

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

Project Title:

ENRTF ID: 030-A

Data Acquisition to Develop Native Mussel Habitat Suitability

Category: A. Foundational Natural Resource Data and Information

Total Project Budget: \$ 309,778

Proposed Project Time Period for the Funding Requested: 2 years, July 2018 to June 2020

Summary:

The acquisition of high-resolution sonar data provides important information essential for mapping mussel habitat while having ecological applications useful to resource managers and policy makers protecting Minnesota threatened/endangered native mussels.

Name: Nancy Duncan

Sponsoring Organization: National Park Service

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Location

Region: Metro

County Name: Anoka, Chisago, Dakota, Hennepin, Ramsey, Washington

City / Township:

Alternate Text for Visual:

Visual of sonar and native mussels.

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



- **PROJECT TITLE: Data Acquisition to Develop Native Mussel Habitat Suitability**

I. PROJECT STATEMENT

The Mississippi National River and Recreation Area and the St. Croix National Scenic Riverway have established high value habitat corridors for threatened and endangered native mussels, including the Winged Mapleleaf (*Quadrula fragosa*) and Higgins’ Eye Pearlymussel (*Lampsilis higginsii*). Understanding these ecologically scarce mussel habitats are vitally important to the survival of native mussels in Minnesota. The National Park System partnered with the US Geological Survey request assistance for high-resolution sonar data acquisition to map and characterize these critical habitat areas.

Native mussels are vulnerable to habitat disturbances and in need of our protection

- Significance of native mussels: excellent biological indicators of a river’s health, increase habitat complexity, filter food and oxygen from the water, and are food for fish, birds, and mammals
- Most imperiled group of animals in North America
- Threats to survival include aquatic invasive species, rising water temperatures, floodplain development, erosion, sedimentation, and increased nutrient loading
- 28 of Minnesota’s 50 mussel species are listed as either extirpated, endangered, threatened, or of special concern

Recent advances in sonar technologies would benefit native mussel survival by providing resources to state agencies

- Characterize habitat suitability
- Identify areas for reintroduction of native mussels
- Identify areas to collect females for propagation work
- Present the outcomes of this work to educate public audiences
- Provide tools needed to develop mussel habitat maps for protection and management
- May provide breakthrough information for Minnesota’s researchers, park managers, and academia to help explain important spatial ecological relationships regarding how and why certain habitat corridors supply protected habitat

II. PROJECT ACTIVITIES AND OUTCOMES

Activity 1: Sonar Data Acquisition and mapping of native mussel habitat in the lower St. Croix National Scenic Riverway **Budget: \$147,888**

- Sonar data acquisition with mussel bed diving validation
- Data Products include: high-resolution bathymetry, river image mosaics, mussel habitat maps
- Presentations on the applications high-resolution sonar data can provide for natural resource management

Outcome	Completion Date
1. High-resolution bathymetry and imagery	Dec 31, 2018
2. Mussel Habitat Maps	March 30, 2019
3. Presentations (Conferences/Workshops)	June 30, 2019

Activity 2: Sonar Data Acquisition and mapping of native mussel habitat in the Mississippi National River and Recreation Area **Budget: \$161,889**

- Sonar data acquisition with mussel bed diving validation
- Data Products include: high-resolution bathymetry, river image mosaics, mussel habitat maps



**Environment and Natural Resources Trust Fund (ENRTF)
2018 Main Proposal**

- Presentations on the applications high-resolution sonar data can provide for natural resource management

Outcome	Completion Date
1. High-resolution bathymetry and imagery	Dec 31, 2019
2. Mussel Habitat Maps	March 30, 2020
3. Presentations (Conferences/Workshops)	June 30, 2020

III. PROJECT STRATEGY

A. Project Team/Partners

The Mississippi National River and Recreation Area: primary awardee; Contributing in-kind assistance

1. Nancy Duncan, Natural Resource Specialist
Provide insight, management perspectives, project assistance, and data product review
Allocation of funds to project partner
2. Allison Holdhusen, Aquatic Biologist
Diving/sampling (validation) of mussel beds

The St. Croix National Scenic Riverway: Contributing in-kind assistance

*The St. Croix have the most diverse mussel assemblages with >40 species and contains Spike (*Elliptio dilatata*), a species of special concern that has declined in most of the state

1. Byron Karns, Aquatic Biologist
Diving /sampling (validation) of mussel beds

US Geological Survey: sub-awardee

*Providing high-grade swath sonar system to capture data

1. Jenny Hanson, Biologist
Sonar acquisition, Mapping, and Presentations
2. Jayme Stone, Cartographic Technician
Sonar acquisition, Mapping, and Presentations

B. Project Impact and Long-Term Strategy

Project datasets can be used to support a number of native mussel applications from local to regional including:

- Results relatable to impact other Minnesota aquatic waterways
- Help understand distribution of mussels in Minnesota
- Guide mussel conservation efforts in Minnesota
- Ecosystem evaluations for mussel threats such as invasive species
- Provide baseline resources to measure success or failure of mussel conservation efforts

C. Timeline Requirements

The complete development for the suite of products including bathymetry, images, mussel habitat maps, and metadata will be delivered over a two-year project timeline.

2018 Detailed Project Budget

Project Title: Understanding the Benthos: Development of NPS Riverine Tools for Assessing Threatened and

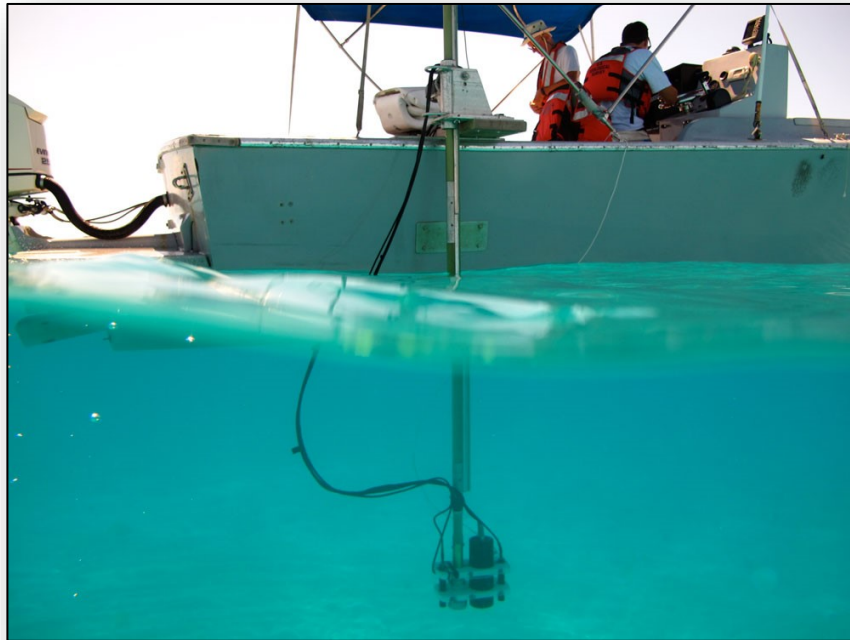
IV. TOTAL ENRTF REQUEST BUDGET 2 years

<u>BUDGET ITEM</u>	<u>AMOUNT</u>
Personnel:	\$ -
Professional/Technical/Service Contracts:	\$ -
US Geological Survey Sonar Data Acquisiton (Includes salary \$244,732, travel \$37,163, and supplies/equipment \$27,883)	\$ 309,778
Equipment/Tools/Supplies:	\$ -
Travel:	\$ -
Additional Budget Items:	\$ -
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST =	\$ 309,778

V. OTHER FUNDS

<u>SOURCE OF FUNDS</u>	<u>AMOUNT</u>	<u>Status</u>
Other Non-State \$ To Be Applied To Project During Project Period:	n/a	<i>Indicate:</i>
Other State \$ To Be Applied To Project During Project Period:	n/a	<i>Indicate:</i>
In-kind Services To Be Applied To Project During Project Period: Nancy Duncan, Project Manager salary	\$ 9,403	<i>Secured</i>
National Park Service In-kind Support: Salaries for diving/validation efforts	\$ 21,412	<i>Secured</i>
US Geological Survey In-kind Support: agency equipment including, Norbit Multibeam Echo Sounder, Hummingbird Helix 10 si/di, survey boat	\$ 143,992	<i>Secured</i>
US Geological Survey In-kind Support: Indirect Cost	\$ 83,066	<i>Secured</i>
Past and Current ENRTF Appropriation:	n/a	
Other Funding History:	n/a	

Step 1: Rapid sonar data acquisition



Step 2: Interpret sonar data to characterize native mussel habitat useful for resource management, research, and policy makers



Higgins' Eye Pearlymussel
Lampsilis higginsii



Winged Mapleleaf Mussel
Quadrula fragosa

Project Manager Qualifications

Project Manager: Nancy Duncan, Natural Resource Program Manager, Mississippi National River and Recreation Area

Affiliation: National Park Service

Mailing Address: 111 E. Kellogg Blvd; Suite 105, St. Paul, MN 55101

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Email: nancy_duncan@nps.gov

Nancy Duncan has been Natural Resource Program Manager with the National Park Service, Mississippi National River and Recreation Area (MISS) for over 20 years. She coordinates corridor research within the MISS, reviews projects, writes and administers grants, sits on numerous Technical Advisory Committees, hires and supervises summer seasonal biological technicians, approves research permits, facilitates natural resource project coordination between the 26 communities within the corridor, and does occasional planning work. Current efforts include developing an overarching natural resource management plan for the entire 72-mile stretch of the MISS and well as the lower 4 miles of the Minnesota River that fall within the MISS boundary.

Work Experience:

1992 – present Natural Resource Program Manager, National Park Service, MISS

1987 – 1992 Cartographic Technician (GIS), National Park Service, Denver Service Center

Education:

1985 – 1992 PhD Candidate, Forest Ecology/Soils Minor, University of MN

1984 – M.S. Degree – Forest Resources, University of MN

1980 B.S. Horticulture/Landscape Architecture, University of Missouri – Columbia

Project Manager Responsibilities:

As the Project Manager, Nancy will provide overall project direction, budget management, supervision of field efforts for the NPS, and provide expert review prior to dissemination of all data products. As the Natural Resource Program Manager, Nancy has demonstrated her ability to manage budgets, direct staff, coordinate with partners, and efficiently and effectively deliver project outcomes.

Organization Description:

The Mission of the National Park Service, which celebrated its 100th Anniversary in 2016, is “to preserve unimpaired the natural and cultural resources and values of the National Park System for the enjoyment, education, and inspiration of this and future generations.” The Mississippi National River and Recreation Area was established in 1988 to preserve the history and natural resources of the Mississippi River as it runs through the Minneapolis/St. Paul area, particularly the river itself and the migratory flyway. The National Park Service also has a strong mission to promote the use of the National Parks as natural laboratories to better understand the natural world.