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

**Project Title:** **ENRTF ID: 198-F**

Saving Our Mosquito-Eaters: Management of White-nose Syndrome

**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:**

White-nose syndrome is drastically affecting bats throughout Minnesota, and the best means of censusing them is by using acoustics. Well use this to evaluate ways to help them.

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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 path from bat to recorder to remote server

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

**PROJECT TITLE:** *Saving Our Mosquito-Eaters: Management of White-nose Syndrome in MN Bats*

## I. PROJECT STATEMENT

Minnesota bat populations, like many across North America, are declining due to the spread of white-nose syndrome (WNS). This fungal infection prematurely wakes animals from hibernation resulting in death due to hypothermia and starvation. As populations decline it is critical to determine 1) species composition and population sizes of the remaining bat colonies 2) the trend of their mortality rate from this disease and 3) best practices that will offer the greatest survival outcomes for species affected by WNS.Here we will use acoustic censusing techniques to study bat populations throughout the state. Acoustic monitoring allows us to effectively monitor bat colonies without increasing the risk of exposure to the white nose fungus that sometimes occurs when researchers enter roosting colonies.

The first goal of this project is to census bat populations throughout Minnesota. This will be done by placing ultrasonic recording equipment throughout the known habitat during the spring, summer, and fall when the animals are active. Data from the sensors will be processed using established survey techniques to produce local and regional population estimates. The second goal, determining which colonies are declining and how fast, will be addressed by modelling population trends across the three years of the data collection period. Finally, after accessing the population status of the bat species in MN, we will collaborate with all stakeholders including, the public, NGOs and government agencies, to establish best practices aimed at reducing population declines caused by WNS outbreaks.

The project will be using bioacoustic approaches for monitoring the population for its first two goals, while the third will require research and development into methods of providing supportive therapies to bats *in situ*, or coming up with other methods of helping them through the disease.

## II. PROJECT ACTIVITIES AND OUTCOMES

**Objective 1:** *Select and deploy recording devices* **Budget: $200,000**

In this research, ultrasonic recorders will be evaluated, built, tested, and deployed to listen for bats.

| Outcome | Completion Date |
|---|---|
| *1. Determine build or buy for recorders* | *01/30/2018* |
| *2. Test recorders* | *05/30/2018* |
| *3. Deploy recorders* | *06/30/2018* |
| *4. Retrieve data from recorders* | *12/01/2020* |

**Activity 2:** *Analyze recording data to census bats* **Budget: $200,000**

Determine the rough number of bats in an area by analyzing acoustic data, and determine population changes across multiple seasons and years.

| Outcome | Completion Date |
|---|---|
| *1. Determine population of bats before first winter* | *09/30/2018* |
| *2. Determine population of bats after first winter* | *05/30/2019* |
| *3. Determine populations of bats in subsequent seasons* | *12/01/2020* |

**Activity 3:** *Try mitigation and support techniques* **Budget: $180,000**

In this activity, various mitigation and support techniques to help bats through the winter will be tried. DNA analysis will also be used to determine the strain of *P. destructans*, the fungal pathogen behind WNS.

| Outcome | Completion Date |
|---|---|

| | |
|---|---|
| *1. Identification of strain of P. destructans* | *07/30/2018* |
| *2. Regulated heating of bat hibernacula* | *05/30/2020* |
| *3. Egress blocking of hibernacula* | *05/30/2020* |
| *4. In situ food support* | *05/30/2020* |
| *5. Fungicide application* | *05/30/2020* |

**III. PROJECT STRATEGY**

**A. Project Team/Partners**

Dr. Peter Marchetto is an assistant professor in the department of Bioproducts and Biosystems Engineering at the University of Minnesota, and will be heading up this research effort. Dr. Jonathan Schilling, an associate professor in the same department and expert in fungi will be helping with the pathogen angle. Dr. Kaitlin Palmer is a researcher whose post-doctoral appointment would be funded by this project, and who is an expert in ultrasonic bioacoustics and bioacoustic censusing.

**B. Project Impact and Long-Term Strategy**

The long term strategy and impact of this project are tied to population monitoring methods for bats in Minnesota, and to disseminate whatever we might determine to be useful mitigation or supportive management methods to combat white-nose syndrome.

**C. Timeline Requirements**

This project is expected to last three years.

# 2018 Detailed Project Budget

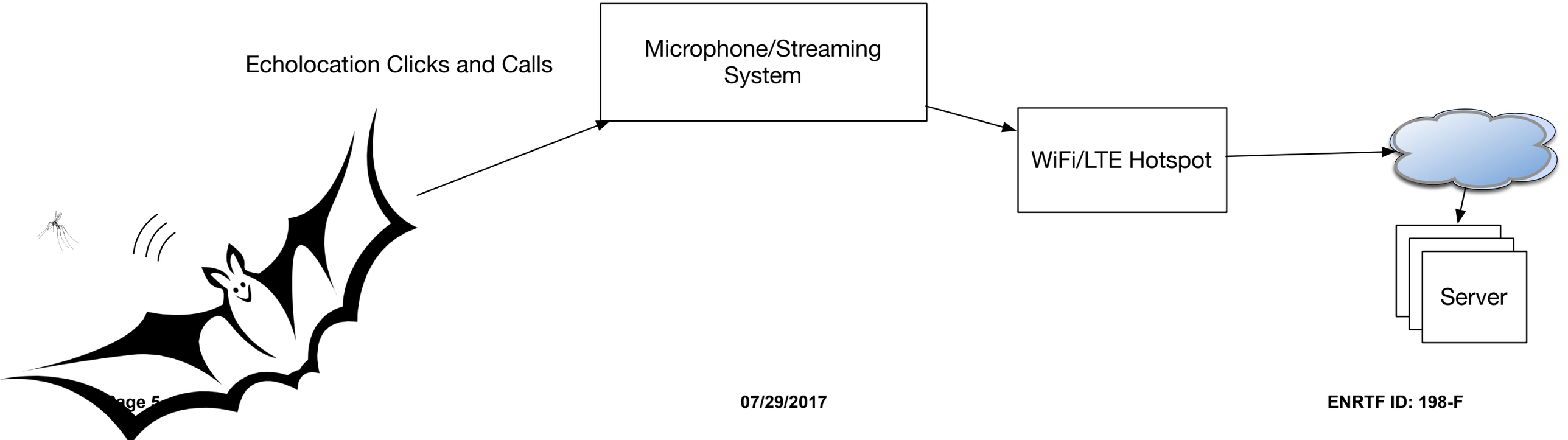
**Project Title: Saving Out Mosquito-Eaters: Management of White-nose Syndrome in Minnesota Bats**

**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 benefits | $ 26,000 |
| Jonathan Schilling, Associate Professor, 3 months summer salary, PI; project coordination, DNA identification work, field site selection; 75% salary/25% fringe benefits | $ 32,000 |
| Postdoctoral Researcher; bioacoustic analysis, behavioral analysis, and fieldwork; 36 months @ 100%; | $ 190,000 |
| Two graduate students, fieldwork , design work, and analysis, 3 years @50% | $ 288,000 |
| **Professional/Technical/Service Contracts:** | $ - |
| **Equipment/Tools/Supplies:** | $ - |
| Lab equipment and supplies for DNA testing | $ 12,000 |
| Bat recording equipment and ancillary parts | $ 10,000 |
| Analysis computers, storage hardware, 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 | $ 295,000 | *Secured* |
| **Past and Current ENRTF Appropriation:** | N/A | Indicate: Unspent? Legally Obligated? |
| **Other Funding History:** | N/A | |


Echolocation Clicks and Calls
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.”