Environment and Natural Resources Trust Fund
2018 Request for Proposals (RFP)

Project Title: **ENRTF ID: 197-F**

Hearing the Cry of the Loon

Category: F. Methods to Protect or Restore Land, Water, and Habitat

Total Project Budget: $ 580,000

Proposed Project Time Period for the Funding Requested: 3 years, July 2018 to June 2021

Summary:

Loons might be displaced by too much noise in their mating and nesting season. Monitoring their nesting grounds will allow us to fix this.

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Sponsoring Organization: U of MN

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Location

Region: Statewide

County Name: Statewide

City / Township:

Alternate Text for Visual:

Signal and storage map of audio/visual data

_____ Funding Priorities	_____ Multiple Benefits	_____ Outcomes	_____ Knowledge Base
_____ Extent of Impact	_____ Innovation	_____ Scientific/Tech Basis	_____ Urgency
_____ Capacity Readiness	_____ Leverage	_____ TOTAL	_____%

PROJECT TITLE: *Hearing the Cry of the Loon: Determining Habitat Impacts of Anthropogenic Noise on Common Loons in Minnesota*

I. PROJECT STATEMENT

As the state bird of Minnesota, the Common Loon is a valued part of the state's landscape. Given the prevalence of jet skis and other boats on the lakes of Minnesota, it is of interest whether their noise affects the Common Loon's mating, rearing of chicks, and life cycle in general.

The goal of this project is to monitor the vocalizations and presence of Loons on various lakes in Minnesota with and without noise from boat traffic, and to see where the birds are most likely to nest. The information thus gained can then inform management of resources such that the fewest birds are disturbed. A secondary goal is to provide Minnesotans with greater information about their beloved state bird by way of using data products (i.e. video and audio data) to allow more people a closer look at this wonderful bird.

The project will achieve these goals by implementing a broad monitoring program of sound levels and Loon populations on lakes with and without early season powered boating. A range of lakes across a spectrum of water qualities in a variety of areas will be chosen to host acoustic and video monitoring equipment, and data from this monitoring will be used to assess how Loons react to boating-related noise, due to a comparison between control lakes with no powered boating and experimental lakes, with defined in-lake motor noise.

II. PROJECT ACTIVITIES AND OUTCOMES

Activity 1: *Monitoring System Production* **Budget: $295,000**

In this activity, video and audio monitoring systems will be evaluated, integrated, calibrated, and deployed.

Outcome	Completion Date
1. Evaluate video and audio system components, perform systems integration	*03/01/2018*
2. Survey field sites	*03/01/2018*
3. Deploy monitoring systems	*04/01/2018*

Activity 2: *System Maintenance and Analysis* **Budget: $285,000**

In this activity, the recording systems will be maintained, and the collected acoustic data analyzed.

Outcome	Completion Date
1. Begin streaming data capture	*04/01/2018*
2. Begin analysis of field season 1	*11/01/2018*
3. Issue preliminary findings and recommendations for 2019	*12/01/2018*
4. Continue analysis and issue findings and recommendations for full study	*12/01/2020*

III. PROJECT STRATEGY

A. Project Team/Partners

Dr. Peter Marchetto, an assistant professor in the Bioproducts and Biosystems Engineering department of the University of Minnesota, will be supervising the research project, as he has prior experience in bioacoustic recorder design and construction, as well as recording and analysis. Dr. Joe Magner of the same department will be helping with the selections of study locations. Mr. Topher White of Rainforest Connection, a not-for-profit entity working on recording devices for in-field monitoring of wildlife and the environment, will be involved in the refining of recorders and the design of detection algorithms. Hanna Lin, a graduate student in BBE at UMN

will be involved in the design, deployment, and analysis phases of the project. Robyn Bailey of the Cornell Lab of Ornithology will also be involved in integrating the live video feeds into the CLO NestWatch program and website for further viewing.

B. Project Impact and Long-Term Strategy

The long-term outcome of this project will be to inform the Minnesota DNR of areas where loons are being displaced by noise, and to connect the citizens of Minnesota with their state's natural resources through a showcasing of the state bird.

C. Timeline Requirements

The timeline for the work in this proposal is a three year period.

2018 Detailed Project Budget

Project Title: Hearing the Cry of the Loon: Determining Habitat Impacts of Anthropogenic Noise on Common Loons in Minnesota

IV. TOTAL ENRTF REQUEST BUDGET *3* **years**

BUDGET ITEM	AMOUNT
Personnel:	$ -
Peter Marchetto, Assistant Professor, 3 months summer salary, PI; project coordination, equipment evaluation and calibration, and bioacoustic analysis; 75% salary/25% fringe	$ 26,000
Joe Magner, Professor, 10% term (self-supporting) faculty, co-PI; location coordination, wildlife censusing, and resource location for project; 75% salary/25% fringe benefits	$ 40,000
Postdoctoral Researcher, 36 months @ 100%; bioacoustic analysis, behavioral analysis, and fieldwork; 82% salary/18% fringe	$ 190,000
Two graduate students, 3 years @50%; fieldwork , design work, and analysis; 58% salary/42% fringe	$ 280,000
Professional/Technical/Service Contracts:	$ -
Equipment/Tools/Supplies:	$ -
Acoustic recording equipment	$ 12,000
Video and audio streaming equipment and telecom costs	$ 10,000
Analysis computers, NAS storage drives, and ancillary equipment	$ 10,000
MSI supercomputer cluster time	$ 5,000
Repair and maintenance for recorders and field equipment	$ 2,000
Acquisition (Fee Title or Permanent Easements):	$ -
Travel:	$ -
Travel to field sites and program reviews	$ 5,000
Additional Budget Items:	
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND $ REQUEST =	$ 580,000

V. OTHER FUNDS *(This entire section must be filled out. Do not delete rows. Indicate "N/A" if row is not applicable.)*

SOURCE OF FUNDS	AMOUNT	Status
Other Non-State $ To Be Applied To Project During Project Period:	N/A	*Indicate: Secured or Pending*
Other State $ To Be Applied To Project During Project Period:	N/A	*Indicate: Secured or Pending*
In-kind Services To Be Applied To Project During Project Period: *Unrecovered Indirect Costs*	$ 220,000	*Secured*
Past and Current ENRTF Appropriation:	N/A	Indicate: Unspent? Legally Obligated?
Other Funding History:*funds and dollar amount.*	N/A	

Interference
Calls and Song
Streaming Video Nest Camera
Microphone/Streaming System
WiFi/LTE Hotspot
Server

Project Manager Qualifications & Organization Description

Project Manager:

Peter Marchetto is an assistant professor in the Bioproducts and Biosystems Engineering department of the University of Minnesota. His background is primarily in the creation and testing of sensors, sensing systems, and instrumentation. In particular, he did his MS and PhD work on bioacoustic instrumentation designed to endure harsh environments while recording animal and environmental noises for months at a time. His background also includes analysis of these recordings for relevant information on presence/absence surveys, or population density estimates.

Organization Description:

The University of Minnesota mission statement reads as follows:
“The University of Minnesota, founded in the belief that all people are enriched by understanding, is dedicated to the advancement of learning and the search for truth; to the sharing of this knowledge through education for a diverse community; and to the application of this knowledge to benefit the people of the state, the nation, and the world.”