

**Big Alum Pond
Notice of Intent**

Big Alum Pond, Sturbridge, MA

Submitted to:

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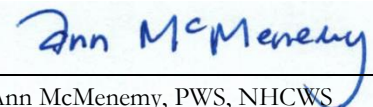
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Project 2300554



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- C. Documentation of Notice to Abutters
- D. Photographs of Big Alum Pond and Dam Structure
- E. Detailed Wildlife Habitat Evaluation
- F. Town of Sturbridge NOI Checklist & Tax Form

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1. Introduction

1.1 Project Background

On behalf of The Big Alum Lake Association (BALA), GEI Consultants, Inc., P.C. is submitting this Notice of Intent (NOI) to the Town of Sturbridge Conservation Commission in order to conduct aquatic plant management services on Big Alum Pond in Sturbridge, Massachusetts (Fig. 1). Aquatic vegetation growth on Big Alum Pond currently impacts recreational and ecological desired uses. To control nuisance aquatic vegetation, BALA is proposing three management strategies to be conducted either separately or concurrently:

1. In-lake aquatic vegetation herbicide treatment
2. Emergent plant aquatic herbicide control
3. Winter lake drawdown

The following narrative will introduce the project background, list all relevant critical resources and habitats located within the project work zone and describe in detail each of the three proposed management actions.

This NOI is submitted under the Massachusetts Wetland Protection Act (WPA) and its Regulations (M.G.L. c 131 § 40; 310 CMR 10.00) and the Sturbridge Wetlands Bylaw and associated Regulations (Division 1 Chapter 286 and Division 2 Chapter 365). A completed Wetlands Protection Act (WPA) Form 3 – Notice of Intent is included in Appendix A. The NOI Wetland Fee Transmittal Form is included in Appendix B which determines the States’ share to be \$737.50 and the Town’s share to be \$762.50. In addition, a check for \$450.00 is included, made payable to the *Town of Sturbridge*, to cover the Sturbridge bylaw fee. Abutter notices regarding this NOI filing were sent via certified mail to all property owners within 200 feet of the proposed work area. The property owner listing was obtained from the Town of Sturbridge Board of Assessor’s office on September 18, 2023. Documentation of the notification and an Affidavit of Service is included in Appendix C.

1.2 General Lake Description

The proposed work activities will take place within the shoreline limits of Big Alum Pond. A site map showing the work zone and resource area is in Figure 2. Big Alum Pond is a 200-acre (8,494,000 square feet) recreational waterbody located entirely within the Town of Sturbridge (Worcester County), Massachusetts. The lake has a mean depth of 23 feet with a maximum depth of 41.4 feet. Water transparency is typically between 10 and 15 feet.

The lake’s watershed is 0.88 square miles (563 acres), which is small compared to its lake size (watershed to lake ratio 2.8:1). The majority of the land use in the watershed is forest,

with dense residential development along the western and northern shorelines. The lake's outlet is located at the southwestern corner and drains into Long Pond, part of the Quinebaug River Watershed.

1.3 Resource Areas

The project work zone is located in Land Underwater jurisdictional area and is only being conducted within the shoreline limits of Big Alum Pond which occupies approximately 8,494,000 square feet, as listed in WPA Form 3. Big Alum Pond is within the 200 feet buffer zone of a DEP mapped wetland located near Roy Road. This wetland is 0.27 acres and classified as a woody swamp. The aquatic herbicide treatment, water level drawdown and the emergent plant treatment will happen within the Lands Under Water resource area and the nature of the project activities are not anticipated to impact this resource.

1.4 Other Resources

The project work area within Big Alum Pond is not within Endangered Species Program (NHESP) estimated Habitats of Rare Wildlife as shown on Fig. 3. There are no Outstanding Resource Waters, Areas of Critical Environmental Concern, Certified Vernal Pools, or Zone II water supply areas associated with the area where work is proposed. All project activities will be conducted within Land Under Water and therefore an evaluation of the FEMA 100-year floodplain is not applicable to this project.

1.5 Stormwater Management

The proposed work activities will not result in either soil disturbance or increase in impervious area, therefore a Stormwater Checklist was not applicable for proposed activities under this NOI. Due to the nature of the proposed activities within Big Alum Pond, a Stormwater Management Report has not been prepared for the work under this NOI.

1.6 Ecological Restoration Limited Project Status Under WPA

This project qualifies under Massachusetts General Law (M.G.L.) c. 131 §40 as an Ecological Restoration Limited Project subject to 310 CMR 10.53(4)(e) because the purpose is to remove aquatic nuisance vegetation to retard pond and lake eutrophication.

A completed WPA Form 3 Appendix A: Ecological Restoration Limited Project Checklist is included in Appendix A.

2. Proposed Actions

2.1 Aquatic Herbicide Treatment

BALA will contract with a Massachusetts certified commercial pesticide applicator to control nuisance aquatic plant populations within Big Alum Pond. The proposed management program is discussed in more detail below and is 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).

All herbicide treatments will be performed by Massachusetts Commercially Certified Applicators in accordance with label instructions, the Order of Conditions, and the site-specific License to Apply Chemicals (BRP WM 04) that must be filed annually with DEP's Office of Watershed Management. A copy of the valid License to Apply Chemicals will be provided to the Conservation Commission upon request.

The total area to be disturbed will be the littoral zone of the lake (~75 acres); however, the maximum area to be treated in one application will be 40 acres, to be determined during the same year of application using past surveys and best management practices. The conservation commission will receive records of the treatment area at the end of the year.

During the day of application, the applicator will check weather and site conditions to ensure that they are sufficient for treatment. Treatments on rainy days and/or high winds can reduce efficiency of treatment and move herbicide offsite. All appropriate postings and notifications will be made to residents and proper local and state authorities. The applicator will ensure that all equipment used will be cleaned, drained, and dried prior to launch.

BALA is proposing three general treatment strategies for management of nuisance aquatic plant growth:

1. **Standing treatment for curly leaf pondweed and clasping leaf pondweed.** A maximum of 40 acres combined for curly leaf pondweed and clasping leaf pondweed would be treated using either diquat dibromide products or fluridone based products. BALA would request that both the liquid and granular fluridone formulations are allowed to be used. The choice between the liquid and granular formulations will

depend on the exact area to be treated and if there are any sensitive native species present. Label rates for both products are listed in the Table 1.

2. **Standing treatment of up to 10 acres of filamentous algae or cyanobacteria.** A maximum of 10 acres can be treated for filamentous algae and or cyanobacteria throughout Big Alum Pond. BALA will provide photo and narrative documentation of the algae infestation prior to treatment for justification. The two active ingredients to be used are copper -based products and peroxide based products. The intent of the treatment is to only treat what algae is present as a reactive approach, not a pre-emptive measure. For example, if 4 acres of algae area documented, then only 4 are able to be treated. If the annual survey submitted to the Conservation Commission or other documentation clearly shows that there is a need to exceed the 10 acres of treatment, GEI would anticipate that the conservation commission would have to re-examine the OOC and potentially issue an amendment.
3. **Treatment of potential new invasive species.** BALA would like to have the option to allow treatment of potential new invasive species if they show up in the lake in the same year without completely amending the OOC. Treating new infestations before the populations become established and widespread will help reduce future impacts to native flora and fauna along with reducing treatment sizes/amounts. The five species that BALA would like to treat for potentially would be Eurasian Watermilfoil (EWM), Variable Leaf Watermilfoil (VLM), Fanwort and Hydrilla. The OOC would allow treatment of these target species within the 40 acres set forth in the curly and clasping leaf pondweed standing treatment strategy. The default products to use for this treatment would be the same as the curly leaf and clasping leaf treatment (diquat and fluridone). ProcellaCOR (excellent on EWM and VLM) and Clipper (excellent on fanwort) can be used, provided BALA provides written justification to the commission to use these products over the standing treatment products. GEI anticipates that any larger changes in the treatment plan would need to go before the commission for amendment of the OOC.

Table 1: Herbicide Active Ingredients	
Active Ingredient	General Use of Pesticide
Copper Based Products (Copper sulfate, Copper Ethanolamine Complex)	Contact herbicide/algacide. Control of filamentous algae and aquatic plants
Diquat Dibromide (Trade Name: Reward, Tribune)	Contact herbicide. Control of aquatic plants, mostly used for spot treatments
Fluridone (Trade Name: SONAR either granular or liquid formulations)	Systemic herbicide. Control of aquatic plants, for lake-wide control and early season curly leaf pondweed treatment
Florpyrauxifen Benzyl (Trade Name: ProcellaCOR EC)	Systemic herbicide. For EWM or VLM Control. Only to be used if specific plants are discovered in Big Alum Lake. Mostly used for spot treatments.

Flumioxazin: Trade Name: Clipper, Red Eagle Flumioxazin 51% Either Granular or Liquid Formulation	Systemic herbicide. For fanwort control. Only to be used if specific plants are discovered in Big Alum Lake. Mostly used for spot treatment.
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If there are any adjustments to the treatment plan on an annual basis, BALA will consult with the conservation commission to determine the appropriate next steps.

2.1.1 Application Methodology

The application method will consist of either a boat-based herbicide drip technology or granular spreading technology, depending on which herbicide is used. The applicator will follow pre-determined treatment polygons using a combination of GPS technology and hand maps. All equipment used for applications will be triple-rinsed on site. Empty herbicide jugs/containers will be contained properly and recycled.

As part of the post treatment monitoring, a survey and count of dead fish will be made. An occurrence of 20 or more adult fish (greater than 6 inches in total length) will indicate a fish kill. If a fish kill is observed, the application will cease immediately until the scope and potential causes of the kill have been investigated by the proper agencies. Based on the application rates proposed and the amount of vegetation to be treated (never more than half of the total littoral zone acreage and only 20% of the entire lake surface area, approximately 1,742,000 square feet), issues with rapid dissolved oxygen loss and resulting aquatic biota stress are not anticipated to occur.

A post-treatment monitoring survey will occur during the late summer, between August and mid-September. The survey will involve inspections of the treatment area and re-visiting pre-established waypoints from the 2022 fall aquatic plant survey (NEAR 2022). At each pre-determined waypoint, all species will be identified, and their percent cover estimated. The purpose of the survey is to monitor trends in plant distribution and abundance of plants over time and to identify any significant changes which would necessitate a change in management strategy. If any changes resulting from the survey are to be acted upon, BALA will send a written request to the Conservation Commission. Written requests will include specifics of the change including differences in active herbicide ingredient, estimated total product to be used and target application rate.

2.2 Emergent Plant Treatment

Using the same commercial pesticide applicator, BALA will control nuisance invasive emergent vegetation if control is deemed necessary. The main method of control would be the use of EPA and state registered herbicide, to be decided upon between stakeholder and applicator (i.e. imazamox, triclopyr, glyphosate).

The decision to treat will be based on the most recent information and a cost/benefit analysis to be performed by BALA with consultation from the commercial pesticide applicator. The analysis will weigh the ecological and recreational impact of the emergent plant populations and the risk of spread and expansion of nuisance populations against the risk of a “no action” decision.

BALA will notify the conservation commission of any emergent plant patches that require treatment with information such as:

- Patch size
- Target species(s)
- Timing of proposed treatment
- Habitat type
- Selected herbicide and rate

2.2.1 Application Methodology

Under ~200 plants, commercial applicators will use hand wicking as the primary herbicide control measure. If target invasives are present amongst desirable native species, hand wicking or a similar selective application method should be implored to avoid collateral damage. Over ~200 plants, commercial applicators will use tank spraying methods. Under both plant density scenarios, the certified pesticide applicator will use an indicator dye to ensure all target plants have been treated and to prevent staff and the disturbing previously treated areas. The applied solution will also contain a MassDEP approved surfactant to achieve optimal results.

The treatments will only take place within the Land Under Water jurisdictional area. The conservation commission will receive an end of the year summary detailing any emergent plant treatment activities.

2.3 Annual Drawdown

BALA will conduct an annual drawdown at the end of the year to assist in controlling aquatic vegetation and allow residents to repair shoreline structures. The drawdown is planned to begin on November 1st of each year. Water will be lowered to 30 inches below the spillway level. In years ending in 0's and 5's the lake is lowered an additional 6 inches to 36 inches below the spillway level. The deeper drawdown allows for additional shoreline weeds to freeze and for residents to plan and accomplish repairs to walls with a deeper shoreline.

Big Alum Pond Dam is located on the southwestern shore of the lake at the intersection of Mt. Dan Road and The Trail. The dam structure is a concrete wall with a 2 feet by 2 feet opening 5 feet below the top of the wall. A 2 feet by 2 feet metal plate covers that opening in order to close the dam. That plate has a threaded rod attached to the top of it. The rod/plate

assembly is raised or lowered by means of a hand wheel/captive nut. Water outflow is controlled by the up or down plate position. Photos of the dam structure and Big Alum Pond are presented in a photo log in Appendix D.

The drawdown will be conducted via best management guidelines laid out in the same documents referenced in the aquatic herbicide treatment section. The drop in water level will happen at a slow enough pace to allow mobile organisms to move out of the exposed zone. The drawdown will commence after November and the target depth of 30 inches below full-lake level will be achieved at least by the beginning of December. Outflow rate during the drawdown period will not exceed 4 cubic feet per second (CFS). BALA members will ensure that inflow and outflow are equal to the greatest possible extent to maintain a stable water level. Outflow discharge during re-fill will be above 0.5 CFS and full lake level will be achieved by April.

Minimal impacts to the jurisdictional area are anticipated considering the drawdown strategy proposed by BALA. Most fish species in Big Alum Pond do not spawn until later than April 1st, when water levels are scheduled to return to pre drawdown conditions. Amphibians, reptiles, and wildlife will have ample time to relocate out of the drawdown area.

There is no anticipated impact to shallow wells from the drawdown effort due to the limited depth of drawdown. We are not aware of any private wells around the area of the pond that would be affected by the drawdown.

Release of a maximum of 4 CFS into the outflow stream will not create any significant downstream flooding and associated damage. The proposed slow release between November 1st and December 1st will also reduce the flooding risk, as opposed to a more rapid, sudden release.

3. Wildlife Habitat Assessment

In accordance with 310 CMR 10.56(4)(a)(4) and 310 CMR 10.60(1)(a), a Wildlife Habitat Evaluation is provided under this NOI. Big Alum Pond’s wildlife habitat as it pertains to the resource area consists of diverse stands of aquatic vegetation, rock outcroppings, partially submersed and overhanging limbs. A completed Detailed Wildlife Habitat Evaluation Form per the Wildlife Habitat Protection Guidance is included in Appendix E.

3.1 Aquatic Vegetation

Important habitat features for Big Alum Pond include Important Wetland/Aquatic Food Plants (Smartweeds, Pondweeds, Wild Rice, Bulrush, Wild Celery). There have been numerous surveys of aquatic vegetation over the past few years, including pre and post herbicide evaluations. Solitude Lake Management performed a pre and post survey effort in 2018, documenting multiple species of pondweeds before and after the herbicide treatment. Species noted include Ribbonleaf pondweed (*Potamogeton epihydrus*), Robbin’s Pondweed (*Potamogeton robbinsii*), Water Starwort (*Callitriche spp.*) and Waternymph (*Naiad spp.*).

A recent survey performed by Northeast Aquatic Research, LLC during the summer of 2022, details several species of aquatic plants which provide habitat for fish and wildlife (Table 2). The most observed species was Clasp ing leaf pondweed, followed by Mudmat and Grassy arrowhead. Curly leaf pondweed was not documented during this survey, most likely due to the seasonality of the plant (dies off in mid-July) and the success of the treatment.

#	Common Name	Scientific Name	Percent Frequency of Occurrence
1	Clasp ing-leaf pondweed	<i>Potamogeton_perfoliatus</i>	35
2	Mudmat	<i>Glossostigma_sp.</i>	14
3	Grassy arrowhead	<i>Sagittaria_graminea</i>	8
4	Macro-algae Stonewort	<i>Nitella_sp.</i>	2
5	Aquatic moss	<i>Fontinalis_sp.</i>	2
6	Green Filamentous algae	<i>Spriogyra_sp.</i>	1
7	Pipewort	<i>Eriocaulon_aquaticum</i>	1
8	White waterlily	<i>Nymphaea_odorata</i>	1
9	Macro-algae Muskgrass	<i>Chara_vulgaris</i>	1
10	Narrowleaf pondweed	<i>Potamogeton_pusillus</i>	1

The combination of native species found in Big Alum Pond provide a varied habitat structure for wildlife. Clasp ing lead pondweed and narrow leaf pondweed grow relatively vertically, while Mutmat, Nitella, and Grassy Arrowhead grow mostly on the bottom, providing ample habitat for benthic invertebrates.

Based on the early season timing of the treatments and previous post treatment monitoring, the proposed action will not have any long-term impact on the wildlife habitat. Furthermore, the non-native curly leaf pondweed population which is one of the target species of the treatments is not considered to be significant to the protection of wildlife habitat. It is anticipated that managing for curly leaf pondweed will improve habitat function overall by giving native, beneficial vegetation space to grow and compete with the invasive.

3.2 Non-Living Habitat

The Land Under Water at Big Alum Pond contains the following Important Habitat Features besides the aquatic vegetation:

- Rocks, crevices, logs, tree roots, or hummocks under the water's surface.
- Rocks, crevices, fallen logs, overhanging branches or hummocks at, or within 1m above the water's surface.
- Live or dead standing vegetation overhanging water or offering good visibility of open water.

The shoreline and underwater areas contain multiple variations on the above habitat including underwater rock formations, limbs and submersed logs. This is especially present in the northern end of the lake, near the island. There are also a few overhanging limbs around the shoreline.

Massachusetts division of wildlife stocks Big Alum Pond with Brown and Rainbow trout annually. The lake is deep enough and has a stable thermocline and a hypolimnion that contains sufficient dissolved oxygen.

Habitat connectivity for Big Alum Pond consists of lake inlets and shoreline areas where turtles and wildlife can move freely from the lake to the upland. GEI considers connectors to be numerous.

4. Project Summary and Schedule

In summary, GEI Consultants, Inc., P.C. has been retained by The Big Alum Lake Association to assist with the permit application for an updated Notice of Intent for aquatic plant management activities. The goal of the project is to manage nuisance aquatic plant populations within Big Alum Pond utilizing EPA registered aquatic herbicides. The association would also like to include annual lake drawdowns and potential management of emergent plant species as aquatic plant control activities.

To summarize, the activities schedule is as follows:

Activity	Schedule
In-lake aquatic vegetation herbicide treatment	One round of application in mid- to late-April. Later season treatments may be necessary depending on the type of treatment and target vegetation.
Winter lake drawdown	Drawdown from November 1 st to December 1 st Re-fill by April
Emergent plant aquatic herbicide control	As needed (likely Spring and Summer months)

The following documents are enclosed for your review:

- Notice of Intent WPA 3 Form (Appendix A)
- NOI Wetland Fee Transmittal Form and Town Fee Calculation Form (Appendix B)
- Notification to Abutters (Appendix C)
- Wildlife Habitat Evaluation (Appendix E)
- Town of Sturbridge NOI Checklist and Tax Form (Appendix F)

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Figures

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Appendix A

WPA Form 3 – Notice of Intent

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Appendix B

Copy of Wetlands Transmittal Fee Form

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Appendix C

Documentation of Notice to Abutters

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Appendix D

Photos

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Appendix E

Detailed Wildlife Habitat Evaluation Form

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Appendix F

Sturbridge NOI Packet