# Notice of Intent Application
# Willett Pond
# Aquatic Management Program

**Norwood/Walpole/Westwood, MA**

**February 2018**

***Prepared for:***
**Willett Pond Charitable and Protection Association, Inc.**
**c/o Rick Sonnenberg**
**119 Bullard Road**
**Walpole, MA 02081**

***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

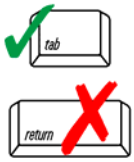
Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Westwood
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):

| 347 Bullard Street | Walpole | 02081 |
|---|---|---|
| a. Street Address | b. City/Town | c. Zip Code |

Latitude and Longitude:

| 42.17820 | -71.23701 |
|---|---|
| d. Latitude | e. Longitude |

| 9 | 14-15 |
|---|---|
| f. Assessors Map/Plat Number | g. Parcel /Lot Number |

2. Applicant:

| Rick | Sonnenberg |
|---|---|
| a. First Name | b. Last Name |

Willett Pond Charitable and Protection Association, Inc.
c. Organization

119 Bullard Street
d. Street Address

| Walpole | MA | 02081 |
|---|---|---|
| e. City/Town | f. State | g. Zip Code |

| 508-397-4156 | | board@willettpond.org |
|---|---|---|
| h. Phone Number | i. Fax Number | j. Email Address |

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

| Ian | Cooke |
|---|---|
| a. First Name | b. Last Name |

Neponset River Land Holding Association, Inc.
c. Organization

2173 Washington Street
d. Street Address

| Canton | MA | 02021 |
|---|---|---|
| e. City/Town | f. State | g. Zip Code |

| 781-575-0354 | 781-575-9971 | staff@neponset.org |
|---|---|---|
| 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):

| $500.00 | $237.50 | $262.50 |
|---|---|---|
| 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 Willet Pond to control nuisance and non-native plant and algae growth utilizing treatment with USEPA/MA State registered aquatic herbicides, algaecides, 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:

| | |
|---|---|
| Norfolk | |
| a. County | b. Certificate # (if registered land) |
| 3255 | 228 |
| 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 | 836352<br>1. square feet<br>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<br>3. cubic feet of flood storage lost | 2. square feet<br>4. cubic feet replaced |
| e. ☐ Isolated Land Subject to Flooding | 1. square feet<br>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<br>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<br>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<br>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.

Attachment B - Project Description & Attachment C - Figures
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:

| | |
|---|---|
| 10584 | 1/24/18 |
| 2. Municipal Check Number | 3. Check date |
| 10583 | 1/24/18 |
| 4. State Check Number | 5. Check date |
| SOLitude Lake Management | |
| 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 2-2-2018 |
| 3. Signature of Property Owner (if different) | 4. Date 2/5/18 |
| 5. Signature of Representative (if any) Permit Coordinator Solitude Lake Mgmt | 6. Date 2/5/18 |

**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:

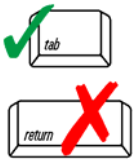
MassDEP File Number

Document Transaction Number

Westwood
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

Provided by MassDEP:

MassDEP File Number

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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

Westwood
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.

Attachment B - Project Description & Attachment C - Figures
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.

**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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## 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.

**Massachusetts Department of Environmental Protection**
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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

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.

Matt Salem
Signature of Applicant or Authorized Agent

MATTHEW J SALEM
Printed Name of Applicant or Authorized Agent

2/5/18
Date

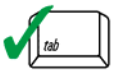
The certification must be signed by the applicant; however, it may be signed by a duly authorized agent (named in Item 2) if this form is accompanied by a statement by the applicant designating the agent and agreeing to furnish upon request, supplemental information in support of the application.

**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:

| | |
|---|---|
| 347 Bullard Street | Walpole |
| a. Street Address | b. City/Town |
| 10583 | $237.50 |
| c. Check number | d. Fee amount |

2. Applicant Mailing Address:

| | | | |
|---|---|---|---|
| Rick | | Sonnenberg | |
| a. First Name | | b. Last Name | |
| Willett Pond Charitable and Protection Association, Inc. | | | |
| c. Organization | | | |
| 119 Bullard Street | | | |
| d. Mailing Address | | | |
| Walpole | MA | 02081 | |
| e. City/Town | f. State | g. Zip Code | |
| 508-397-4156 | | board@willettpond.org | |
| h. Phone Number | i. Fax Number | j. Email Address | |

3. Property Owner (if different):

| | | | |
|---|---|---|---|
| Ian | | Cooke | |
| a. First Name | | b. Last Name | |
| Neponset River Land Holding Association, Inc. | | | |
| c. Organization | | | |
| 2173 Washington Street | | | |
| d. Mailing Address | | | |
| Canton | MA | 02021 | |
| e. City/Town | f. State | g. Zip Code | |
| 781-575-0354 | 781-575-9971 | staff@neponset.org | |
| 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.

**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

## 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 | 1 | $500.00 | $500.00 |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

**Step 5/Total Project Fee:**

**Step 6/Fee Payments:**

| | |
|---|---|
| Total Project Fee: | $500.00 |
| State share of filing Fee: | a. Total Fee from Step 5 $237.50 |
| City/Town share of filling Fee: | b. 1/2 Total Fee **less $**12.50 $262.50 |
| | 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: January 23, 2018

Re: Notification of filing an NOI for Willet Pond

Anticipated date of submission: February 6, 2018

The proposed project is seeking approval to initiate an Aquatic Management Program at Willet Pond in Norwood, Walpole, and Westwood, MA. USEPA/State registered herbicides and/or algaecides will be applied to manage invasive and 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):

Norwood Conservation Commission
Town Hall
566 Washington Street, Room 1, Ground Floor
Norwood, MA 02062

Walpole Conservation Commission
Town Hall
135 School Street
Walpole, MA 02081

Westwood Conservation Commission
Town Hall
50 Carby Street
Westwood, MA 02090

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.

SŌLITUDE
LAKE MANAGEMENT

# AFFIDAVIT OF SERVICE

Under the Massachusetts Wetlands Protection Act I, Matthew J Salem, hereby certify under the pains and penalty of perjury that on 2/6, 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 Westwood Conservation Commission on 2/6, 2018, for an Aquatic Management Program at Willet Pond in Norwood/Walpole/Westwood, 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.

Matt Salem
Name

2/6/18
Date

SŌLitude Lake Management
590 Lake Street
Shrewsbury, MA 01545

## NOTIFICATION TO ABUTTERS UNDER THE

## MASSACHUSETTS WETLANDS PROTECTION ACT

## CHAPTER 131, SECTION 40

In accordance with the 2nd paragraph of Massachusetts General Laws Chapter 131, Section 40, you are hereby notified of the following:

A. The name of the applicant is: Willett Pond Charitable and Protection Association, Inc.

B. The Applicant has filed a Notice of Intent with the Westwood Conservation Commission, seeking to work within an Area Subject to Protection under the Massachusetts Wetlands Protection Act (General Laws Chapter 131, Section 40).

**Description of Project**: An integrated Aquatic Management Program at Willett Pond to monitor, assess and implement measures for control of non-native/nuisance aquatic vegetation, specifically with the use of USEPA/State registered aquatic herbicides/algaecides.

C. The location where the activity is proposed is/are **Willett Pond.**

D. Copies of the Notice of Intent may be examined at the Westwood Conservation Commission office during their normal business hours. For more information, call the Conservation Commission at (781) 251-2580. Copies of the Notice of Intent are available (for a fee) from the applicant's representative (SOLitude Lake Management) by calling (508) 865-1000 between the hours of 8 AM and 4 PM (Monday through Friday).

E. Questions regarding this Notice of Intent may be directed to the applicant's representative (SOLitude Lake Management) by calling (508) 865-1000 between the hours of 8 AM and 4 PM (Monday through Friday).

F. The Norwood Conservation Commission will hold a public hearing on **2/28** at or after 7:00pm in the Champagne Meeting Room, Carby Street Municipal Office Building, Westwood, MA 02090

**NOTE**: Notice of this public hearing, including date, time and place:

1) Will be published at least five (5) days in advance in the local newspaper

2) Will be posted in the Town Hall not less than forty-eight (48) hours in advance of the public hearing.

**NOTE**: You may also 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 the Southeast Regional Office at (508) 946-2700.

SŌLITUDE
LAKE MANAGEMENT

# TOWN OF WESTWOOD
## BOARD OF ASSESSORS

580 High St.
Westwood, MA 02090

Maureen Bleday
Philip N. Shapiro
Mark F. Murphy

phone: 781-326-1904
fax: 781-251-2588

January 29, 2018

**Matt Salem**
*Solitude Lake*
*msalem@solitude.lake.com*
*508 917-7159*

Matt,

Attached please find a list of abutters and abutters 100' of Map 41 Lot 001, Pettee's Pond.

This list reflects owners of record as of January 1, 2018 or current owners, according to our records.

Sincerely,

Mark F. Murphy
Assessor

jb

# ABUTTERS WITHIN 100' OF PETTEES POND


MAP 41 LOT 036

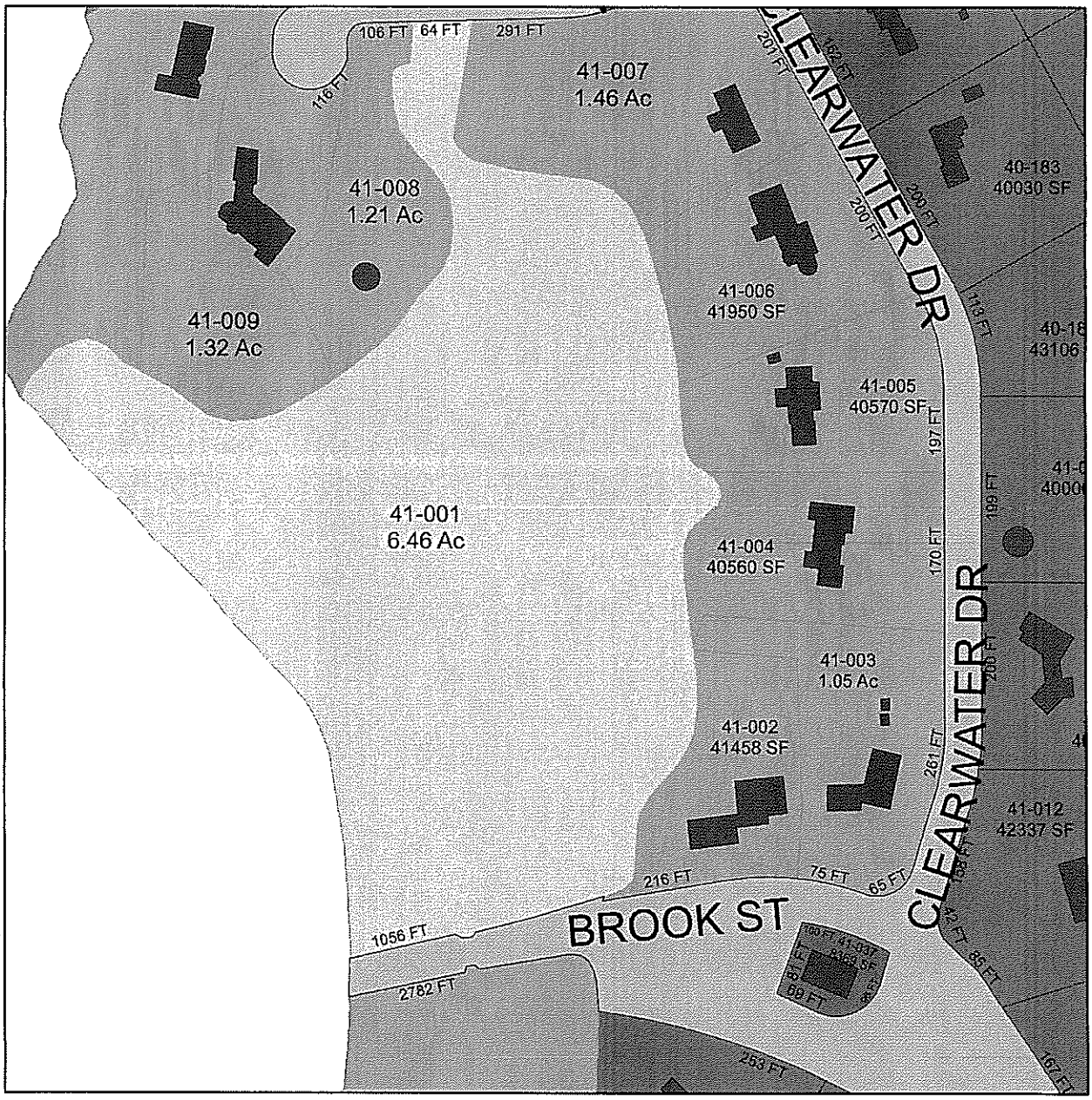
VISION APPRAISAL TECHNOLOGY

N
W E
S

# ABUTTERS LIST FOR WILLET POND
# WESTWOOD, MA

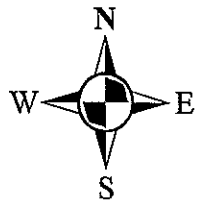
| MAP & LOT | OWNER | CO-OWNER | Mailing Address | City | St Zip | Location |
|---|---|---|---|---|---|---|
| 41001 | NEPONSET RIVER LAND HOLDI | ASSOCIATION INC | 2173 WASHINGTON STREET | CANTON | MA 02021 | REAR BROOK ST |
| 41002 | FREEDMAN MARILYN J | | 95 BROOK ST | WESTWOOD | MA 02090 | 95 BROOK ST |
| 41013 | WAGGETT GERARD M | THERESA S WAGGETT | 53 BROOK ST | WESTWOOD | MA 02090 | 53 BROOK ST |
| 41027 | BEACH MURRAY M | PATRICIA J PALOCZ | 10 BROOK ST | WESTWOOD | MA 02090 | 10 BROOK ST |
| 41028 | RITZENBERG JEREMY | JILL SCIRPO | 6 WILLETT POND DR | WESTWOOD | MA 02090 | 6 WILLETT POND DR |
| 41029 | DONNA EDEN COHEN TRUST | DONNA EDEN COHEN TRUSTEE | 20 WILLETT POND DR | WESTWOOD | MA 02090 | 20 WILLETT POND DR |
| 41030 | WILLETT POND DRIVE REALTY | | 30 WILLETT POND DR | WESTWOOD | MA 02090 | 30 WILLETT POND DR |
| 41031 | STARLING JULIE | | 40 WILLETT POND DR | WESTWOOD | MA 02090 | 40 WILLETT POND DR |
| 41032 | GUIDONE JOHN J | SHERRI A GUIDONE | 11 WILLETT POND DR | WESTWOOD | MA 02090 | 11 WILLETT POND DR |
| 41033 | SPENCE SHARON C | | 25 WILLETT POND DR | WESTWOOD | MA 02090 | 25 WILLETT POND DR |
| 41034 | 5 WILLETT POND DRIVE REAL | JOSEPH D & OLGA FERRARI T | 5 WILLETT POND DR | WESTWOOD | MA 02090 | 5 WILLETT POND DR |
| 41035 | STOLLER JEFFREY M | LINDA R STOLLER | 90 BROOK ST | WESTWOOD | MA 02090 | 90 BROOK ST |
| 41036 | NEPONSET RIVER LAND HOLDI | ASSOCIATION INC | 2173 WASHINGTON STREET | CANTON | MA 02021 | BROOK ST |

# ABUTTERS WITHIN 100' OF PETTEES POND




MAP 41 LOT 001

VISION APPRAISAL TECHNOLOGY



# ABUTTERS LIST FOR PETTEES POND
# WESTWOOD, MA

| MAP & LOT | OWNER | CO-OWNER | Mailing Address | City | St Zip | Location |
|---|---|---|---|---|---|---|
| 40001 | XIAO DEQUAN | JIAYING WEN | 45 WINSLOW RD | WESTWOOD | MA 02090 | 45 WINSLOW RD |
| 40186 | ANTHONY T TAKAZAWA & CATH | CATHERINE DUDLEY & ANTHON | 83 WINSLOW RD | WESTWOOD | MA 02090 | 83 WINSLOW RD |
| 41001 | NEPONSET RIVER LAND HOLDI | ASSOCIATION INC | 2173 WASHINGTON STREET | CANTON | MA 02021 | REAR BROOK ST |
| 41002 | FREEDMAN MARILYN J | | 95 BROOK ST | WESTWOOD | MA 02090 | 95 BROOK ST |
| 41003 | WATSON DEBORAH C. | MATTHEW J. PAPIANOU | 85 BROOK ST | WESTWOOD | MA 02090 | 85 BROOK ST |
| 41004 | KREINSEN KENNEITH J | LAURA J BRENNAN | 32 CLEARWATER DR | WESTWOOD | MA 02090 | 32 CLEARWATER DR |
| 41005 | ZONDERMAN JEFFREY & | JENNIFER M ZONDERMAN | 52 CLEARWATER DR | WESTWOOD | MA 02090 | 52 CLEARWATER DR |
| 41006 | FIORE JOHN J | FIORA ERICA J | 68 CLEARWATER DR | WESTWOOD | MA 02090 | 68 CLEARWATER DR |
| 41007 | OSTRANDER KEVIN & | PHEOBE AUGUSTINE | 84 CLEARWATER DR | WESTWOOD | MA 02090 | 84 CLEARWATER DR |
| 41008 | BURKE JR DAVID & CHRISTIN | BMC REALTY TRUST | 81 WINSLOW RD | WESTWOOD | MA 02090 | 79 WINSLOW RD |
| 41009 | BURKE JR DAVID | CHRISTINE BURKE | 81 WINSLOW RD | WESTWOOD | MA 02090 | 81 WINSLOW RD |
| 41036 | NEPONSET RIVER LAND HOLDI | ASSOCIATION INC | 2173 WASHINGTON STREET | CANTON | MA 02021 | BROOK ST |

# *ATTACHMENT B*

**Project Description**

## 1.0 Introduction

The "Applicant", the Willett Pond Charitable and Protection Association, Inc., is seeking approval to initiate an Aquatic Management Program at Willet Pond. The objective of the management program is to control growth of non-native aquatic plant species, variable watermilfoil (*Myriophyllum heterophyllum*) and water chestnut (*Trapa natans*), along with nuisance growth of various native species, 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 waterbody. Based on the type, distribution, and density of vegetation within Willett Pond, it has been concluded the restoration goals of the Applicant can best be achieved through regular monitoring with 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:

Willett Pond is a 215-acre, impounded waterbody located in Norwood, Walpole, and Westwood (Attachment C – Figures 1 & 2). Based upon the reported maximum depth, large portions of the waterbody's shoreline would be considered littoral area, where sunlight penetrates through the water to the sediment and can support aquatic macrophyte growth. Two invasive aquatic vegetation species, variable watermilfoil and water chestnut, were observed during the site visit in August 2017. Unmanaged, dense growth of vegetation, both invasive and native, can degrade water quality, fish/wildlife habitat, and reduce recreational access. Based on the goals of the Applicant, a management program focusing on monitoring and chemical treatment with USEPA/MA DAR approved herbicides and algaecides 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:

Willett Pond is a 215-acre waterbody located in Norwood, Walpole and Westwood. It is composed of the Willett Pond (206-acres) and shallower Pettee Pond (9-acres) split by Brook Street. The lake's watershed is a moderate size, with water flowing into the northern end of Pettee Pond from Bubbling Brook and Mill Brook, along with surficial runoff from the immediate area (Attachment C – Figure 3). A controllable outlet structure is located on the eastern shoreline south of St. Timothy Catholic Church and outflow goes into Ellis Pond downstream before eventually joining the Neponset River. The shoreline of the lake supports extensive residential development and is used for boating, fishing, and passive wildlife viewing.

| Willett Pond[2] | |
|---|---|
| Surface Area (acres)<br>*Norwood*<br>*Walpole*<br>*Westwood* | 214.8<br>*19.7*<br>*175.9*<br>*19.2* |
| Est. Mean Depth (feet) | 10.0 |
| Maximum Reported Depth (feet) | 20.0 |
| Estimated Volume | 2,148 ac-ft.<br>(699.9 million gal.) |
| Dominant Plant Species | Variable watermilfoil<br>Southern naiad<br>Tapegrass<br>Pondweeds<br>White waterlily |

[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

## 4.0 Existing Conditions:

A survey of the waterbodies and the current conditions was performed in August 2017 by a SŌLitude Biologist to document existing vegetation growth (Attachment C – Figure 4). Pettee Pond exhibited sparse to moderate density variable watermilfoil throughout mixed with sparse to dense native submersed aquatic vegetation. A similar native vegetation assemblage was present throughout the littoral zone of Willett Pond. Multiple substantial patches of watermilfoil were documented along Brook Street and along two portions of the western shoreline. One small patch of water chestnut (7 plants; at right) was found in the northeast cove; these plants were hand harvested at the time to prevent further spread. The most common native species that was reaching nuisance, dense conditions was southern naiad (*Najas guadalupensis*). In some of the shallower coves, this is growing throughout the water column and stagnating water flow, further intensifying filamentous algae blooms (below). Other native species frequently encountered around the waterbody include clasping-leaf pondweed (*Potamogeton perfoliatus*), large-leaf pondweed (*P. amplifolius*), common waterweed (*Elodea canadensis*), bladderwort (*Utricularia sp.*), and coontail (*Ceratophyllum demersum*). Native floating-leaf species found in both waterbodies include white waterlily (*Nymphaea odorata*), yellow waterlily (*Nuphar variegata*), and watershield (*Brasenia schreberi*). One invasive emergent, purple loosestrife (*Lythrum salicaria*), was documented around both shorelines.

## 5.0 In-Lake Management Recommendations:

*5.1 Program Overview:*

Multiple-year approval is requested for the initiation of the Aquatic Management Program at Willett Pond and Pettee Pond. The goal of the management program is to manage invasive vegetation growth, in addition to other nuisance aquatic plant and algae species, to improve and maintain open water habitat, promote the growth of less pervasive plant species, and provide safe recreational access to the waterbody 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 Norwood, Walpole, and Westwood Conservation Commissions and MA DEP.

As with any dynamic system, the ability to change and modify the management program is paramount to its success. Primarily, the program focuses on managing growth of invasive and nuisance aquatic vegetation and algae. The other objectives of improving water quality and maintaining open water habitat can be achieved through regular monitoring supplemented by the prudent use of USEPA/MA DAR registered aquatic herbicides and algaecides. Specifically, we are requesting approval for use of fluridone herbicide (trade name: Sonar), diquat (Reward), Aquathol K (endothall), glyphosate (AquaPro), and copper-based

algaecides. 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 doses 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.

The pond's water level will potentially be lowered no more than six (6) inches prior to herbicide application to increase the retention time of the herbicide within the waterbody. This will have negligible impacts to native wildlife and fish due to the limited scope, 6 inches, and timing, April, when anticipated precipitation over the watershed will recharge the system. There are no plans to stop outflow from the pond's spillway, limiting the impacts to downstream habitats.

No significant alteration to the wetland resource areas will occur as a result of the proposed 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-lake 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 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 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)

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

- 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, 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 targeted, spot 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.

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 direst 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)

**Endothall (Aquathol-K – EPA # 70506-176)**

The USEPA/MA registered herbicide endothall will be applied to the area at or below the permissible label dose. Aquathol-K will be applied to the area for control of nuisance vegetation at the application

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

rate of 2-3 parts per million. Aquathol-K is especially effective on milfoils and pondweeds. The low application rate, along with timing of the treatment, allow for selectivity of the vegetation controlled. Temporary water use restrictions for Aquathol-K are 1) Do not use treated water for livestock watering or domestic purposes within 14 days of treatment. There is no restriction on using treated water for irrigation, swimming, or boating, although prudent management practices call for the closure of the area for at least one day following treatment.

Endothall is a systemic herbicide. The mode of action is suspected to inhibit the use of oxygen for respiration; it initially impacts the portions of the plant that comes into contact with the herbicide and eventually translocates to the roots to some extent. Most endothall compounds break down readily and are not persistent in the aquatic environment.

**Impacts Specific to the Wetlands Protection Act using Endothall**[5]

- Protection of public and private water supply – Neutral
- Protection of groundwater supply – Neutral (no interaction as endothall is adsorbed 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 direst 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)

**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.

[5] Commonwealth of Massachusetts Executive Office of Environmental Affairs. *Practical Guide to Lake Management*: 2004. 127 p.

**Impacts Specific to the Wetlands Protection Act using Glyphosate[6]**

- 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 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[7] 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)

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

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

- Protection of wildlife habitat – Possible benefit (habitat enhancement) and possible detriment (food source alteration, direct toxicity)

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 Monitoring:*

Regular inspections will be conducted in order assess the growth phase of the target plant species and overall waterbody 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 Commissions.

**6.0 Alternatives Analysis:**

Alternatives to the proposed Aquatic Plant Management Plan were considered. SŌLitude evaluated all available strategies for management of Willett 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).

*Bottom Weed Barriers: Not Recommended*

Physical controls, such as the use of bottom weed barriers (i.e. Aquatic Weed Net or Palco) can be effective for small dense patches of nuisance vegetation, but are not cost effective or feasible for large areas. Weed barriers are expensive to install and maintain at ~$1.75/ft$^2$ (material & installation). Semi-annual maintenance to retrieve, clean and re-deploy the barriers would be expensive and time consuming. Additionally, covering expansive areas of the pond bottom may also have detrimental impacts on invertebrates or other types of wildlife.

*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, naiad, and pondweeds has comparatively

small root structures, and as such, control is likely to be annual at best, with considerable temporary disturbance. Milfoil 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 naiads 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 filamentous algae 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 in Willett 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 of the waterbody 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. The waterbody's recreational and aesthetic value would be significantly degraded.

## 7.0 Compliance

*Massachusetts Wetlands Protection Act:*

The objective of this project is to control invasive species through herbicide applications, manage nuisance native vegetation, and promote growth of desirable native aquatic 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. 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, Willett Pond and Pettee Pond are not located within area designated as Priority Habitats of Rare Species 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 – Willett Pond is not used directly as a drinking water supply. Aquatic herbicide treatment at the lake will not have any adverse impacts on the public or private water supply, when used in accordance with the project label and conditions of the MA DEP License to Apply Chemicals.

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 Willett 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.

Flood control and storm damage prevention – No construction, dredging or alterations of the existing floodplain and storm damage prevention characteristics of the waterbody 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 nuisance 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.

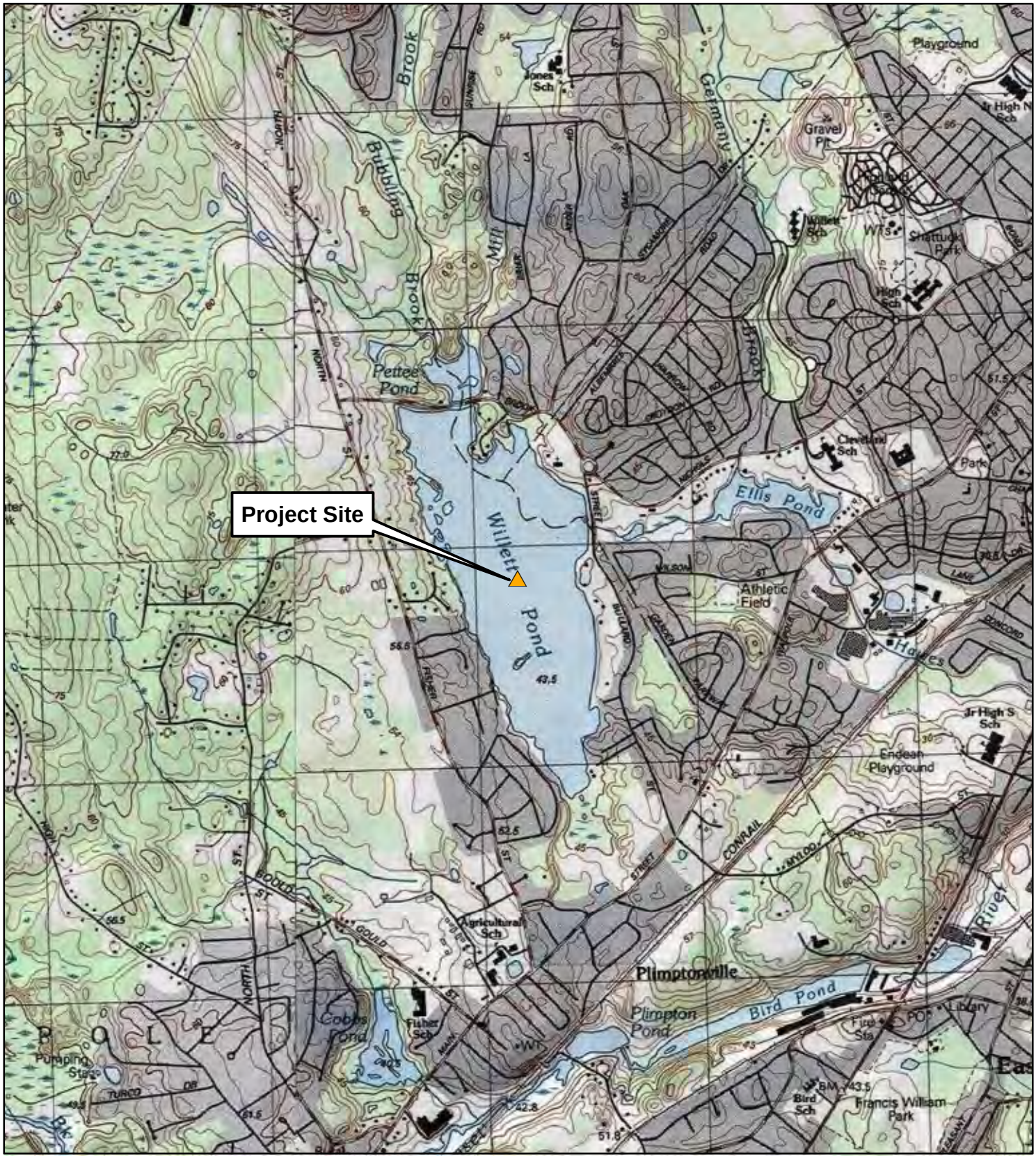
Protection of wildlife and wildlife habitat – In general, excessive and abundant plant growth, especially non-native plants, provides poor wildlife habitat for fish and other wildlife. The proposed management plan is expected to help prevent further degradation of the waterbody through excessive weed 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




**Willett Pond**
Norwood/Walpole/
Westwood, MA
Norfolk County
42.17820°, -71.23701°

## Willett Pond

0 1,500 3,000 Feet

1:24,000

N

Map Date: 1/23/18
Prepared by: MS
Office: SHREWSBURY, MA

# FIGURE 2: Waterbody Area by Town

SOLITUDE LAKE MANAGEMENT
888.480.5253
solitudelakemanagement.com


**Willett Pond**
Norwood/Walpole/
Westwood, MA
Norfolk County
42.17820°, -71.23701°

**Willett Pond**

0 500 1,000 Feet

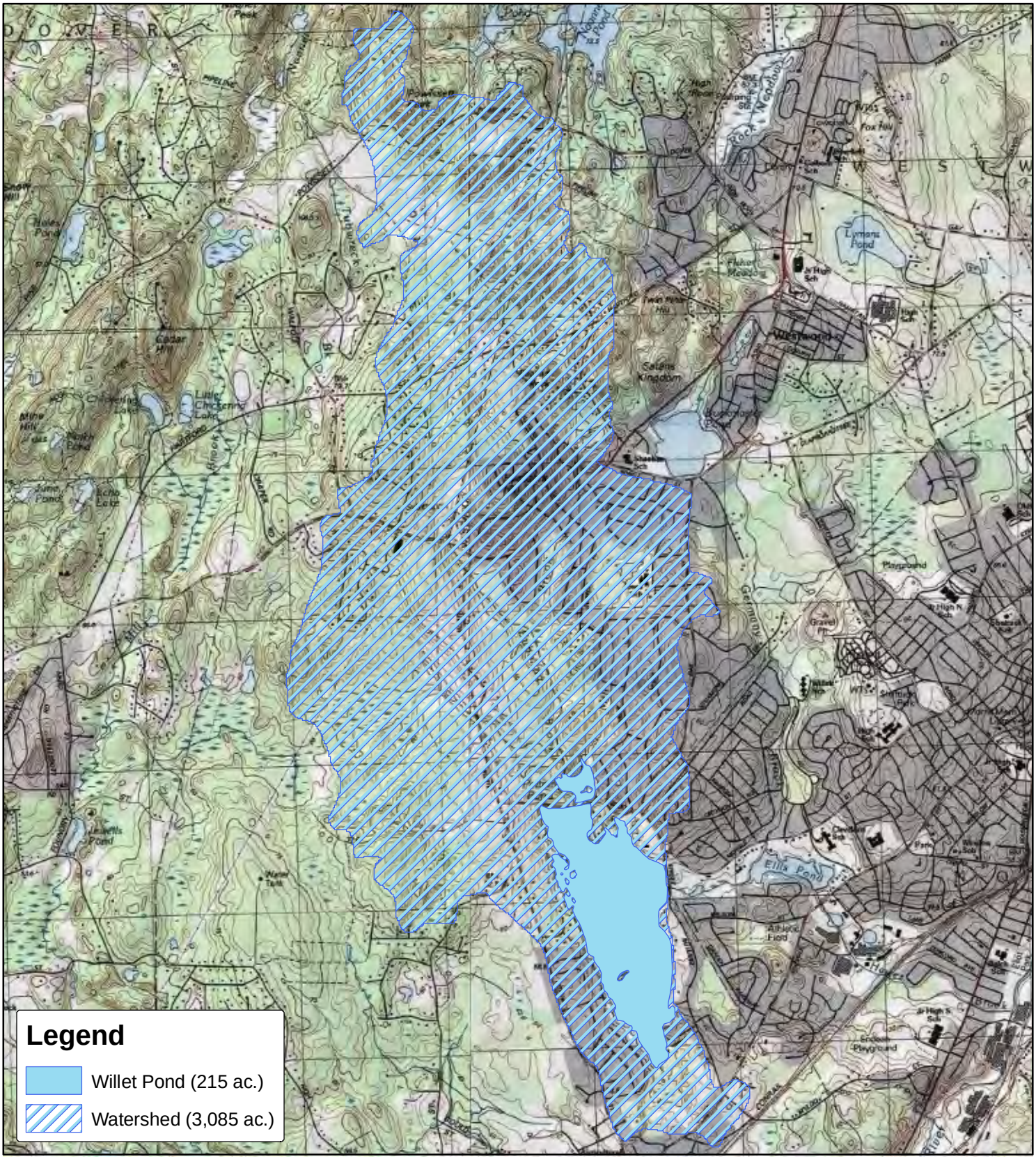
1:10,000

N

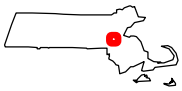
Map Date: 1/23/18
Prepared by: MS
Office: SHREWSBURY, MA

# FIGURE 3: Watershed (USGS Streamstats)

SOLITUDE
LAKE MANAGEMENT
888.480.5253
solitudelakemanagement.com




**Willett Pond**
Norwood/Walpole/
Westwood, MA
Norfolk County
42.17820°, -71.23701°



**Willett Pond**

0 2,000 4,000 Feet

1:36,000

N

Map Date: 1/23/18
Prepared by: MS
Office: SHREWSBURY, MA

# FIGURE 4: Vegetation Assemblage (8/16/17)

SOLITUDE LAKE MANAGEMENT
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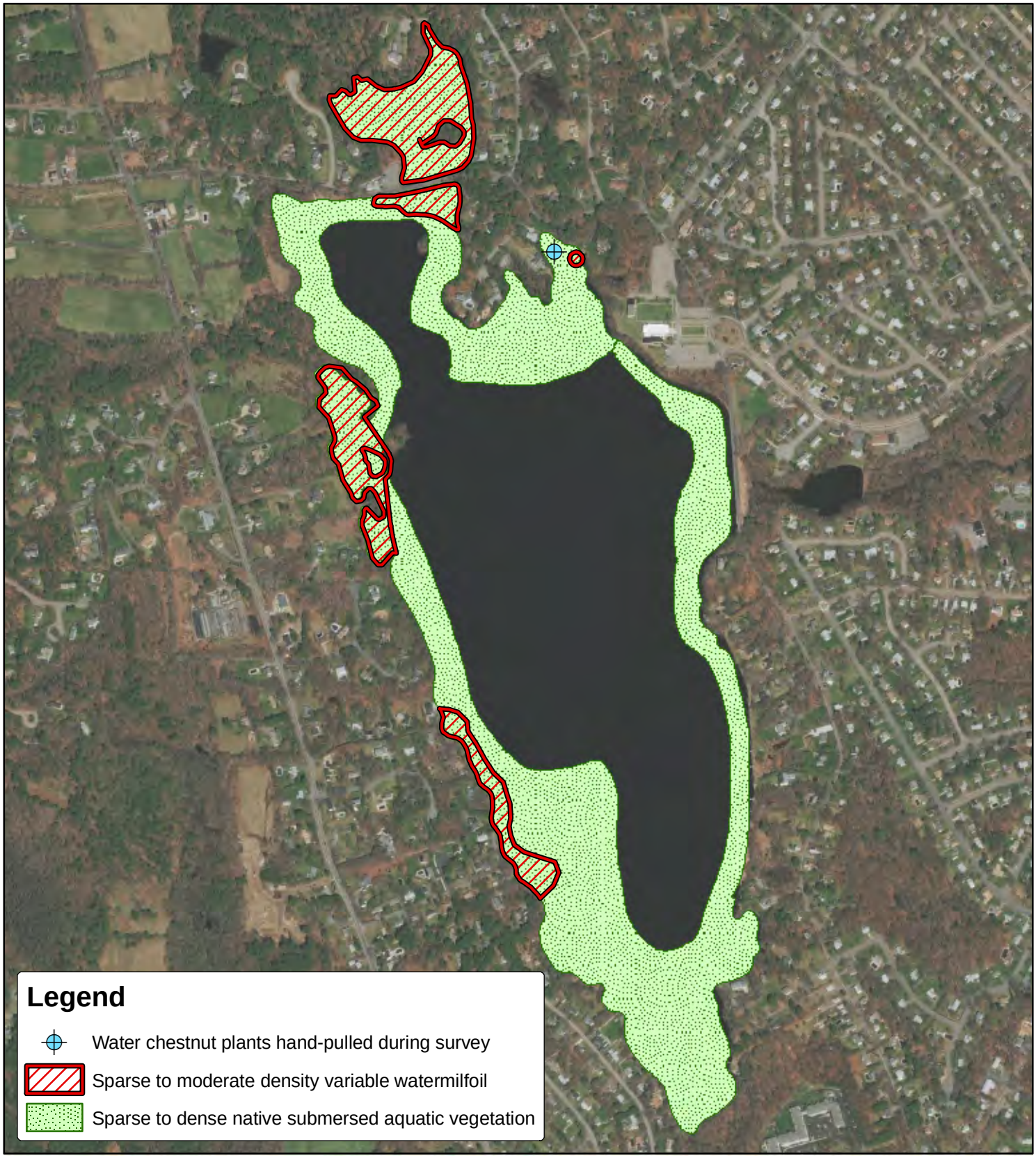



**Willett Pond**
Norwood/Walpole/
Westwood, MA
Norfolk County
42.17820°, -71.23701°

**Willett Pond**

0 520 1,040 Feet

1:10,000

N

Map Date: 1/23/18
Prepared by: MS
Office: SHREWSBURY, MA

# *ATTACHMENT D*

**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

# *ATTACHMENT E*

**Willett Pond Aquatic Vegetation Program Review – Draft Report (12/2/17)**

*David F. Mitchel, Ph.D., CLMI*

December 2, 2017

Thomas Palmer, Willett Pond Manager
Neponset River Watershed Association
2173 Washington St.
Canton, Massachusetts 02021

Re: **Review of proposed Aquatic Vegetation Management Program for Southern naiad in Willett Pond, Walpole, Norwood, and Westwood MA**

This letter report was prepared for the Neponset River Watershed Association ("NRWA"). It is a review of the aquatic vegetation management program proposed for Willett Pond (the "Pond") by SOLitude (a commercial lake management firm). This report is divided between (1) review of existing information regarding the Pond and its setting and the macrophyte community in the Pond; (2) review of the properties and effectiveness of various herbicides in controlling the problem species; (3) evaluation of the proposed whole-lake treatment program for control of southern (or bushy) naiad in the littoral zone and spot treatment for variable milfoil elsewhere; and (4) other considerations for effective management of the Pond.

## 1. Review of Existing Information

For this evaluation, I reviewed primary data, documents, or sources specific to Willet Pond, including, but not limited to:

- General information about Willett Pond, its watershed and environmental setting and other related materials (Palmer 2003, 2017);
- Information about the Willett Pond Dam (ACO 1979; Fuss & O'Neill 2010);
- Aquatic vegetation surveys (Palmer 2003; SOLitude 2017a);
- Available water quality data (MADEP 2010; NRWA 2017);
- Proposed SOLitude pond management proposal (SOLitude 2017b; and
- Other related materials (e.g., Burchesky 2010).

### Willett Pond Current Conditions

Willett Pond is a 220-acre impoundment in Norfolk County, Massachusetts with shoreline shared by the towns of Walpole, Norwood, and Westwood. The Pond was created in 1913 through impoundment of Hawes Brook to provide water storage year-round for a downstream tannery (Palmer 2003). The two impounding structures include a 900-foot dam structure and a 1,900-foot supplementary dike. The main dam has a maximum height of about 25 feet while the dyke height reaches about 14 feet high (ACOE 1979). Water flows downstream into Ellis Pond, eventually to the Neponset River.

The Pond basin is approximately 1.25 miles along it longest fetch (north/south axis) and has a maximum breadth of about 0.5 mile (Palmer 2003). A historic (1913) bathymetric map indicted that the Pond has a maximum depth of approximately 20 feet with an average depth about 10 feet. The water storage capacity was estimated by the Army Corps of Engineers at 2,700 acre-feet of water (ACOE 1979).

It has not been determined whether the Pond is thermally stratified in the summer and if so, at what depth. The thermal profile conducted in August 2017 (SOLitude 2017a) measured very uniform temperatures from surface to

bottom and little depletion of dissolved oxygen except at the lowest depth[1]. It is possible that the constant outflow of the two drains in the dam (see below) are selectively removing the colder bottom water (e.g., hypolimnetic withdrawal) to reduce thermal layering or that the large fetch allows sufficient wind action to transmit heat and exchange dissolved oxygen into bottom waters.

Willett Pond is classified as Class B waters and current designated uses of the lake include: aquatic life support, primary (contact) and secondary recreation, and aesthetic value (MA DEP 2010). The Pond is considered a privately-owned pond with approximately 85 shoreline residences.

The primary sources of water to the Pond include the primary inflows Bubbling Brook and Mill Brook, overland runoff and precipitation. Water can exit the Pond via a surface outfall under Bullard's Street, by release through two 20-inch valve gates at the toe of the dam, through seepage through the dam, or due to seasonal evapotranspiration.

The primary outlet structure is the dam spillway, with an invert elevation of 137.75 feet (Fuss & O'Neill 2010). The normal water surface elevation (139.9) is maintained by three timber logs ("flashboards") which are kept in place most of the year. The low-level outlet for the dam consists of two 20-inch diameter, cast-iron conduits (downstream invert of 118.7) with flow controlled by manually operated gate values in the adjacent gatehouse (ACOE 1979; Fuss and O'Neill 2010).

The total watershed drainage area of Willett Pond Dam was estimated at approximately 4.8 sq. mi. (Fuss and O'Neill 2010). Current watershed land use is a mixture of residential, rural, and undeveloped areas with the greatest density of development in the immediate vicinity of Willett Pond.

While flow has not been measured in the system, using standard yield coefficients. A very rough estimate of the flushing rate and hydraulic retention time was made for Willet Pond. Assuming a water yield coefficient range of 1.0 to 1.5 cubic feet per second (cfs) /sq. mile (Soper and Lull 1970) and a watershed of 4.8 sq. mile, the average inflow is in the range of 4.8-7.2 cfs. Using this inflow and a storage volume of 2,700 acre-feet (= 117,612,000 cubic feet) hydraulic residence time is calculated at 189-284 days with basin flushing rates (i.e., complete exchanges of reservoir water) of 1.3-1.9 exchanges per year.

**Water and Sediment Quality**

The 2008 Water Quality Assessment of Willett Pond (Segment MA73062) reviewed the relevant water uses associated with Class B waters (MADEP 2010). The Pond was considered safe for primary and secondary recreational contact (i.e., low bacterial counts) but with a generic fish consumption advisory due to mercury (atmospheric sources). Insufficient data was available to evaluate aquatic life and aesthetic uses (MADEP 2010).

Water samples were collected over six years (2012-2017) at two locations in Willett Pond (WIP002), WIP003) as well as the inflow of Mill Brook into Pettee Pond (MLB024) (NRWA 2017). Samples were taken approximately monthly during the growing season (i.e., April-October) and analyzed for water quality parameters including pH, *Escherichia coli* (EC), total phosphorus (TP) and chlorophyll pigment. Temperature was measured in the field at all stations and dissolved oxygen monitored at the stream inlet.

The in-lake *E. coli* geometric means ranged from 23 to 27 counts of colony-forming units (CFU) /100 ml. These are well below the State criterion of 126 CFU/100ml to support contact recreation. However, Mill Brook concentrations (182 CFU/100 ml) exceeded the primary contact standard. The higher values at Mill Brook likely reflect the influence of storm water in the urban watershed as well as being attractive habitat for waterfowl.

[1]It was noted that the SOLitude survey reported a total depth of 36 feet rather than the 20-foot maximum depth indicated by the 1913 map.

Phosphorus is the element usually "limiting" primary productivity in temperate zone lakes, as it is most often the element in shortest supply in relation to the needs of plants (rooted aquatic plants or phytoplankton). The TP concentrations were highest in the Mill Brook inlet (geometric mean = 42 ug/L or parts per billion (ppb)[2] while the in-lake values were 23 and 15 ppb for the central (WIP002) and southern (WIP003) areas of the Pond, respectively. While the in-lake concentrations are acceptable for the present uses of the Pond (Brown and Simpson 2013), the influence of nutrients delivered from the watershed via Mill Brook might pose future concerns for the Pond.

Chlorophyll pigment concentrations in the Pond were 7.8 ppb at WIP002 and 5.3 ppb at WIP003. These levels would be considered characteristic of a moderately-fertilized or mesotrophic lake trophic state. Secchi disk transparency[3] (SDT) data are not regularly measured but local observations indicate that 8 to 11 feet are typical summer values (Palmer 2017). The August 2017 survey measured a SDT of 12 feet (SOLitude 2917a).

No comprehensive mapping of sediment depth and composition has been conducted over the Pond. However, Palmer (2003) considered the predominant bottom substrate to consist of coarse materials (e.g., sand, gravel, and cobble) associated with glacial outwash soils, ubiquitous everywhere above the 8-foot depth contour. There is very trace accumulation (i.e., 1-2 inches deep) of organic materials and silt at most in-lake locations except in the vicinity of stream mouths, outfalls, or sheltered coves (Palmer 2003).

**Aquatic Vegetation and Fish**

Aquatic vegetation surveys have not been conducted regularly in Willett Pond. The most detailed information is the 2002 natural resource inventory of Willett and Pettee Pond (Palmer 2003) which identified 25 aquatic species distributed among the emergent, floating, and submerged habitats. Five species were dominant among the submerged macrophytes: redhead grass (*Potamotogeton perfoliatus*), Robbin's pondweed (*Potamotogeton robbinsii*), big-leaved pondweed (*Potamotogeton amplifolius*), lesser waterweed (*Elodea nuttalii*), and tapegrass (*Valisneria americana*). Variable milfoil (*Myriophyllum heterophyllum*) was present but categorized as rare, while southern naiad (*Najas guadalupensis*) was not present. In general, the inventory depicts a diverse mixture of native macrophytes at low to moderate densities, providing good habitat for fish and macroinvertebrates with little impact to recreational activities (Palmer 2003).

Since the last 15 years, there have been occasional concerns about weeds from abutters, but these may have been associated with periods of seasonal low water elevation when weeds are perceived as more abundant or in shallow cove areas with highly organic sediments. Variable milfoil populations were present during this period but their coverage was generally stable (Palmer 2017).

Southern naiad was first noted in the Pond in 2013 and by 2015 was reported as dominant and very dense in one shallow cover area (Palmer 2017). In 2016, a year of historic drought, abutter concerns about weed densities accelerated. In 2017 there was a rapid expansion of southern naiad when it "suddenly became completely dominant everywhere including large areas with very minimal sediment accumulation" (Palmer 2017). Water chestnut (*Trapa natans*) has also been observed in the Pond in isolated locations in some northern coves and is being manually harvested wherever found.

SOLitude conducted a qualitative diagnostic survey in mid-August 2017 using throw-rake and view-scope (SOLitude 2017a). This survey identified many species found by Palmer (2003) but also contained southern naiad,

[2] Use of the geometric mean reduces the influence of extreme values from skewing the average disproportionally. This is particularly useful in assessing bacterial counts when a few highly elevated values are typically encountered.

[3] A measure of transparency of water obtained by lowering a black and white, or all white, disk (Secchi disk, 8 inches in diameter) into water until it is no longer visible. Measured in units of meters or feet

water chestnut (both noted earlier) as well as another common native species - coontail (*Ceratophyllum demersum*). SOLitude reported that southern naiad was very abundant and dense over 94 acres of pond area (this may include Pettee Pond) and there was sparse to moderate milfoil over 22 acres as well (SOLitude 2017a). The wide-spread and overabundant southern naiad significantly impaired recreational activities in the littoral zone (Palmer 2017).

Based on a recent fish survey (Burchesky 2010), eleven fish species were identified in Willett Pond. The fish community contains many fish common to most large Massachusetts waterbodies including bullhead, chain pickerel, pumpkinseed, bluegill, largemouth bass, yellow perch, rainbow trout (stocked) and black crappie. Two fish (stream darter and banded killifish) associated with stream environments were identified and are likely present at stream mouths or in coves. The presence of American eel (*Anguilla rostrata*) is somewhat favorable since they generally are found in good quality waters. No detailed information was available on benthic life in the Pond but freshwater mussels are reported to be present and reasonably abundant (Palmer 2017).

2. **Aquatic vegetation control and management of southern naiad**

The multi-year aquatic vegetation management program proposed by SOLitude (SOLitude 2017b) focuses on reduction of southern naiad in the littoral zone. A preliminary review was made of available management techniques, including the properties and effectiveness of various herbicides in controlling the problem species. Relevant information that was considered included:

- Information on the biology and growth characteristics of southern naiad;
- Potential range of pond vegetation control options; and
- Effective herbicides for southern naiad.

**Biology and growth characteristics of southern naiad**

Southern or bushy naiad (*N. guadalupensis*) is widely-found, being native to the lower 48 states and parts of Canada (NRCS 2017). Southern naiad is an annual plant that branches profusely and forms very dense stands of rooted submerged vegetation (TAMU 2017). It is typically found in still or slow-moving water in a broad range of substrates, including ponds, lakes, reservoirs, canals, rice fields and irrigation ditches (DiTomaso and Kyser, 2013). It grows at water depths of 3 to14 feet and tolerates polluted or slightly brackish water. The foliage and seeds are important food sources for wildlife, especially shorebirds or waterfowl. Plants produce abundant hard-seeded achenes that are dispersed by water and persist for a long time in the sediment seedbank, though the actual length of viability in the seedbank is unknown. While southern naiad is not usually considered weedy in natural habitats, it can become troublesome in some aquatic systems, becoming locally dominant, forming dense mats (DiTomaso and Kyser, 2013).

Southern naiad is an infrequent problem species in New England but has shown remarkably rapid growth in some lakes. Lower Bolton Lake, CT suffered an outbreak of southern naiad in 2011-2012 (NEAR 2016). The Connecticut Agricultural Experiment Station (CAES) conducted in an aquatic vegetation survey in 2005 and did not find the species in the lake. However, six years later in 2011, CAES documented southern naiad covering about 97% of the lake area growing to a depth of 15 feet. In addition, there were about 12 acres of floating rafts of naiad too dense to even mechanically harvest (NEAR 2016). By the following year, southern naiad was dense and near the surface over about 90% of the lake area.

**Potential aquatic vegetation control options**

Information on potential aquatic vegetation control options is widely available and easily accessed. An excellent general compendium of techniques, project experiences, advantages and disadvantages, and permitting requirements specific to Massachusetts is presented in the *Eutrophication and Aquatic Plant Management in Massachusetts. Final Generic Environmental Impact Report* (GEIR) (EOEA 2004).

In addition to the Massachusetts GEIR, aquatic vegetation management options are also covered in *The Practical Guide to Lake Management in Massachusetts* (Wagner, 2004), a companion guide to the GEIR. Further, MA DEP (2004) provided *Guidance for Aquatic Plant Management in Lakes and Ponds: As it relates to the Wetlands Protection Ac*t. (MA DEP Policy/SOP/Guideline #BRP/DWM/WW/G04-1). Other useful sources of practical information about lake management include Cooke et al. (1993), McComas (2011) and Osgood (2015).

Aquatic vegetation control management guidance is also widely available from the scientific literature, on websites of state regulatory agencies, non-profit lake associations, and commercial lake management companies. Since southern naiad has a greater history of management issues in Southern waterbodies, we particularly consulted information from those areas. All references and documents consulted are listed at the end of this report.

The summary of potential aquatic vegetation and control methods provided in the Massachusetts GEIR (EOEA 2004) divides up the management options into three broad categories – physical, chemical, and biological. No comprehensive screening of all methods was conducted but those that have most relevance to Willet Pond were considered further. These include:

- Physical – bottom barriers for localized relief for docks and swimming areas, water level drawdown for general reduction of plant biomass.
- Chemical – application of selective and/or systematic herbicides
- Biological – none (stocking of triploid carp remains illegal in Massachusetts).

The remaining portion of the evaluation focuses on the herbicide treatment described for the SOLitude proposal, but will touch on the use of drawdown in Section 4.

**Aquatic herbicides effective for controlling southern naiad**

Information regarding specific aquatic herbicides registered in Massachusetts is on the EOEEA (2017) website for Aquatic Vegetation Control at http://www.mass.gov/eea/agencies/agr/pesticides/aquatic-vegetation-management.html. This site provides updated information and resources regarding herbicide active ingredients and products that have been approved for use in lakes and ponds in Massachusetts.

Information on herbicide effectiveness was gathered from five states' weed control sites (CA, FL, MS, NC, and TX) that rated various herbicides as to their ability to treat southern naiad (DiTomaso and Kyser 2013; Langeland et al. 2006; Masser and Shelton 2013; Richard and Getsinger 2016; and TAMU 2017). Six chemical active ingredients are typically used in treating naiad: copper compounds, diquat, endothall, flumioxazin, fluridone, and penoxsulam, Effectiveness ratings varied between the states for some products which may reflect regional differences in flora, water chemistry or historical experience[4]. Overall, fluridone and diquat were the most common and highly effective herbicides used in controlling naiad species.

Fluridone is a broad-spectrum systematic herbicide that can successfully treat the species of concern (naiad, milfoil). Systemic herbicides are absorbed and move within the plant to the site of action and tend to act more slowly than contact herbicides. Fluridone is generally used as a whole lake treatment but typically requires several weeks to months of water retention (little to no downstream flow) and some restricted recreation activities during that period. Fluridone is considered to have low toxicity to invertebrates, fish, other aquatic wildlife, and mammals, including humans. The typical commercial products include Sonar, Avast, WhiteCap, and other products.

[4] Both diquat and fluridone were consistently rated as good to excellent in controlling southern naiad. Endothall and various copper compounds were also rated as generally effective but had some poor results in some states (possibly due to differences in formulation. Flumioxazin was rated good to excellent but had poor results in waters with high pH values. Results with penoxsulam ranged from fair to excellent but it may not be registered as an aquatic herbicide in Massachusetts yet (or website may be not up-to-date). Overall, diquat and fluridone were the most common and effective chemicals in controlling naiad.

Diquat is used as a general-purpose aquatic herbicide, both as a primary control agent for a broad range of macrophytes and as a follow-up treatment chemical for control of plants (especially milfoil) missed by other herbicides or physical control techniques (Wagner 2004). Diquat has been shown to be very effective on southern naiad and milfoil particularly if mixed with a copper compound. As a broad-spectrum herbicide, diquat can be expected to impact non-target plants when they are present. Treatment with diquat is generally recommended early in the season to impact early growth stages, but can be applied any time (WDNR 2012). Usage in Massachusetts has shown that the effects of diquat are generally visible after 2-3 days and plants are controlled within 7-10 days (Wagner 2004). The typical commercial products available include Reward, Weedtrine D, and other products.

3. **Evaluation of the proposed SOLitude treatment**

The current proposal by SOLitude is a whole lake treatment with fluridone to control the southern naiad with spot treatments with diquat (SOLitude 2017b). The herbicide treatments are expected to sharply reduce the naiad growth with the diquat used to prevent the variable milfoil from colonizing newly cleared areas. The fluridone would be applied throughout the reservoir in late spring/early summer 2018 at relatively low levels (i.e., <10 ppb). The applicator will need to track fluridone levels and add more herbicide as necessary to achieve the needed combination of dose and exposure. It is probable that monitoring of fluridone concentrations will indicate that a second application is required to "bump up" concentrations to desired levels. Additional years of monitoring and treatment have also been proposed by SOLitude. The proposed SOLitude treatment is evaluated below with regard to effectiveness, longevity, and short and long-term impacts.

**Effectiveness and Longevity**

Application of fluridone to control southern naiad in Willett Pond is very likely to be an effective means to reduce this species. Fluridone is commonly used to control naiad species in many areas where this species can be problematic. While the database of management of southern naiad in New England is sparse, there is an encouraging example. In May 2013, Aquatic Control Technology (now part of SOLitude) treated the infested Lower Bolton Lake with fluridone with a follow up booster treatment in June 2013. Vegetation surveys, conducted immediately after the second treatment (July 2013), determined that the southern naiad cover was reduced by over 98% (NEAR 2016). Subsequent surveys in 2014 and 2015 indicated very little naiad, and the treatment was considered highly successful in control of this species.

Effective use of fluridone is predicated on maintaining dose concentrations for long periods of time. Wagner (2004) recommended that fluridone concentrations should be maintained in the lethal range for the target species for at least 6 weeks, preferably 9 weeks, and ideally 13 weeks. This requires that water elevations in Willett Pond be manipulated to prevent or minimize outflow for as long as practicable. The Pond has a sizeable watershed to pond area ratio of about 13:1, suggesting that spring inflows could be considerable. However, by removing the dam flashboards in late winter, the Pond elevation could be drawn down and then the flashboards reinstalled to maximize water storage. Flow from the bottom drains could also be controlled to increase storage capacity. Due to these factors, Willett Pond has above average capability to provide sufficient water retention to support the treatment. It should also be noted that there is little threat of downstream impacts of herbicide leaving the Pond. This is due to the presence of a wetland and pond complex below and a reported lack of endangered species' habitat (Palmer 2017).

Since southern naiad produces abundant seeds, some even after initial treatment, recolonization is expected. The longevity of the control by fluridone is at least one season and, quite possibly, two seasons or more depending on the success of the initial treatment. Results from Wagner et al. (2017a) suggest that *Najas* species return to pre-treatment conditions in 3-4 years. In the long run, it would be expected that renewed competition with other native pondweeds could rebalance the macrophyte community to pre-invasion diversity and densities.

**Short-term and Long-term Impacts**

The short-term impact of the fluridone is a significant reduction of the target species, southern naiad and variable milfoil. However, many of the non-target native pondweeds (*Potamogeton* spp. *Valisneria*, *and Elodea*) are also moderately susceptible to fluridone, so overall Pond vegetation density and diversity could be reduced. However, Smith and Pullman (1997) reported that despite several native pondweed species and tape grass being susceptible, the adverse effects were largely avoided by use of low-dose concentrations (<10 ppb) which were still effective in controlling naiad and milfoil. Madsen et al. (2002) reported that native plant cover in four Michigan lakes was maintained at greater than 70% following treatments based on surveys conducted up to 15 months after whole lake low-dose fluridone application. Thus, in the short-term, some reduction of the non-target plant community could be expected.

While reduction in rooted aquatic vegetation will alleviate the weed issue for most recreational activities, there is also a possibility that it could result in greater uptake of nutrients and growth by suspended algae (phytoplankton) in the water column. While the most current nutrient and chlorophyll levels (NRWA 2017) seem acceptable, how the phytoplankton community will react to reduced competition for nutrients is still uncertain. As part of the overall Pond vegetation management strategy, provisions to deal with a potential resulting algal bloom after herbicide treatment should be included.

Information on the long-term impacts of multiple fluridone treatments to plant occurrence and diversity (species richness) has been recently presented by Wagner et al. (2017a, b). Drawing on a database on 147 low-dose treatments of 64 lakes over the last 20 years, they examined the frequency of occurrence (presence/absence) of non-target species. They found substantial variation in the response of individual species to low dose fluridone treatment but that most non-target species are nominally impacted on average and recover within 2 years (Wagner 2017a)., These results still require further analysis and natural variation in frequency of occurrence makes it hard to discern changes less than 15%. In cases where *Najas* spp. were non-target species (typically in treatment for Eurasian watermilfoil), the central tendency for populations was to return to pre-treatment conditions in 3-4 years. However, it is important to note that these were lakes where *Naja*s was not the dominant species prior to treatment.

The question of long-term impacts of low-dose fluridone treatments on species richness (i.e., number of species present, without regard for relative abundance) was also addressed through comparison of pre- and post-implementation richness (Wagner 2017b). Since species richness counts are dependent on survey effort and nature of habitat, comparisons were restricted to 15 case studies with two years of good quality pre-treatment data were available. The results indicated that species richness declines slightly in the year of treatment in many cases, but rebounds within a couple of years. However, as with the frequency of occurrence, species richness shows considerable natural variation in lakes over the years (even without low-dose fluridone treatments) at levels that may obscure treatment impacts. Thus, the long-term impacts for fluridone treatment for Willett Pond are likely to show a return (partial if not complete) to increased plant richness based on historical records.

In summary, the proposed application of fluridone to reduce southern naiad beds with spot treatment with diquat to control milfoil during the treatment seasons is reasonable and likely to be effective and poses little short-term or long-term impacts to the plant community. Additional confidence is provided by the success of SOLitude in successful treating another waterbody with a similar naiad infestation. At this point, the need for multiple years of treatment is less certain, since a single application may provide for several years control of naiad. However, there is considerable uncertainty regarding the exact response of the plant community to a sudden decrease to a dominant plant and both the milfoil and algal populations should be monitored and, as needed, addressed.

4. **<u>Other considerations for the protection of Willett Pond</u>**.

In his assessment of current conditions in Willett Pond in August 2017, Pond Manager Palmer stated that *"It's still unclear whether Willett's plague of bushy pondweed is going to be a temporary aberration or a permanent disability. Ultimately the volume and distribution of aquatic plants at Willett depends on a complex interplay of water, nutrients, and light, and in years past the pond's lightly-developed watershed, large size, and considerable depth have prevented submersed plants from filling the pond. But over-fertilization via lawn chemicals, storm water runoff, and leaky septic systems is continuing, and very little has been done to mitigate these impacts. The pond we have today may not be the pond we have tomorrow."*

We are in complete agreement with this statement. Even if the proposed fluridone treatment significantly reduces the problematic naiad beds, the Pond is unlikely to fully revert to the waterbody described in the inventory of Palmer (2003). Willett Pond has, until recently, provided an open and good quality recreational and ecological habitat requiring little in the way of lake or watershed management. Its protective natural and man-made features included its large volume, a long fetch and wave action, presence of dissolved oxygen in the water column, lack of organic bottom sediments, moderate shoreline development, presence of wetlands and water storage in the watershed, and controlled recreational access.

However, the Pond is not isolated from its surroundings and the cumulative impacts exerted by the urban factors noted above (i.e., erosion, storm water, septage, fertilizers, waterfowl, etc.). Recently, the Pond has started exhibiting symptoms typically associated with cultural eutrophication including: high nutrient loading from the watershed, sediment accumulation in coves and below outfalls, localized nuisance algal blooms (e.g., blue-green algae), and an increasing presence of invasive species. The huge surge in coverage and density by the southern naiad over the last 5 years raises concerns whether the Pond is reaching a sort of an ecological "tipping point" into a new steady state of reduced ecological and recreational quality.

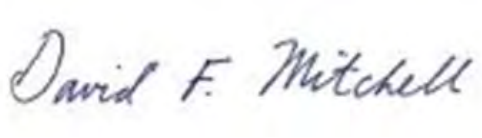
Based on these concerns, the NRWA needs to develop a comprehensive pond and watershed management strategy and a first step is collection of necessary information and environmental data. While much information about the Pond already exists (particularly the ecology), some additional information or monitoring needs include, but are not limited to:

- Measurement of local precipitation and flow out of Willet Pond through monitoring of outfall and gate values. An approximate hydrologic budget should be constructed;
- Investigation of the drawdown capacity of the current spillway structure and bottom drains to assess whether a winter drawdown of 5-8 feet may be feasible;
- Continued in-lake monitoring of water quality, including top and bottom water samples and expansion of the parameters analyzed to include nitrogen fractions;
- Conduct regular measurement (1-2 times per month) of a central lake station for SDT and vertical depth profiles of temperature and DO;
- Establish permanent aquatic vegetation monitoring sites or retain those used for post-application surveys;
- Map sediment composition and depth in problem areas such as coves or below outfalls and for reference in select locations in the littoral of the main basin;
- Conduct a thorough watershed investigation to identify potential sources of nutrients and sediment in the watershed particularly those that can be reduced or mitigated;
- Identify what parts of the watershed still have septic systems and inventory number and distance;
- Continue to inspect shoreline areas for water chestnut plant and remove them quickly and completely;
- Provide shoreline residents with information on best practices and good environmental stewardship; and
- Partner with the North Walpole Fish and Game Club to make sure that boats entering the lake are fully cleaned prior to entry to the lake to avoid accidental introductions of macrophytes.

It is realized that this is quite a shopping list for a private lake with limited funds available but judicious use of the permanent staff, local volunteers, high school or college interns, community groups, etc. may help whittle this list down. These activities would be first steps for the NRWA to consider to gather the information that will be need to develop a comprehensive lake management plan.

Please review this letter and let me know if you have any questions or need further clarification of the details. My contact information is email (Waterfront2828@gmail.com) and mobile (508-769-7448). I look forward to meeting with you and the abutters on December 5th.

Sincerely,



David F. Mitchell, Ph.D., CLM

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## Appendix A. Responses to Questions Posed:

1. **How confident are we that the overwhelming growth of bushy pond weed during 2017 will recur?**
   *It may not be possible to pinpoint exactly what environmental shift (light, flow, nutrients) triggered the rapid expansion of the naiad, but I would expect the overabundance to continue into 2018 unless some action is taken. The course of introduction and infestation seems similar to that of Lower Bolton Lake (see paragraph 5; page 4) which continued at about the same overabundant level over two consecutive years. Since it generally grows near the bottom, the spread of Najas is less likely to be detected until it is very problematic. In other words, this growth has probably been advancing at a significant pace for several years and would not be expected to decrease significantly next year.*

2. **How confident are we that sonar and diquat can be used "selectively" to retard the bushy pondweed and variable milfoil without impacting desirable natives?**
   *Both herbicides can impact many weeds include the native Potamogeton species. However, use of a low-dose (<10 ppb) treatment seems to provide a good trade-off. The naiad and milfoil are more susceptible and are impacted much more than the non-target species but some loss of native species could occur (see discussion of Short and Long-term Impacts on page 7). It should be assumed that the loss of the Najas would open more habitat for the pondweeds to rebound. However, be careful of what you wish for, I have an experience with one lake when an herbicide treatment to control milfoil and fanwort resulting in an unexpected surge in large-leaved pondweed (P. amplifolius) that impaired recreation.*

3. **How likely is it that an herbicide application or drawdown might in fact facilitate the more rapid spread of milfoil?**
   *Since fluridone reduces variable milfoil, it should not immediately expand. It can recover within the season and start to expand. Based on Palmer's observations, it seems not to be have colonized large areas over a longish period (possibly due to substrate limitation) but that is not a guarantee of its response. Having the ability to treat selective areas on a as-needed basis might be a useful tool to have. With regard to a winter drawdown, experience shows that it is more likely to favor Najas (annual, seed propagation) than milfoil (overwintering vegetation); for more information check GEIR or general lake management references.*

4. **Would it make any sense to undertake a more limited herbicide treatment this year, presumably using diquat, to target limited geographic areas where the water is shallow and sediments deep**?
   *That is one approach to take and certainly could make sense if only a small area needed to be treated to improve the local recreational needs. However, limited treatment to areas with shallow water and deep organic sediments suggest treatment only in cove areas and my understanding is that problems are more wide-spread.*

5. **Is there any effective way to selectively rid the pond of milfoil and or prevent its spread?**
   *It may be nearly impossible to completely rid the pond of milfoil. It is a native species that is found in many lakes in Massachusetts and has been highly adaptable to most control efforts. Prevention of its spread is a definite goal but monitoring may be necessary to determine which areas and conditions are conducive to its growth. It sounds like the stability of the moderate populations over years may be due to acceptable substrate and disturbance (wave action).*

6. **Is there some other intervention needed in our shallow /organic areas to achieve longer term weed reduction; such as dredging, sediment inversion or something along those lines?**
   *It seems like sediment accumulation is beginning to foster increased macrophyte in the Pond. Reduction of sediment accumulation on the bottom would be beneficial but dredging the lake basin would be prohibitively expensive. Sediment inversion was suggested in the 1970s but never really panned out as an effective method [I actually did work on the one pond in Cape Cod where it was claimed to be effective and it was not]. What would be effective is to consider removal of sediment from portion of Pettee Pond which has been functionally working as a sediment trap for Willett Pond but is likely reaching storage capacity. Something like that would need to be part of an overall pond and watershed management program.*

7. **Given our ability to fully drain the pond if desired, is a winter drawdown a potentially effective and less expensive alternative to herbicide application?**
*Where possible, a winter drawdown is a relatively inexpensive alternative to reduce macrophyte biomass in the near shore area, particularly if a dry and cold winter occurs. There is also the positive effect of consolidating and compacting organic sediments. Since Najas is fairly tolerant of drawdowns, you may want to consider that option only after an initial herbicide reduces that species and as a way to control the colonizers (including milfoil) that may occur as the niche space opens. Also, do you know for certain that a complete drawdown is possible? You would need to check whether the two 20" drains are sufficient to fully drain the lake. Given the large volume and watershed size, they strike me as too little for the job, but that is a question that a hydrologic budget could answer. I do assume that you could likely have a decent drawdown of 5 to 8 feet) if the weather cooperates.*

8. **Which entails greater ecological impact drawdown or herbicide**?
*Great question! Herbicide applications, depending on their timing of application in the growing season, most likely can affect aquatic vegetation community with secondary effects on water quality (e.g., too rapid a breakdown can lead to increased nutrients or low dissolved oxygen0. On the other hand, drawdowns have more negative impacts on the fish and invertebrate communities depending on how fast the water is withdrawn or the physical structure of the basin. I don't think there is an inherent choice on which is more of a change agent. A lake system will generally recover from either in one to two seasons.*

9. **Would it make sense to do nothing and see if the pond returns to something closer to its historic equilibrium during 2018 before incurring the expense and risk associated with herbicide treatment or drawdown**?
*That would be considered the "No Action" alternative which always should be considered as part of any alternative analysis. As discussed it Question 1, it could be tried but I don't think the system will reset itself to historic conditions without some kind of intervention.*

10. **Are there any other options we should consider such as triploid carp?**
*There are certain other options to consider but triploid carp is not one of them. The stocking of triploid carp is common in many states but has always been and continues to be illegal in Massachusetts.*

11. **Should we be instituting a more methodical weed monitoring program or adding additional parameters to our water quality monitoring regime and if so what should be involved**?
*The answer is a definite yes. I have outlined some areas in Section 4.0 where additional information would be useful in thoughtful management of the Pond.*

12. **Are there any watershed management measures we should be pursuing**?
*I have outlined some possibilities in Section 4.0 but basically anything which reduces sediment and nutrient loading to the Pond would be beneficial.*