A.6. GENERAL PROJECT DESCRIPTION
B.2.

Introduction.

This Notice of Intent constitutes continued implementation of the Leverett Pond Management Plan (Copy at Leverett Conservation Commission). The Leverett Pond Management Plan serves as a guide for projects that may take place under this permit. The Plan was produced under a matching grant from the Massachusetts Department of Environmental Management (now Department of Conservation and Recreation) in 1999 and updated in 2004, 2010 and 2020. The Plan and its associated projects are a continuation of a nuisance vegetation management effort and fisheries habitat improvement conducted under earlier permits issued by the Massachusetts Department of Environmental Protection in 1994 and 2010 and conducted with the review and approval of the Leverett Conservation Commission (hereafter LCC) (File Numbers DEP 200-104 and DEP 200-166). The Project will be conducted in the spirit of Integrated Pest Management (IPM) and Best Management Practices, in which mechanical and chemical means are combined, with public education an important component. Herbicide applications are to be minimized and are considered short-term solutions to be reduced over time. When used they will target invasive aquatic vegetation species, and where applicable nuisance native plants that are interfering with the Pond's ecology. In preparation of this Project the authors have reviewed Lealdon, et al., 2004; Wagner 2004, and Department of Environmental Protection (DEP) 2014 (310 CMR 10.53(4); Brenner 1981 and Basler 1994 (see Bibliography below).

The Project will consist of:

- Herbicide use to reduce/retard invasive plants and control spread potential
- Mechanical weed and root removal to control invasive and nuisance vegetation
- Hand removal of invasive and nuisance aquatic vegetation
- SCUBA removal of invasive and nuisance aquatic vegetation

Goals. This Project is considered a "Ecological Restoration Limited Project" ((DEP 2014), 310 CMR 10.53)) because it will improve the natural resource capacity of Leverett Pond. As a "Limited Project" as defined in 310 CMR 10.53, the Project will include:

> the removal of aquatic nuisance vegetation including invasive species to impede eutrophication

A major goal of this Project is to improve fisheries habitat by removing invasive mono-culturistic nuisance aquatic vegetation, thereby improving habitat edge for fisheries. Some native plants (such as water-lilies, watershield, large-leaf and floating-leaf Pondweed, and cattails) also are considered where they interfere with the fishery. While not a part of the Wetlands Protection Act permitting process, FLP's goal is also to improve recreation and pond use. In areas treated, eutrophication will be lessened, resulting in an increase in dissolved oxygen in the water column in treated areas. The Public Access pool north of Depot Road and waterfronts will be improved for fisheries and other wildlife, fishing, swimming, and boating by removal or reduction of nuisance aquatic vegetation. Work at the pool at the Public Access also will clear weeds that

impede water flow from the tiny brook that enters the pool, so that it can in the future resume use for an existing but "dry" fire hydrant (Attachment 2). Note that in 2018 the existing hydrant was no longer operable because of silt in the small brook that was the water source. In response to this problem, FLP purchased a Turbo Draft ™ for the Leverett Fire Department to be used as a water source in fighting fires throughout town. Someday the hydrant at the Public Access should be made operable again. Fire Chief John Ingram has indicated that it would be beneficial to again have a working hydrant at the Pond and has provided a letter of support (Ingram 2020) (Attachment 2). This is particularly important for the following reasons: the Turbo Draft could fail mechanically during a fire; additional water could be necessary from another source, while the Turbo Draft™ is actively in use at a fire location; and another town might need water from the hydrant without having to involve the Leverett Fire Department. Cattails and other plants are now beginning to block the brook, as well as the lawn edge of the Public Access. Annual mechanical removal will remedy this problem.

Approval and Oversight. The Project is to be conducted by the Friends of Leverett Pond, with approval from and in close cooperation with the Leverett Conservation Commission (LCC). Annual projects under this NOI will be proposed. All annual projects to be proposed by the FLP must be approved by the LCC.

Proposed Initial Three-Five Year Weed Management Project.

The management approach is a three-to-five-year project (with possible extensions at the end of the 3-5 year terms to be approved by the LCC and DEP). The Project is to use mechanical means to control nuisance vegetation whenever possible, and to use herbicide control as needed to control milfoil, and other invasive plants, as well as some nuisance aquatic plants. Reduction of plant foliage with herbicides will allow hydro-raking or harvesting without spreading the invasive/nuisance weed. Herbicides to be used will be those approved by the Commonwealth and used in limited areas to reduce nuisance aquatic weeds. Herbicide use will occur over a maximum of 8 acres annually within the 102-acre pond, or less than 8% coverage. Hydro-Rake use will be limited to less than 4 acres (or less than 4% coverage). Measurements of raked hydro-rake material from the Pond in 2020 averaged about .522 cu yards per hour of raking. One hour is typical coverage for a 1/8-acre area of raking within the Public Access pool or a typical waterfront. The amount of hydro-raking in a given year has ranged from 20 hours (10.4 cubic yards) to 32 hours (16.7 cubic yards). **FLP will assure that hydro-rake raking does not exceed 99 cubic yards of material over the entire project by measuring removed material each year. Provided raking does not exceed 99 cubic yards, this is not categorized as dredging as indicated in the Wetlands Protection Act or Water Quality Certificate. FLP understands that the 100 cubic yard threshold is not a part of the Chapter 90 Dredging Permit regulations, and also that a harvester of any kind constitutes dredging under those regulations. The FLP and will formally apply for a dredging permit following a positive outcome of this Notice of Intent review. The FLP has completed a WW01 form, spoken with DEP Chapter 90 personnel, and is preparing drawings for submittal (some of which cannot be done until there is no ice on the Pond.**

Anticipated nuisance plants include, but are not limited to *:

- Eurasian (*Myriophyllum spicatum*) and Variable Watermilfoil (*M. heterophyllum*)
- Curly-Leaf Pondweed (*Potamogeton crispus*)
- Swollen and Purple bladderwort (*Utricularia inflata* and *purpurea*)
- Large Leaf Pondweed (*Potamogeton amplifolius*)
- European/Brittle Naiad (*Najas minor*)
- Waterweed (*Elodea nutalli and canadensis*)

Hydro-rake treatment may follow herbicide applications at a later date for removal of roots and dead vegetation (once foliage is minimized to limit spread) from waterfronts, and the pool at the Public Access.

In addition, based on recommendations of the Massachusetts Division of Fisheries and Wildlife (Basler 1994), as many as five narrow (15-20-foot-wide) channels will be cleared of floating leaf vegetation using a hydro-rake and/or harvester. This will improve conditions for fish because present plant coverage is so heavy that fish habitat is significantly reduced (see discussion below). **N.B. Only plant foliage will be harvested from the channels, not roots and silt.** Channels may not be cleared all in one season. Channels will be cleared or maintained as funding is available through FLP fund-raising. FLP will include channels to be cleared in their annual proposals to the Conservation Commission. Existing weed species in channels include:

- Watershield (*Brasenia shreberi*)
- White and Yellow lily pads (*Nymphea* and *Nuphar*);
- Mature Large-Leaf Pondweed (*Potamogeton amplifolius*)

In a few areas, such as the Public Access pool and near the existing narrow channel that extends from that pool to the main water body of the Pond, there are cattails (*Typha*) that occasionally interfere with the use of both these areas. A small growth of cattails also periodically blocks water flow in the Pond's only perennial stream (at the Public Access pool). These plants also encroach on the shoreline lawn area used as public access. Removal will involve only a small number of plants.

- Cattails (*Typha*)

Limited removal of native/indigenous plants is justified in some areas to improve the environmental conditions for fish and other species. In 1994, a study by the Massachusetts Division of Fisheries and Wildlife (Basler 1994) determined that coverage by floating leaf vegetation on the pond was at least 40%, exceeding the amount for a healthy fishery (see discussion below). Since that time, rapid growth of invasive and other weed species has increased to more than 40% coverage and has led to unhealthy dissolved oxygen levels in parts of the pond. Intermittent areas of open water have been choked with bladderwort and other nuisance weeds. Removal of some lily pads, watershield, and large-leaf pondweed in channels will improve this condition. Limited cattails also will be removed in some areas including portions of the Public Access, especially where they block the small brook (reducing fresh water

flow into the Public Access pool and causing a backup of sediment) and blocking a small portion of the public use area (see also discussion of fire hydrant below).

Proposed Methods

- **Herbicide Treatment.** Application of herbicides is proposed in selected areas (Public Access pool, large area (about one acre) northeast of the pond access channel north of the Public Access, and waterfront areas in shallow water around the perimeter of the Pond). All are infested with milfoil and other invasive plants. An algaecide may be used to control algae if the weather is warm. Herbicides will be applied by airboat and will minimize the spread of the herbicide by either pellet or short-hose broad-casting, or hoses beneath the boat. Herbicides will eliminate or retard re-growth of milfoil and other invasive and some nuisance species. Removal of foliage will facilitate mechanical removal of roots and reduce the threat of spread. It is anticipated that herbicide control in 2021 will probably not be necessary if milfoil regrowth continues to be limited following FLP's 2019 *ProcellaCOR* herbicide application to control milfoil. Herbicide treatment will not exceed 8 acres in area or 340,480 square feet. Prior to herbicide treatment, cautionary signs (about 40) will be posted, and written (E-Mail) and phone notification will be made to all known landowners and users of the Pond.

- **Mechanical Treatment**. Mechanical removal of weeds and roots using a *hydro-rake* and/or *mechanical harvester* is proposed in areas where there is very low volume or no milfoil growth (or other plants that are spread by fragmentation). This activity will generally follow herbicide treatment by a few weeks as needed. "Touch-up" applications or mechanical methods may occur in the same year if needed. Following raking, floating weed or root fragments will be removed by volunteers using nets or rakes. A small amount of native plants (e.g. lilies, cattails) may be raked if they interfere with the ecology of the Pond. **Hydro-rake removal will not exceed 99 cubic yards over the course of the entire Project. Hydro-raking will take place *within* the 8 acres treated by herbicides.** *All removed weeds, roots and silt will be placed on land to dry and will then be moved to a location outside the buffer zone (100 ft) from the Pond and not in a wetland. Storage at a distance shorter than 100 ft can only be used if approved by the Conservation Commission. In some cases a contractor will remove piles to a "stump dump" or mulching operation in a non-wetland location.* This continues requirements in the previous 2010 DEP 200-0166 Order of Conditions.

- **Harvesting of Vegetation in Channels.** Harvesting of *floating leaf vegetation* is proposed in limited areas along the proposed or existing channels, town Public Access, and occasional waterfronts. Weed management is proposed to create **temporary channels** only through areas of dense growth of emergent vegetation (i.e., lily pads, watershield, large-leaf and floating-leaf Pondweed) in the south portion of the pond where extensive weed cover interferes with water circulation, light penetration and safe dissolved oxygen levels cumulatively resulting in reduced fish habitat. Creation of channels as a solution have been identified by the Massachusetts Division of Fisheries

and Wildlife (Basler 1994 – described more fully below and in Attachment 5). Opening narrow channels (approximately 15-20 feet in width) by *removing* plant leaf cover will improve water movement and increase dissolved oxygen. The total length in 5 channels to be cut and retrieved by harvester or hydro-rake is approximately 2,600 feet. Given the maximum 20-foot width of the channels this totals about 52,000 square feet or 1.22 acres overall. Channels will be beneficial for fish and other wildlife, as well as for swimming and boating. **In creating and maintaining channels a hydro-rake or harvester will *pull/cut* the stalks and leaves and deposit them on shore. Channel work will not include removal of roots or sediment.** As with hydro-rake piles the removed weeds, once dry will be moved to a point outside the buffer.

- **Limited Cattail Removal.** Very limited areas of cattails (*Typha*) may be removed from the Public Access or along the channel from the Public Access to the main body of the Pond, where the plants are growing rapidly and are encroaching on a small brook and the public use areas. This small brook is located at the south end of the Pond and is the water source for the Town's now dry fire hydrant. This area should remain open for eventual repair of the hydrant. Removing a small portion of the cattails will not threaten survival of the species on and around the Pond.

- **Manual Methods.** a) Hand-pulling and hand-raking (mostly follow-up) of aquatic nuisance vegetation at waterfronts and the Public Access pool. b) Removal of small amounts of nuisance vegetation and roots by SCUBA divers in some areas. Both hand methods are useful once the volume of nuisance plants has been reduced, as well as to remove small outbreaks.

- **Benthic Barriers.** Limited use of benthic barriers (also known as "pond rugs" or "pond blankets") to inhibit regrowth of milfoil. In the previous project these barriers were used in only 4 locations and were effective for very small areas (e.g. 12x30ft each). They must be removed periodically to remove accumulated silt that can support re-growth of nuisance plants.

Surveys and Documents

- All applications or use of mechanical equipment and herbicides will require the *prior annual approval* of the LCC before weed management may occur. An annual proposal will be submitted to the LCC for approval early each year.

- Annually, prior to the year's weed management, FLP will conduct a weed-identification and weed volume survey in tested areas and control areas to allow evaluation of the effectiveness of the treatment. Presently being conducted by FLP personnel, the FLP is seeking a qualified wetlands specialist (hopefully a graduate student from the University of Massachusetts or one of the colleges) to conduct the survey. FLP will assist in location of the test plots. FLP has been in touch with Dr. Allison Roy seeking such a person.

- FLP will supply the LCC with a report of treatment results annually. The report will be

submitted to the LCC each December.

- Each year, the FLP will evaluate progress, report to the LCC, and propose continued best management practices.

Details of Proposed Project.

Discussion of Proposed Herbicide Treatment.

During the course of the Project, the FLP proposes to selectively manage nuisance aquatic vegetation in Leverett Pond, Leverett, Massachusetts (Figures 1 through 7). This will be done on an as needed (predominantly annual) basis.

- Of particular concern is an infestation on the Pond of several invasive species (Figure 2). The target species are listed above and may be added to as previously unobserved species occur. It should be noted that since the COVID-19 pandemic, pond improvement from past management projects (e.g. DEP 200-0166), and creation of FLP's new Boat Loan Program, Leverett Pond has become a very popular fishing and boating location. Two previously unnoticed species were identified in 2020 (European/Brittle Naiad (*Najas minor*), and Waterweed (*Elodea nutalli and canadensis*). These weeds may have been introduced by boats and boat trailers. Waterfowl are also possible culprits.

  Eurasian Water Milfoil (*Myriophyllum spicatum*) was first discovered in 1993 on the Pond, and a more recent (2007) infestation of Variable Milfoil (*M. heterophyllum)* continues to spread today. The Variable Milfoil identified is believed to be a hybrid. Variable Milfoil cannot be treated by using biocontrol Water-Milfoil weevils. The plant also cannot be removed mechanically while dense foliage is present because of the threat of fragmentation and dispersal. Herbicide applications are required to continue to control the density of milfoil and other invasive plants using herbicides approved by the Massachusetts Department of Environmental Protection. The area of herbicide application is predominantly along the shoreline and is approximately 8 acres in total within a 102-acre pond (7.8%). The herbicide applications will be conducted by a licensed applicator (probably Solitude Lake Management, Inc. of Shrewsbury, Massachusetts) under separate state permit and license. *A License to Apply Chemicals in the Waters of the Commonwealth* from the DEP Bureau of Resource Protection will be applied for by the FLP and the licensed applicator. Special permitting will be required if the chemical 2,4-D should be recommended by the treatment specialists with the licensed applicator. FLP tries not to use this chemical unless conditions dictate its use.

Proposed Mechanical Treatment

- **Hydro-Raking.** Hydro-raking removes weeds, roots and silty detritus caused by rotting aquatic vegetation. Some sediment adheres to the removed material, but it is predominantly gelatinous detritus, roots and foliage. Removal of sediment will be

minimized. DEP regulations consider any removal of more than 100 cubic yards from a lake or pond to be dredging. The volume of material removed over the course of the Project will not exceed 99 cubic yards and is not considered dredging under the Wetlands Protection Act regulations. Dredging requires additional permitting. FLP has measured hydro-rake piles from the 2020 weed management season in order to compute their approximate volume and to arrive at an estimate-per-hour of mechanical raking in order to predict raking volume. Measurement of hydro-raked piles from Leverett Pond in 2020 averaged .522 cubic yards per hour of hydro-rake use. This totals 10.44 cubic yards in a 20-hour effort that raked within a 2-acre overall area (approximately 1/8 acre raking areas in each waterfront or Public Access area). This average will be used to monitor hydro-rake use to assure raking of less than 100 cubic yards in the course of the project allowed under the present DEP guidelines. Based on past hydro-rake use, it is estimated that raking will average about 25 hours per year, or 12.25 cubic yards per year. Piles will be measured each year and reported to the LCC in the annual report. An "Eco-Harvester" may be substituted for a hydro-rake or mechanical harvester in some or all areas. This machine uses a roller attachment to cut/pull milfoil and other weed roots while also removing the foliage. This minimizes removal of sediment and sand and gravel from the bottom. Hydro-raking will take place at opportune times of the season to avoid spreading seeds.

Note: Contractors likely to be hired to conduct weed management are as follows:

- **Herbicide, Hydro-raking and Mechanical Harvesting: Solitude Lake Management, Inc., 590 Lake Street, Shrewsbury, MA 01545; and**

- **Eco-Harvesting (pulling and removal): C&D Underwater Maintenance, Inc. 1 Indian Hill Lane, Sandy Hook, CT 06482**

Turbidity will be minimized by avoiding hydro-raking adjacent waterfronts once one area has been completed. This will allow sediment to settle before moving on to adjacent areas. The hydro-rake will move on to a distant area and complete that area before returning to the adjacent area.

Channels. It is proposed that as many as five narrow boating channels (Figure 3) be temporarily cleared of nuisance floating-leaf vegetation as funds allow. This will result in the creation or improvement of approximately 2,600 feet of channels (total 1.22 acres). This will cut and remove (harvest) nuisance aquatic vegetation, but not their roots or bottom sediment. This will result in temporarily improved fish and other wildlife habitat by creating edge and circulation as well as improving recreation. Each channel will be surveyed in advance and marked with buoys to avoid any large areas of milfoil or cloning plants. **(Note: Milfoil is rare in areas of dense coverage of foliage.)** Management of the channels will allow improved circulation and access from the Public Access pool at the south end of the pond to the open deeper water area in the north and across the dense growth of floating-leaf weeds in the south end of the pond to deeper water. A mechanical hydro-rake, harvester or "Eco Harvester" will be employed to remove limited areas of watershield, lily pads and other floating-leaf vegetation (Figure 4). While these species are native plants they dominate approximately 40-or-more percent of the Pond's surface

and thus cause unhealthy conditions for fish. The Massachusetts Division of Fisheries and Wildlife identified channels as a means of improving fisheries habitat (Basler 1994). The proposed location of the channels is based on channel locations cut through the densest weed cover in the past (e.g. Channels 1-4 Figure 5). These channels will connect open deep water with cleared areas along the shoreline to make a continuous channel. Channel 5 will cut through an area recently covered by large-leaf Pondweed and lilies. More exact locations will be provided to the LCC in the annual proposals. Channels will be harvested during periods of peak growth to maximize effectiveness.

  - *N.B.: it is not planned to remove large amounts of root material and detritus from the bottom of these channels. The volume would be prohibitive. Removal using herbicides could result in bringing dead roots to the surface, requiring subsequent mechanical removal. Based on results of past channel creation, the removal of live vegetation (foliage) alone can result in one to three years of open water before emergent vegetation is fully regrown. This temporary removal will result in improved water circulation and increased dissolved oxygen which is beneficial for the fishery. Also, for recreation this will improve access by kayaks, canoes and row boats, as well as swimming.*

- Mechanical methods will only be used if large areas of milfoil are not present or plant foliage is low. All weeds removed by mechanical or manual means will be placed on the shore to dry, and then will be removed to a location at least 100 feet from the Pond and not in another wetland.

Education as a Preventative – and Long Term Management.

- FLP will conduct an annual survey of treatment areas to determine the effectiveness of the weed management project over time, and to provide the results to the public via the FLP web site, and to the LCC when requested. This will be a continuation of the survey conducted by FLP over the past few years. FLP is presently seeking a wetland specialist (perhaps a graduate student from the University of Massachusetts.) and has been in touch with Dr. Allison Roy, a wetland specialist at the University. The FLP weed management group will regularly monitor growth of problem species and report outbreaks. Volume of hydro-rake treatment will also be reported annually. Results will be reported to the LCC when requested.

- The Friends of Leverett Pond web site will be updated periodically by the FLP. The web site will provide a discussion of preventative measures to minimize weed growth and reduce the need for short-term treatment such as mechanical and chemical plant control. Tips for good pond-neighbor practices will be included such as avoidance of lawn fertilizers, or any form of nutrient discharge into the pond.

- A program discussing weed management issues will be presented at the meetings of the local pond associations and at the Leverett Public Library by the Friends of Leverett

Pond.

- Preventive signage will be placed at the Public Access north of Depot Road (the main boat launch point on the Pond). FLP has a supply of signs from the Massachusetts Department of Conservation and Recreation that focus on minimizing the spread of nuisance vegetation. Other signs include encouragement to "catch and release" fish and cautions for spread of weeds by motorboats.

More on Protection of Fisheries Habitat.

Lake and pond management programs to "remove or thin" nuisance aquatic vegetation is classified as an Ecological Reconstruction Limited Project under the 310 CMR 10.53 (4). Control and reduction of the invasive aquatic weed, Eurasian Water Milfoil, Variable Water Milfoil, Bladderwort, Waterweed, European/Brittle Naiad, and channel areas of Water Shield and water lilies (*Nymphaea* and *Nuphar*) and other nuisance vegetation will improve the potential of the resource area to provide fisheries and wildlife habitat, improve water circulation in areas treated, and maintain and improve boating/fishing/swimming channels (310 CMR 10.56 (4)(b)). **In addition, responsible control of Eurasian Water Milfoil and Variable Water Milfoil densities in Leverett Pond will reduce the potential threat of spreading this and other invasive species to other nearby lakes and ponds via watercraft and waterfowl**.

When herbicide use is warranted, FLP proposes to use herbicides such as *ProcellaCOR* which selectively targets milfoil. *Diquat* or similar herbicides may be used to control species such as Curly-Leaf Pondweed, Swollen Bladderwort, Naiad and Waterweed. The toxicology effects of *ProcellaCOR, Diquat* and other approved herbicides on fish and other aquatic organisms have been studied carefully. When applied properly they do not interfere with fisheries habitat or that of other species. The information on these herbicides indicates that field application rates are substantially lower than laboratory "LD50" values (a dose measurement used to set safety limits of use). In the proposed Project, the herbicide application will be conducted by a licensed applicator, under permit from the MassDEP and approval by the LCC. The proposed Project advocates the use of herbicides on a limited basis, covering only 7.8% of the pond. Herbicide applications will be reduced over a 3-5year period, to be replaced or accompanied by mechanical methods. Best management practices will be followed. FLP will only use herbicides recommended by its applicator and approved by the Commonwealth of Massachusetts. Specific herbicides will be reported to the LCC in FLP's annual proposals and reports.

Regarding reducing use of herbicides, the FLP is pursuing a NOI to allow occasional winter drawdowns of about 4 feet that will help control milfoil and other nuisance species. The FLP understands that a drawdown of more than 3 feet must be reviewed by Massachusetts Fish and Game because a 3-foot depth does not comply with the Drawdown Performance Standards or the GEIR. A drawdown may be done in conjunction with this NOI (herbicides, mechanical methods).

It has been documented that fish feed less efficiently in very dense stands of aquatic weeds than in areas comprised of moderate densities of native aquatic plants. These weeds include Water Milfoil, Bladderwort, Curly-Leaf Pondweed, Naiads, Waterweed and other invasive weeds, and dense coverage of floating-leaf vegetation (e.g., Lilies, Watershield, Large Leaf and

Floating Pondweed). Oxygen levels taken from one of the more densely infested areas of bladderwort and milfoil on Leverett Pond indicated that levels are not conducive to healthy fisheries habitat. In fact, during two fish kills occurred in 2001 and 2003 related to very thick ice and snow cover, Leverett Emergency Manager James Field tried to get a dissolved oxygen measurement and it was so low that his sensor could not register a reading. Past studies of phosphorous and dissolved oxygen were obtained from the pond through the assistance of the Massachusetts Water Watch Partnership when it was in operation, Past observations on Leverett Pond indicate that in the vicinity of the dense bladderwort and floating-leaf plants, and especially beneath them, oxygen levels fall well below the acceptable level for fish. The same is true for dense stands of milfoil. A Leverett Pond study in 1993 (Thomas and Thomas 1993-1995) measured DO at 7.72 in clear deep water. In a nearby location, DO of 5.52 was obtained above a large clump of bladderwort at .8m depth, and a DO reading of 3.76 was obtained just below the clump at a depth of 1.9m. Temperatures in these densely infested areas are several degrees higher than in areas of open water, a condition many swimmers know well. Dead fish are sometimes observed floating on the surface of these areas. Dead bass fry are found occasionally in raked bladderwort. Furthermore, a very small part of Leverett Pond (maximum 7.8%) is proposed to be treated with herbicides (annually or as necessary), leaving more than 94 of the 102 +/- acres to provide unchanged fish and aquatic habitat. Treatment of this small percentage over selected areas will not have a negative impact on fisheries or other wildlife habitat. On the contrary, following treatment, fish habitat will have improved edge and cover, as well as higher dissolved oxygen levels, and more consistent temperature ranges.

More on Protection of Wildlife and Wildlife Habitat and Channels.

During the summer months in 1994, approximately 40 percent (Basler 1994:1) of the pond's surface was covered with rooted, floating-leaved aquatic vegetation. This area has increased since then with growth of watershield and invasive plants like milfoil and curly-leaf Pondweed. A maximum of 30% coverage is considered healthy for fish habitat. Over the past few years, portions of the remaining area of "open water" has been taken over by dense areas of Variable Milfoil (possibly a hybrid), Bladderwort, and curly-leaf Pondweed precluding its use for fishing and creating a safety hazard for boaters and swimmers, increasing the 40% coverage identified in 1994. For many years the Pond has been known for excellent bass and pickerel fishing. A 1950s newspaper article reported that a record pickerel (48 inches) was caught in the pond in the 1950s (possibly a pike). By the 1980s fish were reported as stunted continuing to 1994 (Brenner 1981, Basler 1994). In the 1990s with excessive growth of nuisance plants and an early spring fish kill, a marked decline in fishing activity occurred. Newspaper articles written for fishing enthusiasts commenting on "stunted bass" populations in the pond. Today eight-pound large-mouth bass and American Eels are often caught. The FLP believes this improvement is partially the result of the weed management project conducted from 2010 to 2020 (DEP 200-0166). Four to five-pound large-mouth bass are often caught. Recently a nine-pound bass was caught in the north end of the Pond. Fish caught in the south, weed covered portion of the pond are few. The number of fishing boats on the Pond (motorized and passive) has increased dramatically with many of the same fisherman returning often. This situation was occurring before the Covid-19 pandemic, since the treatment covered by DEP 200-0166, but has increased in the past 6 months.

Some excerpts from the MDFW study follow:

"Studies of fisheries on Leverett Pond were conducted in 1974, 1981 and 1994 by the Massachusetts Division of Fisheries and Wildlife (Brenner 1981; Basler 1994). Results indicated that in general fish condition factors were above average for most species with the exception of pumpkinseed and chain pickerel). In 1994, pumpkinseed were the dominant species and dominated other species by about 1200:1. While the "well-being of the fish community was above average in most cases, below average growth rates give an indication of unbalanced, or stunted, populations of bluegill, largemouth bass and black crappie" (Basler 1994:1). While methods were introduced to improve this condition, the studies indicated that approximately 40 percent of the pond surface is covered by emergent aquatic vegetation. Basler states that "it is generally felt by fisheries biologists that less than 30% surface area coverage by aquatic vegetation will maximize fisheries potential in lakes and ponds (Basler 1994:2)." It is indicated that reestablishment of channels and maintaining them will provide access to the deeper area of the pond and allow fishing throughout the pond, rather than in isolated pockets. Channelization will probably increase movement of fish throughout the pond. Areas previously unsuited for breeding may once again be free of aquatic plants. In species such as largemouth bass, which requires a solid substrate for nesting, the channels and adjacent bottom may encourage reproduction. Removal of plants in the channels will also reduce the area available for small fish to hide in and reduce population pressure through predation…Increasing the amount of edge available through channelization allows increased escapement for fish species, as well as better hiding for predators. (Basler 1994:2)." Leverett Pond is not stocked.

"Improvement of water circulation is also probable with channelization and removal of bladderwort and Eurasian water milfoil (Note: these were the known target species in 1994). Increased circulation should improve oxygen levels throughout the pond and minimize the effects of late summer uptake by aquatic vegetation on DO levels available to fish. The removal of Eurasian milfoil, which can grow in dense profusion, will be especially beneficial to local DO levels (Basler 1994:3)."

N.B. Note that there is a statement in Brenner 1981 and Basler 1994 that the size of Leverett Pond is 69 acres. This is taken from an outdated report in the 1970s. Leverett Pond is approximately 102 acres.

It should be noted that narrow shoreline weed control provides the same edge benefits as do channels. The proposed channels will take advantage of waterfront edge areas and connect them to deeper water.

Rare or Endangered Species (NHESP Concerns).

Within the area of the Project, no areas of endangered or rare species are indicated on the NHESP map (Figure 6). An area of critical concern is located on the south side of Depot Road (a paved main thoroughfare), but the proposed Project does not impact this area. FLP has contacted

Massachusetts Natural Heritage and Endangered Species Program requested a statement of impact of the Project on areas of concern. FLP has been notified by E-Mail that no areas of concern are within the Pond treatment area (Attachment 1). This notice has been submitted to the LCC.

Proposed Monitoring Plan

The FLP will monitor both the herbicide application and the mechanical harvesting to assure that these operations are conducted properly as stated within the Notice of Intent, the annual proposals and within the permitted areas. Monitors will assure that weeds are not evident on equipment that may have been in other ponds. Over the course of the Project, the FLP group will monitor the re-growth of plants in areas that have been treated with herbicides and mechanical treatment, as well as control areas not treated. This will be done annually before treatment. The results of the monitoring will be reported to the LCC in FLP's annual report, and plans will be presented for continued "touch up" applications to remedy re-growth. Hydro-rake weed piles will be measured annually to assure that raking does not exceed 99 cubic yards, and volume will be reported in the annual report. The results of the survey will inform the following year's proposed treatment.

The FLP will monitor the Pond periodically to detect previously unknown invasive plants.

The FLP plans to request from the Massachusetts Department of Conservation and Recreation, that a fisheries study be conducted similar to that conducted in 1994. The study will be used to compare to previous studies conducted on the pond.

Summary

In summary, the existing research literature indicates that Water Milfoil (especially Variable and Eurasian), and dense infestations of other nuisance weeds such as bladderwort, waterweed and European and Brittle naiads provide poor wildlife habitat and food value. Therefore, the proposed Project will improve the wildlife habitat on Leverett Pond in those areas treated. In areas to be managed, the proposed treatment will selectively reduce or eliminate plants that interfere with fish habitat. In the long-term, treatment and management of the Eurasian Water Milfoil, Variable Milfoil, bladderwort, Curly-Leaf Pondweed, European/Brittle Naiad and Waterweed infestations, and some floating leaf vegetation in Leverett Pond will improve habitat and the overall health of the pond.

In conclusion, in the areas proposed for management, the control and management of the nuisance aquatic plant infestation will reduce the potential for deterioration of fish habitat and wildlife habitat, water quality, recreational activities and aesthetic values on Leverett Pond. The proposed integrated herbicide/physical management program is compatible with current scientific research on the control of infestations of exotic and native plants.

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Figures

Attachments