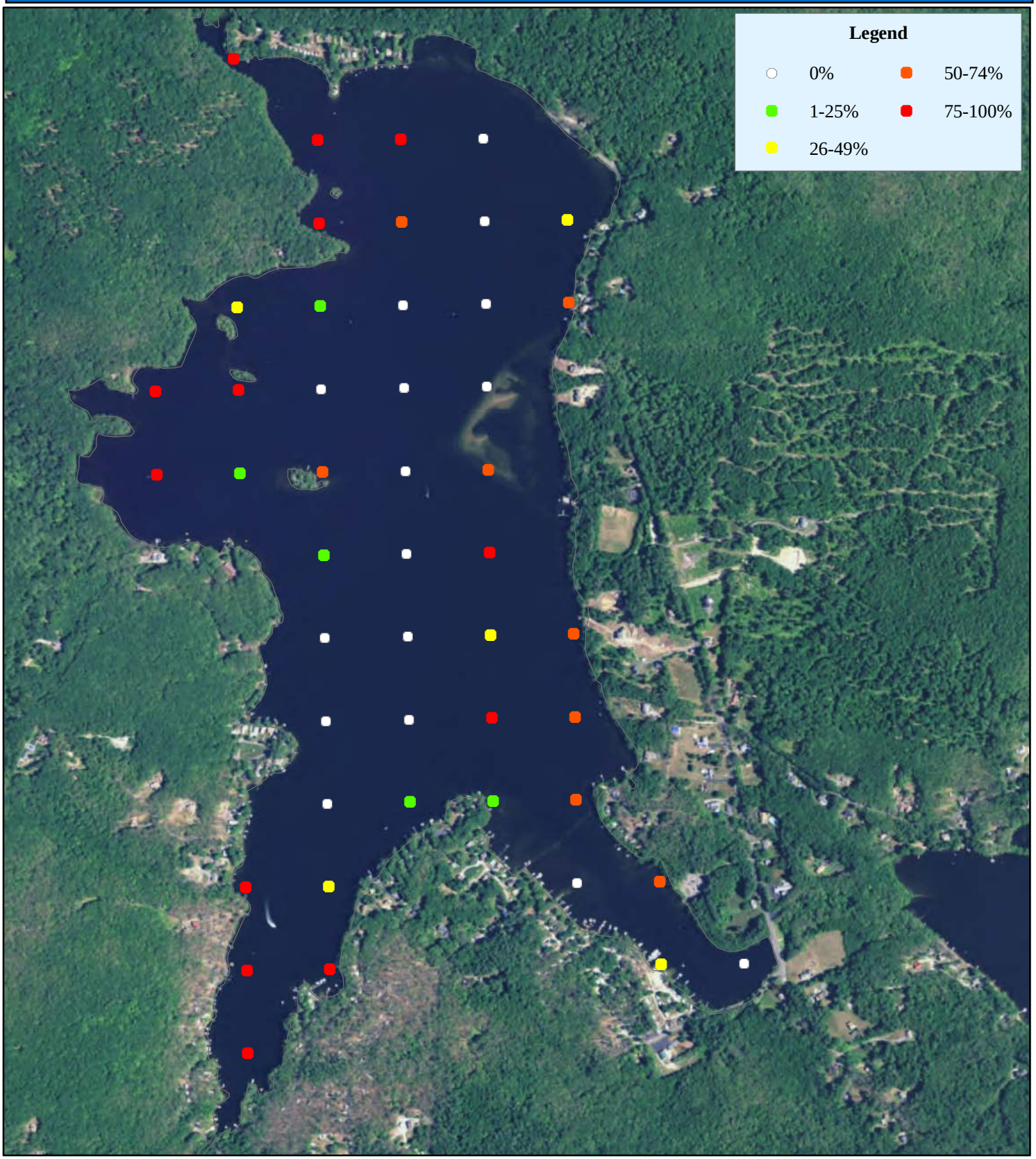
N

Legend

Moderate
Trace
Sparse

Map Date: 7/31/2017
File: ManchaugPd17_0731_NatVeg_Fig6
Prepared by: ALM
Office: Shrewsbury, MA

FIGURE 7: Percent Cover of All Species



Manchaug Pond
Sutton, MA

Manchaug Pond

0 850 1,700

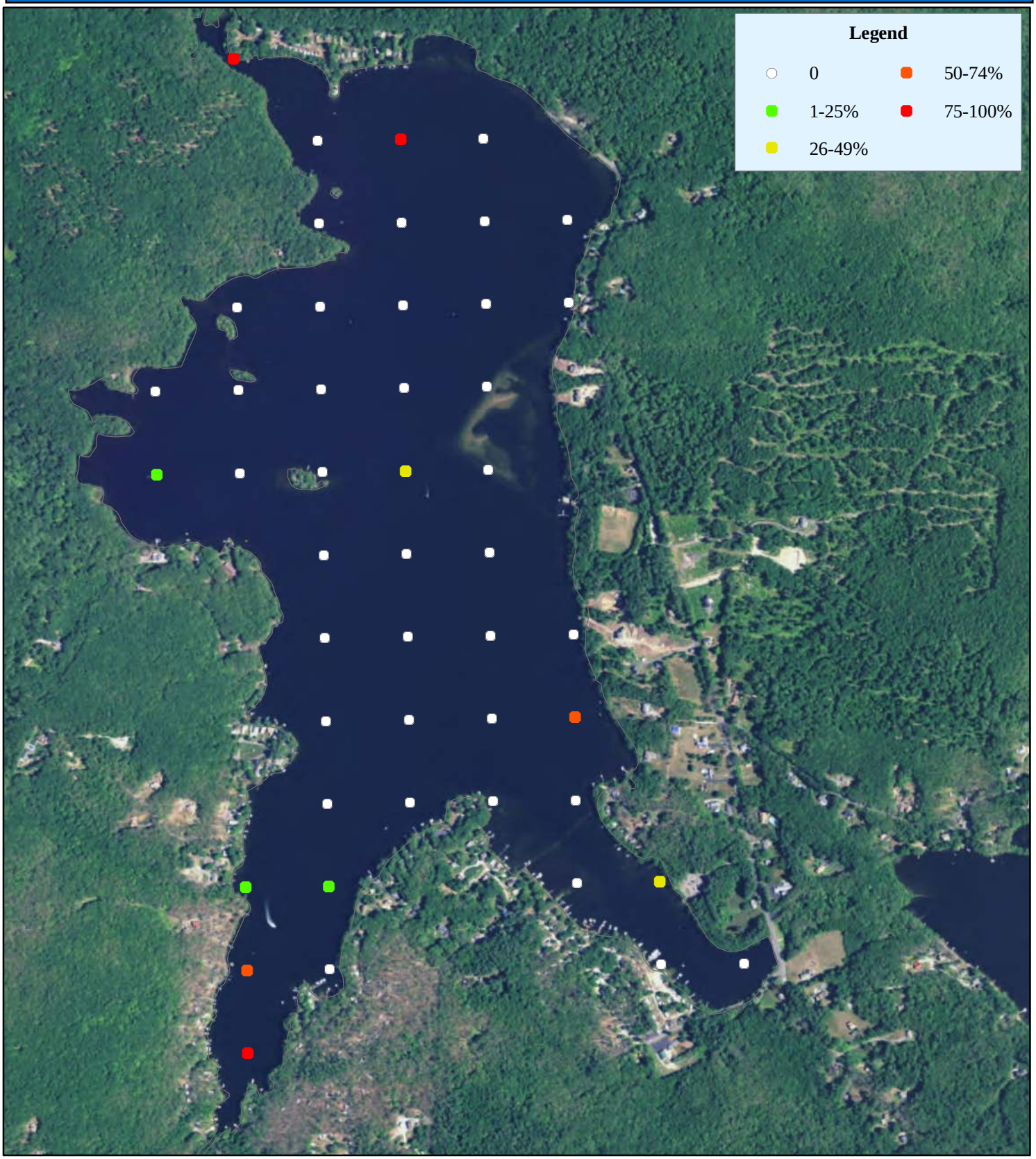
1:11,400 Feet

N

Map Date: 07/31/2017
Survey Date: 07/31/2017
Prepared by: ALM
Office: SHREWSBURY, MA

FIGURE 8: Percent Cover of Target Species (Fanwort & Variable Watermilfoil)

SOLITUDE LAKE MANAGEMENT



Manchaug Pond
Sutton, MA

Manchaug Pond

0 850 1,700

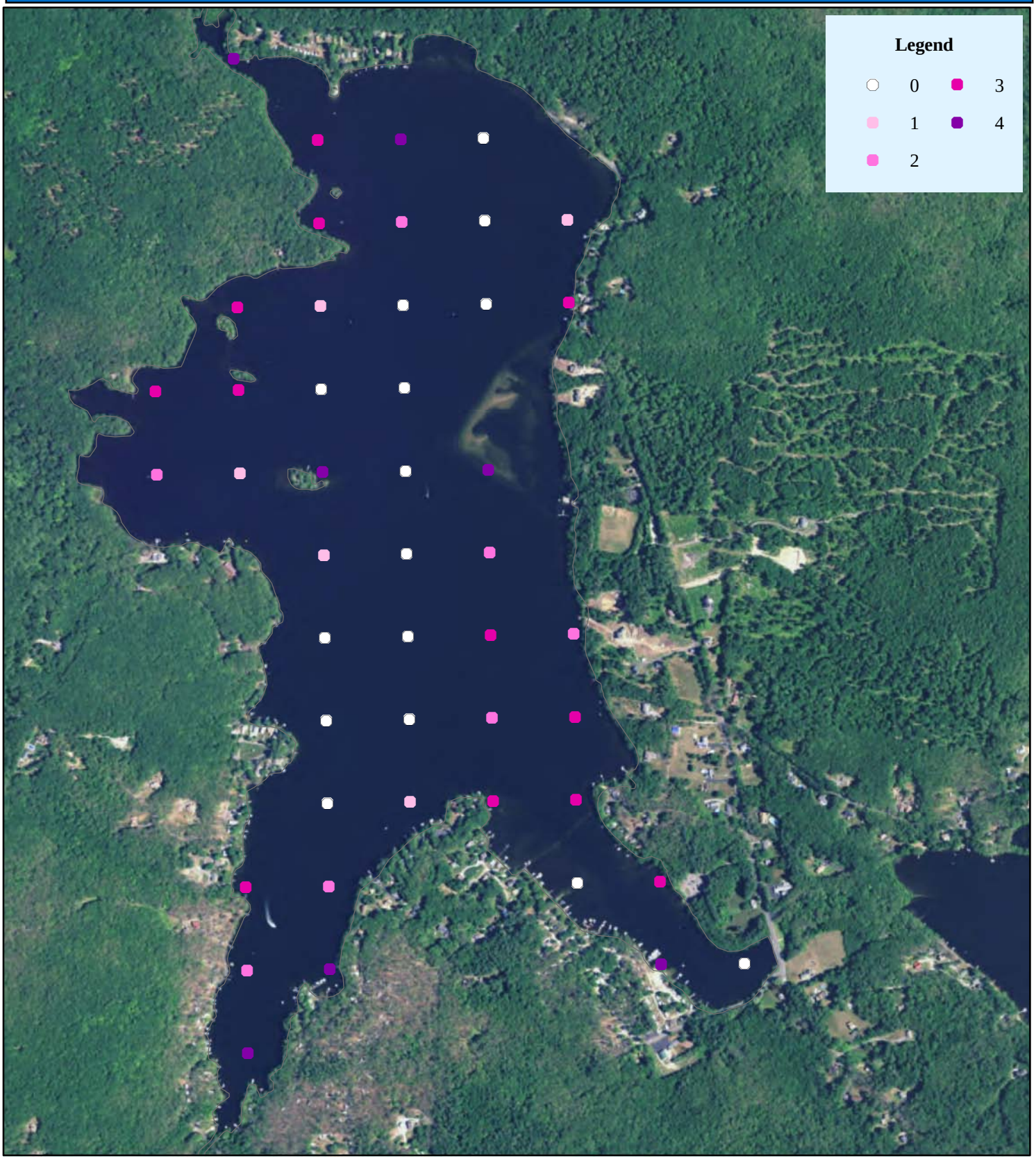
1:11,400 Feet

N

Map Date: 07/31/2017
Survey Date: 07/31/2017
Prepared by: ALM
Office: SHREWSBURY, MA

FIGURE 9: Biomass (BMI) of Submersed Aquatic Vegetation

SOLITUDE LAKE MANAGEMENT



Manchaug Pond
Sutton, MA

Manchaug Pond

0 850 1,700

1:11,400 Feet

N

Map Date: 07/31/2017
Survey Date: 07/31/2017
Prepared by: ALM
Office: SHREWSBURY, MA

Manchaug Pond 2017 Point-Intercept Raw Data

Point Number	Fanwort	Variable Watermilfoil	Variable-leaf Pondweed	Clasping-leaf Pondweed	Big-leaf Pondweed	Bushy Naiad	Tape-grass	Bladderwort	Coon-tail	Quillwort	Common waterweed	Robbins Pondweed	Stonewort	Spike Rush	DEPTH	BMI	%CVR ALL	% CVR TRG
1	M	D		T											7.0	4	100%	90%
2		M						T					P		8.3	2	75%	65%
3			S	S	M	M		T					P		8.1	4	80%	0%
4			S			T	T	S						T	6.0	4	40%	0%
5															15.0	0	0%	0%
6	S	M	S	S				T						T	5.7	3	75%	20%
7	T					M									11.2	2	45%	15%
8															3.5	0	0%	0%
9		S					S								5.1	3	50%	25%
10															19.3	0	0%	0%
11						T									18.9	1	10%	0%
12			S												3.9	3	15%	0%
13			M	S			S	T							4.8	3	65%	0%
14															22.6	0	0%	0%
15															32.4	0	0%	0%
16						D		T							11.0	2	90%	0%
17	M					S		T	S						11.0	3	70%	45%
18															25.3	0	0%	0%
19															25.0	0	0%	0%
20				T		S									12.9	3	40%	0%
21						M		T							11.0	2	60%	0%
22						S		T							21.0	1	20%	0%
23															25.2	0	0%	0%
24						D									10.2	2	90%	0%
25	T					M		T			T	M			10.8	2	80%	10%

Manchaug Pond 2017 Point-Intercept Raw Data

Point Number	Fanwort	Variable-leaf Watermilfoil	Variable-leaf Pondweed	Clasping-leaf Pondweed	Big-leaf Pondweed	Bushy Naiad	Tape-grass	Bladderwort	Coon-tail	Quillwort	Common waterweed	Robbins Pondweed	Stonewort	Spike Rush	DEPTH (Feet)	BMI	%CVR ALL	% CVR TRG
26						T					T				16.9	1	10%	0%
27			M			S									5.4	4	65%	0%
28															23.5	0	0%	2%
29			S			S							S		4.2	4	55%	0%
30				M		S	S	S				M			5.3	3	80%	0%
31				S		M	S	T							8.6	3	80%	0%
32															32.9	0	0%	0%
33															32.9	0	0%	0%
34			M			S	T	T							4.0	0	0%	0%
35					S	S						S			10.2	3	45%	0%
36						T									12.9	1	15%	0%
37															25.1	0	0%	0%
38															25.0	0	0%	0%
39			M	S		S				T					8.3	3	60%	0%
40				S		D		T			T				6.1	3	100%	0%
41						M		T			T				12.3	2	50%	0%
42															25.6	0	0%	0%
43						S									18.0	1	25%	0%
44				S	S	M	M								6.1	3	90%	0%
45		M				S		T							8.6	4	75%	70%
46															21.5	0	0%	0%
47	D	S					S		S						4.9	4	100%	80%

ATTACHMENT E

Herbicide/Algaecide Information

Detailed information herbicides proposed in this NOI can be found at the **Massachusetts Department of Conservation and Recreation, Lakes and Ponds Program website.** There are links under the Publications tab to the "Generic Environmental Impact Report for Eutrophication and Lake Management in Massachusetts" and the "Practical Guide to Lake Management in Massachusetts."

<http://www.mass.gov/eea/agencies/dcr/water-res-protection/lakes-and-ponds/>

Additional information on these herbicides can be found at the **Massachusetts Department of Agricultural Resources website**

http://www.mass.gov/eea/agencies/agr/pesticides/aquatic-vegetation-management.html