**B5-BMP ISSUE**

Over the course of the weed management project the FLP has employed Best Management Practices (BMPs) to manage invasive and nuisance vegetation in the spirit of Integrated Pest Management. The assumption is that no one management tool can be used successfully to combat aggressive invasive weeds. Several best management or most effective tools must be combined. BMPs employed include:

a) Education to avoid introduction or spread of the weeds, or introduce pollutants like fertilizers;

Precautionary signage at the kiosk at the Public Access, and cautionary notices by word of mouth, meetings, and newsletter posters informing the public about avoiding bringing invasive plants in and out of Leverett Pond on propellers, boat trailers and kayaks, to avoid poor practices such as use of fertilizers, breaking up cloning plants such as milfoil, etc. Efforts are published on the FLP web site. This practice has been effective in keeping pollutants off the Pond over the years. The effect on spread through boats is unknown. Signage by FLP and the MDCR warn of spread of invasives. Yet previously unidentified invasives have been found at the public access recently despite efforts.

b) Survey of Pond annually to identify areas with densities of invasive weeds;

Annual weed surveys at the beginning (pre-treatment) and end of each season )post-treatment) are conducted by boat to identify presence absence and dense infestations of invasive plants. This informs weed management efforts for each season and provides information about the effectiveness of management techniques used. A more systematic survey was put in place in 2018 that promises to provide better evaluation of effectiveness. The surveys and anecdotal review published in FLP’s annual reports show gradual improvement from 2011 to 2018 followed by dramatic improvement in milfoil control in 2019 when the herbicide *ProcellaCOR* was used.

c) Use of herbicides to eliminate or reduce invasive and nuisance vegetation foliage – the goal being to be able to retard regrowth over time, and more immediately to allow mechanical methods without spreading cloning plants. Also reduce the need for herbicide treatment over time;

The program began with use of herbicides recommended by Solitude Lake Management the applicator/consultant. The herbicide Navigate used throughout New England to control milfoil was applied for two seasons. These worked well, but slowly and did not provide enough reduction for use of mechanical equipment to remove roots and detritus. This was followed by a recommended change in herbicide to Renovate Max G which provided reduction of foliage within two weeks allowing use of the hydro-rake to remove roots and detritus effectively. Each season of treatment saw continued, but slow retardation of milfoil regrowth. A two-year interlude of use of the herbicide Diquat to control curly-leaf Pondweed, Swollen Bladderwort as well as milfoil worked well for curly-leaf Pondweed, but less well for Bladderwort. Milfoil was controlled, but use of Renovate Max G was more effective. Finally in 2019 Solitude was able to apply *ProcellaCOR* an herbicide specifically designed to manage milfoil. It was permitted by the State in 2019 and had not been available before this. The results were dramatic and worked fast allowing mechanical means to remove roots and detritus. The herbicide is so effective it is predicted to work for up to 3 years. FLP is in the second year of its application and milfoil growth remains low as predicted. While FLP’s goal is to reduce the need for herbicides over time, *ProcellaCOR* is recommended for any future herbicide application to control milfoil. It reduces the need for treatment from annually to every three years. It is the safest of all milfoil herbicides and has minimal effect on Native species.

d) Use of hydro-rake to remove root systems and dead plant matter (detritus) following herbicide treatment to avoid or retard regrowth;

Following removal of milfoil and other invasive foliage, a hydro-rake focused on root systems in areas that could be raked. The combination of herbicide use followed by removal of roots effectively retarded regrowth. In some cases reducing growth for a season. Repeated raking of the root areas in years following made this more effective eliminating the need for raking in previously raked areas. The hydro-rake is a very useful tool in milfoil management, but unless milfoil plants are very low volume cannot be used without proper herbicide treatment. The hydro-rake should be considered in plans to “cut” and remove native nuisance plants such as in proposed channels without the threat of spreading. A mechanical harvester would be more efficient time-wise.

e) Follow-up hand-raking and proper disposal of “floaters”, and raking of plants missed by other methods (very low volume). Hand raking any time invasives are observed; and

Hand raking is a crucial tool in management of invasive plants. As invasive plants begin to grow in the spring they can be effectively removed by hand or through hand raking. Removal of floaters is important. Hand raking is very important following hydro-raking, or on a day-to-day basis removing floaters of invasive plants caused by wind, boats and waterfowl.

f) Hand removal of foliage and roots of invasives by SCUBA divers;

This method was proposed as a viable tool, but has not yet been employed. SCUBA divers remove roots and foliage using hand gardening tools and bagging them after removal. Thus far the cost has been prohibitive. If reasonable cost can be found this would be a very good follow up method for small areas.

g) Control of invasives in very small areas using benthic barriers (pond blankets);

This is a technique used in 3 and sometimes 4 areas on Leverett Pond. The barriers are nylon fiber “blankets” typically about 24 by 12 feet in size. They are placed on the bottom (preferably after raking or hydro-raking). They must be removed or cleaned annually or milfoil will begin to grow on sediment which inevitably accumulates. One technique is to flip the blanket occasionally to an adjacent location. The process effectively retards the growth of invasives, but in a very small area.

h) Removal of raked dead plant matter from the Pond area to avoid reintroduction of invasives.

Hydro-raked or hand-raked weeds were placed as far from shore as possible and allowed to dry. Covering the pile with a dark tarp (preferably one that is not unsightly) hastens drying and protects from spread by erosion, birds, etc. Once reasonably dried, the piles were removed out of the buffer of the Pond and not into another wetland. Some landowners had the weeds removed by a contractor. This is a tedious process and would be more effective if a contractor could handle removal of all piles.

**Tentative Plans for 2021 (2022) Weed Management**

The FLP is presently working on a new Notice of Intent (100-0196) weed management plan/proposal for the upcoming season and 3-5 years thereafter. The plan includes the following:

**Tentative Plans for 2021 Herbicide Treatment.** Because of the excellent results from the *ProcellaCOR* application, and based on manufacturer’s recommendations, no herbicide application is recommended for 2021. According to the product specification and recommendations, relief from regrowth can occur up to 3 years. The application is so rigorous that any remnant milfoil is likely to be resistant plants and a second application would not be effective. In a third year, regrowth is possible from roots, but many lakes have seen continued relief. FLP hopes that hydro-rake removal of roots in some treatment areas will further reduce the need for herbicide treatment.

**Tentative Plans for 2021 or 2022 Hydro-Raking**. Hydro-raking is proposed for 2021-2022. As long as milfoil regrowth remains at a minimum, Hydro-raking is proposed for early May to June. As in past years, hydro-raking is proposed in areas that were treated earlier (in this case 2019) with herbicides. Root systems and some non-milfoil plants will be raked and moved to the shore, where they will be dried and then removed to non-wetland areas (following conditions agreed to in the Order of Conditions and our discussions with the LCC). Floating remnant Swollen bladderwort and curly-leaf Pondweed will also be removed to shore. Covering piles with dark-colored tarps is highly recommended to accelerate drying. Areas that were not treated with herbicides, and that contain milfoil, will be avoided by the hydro-rake to avoid the spread of milfoil. Raked weeds will be removed to a point 100 feet from the pond or wetland once dry. FLP will provide the locations of the piles to the Conservation Commission, with the exception of those piles removed to commercial locations.

**Plans for Weed Management at the Public Access.** There is some regrowth of milfoil in the pool at the Public Access and a newly discovered invasive plant called Waterweed is located in the pool. Curly-Leaf Pondweed is also growing there with a small amount of bladderwort. This may be of low enough volume to warrant hand raking. FLP proposes to organize a team of volunteers to hand-rake much of the pool and ask the town Highway Department to remove the weeds to the town transfer station. Hydro-raking may also be warranted.

**Plans for Drawdown.** Construction of the new dam was completed in October, 2019 and is now fully functional. FLP plans a formal ribbon cutting as soon as the Covid-19 virus issue is resolved and the Conservation Commission is invited. The dam has a floodgate that can be used to lower the water level in the Pond. Under a future permit, FLP hopes to be able to do a limited fall-winter drawdown (approximately 4 feet) as soon as it has the appropriate permits. The drawdown would occur in late fall/early winter of the drawdown year. At this point FLP is researching permits required and anticipates permits from DEP, the Conservation Commission, MESA, and possibly the U.S. Army Corps of Engineers. FLP understands that studies may be necessary to determine the most effective time of year for a drawdown to minimize or eliminate negative impacts to small wildlife. FLP will begin working on a NOI in 2021 and will put into place any necessary studies and surveys. Drawdowns at other ponds involve a very slow process to give fish, amphibians, turtles and other wildlife time to move to safe water. The exposed areas will be snow covered, but milfoil will be allowed to freeze, controlling milfoil which grows in the shallow water. FLP plans to seek the advice of a wetland consultant who has experience with drawdowns and the appropriate laws, and to be in contact with associations from other ponds that regularly do drawdowns. FLP will seek to have the necessary studies done and permits acquired by the end of 2021 or 2022.

**Hand Raking**. Occasionally hand-raking should take place under Conservation approval in 2021. This will help reduce growth of invasives as they are observed.

**Benthic Barriers**. Pond blankets should be left in place in 2021. This will help control invasives at these locations.