Project Title: **ENRTF ID:**   **056-AH**

Conserving Black Terns and Forsters Terns in Minnesota

Category: H. Proposals seeking $200,000 or less in funding

Sub-Category: A. Foundational Natural Resource Data and Information

Total Project Budget: $ 198,640

Proposed Project Time Period for the Funding Requested: June 30, 2023 (3 yrs)

Summary:

Black Tern and Forster's Tern populations have declined. Comprehensive assessment of distribution and breeding status will identify population limiting factors for best management practices and prioritizing conservation and restoration efforts.

Name: Annie   Bracey

Sponsoring Organization: U of MN - Duluth NRRI

Job Title:

Department:

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Location:

Region: Statewide

County Name: Statewide

City / Township: N/A

Alternate Text for Visual:

Photo of Black Tern and Forster's Tern and maps. Text - We will conduct a comprehensive assessment of the current and historical status and distribution of Black Tern and Forster's Tern. Determining site quality and habitat characteristics of breeding colonies will allow us to create best management practices and prioritize conservation and restoration efforts.

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

Environment and Natural Resources Trust Fund (ENRTF)
2020 Main Proposal Template

PROJECT TITLE: Conserving Black Terns and Forster's Terns in Minnesota
I. PROJECT STATEMENT

We will conduct a comprehensive assessment of the current and historical distribution and abundance of the Black Tern and Forster's Tern in Minnesota. We will identify population limiting factors associated with habitat suitability, allowing us to create best management practices and prioritize conservation and restoration efforts in the state.

Black and Forster's terns are waterbirds that breed in freshwater wetlands with extensive emergent vegetation and open water, preferably located within large wetland complexes. These species have similar habitat preferences and can often be found nesting in the same wetlands. Populations of both species have declined significantly throughout their range in North America over the last 50 years. In Minnesota, Black Terns have experienced a large and statistically significant decline since 1966, decreasing an average of 5.8% per year for a loss of nearly 96% of the state population over 53 years. It has been suggested that the distribution and abundance of Forster's Terns has remained relatively unchanged in the state since the 1980s, although numbers remain low, likely <1,000 nesting pairs. For these reasons, both species are designated as Species in Greatest Conservation Need by the Minnesota DNR and Target Conservation Species by Audubon Minnesota.

The main cause of population declines in Minnesota is hypothesized to be loss of suitable nesting habitat and habitat degradation due to invasive plants such as *Phragmites*, purple loosestrife, and hybrid cattail. However, based on habitat preferences, suitable nesting habitat appears to exist in the state that is not currently being used by these species. Therefore, it is important to characterize changes associated with development, hydrology, and invasive species that have occurred in wetlands that have historically been used for breeding. Given the low site fidelity of Black Terns and the apparent lack of colonization of new sites by Forster's Terns, quantifying landscape changes associated with abandoned colonies in addition to identifying important characteristics of breeding colonies that have persisted over time will allow us to prioritize and develop recommendations for habitat restoration.

II. PROJECT ACTIVITIES AND OUTCOMES

Activity 1 Title: Data integration of historical and current breeding sites and wetland monitoring prioritization.
Description: To develop a comprehensive assessment of potential priority wetland complexes we will reach out to project partners to obtain historical and current breeding records for Black and Forster's terns. We will contact wildlife partners from MNDNR, MNBBA, MOU, and Audubon Minnesota to obtain all relevant data. We will use the global surface water dataset (https://global-surface-water.appspot.com/) to characterize wetlands used for breeding and assess changes in landscape characteristics such as development, changes in hydrology, and introduction of invasive species that have occurred over time. We will use these data to model wetland characteristics of successful colonies and identify priority wetlands for monitoring.

ENRTF BUDGET: $ 36,740

Outcome	Completion Date
1. Obtain and merge data sources and integrate into the breeding colony geospatial database.	*Oct. 2020*
2. Characterize wetlands used for breeding over time and analyze impacts of landscape changes on breeding colony persistence.	*April 2021*
3. Identify priority wetlands to use as focal study sites.	*May 2021*

Activity 2 Title: Determine site quality and habitat characteristics of priority wetlands

1

Description: We will locate and inventory potential nesting areas to monitor the status of breeding colonies in priority wetlands. Monitoring will be conducted using a combination of in-person visits and drones. This activity will allow us to assess the feasibility of using drones as part of a long-term monitoring program for tern colonies across the state. We will measure hydrological changes, water quality, and food availability to assess site-specific conditions. We will also quantify habitat characteristics of breeding colony locations in the wetlands along with features of individual nest locations. Specifically, we will characterize features associated with presence of both species relative to breeding status including interspersion of hemi-marsh, water level control mechanisms, presence of invasive species, and land use around the wetlands. These data will allow us to determine characteristics of productive colonies, identify features that impact colony success, develop best practices for public land managers, and provide metrics for restoration and conservation initiatives.

ENRTF BUDGET: $ 133,500

Outcome	Completion Date
1. Conduct tern monitoring surveys at priority wetlands for two breeding seasons using a combination of field visits and drones to estimate site abundance and nest density.	*August 2022*
2. Collect data to characterize site quality (water quality, hydrology, and food availability) and habitat features (% open water / vegetation, size of complex, density of invasives) of priority wetlands, breeding locations within wetlands, and individual nest site locations.	*August 2022*
3. Determine characteristics of productive colonies and identify limiting factors for breeding colonies across the landscape.	*Dec 2022*

Activity 3 Title: Identify priority wetland sites for restoration and develop long-term monitoring protocol for breeding tern colonies.

Description: To increase the availability of suitable breeding habitat for Black and Forster's terns in the state we will use the landscape model developed in Activity 1 to identify wetland sites that are most likely to sustain breeding tern colonies. We will use the information from Activity 2 to develop site specific restoration plans for these wetlands to ensure the restored sites meet the site quality and habitat characteristics needed for successful breeding colonies. We will use the monitoring data collected in Activity 2 to develop best practices for long-term monitoring of breeding tern colonies.

ENRTF BUDGET: $28,400

Outcome	Completion Date
1. Identify priority sites for restoration and develop site specific restoration plans.	*June 2023*
2. Determine viability of using drones for monitoring breeding colonies and develop protocol for long-term monitoring of breeding tern colonies.	*June 2023*

III. PROJECT PARTNERS AND COLLABORATORS: The project team includes Annie Bracey (PI) from the Natural Resources Research Institute (NRRI), Dr. Alexis Grinde (NRRI), and Dr. Francesca Cuthbert (UMN-TC). The project team will work closely with Minnesota Audubon, Minnesota Land Trust, and Minnesota DNR to develop monitoring protocols and restoration plans.

IV. LONG-TERM IMPLEMENTATION AND FUNDING: This project builds on several current and previous LCCMR funded projects including the "Minnesota Breeding Bird Atlas" (NRRI/Audubon Minnesota), "Implementing Conservation Plans for Avian Species of Concern" (Audubon Minnesota), and "Creating a Statewide Wetland Bird Survey" (Audubon Minnesota). Our breeding colony monitoring protocol and restoration guide will be distributed to land mangers throughout the state. Additional funding will be needed to continue long-term monitoring of breeding terns; we will seek additional funds from available state and federal resources to ensure the long-term conservation of these imperiled species.

2

Attachment A: Project Budget Spreadsheet
Environment and Natural Resources Trust Fund
M.L. 2020 Budget Spreadsheet
Legal Citation:
Project Manager: Annie Bracey
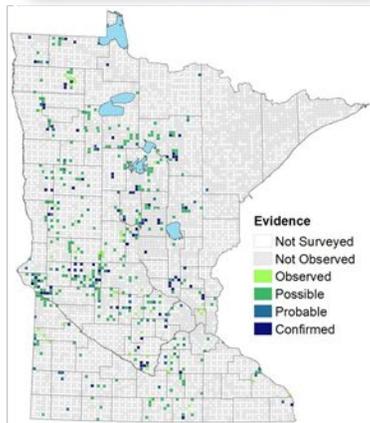**Project Title:** Conserving Black Terns and Forster's Terns in Minnesota
Organization: Natural Resources Research Institute, University of Minnesota Duluth
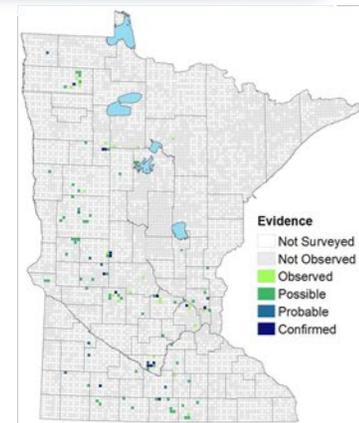**Project Budget:** $ 198,640
Project Length and Completion Date: 3 years; June 30, 2023
Today's Date: April 7, 2019

ENVIRONMENT AND NATURAL RESOURCES TRUST FUND BUDGET	Budget	Amount Spent	Balance
BUDGET ITEM			
Personnel (Wages and Benefits)	$ 168,840	$ -	$ 168,840
A. Bracey, Avian ecologist at Natural Resources Research Institute: $47,671 (74% salary, 26% fringe), 18% FTE for 3 years. *Note that NRRI research staff salaries are largely sponsored by external funds.			$ -
A. Grinde, Research Program Manager at Natural Resources Research Institute; Co-PI: $3,664 (74% salary, 26% fringe), 1% FTE for 3 years.			$ -
F. Cuthbert, Professor, University of Minnesota; Co-PI: $6,190 (74% salary, 26% fringe), 1% FTE for 3 years.			$ -
Graduate Research Assistant: $79,938 (86% salary, 14% fringe) and tuition reimbursement in AY; 50% FTE AY and 50% FTE SUM for 2 years.		$ -	$ -
Research assistant: $10,329 (92% salary, 8% fringe), 10% FTE for 3 years.		$ -	$ -
Research scientists: $21,068 (77% salary, 23% fringe), 10% FTE for 3 years.		$ -	$ -
Equipment/Tools/Supplies			$ -
Wildlife monitoring and hydrology equipment (Acitivity 2): drone platform and camera @ $8400.00, remote camera system for monitoring colony status (20 @ $300.00 each = $6,000), misc field supplies (batteries, wader, etc. $1000.00), pressure transducers for continuous water table monitoring of wetland sites (12 @ $330.00 each)	$ 19,360	$ -	$ 19,360
			$ -
Travel expenses in Minnesota			$ -
Travel to the research sites multiple times each year to collect data related for Activity 2. We estimate over 8000 miles traveled each year due to long distances between sites. Travel expenses includes lodging and meal allowance for graduate students, research associates, and field technicians.	$ 10,440	$ -	$ 10,440
Other			$ -
	$ -	$ -	$ -
COLUMN TOTAL	$ 198,640	$ -	$ 198,640

SOURCE AND USE OF OTHER FUNDS CONTRIBUTED TO THE PROJECT	Status (secured or pending)	Budget	Spent	Balance
Non-State:		$ -	$ -	$ -
State:		$ -	$ -	$ -
In kind: Unrecovered F&A @ 54% MTDC	Secured	$ 89,996	$ -	$ 89,996

Other ENRTF APPROPRIATIONS AWARDED IN THE LAST SIX YEARS	Amount legally obligated but not yet spent	Budget	Spent	Balance

We will conduct a comprehensive assessment of the current and historical status and distribution of Black Tern and Forster's Tern. Determining site quality and habitat characteristics of breeding colonies will allow us to create best management practices and prioritize conservation and restoration efforts.

2020 LCCMR Project Manager Qualifications and Organization Description

Annie Bracey, PhD Candidate, Natural Resources Research Institute, University of Minnesota Duluth

Key Qualifications

Annie Bracey has worked as an Avian Ecologist at the Natural Resources Research Institute, University of Minnesota Duluth for over 10 years, working primarily on projects related to marsh birds in Great Lakes coastal wetlands. Annie obtained her Master's degree at the University of Minnesota Duluth and is currently a PhD candidate in the Conservation Sciences program at the University of Minnesota Twin Cities. Her research is focused on conservation and management issues related to Common Terns in the Great Lakes region including; 1) documenting exposure to contaminants, 2) tracking terns using light-level geolocators and GPS tags to document migration routes, wintering areas, and foraging habitats, and 3) using Integrated Population Models to make inferences about population dynamics. Her broad interest is determining how human activities influence bird populations and how research that integrates ecology, biology, and conservation sciences can be used to better inform management decisions. Her recent publication on Common Tern migration was feature in Science Daily.

The Natural Resources Research Institute is a part of the University of Minnesota Duluth. NRRI's mission is to promote private sector employment based on natural resources in an environmentally sensitive manner.