Lamprey River Advisory Committee
Grant Application Form

date:
January 22, 2020

name of applicant or organization:
Pawtuckaway Lake Improvement Association, (PLIA)

contact information for applicant: name, address, phone number, email address
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type of grant being sought: (Community Grant, other-specify)
Community Grant

title of proposed project:
Side-Scan Sonar Purchase to Identify Areas of Aquatic Invasive Milfoil in Pawtuckaway Lake

Goals of Proposed Project:
Background:
Pawtuckaway Lake is 784 acres and has two operational dams situated in the Town of Nottingham; and is its signature resource. Through the Town Beach, the Fundy boat launch, and State Park access, citizens of Nottingham and members of the public take advantage of its many recreational opportunities.
The Pawtuckaway Lake Improvement Association, (PLIA), was established to monitor and improve the health and safety of Pawtuckaway Lake. The PLIA also educates the public on the conservation, protection, and improvement of water quality, natural shoreline, wildlife habitat, recreational, and natural assets of Pawtuckaway Lake. To that end, the PLIA collaborates with conservation commissions, planning boards, state and federal entities, land trusts, and other conservation organizations working to conserve or protect natural resources that have an impact on the Lamprey River Watershed that includes Pawtuckaway Lake.

In 2014 variable milfoil was discovered in Pawtuckaway Lake near the Horse Island boat launch. Since then a team of resident volunteers, using snorkels, hookah gear, and scuba equipment have been regularly searching the area around the Horse Island site to locate and remove any additional areas of infestation. Over the next two years, milfoil spread to adjacent areas in the South Channel. While that increased our concerns, we still felt that our search and removal efforts were containing the milfoil to a reasonable area. However, in 2018 we also found milfoil in Gove Cove, a mile away from any previous location. In 2019 we also found milfoil in a small cove outside the South Channel. Once we find a location with milfoil, our volunteer team has been successful in marking and removing every plant we have found. Since milfoil can be easily spread by fragmentation, as well as by boaters carrying milfoil on boats, motors, and fishing gear, we are very concerned that there may be milfoil in other parts of the lake that our volunteer team cannot reasonably survey with available resources. Goals:

Goals of the project are to continue to identify, remove, and manage aquatic invasive milfoil and other invasive species that have been discovered in Pawtuckaway Lake.

According to our divers, milfoil cannot be spotted underwater more than 10 feet away, less, early in the summer with the pollen in the water. On many occasions, divers have found plants; have come to the surface to get a marker, and then have spent several minutes trying to find the same plant to drop the marker even knowing they were within 20 feet of the plant. Locating new areas of milfoil through diving alone, therefore, is a very time-consuming process that is highly likely to miss new areas of milfoil growth. Side scan sonar shows structure and imaging of large areas of plants.

With the purchase of side-scan sonar, we would be able to perform large scale surveys of possible growth areas quickly and efficiently. We could then follow-up with in-water searches to locate and remove any definitive areas of milfoil.

goals of 2013 Lamprey River Management Plan addressed (see http://www.lampreyriver.org/about-us-2013-management-plan)

While there are many individual goals for the Lamprey River Management Plan, the overarching purpose of the plan is to maintain a healthy biology in the watershed. Pawtuckaway Lake itself is one of the key components of the watershed and is an important factor in the overall plan. Therefore, maintaining the health of the lake is important since

outflows from the lake are an integral part of the management of the watershed. If the quality and health of the lake declines, that will have a significant impact on the instream flow management of the Lamprey.
Pawtuckaway Lake is the primary water impoundment of the Instream Flow Program, established under both Federal and State statues under the Clean Water Act. Instituted in 2014 and made permanent in 2017, the program calls for water to be released from the Pawtuckaway impoundment when the instream flow is reduced to critically low levels at points along the Lamprey River. These events can occur at anytime of year.
Furthermore, the NHDES Dam Bureau's lakes management plan calls for the release of large quantities of water from Pawtuckaway Lake into the Lamprey during the Fall Drawdown. Taken together, these events provide ample opportunities for invasive species to enter the Lamprey River.

If variable milfoil, or other invasive plants, gets out of control and overwhelms the lake, eutrophication and a drastic drop in biodiversity will inevitably result. That will have a direct impact on the water quality of any water sources that are downstream of Pawtuckaway Lake. In addition, it is entirely possible that variable milfoil fragments or fragments of other invasives could escape through the lake's dams and start populating the rivers downstream. While milfoil is not likely to root in the fast-flowing portions of the rivers, it can certainly take hold in any slower moving or marshy areas. Milfoil fragments can drift with the current or wind for 10-14 days before sinking and rooting. Fragments escaping over one of the Pawtuckaway dams could, therefore, drift far down the Lamprey watershed before rooting downstream. An example of this, Beaver Lake in Derry also has variable milfoil. The milfoil in the lake has been kept more-or less under control, but the downstream marshy area has been overrun with milfoil to the extent that only expensive herbicide treatments have provided any possibility of control.
Pawtuckaway Lake provides the Lamprey River watershed instream flow and accepts anadromous alewife fish from NH Fish and Game since 1994.

The PLIA supports the protection and conservation of the Lamprey River Watershed through several programs:

Lake Host Program

The Lake Host Program is a courtesy boat inspection and public education program to prevent the introduction and spread of exotic

aquatic invasive species. Administered by New Hampshire Lakes Association, PLIA volunteers and trained personnel seek to identify and remove foreign “hitchhikers” before they enter the waterways of Pawtuckaway and proliferate.

A team of 8 paid lake hosts and about 13 volunteers offered courtesy boat inspections and education outreach to teach boaters how to inspect their boats when a lake host is not present. In 2019, paid lake hosts staffed boat ramps in Fundy and in the State Park from Memorial Day through Columbus Day totaling **1,636 hours**. There were **388 volunteer hours** at these boat ramps during this period. Lake Hosts conducted **10,148** inspections of motor and non-motorized watercraft, with two saves, (variable milfoil and water chestnut); which prevented these invasive species from entering Pawtuckaway Lake.

Milfoil Management Team

The Milfoil Management Team, formed in 2014, is responsible for coordinating all aspects of searching, marking, and removing any invasive milfoil from the lake. That includes assessing samples of vegetation found by Weed Watchers and working with NH DES to keep them informed of milfoil locations and removal operations. If any additional underwater invasive plants are discovered in the lake, this team would also be responsible managing that as well.

Weed Watchers Program

The PLIA has a volunteer Weed Watchers Program. Volunteers are trained to inspect the lake shore and adjacent waters for weeds, that by their presence threaten to disrupt the balance of biodiversity in plant life around the lake. Weed Watchers have been able to remove invasive plants, (except milfoil), when they have been discovered; (phragmites and purple loosestrife). Over a 5-month period in 2019, Weed Watchers, (**324.5 hours),** and the Milfoil Management Team, **(434.5 hours)** accumulated a total of **759 hours.**

Water Testing

Since 1988 the PLIA has been monitoring lake water for its clarity and condition. The Water Testing Committee operates five months of the year, under the guidance of NH Department of Environmental Services, (NHDES), through its Volunteer Lake Assessment Program, (VLAP). Following a specific protocol, water samples are taken from designated locations in the lake and tributaries, which are sent to the NHDES lab to measure clarity, oxygen, phosphorus, chlorophyll, and other indicators of water quality.

Island and Road Clean-up

Every spring and fall, PLIA volunteers convene to pick up trash along Route 156. In the fall after the lake level has lowered significantly, volunteers perform similar tasks on and around the lake's many islands.

Partnership with NHDES

The PLIA works collaboratively with NHDES to enhance the lake's water quality. NHDES has conducted aquatic plant surveys at Pawtuckaway Lake over several years. The initial results formed a baseline that allowed DES to compare surveys over a period of years. The response of DES to the discovery of invasive milfoil was swift and thorough.

intended audience or beneficiaries:

The intended audience are residents, visitors, campers, fisherman, boaters, and other users of Pawtuckaway Lake as well as other concerned parties within the Lamprey watershed.

location of project (if applicable):

Pawtuckaway Lake, Nottingham, New Hampshire

project procedures:

The sonar unit will be used to repeatedly search all areas of Pawtuckaway Lake that are less than about 15 feet in depth. If the sonar display or the saved sonar data shows suspect areas of plant growth, they will be marked with floats and examined more carefully through direct observation, either from the surface or underwater. If the suspect areas are indeed invasive plants, they will be removed by our volunteer certified dive team. Those areas will then be monitored more closely to check for any regrowth.

proposed timeline: start date, milestones, end date

The first sonar survey would be performed between Spring 2020 and early October 2020, soon after we purchase the equipment. The sonar would then be used on a continuing basis in following years for resurveys.

proposed budget (Grant money is to be used for expenses directly associated with the project, with not more than 10% going to overhead.):

The proposal is targeted to the acquisition of a suitable 3D side-scan sonar unit. All other expenses associated with the use of the sonar, such as the use of a boat and hours spent using the unit to locate milfoil will be assumed by the PLIA and its volunteers. As a result, there are no administrative expenses.

Based on the technology required, cost, and availability, we recommend the purchase of the following equipment:
Lowrance HDS Live 16 with standard Active Imaging 3-in-1 transducer
$4499.00
Lowrance Structure Scan 3D Transducer and 3D Module
999.00
Reefmaster Software to perform post analysis of sonar data
199.00
Total Expense
$5697.00

final products that will be produced:

Using side-scan sonar, the search for milfoil in various areas of the lake can be made more efficient, and its removal can be made in a timely manner, reducing the probability of further milfoil spread.

sustainability: (How will the project or intended impacts be sustained in the future without LRAC funding?)

The PLIA, through our Lake Host Program, Weed Watchers, Milfoil Management Team, Water Testing, and partnership with DES will continue to monitor and improve the health of Pawtuckaway Lake. The operation/use of side-scan sonar would continue to be supported through the PLIA.

outreach opportunities:

There are several outreach opportunities which would be natural adjuncts to our activities in searching for and removing milfoil. These outreach opportunities would be amplified as we develop procedures to use side scan sonar in this effort. While the DES does use side scan sonar for vegetation surveys and commercial diving companies use it for locating underwater structures and invasive weeds, we are not aware of any other bodies of water in New Hampshire that routinely use side scan sonar for this purpose. It will take some time to learn how to utilize the equipment successfully and how to analyze the data but, if we are successful in using this technology, we will have developed a very useful technique that can be of benefit to other waterbodies in the Lamprey watershed and, in fact, to waterbodies across the state of New Hampshire.
We would expect to disseminate our findings to other lake associations and other concerned parties through direct contact, online forums, and any conferences which may be relevant. This outreach would certainly include the side scan results but would also include a large body of experience which we have developed over the past six years. In this

vein, we have already reached out to NH Lakes to try to establish a forum where best practices in eradicating invasive underwater plants might be discussed.

As part of this effort we could also volunteer to demonstrate our techniques and procedures to other interested groups or individuals. This equipment will not be permanently affixed to a boat so the display and transponder could be relatively easily moved to other suitable boats. With that we could demonstrate our activities either on Pawtuckaway Lake or on other waterbodies such as Mendums Pond or the Lamprey River. This would also present an opportunity to get student interns, perhaps from UNH, involved with our work.

Finally, as general statement, it would encourage residents and users of Pawtuckaway Lake become involved in the Lake Host Program or Weed Watchers Program both of which have proven very valuable in invasive weed prevention and detection.

evaluation of project: (How many people benefit, how is the river protected, etc.)

Invasive aquatic plants are in 11 rivers in New Hampshire as well as the majority of lakes. We want to prevent variable milfoil from entering the Lamprey River. By continuing to identify, remove, and manage variable milfoil as well as continuing to educate users of Pawtuckaway Lake, and utilizing the programs in place, (as previously described), we hope to sustain the health and safety of Pawtuckaway Lake and the Lamprey River and its tributaries.

This project should markedly increase our chances of containing or eradicating variable milfoil from Pawtuckaway Lake. As such, it will benefit all those who use the lake. That includes the 320 homeowners on the lake, 7000+ annual Pawtuckaway State Park campers, and the large number of day visitors who use the State Park and public boat launch in Fundy Cove, the second busiest boat launch in New Hampshire). Containing milfoil will also benefit the downstream rivers, the North Pawtuckaway, and ultimately the Lamprey by helping to insure a healthy water supply for the river biology. Through the outreach aspects of our work it could also benefit other waterbodies in the Lamprey watershed and, indirectly, any other interested parties from other waterbodies in New Hampshire.

The success of the use of side-scan sonar will be measured directly if we find milfoil through the use of this tool in areas where it was not

previously feasible to search. It will be measured indirectly by our ability to repeatedly search areas the we cannot currently search to give us more confidence that milfoil is not growing in wider areas of the lake. If our experience proves that this is a valuable asset in limiting the spread of invasive aquatic plants, the success could also be measured by the amount of adoption of this technique in other New Hampshire waterbodies.

Reports and products:

Open communication between the grantee and the Lamprey Rivers Advisory Committee is encouraged. At least one written interim progress report is required midway through the term of the grant. An interim presentation to the committee or managing subcommittee is also encouraged.

Final reports must contain the following:

- ✓ a brief description of the project, including title, purpose, audience, procedures, & evaluation procedures
- ✓ a list of valuable accomplishments & who benefited
- ✓ funds budgeted and how they were spent
- ✓ two copies of any products (reports, press releases, photos)

Grantees are often invited to speak to the full committee when their project is completed.

Disclaimer for funded projects: Grantees are required to complete an IRS Form W-9 for tax and accounting purposes. All projects and associated publicity/outreach will acknowledge LRAC funding. "These funds are provided by the National Park Service under CFDA 15.962 – National Wild and Scenic Rivers System." As a sub-recipient, the sub-contractor is responsible for meeting the audit requirements of OMB Circular A-133 regarding the expenditure of $750,000 or more in federal awards during the contractor's fiscal year, if applicable, and for compliance with other laws, regulations, and the provisions of the parent grant agreement, including those regarding employee whistleblower rights, trafficking in persons, and requirements for publications.

The LRAC retains copyright rights and may use any and all materials generated as it sees fit without any additional compensation.

Applicants are encouraged to contact LRAC to discuss the proposal prior to submission of the application.

Completed applications should be emailed to spetersen.lrac@comcast.net or mailed to Joe Foley, chair, 88 Hedding Road, Epping, NH 03042.