

LAKE GEORGE ZEBRA MUSSEL MONITORING AND REMOVAL

Application for Funding from Lake George Watershed Conference

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Lake George Watershed Conference Priorities

The work to be accomplished using funds requested in this application is of critical importance in Lake George and its watershed as well as other areas throughout New York and other areas of the North American continent. The requested funding and the work that would be accomplished with it would advance efforts to develop an effective zebra mussel (*Dreissena polymorpha*) control program, which is recommended as a priority action in the document entitled **Lake George – Planning for the Future** and the **Lake George Watershed Conference Status of Accomplishments and Future Priorities** (see Nuisance Species Management and Control, pages 18 and 19). The requested funding would also advance short and longer term efforts identified in Item F) Invasive Species on page 35 in Section IV – Future Priorities of the Lake George Watershed Conference’s Status of Accomplishments and Future Priorities document. It would do so by: 1) addressing threats from zebra mussels by advancing proactive means to prevent their introduction and conditions that allow their proliferation by both monitoring and physical removal of them in manners demonstrated to be effective at known infestation sites in Lake George; 2) involving newly demonstrated and evolving effective practices and programs to control established infestations at known locations, and to search out and control newly established and newly discovered populations; and 3) providing information that will help prepare and implement over the longer term a lakewide zebra mussel control program that includes the location and extent of infestations, provide a means of continuous detection, monitoring and analysis and rapid responses to and elimination of newly discovered infestations, information that will be used in a continued program of public education and outreach, and through regular reporting and assessments of results evaluations and knowledge-based support of existing as well as possible future control programs.

Specifically, This Project Addresses the Lake George Watershed Coalition Priority Objective 6: Intervention and Control of the Introduction of Nuisance Species in the Waters of Lake George

Project Summary Statement

This project involves the monitoring, removal and study of zebra mussels in Lake George. Darrin Fresh Water Institute leads and conducts a wide range of tasks associated with this effort and is a regional and national leader in these efforts. The overall goals of the efforts are to better understand the biology of zebra mussels, the physical environmental characteristics of areas that both support and do not support their survival, settlement, and propagation, the means of their introduction to Lake George, and effective, expedient and environmentally benign means (as opposed to those means having or otherwise resulting in adverse effects on desired natural resources and values) of discovering, monitoring, and eliminating them in Lake George. As the adverse effects of zebra mussels include a wide range of undesired effects on native species and population ecology as well as human cultural resources and facilities, it is of utmost importance that zebra mussels are monitored, their biological needs are better understood, and that they are effectively prevented from permanently populating Lake George.

Deliverables include copies of daily diver field notes, laboratory notes and data entry and analysis, and project completion reports. Key resources who have conducted previous work advancing these efforts include staff of the Darrin Fresh Water Institute including the Director, other advanced degree academic staff of the Institute and cooperating institutions, laboratory technicians and other support staff, professional scientific divers from InnerSpace Scientific Diving, and volunteer diver support and field labor from local involved citizens. The effort is expected to be conducted during an annual cycle, and a report describing the efforts and results will be prepared and submitted at the end of the one year effort. Staff and equipment are available and can undertake the work immediately. Darrin Fresh Water Institute has obtained necessary permits from the New York State Department of Environmental Conservation for the removal of zebra mussels as an element of this and related work. Necessary matching funds and in-kind services are available.

The overall environmental benefits of this effort, which is to help prevent and control zebra mussel infestations so they do not adversely affect or eliminate Lake George's existing high value natural and cultural resources, characteristics, values and uses, are immeasurable. The proposed work involves innovative techniques (as opposed to the use of toxics and other means of control and eradication that result in oftentimes unintended significant adverse effects on other resources and uses) that have not been used elsewhere. The successful results from this work and the research associated with it could therefore be used as a model in other areas not only in New York but elsewhere in the North American continent exhibiting similar characteristics as Lake George. As this proposal involves more recent and successful in-depth field monitoring and collection techniques it is expected that the efforts will be successful in reducing or eliminating zebra mussel infestations in known locations.

Project Description

A detailed description of the specific tasks that would be undertaken with this funding is provided below:

Scientific diver surveys of nine (9) known areas of zebra mussel infestation and physical removal of zebra mussels, transport to the DFWI laboratory, measurement of specimens and cataloguing of data (requesting funding from LGWC);

Establishment and maintenance of spat traps and collection and replacement of collection plates at six (6) stations twice a year, immediately followed by microscopy for presence/absence of juvenile zebra mussels and cataloguing of data (requesting funding from LGWC);

Collection of concentrated water samples from twelve (12) locations, happening two days every two weeks when the water temperature is above 12 degrees C. (total of 9 sets of 2-day collections), immediately followed by microscopy for presence/absence of zebra mussel veligers and cataloguing of data. (Funding from Froehlich Foundation)

This proposal for funding calls for seventeen (17) days of fieldwork which includes: 15 days for zebra mussel removal and surveys, 2 days for removal/replacement of spat traps; sixty-eight hours (8 ½ days) of lab work for measurement of removed mussels, examination of spat trap plates; and data entry and analyses. It also includes approximately five (5) days (36 hrs) of logistical support including report writing and other professional management duties.

Task I: Scientific Diver Surveys and Removal of Zebra Mussels at Nine (9) Confirmed Zebra Mussel Sites and Responding to New Sightings

The table below lists confirmed zebra mussel sites, dates discovered, number of mussels removed to date, and estimated dive time to continue management and removal of zebra mussels at these sites in autumn 2009-spring 2010. Based on experience it is critical to immediately remove as many mussels as possible when adult zebra mussels are found. This reduces the possibility of successful spawning. The number of dive days at each location is based on the surveyed area in which zebra mussels have been found, estimated populations, likelihood of reoccurring introductions and logistical considerations for diving at the site (e.g. boat traffic, silt causing reduced visibility). For example, the largest area of zebra mussel infestation is Lake George Village, the location least likely for reoccurring introductions is Cleverdale, and the locations most difficult to dive and survey at are Mossy Point and Sandy Bay. Therefore, a range of minimum and maximum dive days at each site is proposed. Given the uncertainty of the need to respond to potential “new sightings” the schedule needs to be flexible. Funding for diving which includes zebra mussel surveys and removal efforts will not exceed 15 days (projected range being 13-20 days). Costs associated with 15 days of diving (based on a minimum of two scientific divers, a support person and some volunteers) are used as the basis for this Task I grant request. Payment to experienced scientific divers is for in-field hours and does not reflect hours of pre- and post- fieldwork preparation and breaking down of scuba and other related gear for each day’s scientific diving

Location	Date Discovered	Mussels Removed to Date	Min.-Max Number of Dive Days ¹
Lake George Village ²	Dec. 1999	21,279	1-3
Cleverdale ³	July 2004	1,380	1-2
Mossy Point ²	Nov. 2004	1,817	3-4
Sandy Bay ⁴	May 2006	451	2-3
Rogers Rock ²	June 2007	231	1-2
Yankee Boating ²	Sept. 2007	36	1-2
Castaway Marina ²	Sept. 2007	47	1-2
Treasure Cove ² -Diam. Pt.	Oct. 2008	214	1
Beckley’s ² —Diam. Pt.	Oct. 2008	22	1
Surveys of new sightings	NA	NA	1-2

¹Each dive day requires a minimum of 2 divers and 1 support person/alternative diver

²Access by land

³Access by boat

⁴Access by land and/or boat

Task II. Dive To Establish/Maintain Spat Traps and Collect/Replace Collection Plates at 6 Stations Twice (2x) Per Year at Each Station for Total of 2 Days of Diving

Spat Trap Location	Dive Time Spring	Dive Time
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		Fall
Lake George Village	Concurrent with Task I	Concurrent with Task I
The FORWARD Underwater Preserve ¹	2 hr	2 hr
Dark Bay ¹	2 hr	2 hr
NYSDEC (off Green Island) ¹	2 hr	2 hr
Coates Point ¹	2 hr	2 hr
Mossy Point	Included in Task I	Included in Task I
Total	1 day	1 day

¹Sites that need to be accessed by boat

*Each dive day requires 2 divers and 1 support person/alternative diver

Project Budget

The proposed budget breakdown for specific tasks for this effort is provided in detail below. This request is for \$40,000 for the identified tasks, to be matched by funding from the Froehlich Foundation and in-kind professional and volunteer labor and equipment costs (for example, use of vessels and gas and oil for them for vessels other than those owned by the Darrin Fresh Water Institute, personal vehicle mileage for staff and volunteers, in-kind professional scientific diving other than that to be funded by this grant request, etc.). Thus, the total project cost is \$80,000, with 50% (\$40,000) requested from the LGWC and 50% provided from a local match.

Task I: Scientific Diver Surveys and Removal of Zebra Mussels at Nine (9) Confirmed Zebra Mussel Sites and Responding to New Sightings

Personnel costs (field work) associated with each dive day is \$35/hr x 8 hr x 3 divers=\$840

Personnel costs (field work) for 15 days x \$840 = \$12,600

*Additional costs (estimated):

Boat or truck and gas (\$150 x 15 days= \$2250 + \$1500 gas = \$3,750)

SCUBA equipment costs (\$75/day x 15 days= \$1,125) [Tank air fills, misc. expenses]

Lab technician measurement of zebra mussels, data entry and analysis (\$35/hr x 60 hr= \$2,100)

Volunteers, mileage to-and-from home/Lake George (1750 mi. x 50.5 cents=\$884) [Estimated cost for mileage for volunteers]

Volunteers, food (\$80/day x 10 days=\$800) [Estimated cost for lunch, etc. for volunteers]

Underwater videographer/photographer & supplies (\$315/day x 3 days=\$945) [Underwater videographer/photographer needed to acquire image documentation for reports, presentations, etc. Cost includes diver, dive gear, and video/photography equipment]

Misc. Office and lab supplies, postage, phone, hardware, etc. (\$300)

Report preparation, photo management, presentations (\$35/hr x 32 hr=\$1,120)

Grant preparation & writing (\$35/hr x 20 hr=\$700)

TOTAL, Task I = \$24,324

Task II. Dive To Establish/Maintain Spat Traps and Collect/Replace Collection Plates at 6 Stations Twice (2x) Per Year at Each Station for Total of 2 Days of Diving

Personnel costs associated with each dive day. \$35/hr x 8 hr x 3 divers=\$840

*Personnel costs for 2 days= \$840 x 2= **\$1680**

*Additional costs:

Boat and gas (\$150 x 2 days= \$300 boat + \$150 gas = **\$450**)

SCUBA equipment costs (\$75/day x 2 days= **\$150**)

Lab technician inspection of 48 spat trap plates (\$35/hr x 8 hr= **\$280**; 10 min/plate)

Report preparation (\$35/hr x 4 hr=**\$140**)

TOTAL, Task II = \$2,700

Task III: Collection of Concentrated Water Samples from Twelve (12) Locations Happening Two Days Every Two Weeks (When the Water Temperature is above 12-15 degrees C).

[Funding through Froehlich Foundation to DFWI, that contributes to cost-sharing on the project]

Management: The zebra mussel monitoring and removal program is a collaborative effort between the Darrin Fresh Water Institute, Bateaux Below Inc. and InnerSpace Scientific Diving. Sandra Nierzwicki-Bauer serves as the scientific lead and coordinator with the Froehlich Foundation zebra mussel work, and Joe Zarzynski serves as the field work lead on this project. Funding for one week salary for Sandra Nierzwicki-Bauer is requested. Activities that she will be involved with include coordination of all zebra mussel project components, analysis of results, and scientific dissemination of results. Additional S. Nierzwicki-Bauer time will be cost-shared by the Darrin Fresh Water Institute.

TOTAL=	\$31,725	
	\$ 8,248	26% Indirect Costs *

Project Total Request = \$39,973

* Indirect costs (overhead) are a required fee by Rensselaer Polytechnic Institute for basic administrative costs/services such as financial accounts/purchasing/invoicing/data communication support/ legal services/ insurance, etc.

It is not known at this time whether sustained funding at the requested level will be required over the long term. It is expected that the results of this effort will help determine whether a sustained level of commitment is necessary to continue an acceptable level of control and eradication of zebra mussels in Lake George, or whether these efforts will have reduced existing populations to levels that are no longer viable for sustained or otherwise continuing infestations.