

**Environment and Natural Resources Trust Fund
2012-2013 Request for Proposals (RFP)**

Project Title:

ENRTF ID: 040-C1

Manipulating Fisheries to Enhance Biocontrol of Eurasian Watermilfoil

Topic Area: C1. Invasive Species - Aquatic

Total Project Budget: \$ 376.200

Proposed Project Time Period for the Funding Requested: 3 yrs. July 2013 - June 2016

Other Non-State Funds: \$ 0

Summary:

This project will determine if altering fish community structure, especially the reduction of stunted sunfish populations, can be accomplished to enhance the biological control of Eurasian watermilfoil with herbivorous insects.

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Sponsoring Organization: U of MN

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Location

Region: Statewide

County Name: Statewide

City / Township:

<input type="checkbox"/>	Funding Priorities	<input type="checkbox"/>	Multiple Benefits	<input type="checkbox"/>	Outcomes	<input type="checkbox"/>	Knowledge Base
<input type="checkbox"/>	Extent of Impact	<input type="checkbox"/>	Innovation	<input type="checkbox"/>	Scientific/Tech Basis	<input type="checkbox"/>	Urgency
<input type="checkbox"/>	Capacity Readiness	<input type="checkbox"/>	Leverage	<input type="checkbox"/>	Employment	<input type="checkbox"/>	TOTAL <input type="checkbox"/> %



Environment and Natural Resources Trust Fund (ENRTF)

2012-2013 Main Proposal

PROJECT TITLE: Manipulating fisheries to enhance biocontrol of Eurasian watermilfoil

I. PROJECT STATEMENT

Manipulating fisheries to enhance biocontrol of Eurasian watermilfoil will experimentally determine if altering fish community structure, especially the reduction of stunted sunfish populations, can be accomplished to enhance the biological control of Eurasian watermilfoil with herbivorous insects. Eurasian watermilfoil is an invasive aquatic plant that is now in over 250 water bodies in Minnesota. Previous research has shown that herbivorous insects, primarily the milfoil weevil, can control Eurasian watermilfoil when sufficient numbers are maintained through the summer, but herbivore densities are too low in many lakes to control the plant. Low densities of herbivores are associated with high densities of sunfish that eat the herbivores. Because there is considerable interest in control of Eurasian watermilfoil that does not require use of chemicals or harvesters, development of effective biological control strategies is needed. EnviroScience, of Stow Ohio, has developed a process to stock milfoil weevils into lakes; they have stocked over 200 lakes in the US and Canada. Although they purport good success, the published evidence is equivocal and effective methods to reduce predation by fish would enhance the success of both natural and stocked populations of milfoil weevils and other herbivores.

The **goal** of this project is to determine experimentally if sunfish populations can be manipulated to increase herbivore abundance and thus biological control of Eurasian watermilfoil. Strategies to reduce abundance and enhance size structure of sunfish populations will be developed and assessed.

The specific **outcomes** of the project are: 1) determine the most effective combination of approaches to reduce abundance of small sunfish and develop a balanced population, 2) determine if reduced sunfish populations will allow increases in herbivore densities to levels sufficient for milfoil control and 3) determine if the enhanced herbivore populations result in sustained control of Eurasian watermilfoil.

These goals and outcomes will be achieved by selecting a set of control (at least 6) and treatment (6 to 8) lakes to test the manipulations and determine if reducing sunfish abundance will result in increases in herbivore populations and subsequent declines of Eurasian watermilfoil. A long-term, controlled, experimental manipulation is required to determine if biological control can be made operational in most of our lakes. All lakes will be monitored for two years to obtain pre-manipulation data; during this time, tests of methods to control sunfish will be made and the need for fishing regulations determined. In the following year, densities of small sunfish will be reduced and methods to enhance sunfish size structure will be implemented. These may include trapnetting, selective angler removal of small sunfish via volunteers or tournaments, stocking of predators, destruction of nests and angling restrictions (protection of predators and large sunfish). Sunfish populations will be monitored and strategies changed in any lake if they are not adequate to manipulate the sunfish population; the manipulation will continue for at least three years. Assessment of plant communities, herbivore populations and sunfish populations in each lake during the course of the study will allow us to pinpoint critical steps and limiting factors and determine if approaches to enhance herbivore populations can be developed.

II. DESCRIPTION OF PROJECT ACTIVITIES

Activity 1: Select study lakes

Budget: \$141,347

Careful selection of study lakes will be key to a successful study. At least three control lakes should have abundant milfoil and few herbivores; three other lakes should have herbivore populations sufficient to control Eurasian water milfoil. At least 4 treatment lakes should have abundant milfoil and few herbivores. In addition to these biological criteria, the Minnesota Department of Natural Resources (MN DNR) will need to support each lake for inclusion in the study and agree to fish manipulation and

possible regulations. Meetings with the lake associations will be conducted to determine their interest in participating and willingness to forego other extensive treatments and support for potential regulation changes and manipulation of the fishery. As a fail-safe, a few extra lakes may be selected in each group and the final set of lakes determined during the two-year pre-manipulation assessment.

Outcome	Completion Date
1. Assess potential study lakes	<i>October 2013</i>
2. Meet with stakeholders and DNR to select study lakes (control and treatment)	<i>March 2014</i>

Activity 2: Pre-manipulation monitoring and sunfish manipulation testing. **Budget: \$219,853**

The lakes will be sampled once each year for sunfish, 3 times per summer for plant community composition and biomass and every 2 or 3 weeks for herbivore densities. Pre-manipulation sampling will occur during 2 summers. Methods to control sunfish will be tested in a subset of treatment lakes.

Outcome	Completion Date
1. Initiate sampling of all study lakes (fish, herbivores and plants)	<i>June 2014</i>
2. Develop and assess strategies to control sunfish	<i>December 2016</i>
3. Complete pre-manipulation sampling	<i>September 2016</i>

Activity 3: Develop plans for treatment lake manipulations. **Budget: \$15,000**

Based on the data collected in the first year of pre-treatment sampling, we will meet with DNR to devise strategies to control sunfish and target densities and size structure to reach. We will then meet with lake associations and stakeholder to discuss and get approval or need for modification of the strategies. The actual manipulations will be covered under a subsequent proposal (see below)

Outcome	Completion Date
1. Consult DNR and devise strategies to present to lake associations/stakeholders.	<i>September 2015</i>
2. Presents plans to stakeholders and get agreement on treatments and targets.	<i>June 2016</i>

III. PROJECT STRATEGY

A. Project Team/Partners

The main partners in this project are the University of Minnesota and MN DNR. Raymond Newman, professor of fisheries at the University, will lead the project and supervise the students and technician. He has worked on invasive species and biological control of watermilfoil for over 20 years. Staff from the MN DNR Invasive Species Program will assist with site selection and Regional Fisheries Managers and Area Supervisors will be involved with lake selection and implementation of sunfish control strategies. The Fisheries Research Unit will be consulted with fish manipulation and regulation changes.

B. Timeline Requirements

This proposal addresses lake selection and pretreatment monitoring during the first three years of the project. An addition three to five years of treatment (sunfish manipulation) and assessment will be needed and funding will be requested from LCCMR to continue the project in 2015.

C. Long-Term Strategy and Future Funding Needs

This project will require six to eight years to obtain sufficient pre-manipulation data and to assess the effects of the manipulations. The current request covers the initial design and pre-treatment data collection. In 2015 another LCCMR proposal will be submitted to initiate the treatment phase in 2016. It is anticipated that annual funding requirements and efforts will be similar to the current proposal. Funding for much of the entire project is covered within the University of Minnesota Aquatic Invasive Species Research Center proposal, and this proposal will be withdrawn if the invasive plant component of that proposal is fully funded.

2012-2013 Detailed Project Budget

IV. TOTAL ENRTF REQUEST BUDGET 3 years

BUDGET ITEM <i>(See list of Eligible and Non-Eligible Costs, p. 11)</i>	AMOUNT
Personnel	
Raymond Newman 4 weeks per summer (12 total) 93% Salary, 7% Fringe	\$ 33,972
Research Fellow (50% time; 3 yrs) to supervise lab and field operations; 74% salary, 26% fringe	\$ 100,885
Graduate Research Assistant (50% time; 3 yrs) supervise and conducts field research; 54% salary, 46% fringe	\$ 114,681
Undergraduate research assistants (3 yrs) to help with lab and field work. 3 full time during summer; 1 at 25% during academic year. 93% salary, 7% fringe	\$ 65,833
Equipment/Tools/Supplies:	
Pontoon boat, motor, and trailer	\$ 25,000
Field equipment Oxygen/temp meter and GPS depth finder	\$ 4,000
Expendable supplies boat gas, oil and expendables, rope, ziplock bags, paper bags, netting, fencing, waterproof paper, chemicals, filters	\$ 7,500
Repairs and maintenance (winterization, trailer and tire repair, boat maint)	\$ 1,500
Travel:	
Vehicle rental for each summer (Truck to haul boat, sampling gear and personnel) to field sites and fuel mileage	\$ 20,568
Transportation, lodging and per diem for out of metro consultation on fish removal strategies	\$ 2,111
Additional Budget Items: photocopies and duplication	\$ 150
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST =	\$ 376,200

V. OTHER FUNDS

SOURCE OF FUNDS	AMOUNT	Status
Other Non-State \$ Being Applied to Project During Project Period:	\$ -	
Other State \$ Being Applied to Project During Project Period:	\$ -	
In-kind Services During Project Period:	\$ -	
Remaining \$ from Current ENRTF Appropriation (if applicable):	\$ -	
Funding History:	\$ -	

Project Manager Qualifications:

Dr. Raymond M. Newman is a Distinguished Teaching Professor of Fisheries in the Department of Fisheries, Wildlife, and Conservation Biology in the College of Food, Agriculture and Natural Resource Science at the University of Minnesota. He has been investigating impacts and control of invasive species for over 20 years and led a 10-year, LCMR-funded project to investigate biological control of Eurasian watermilfoil. That work has been reported in more than 20 peer reviewed publications and 6 MS and PhD theses and indicated that biological control with the milfoil weevil can work but overabundant sunfish are limited herbivore populations in many lakes. Newman is currently on sabbatical as a Fulbright Scholar at Rhodes University in South Africa, investigating the suitability of introducing the milfoil weevil there to control Eurasian watermilfoil. Prior to his sabbatical, Newman served as Director of Graduate Studies for the Water Resources Science graduate program and Project Director for the NSF funded IGERT: Risk Analysis for introduced Species and Genotypes.

Newman will oversee the project and participate in field and laboratory work as well as meetings with the DNR and stakeholders. He will supervise a graduate student that will base their thesis on a component of the work. A masters-level Research Fellow will spend 50% time overseeing lab work and meeting logistics and coordinating the field work along with the graduate student. Three undergraduate assistant will help with field and lab work during the summer (full time for 14 weeks) and 1 undergraduate will provide assistance during the academic year (average of 10 hrs per week).

Organization Description:

The University of Minnesota Department of Fisheries, Wildlife, and Conservation Biology focuses on conducting sound science to advance our understanding and to solve pressing environmental problems. Its members participate in a number of graduate programs including Ecology, Evolution and Behavior, Conservation Biology, Water Resources Science and Natural Resource Science and Management. The department has educated many Minnesota resource agency personnel and the university is the primary natural resource graduate educator in the state.

Wet and dry laboratory facilities are available to conduct the research and most required facilities and equipment are available for use. Funds are requested to replace an aging 1992 pontoon boat, trailer and 2 cycle motor that has provided 20 hard field seasons of work.

