

**Environment and Natural Resources Trust Fund
2020 Request for Proposals (RFP)**

Project Title:

ENRTF ID: 161-D

Enhancing Habitat and Diversity in Cattail-Dominated Shorelines

Category: D. Aquatic and Terrestrial Invasive Species

Sub-Category:

Total Project Budget: \$ 582,994

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

Summary:

Determine if hybrid cattail removal at the landowner scale benefits nearshore ecological function by experimentally removing cattails from sites in 36 lakes and measuring environmental, vegetation, and fish responses.

Name: Amy Schrank

Sponsoring Organization: U of MN

Job Title: Dr.

Department: Department of Fish, Wildlife and Conservation Biology

Address: 135 Skok Hall, 2003 Upper Buford Circle
St. Paul MN 55108

Telephone Number: (906) 231-0120

Email: aschrank@umn.edu

Web Address: _____

Location:

Region: Statewide

County Name: Statewide

City / Township:

Alternate Text for Visual:

Encroaching, dense, hybrid cattail along lake shorelines can reduce oxygen, displace native plants, and reduce habitat quality for fishes. Small-scale cattail removal may foster native vegetation recovery and benefit fishes.

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



PROJECT TITLE: Enhancing habitat and diversity in cattail-dominated shorelines

I. PROJECT STATEMENT

- Goal: We will determine whether and where cattail reduction at the individual landowner scale can be an ecologically and socially beneficial component of nearshore lake management. To accomplish this, we will experimentally remove sections of cattail in 36 lakes across Minnesota’s three major ecoregions and measure environmental, vegetation, and fish responses.
➤ Objectives:
1. Identify landowners willing to participate in experimental cattail removal following specific technical guidance, treatment implementation, and subsequent environmental monitoring.
2. Measure environmental variables and plant and fish communities in paired experimental locations (one plot with dense cattail removed paired with a no-removal control plot) in each study lake.
3. Use results to inform Department of Natural Resources Aquatic Plant Management (DNR APM) permitting policies that strive to balance aquatic plant conservation with landowner recreational needs.

Hybrid/narrowleaf cattail (hereafter cattail) has steadily encroached on shorelines of Minnesota lakes, altering environmental conditions and displacing native plant communities. Nearshore aquatic plants are an important source of biodiversity and are critical to sportfishes such as bass, pike, walleye, and sunfish. But the value of dense cattail stands as fish habitat is poorly understood. Fishes using nearshore, vegetated habitat usually prefer a combination of emergent, floating-leaved, and submerged plants for spawning, rearing, refuge, and feeding habitat. However, as cattail invades, the environment becomes more homogeneous and dominated by tall, dense, difficult-to-penetrate cattail and its litter (dead cattail). Furthermore, lakeshore property owners frequently raise concerns that cattails limit recreation and access. Yet despite the negative impacts of dense cattail in many habitats, in some Minnesota lakes (e.g. shallow southern lakes where other species struggle to survive), cattails play crucial roles by providing vegetated habitat and preventing erosion. Thus, the extent to which cattails are detrimental or beneficial to nearshore habitats is likely to vary across the state.

II. PROJECT ACTIVITIES AND OUTCOMES

Activity 1 Title: Site choice, landowner enrollment, and cattail removal.

Description: We will collaborate with DNR APM staff to select suitable lakes with encroached cattail populations. Experimental sites will be located near areas of public land or adjacent to private property of landowners willing to participate in our project. DNR will be the liaison between landowners and the project. Cattails will be removed by mechanical harvesting below the water in channels 30 ft (9 m) wide from shore to open water. Non-removal control sites will have the same dimensions.

ENRTF BUDGET: \$ 194,373

Table with 2 columns: Outcome, Completion Date. Row 1: Select 12 lakes in each of 3 ecoregions (36 lakes) for cattail removal experiments. August 2020. Row 2: Collaborate with landowners for removal timeline. August 2020. Row 3: Remove cattails at selected sites in all lakes. November 2020.

Activity 2 Title: Assess hybrid cattail removal effects on the nearshore environment, native plants, and fishes.

Description: All variables will be measured at paired control and cattail removal sites in 36 lakes across 3 ecoregions. Environmental variables will include depth, temperature, dissolved oxygen, and water chemistry. Landowners (where applicable) will be enlisted to help measure some lake variables. Quadrats will be used to measure physical habitat structure, vegetation structure, and plant species composition and diversity. Fish abundance and diversity will be measured using minnow traps (10 traps per 30 m²) deployed for 10 days.



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

ENRTF BUDGET: \$ 372,869

Outcome	Completion Date
1. Provide landowners with equipment and detailed instructions for water depth, water temperature, and plant regrowth monitoring.	<i>March 2021</i>
2. Complete 2-year, post-treatment monitoring of environmental variables, plants, and fishes at control and removal sites in all study lakes.	<i>September 2023</i>

Activity 3 Title: Write completion report and recommendations for APM permitting policies.

Description: Complete data analysis, write completion report, and collaboratively work with DNR to evaluate and recommend changes to APM permitting policies as appropriate. Current DNR APM permitting typically allows landowners to open and maintain a 15-foot channel through emergent vegetation, including cattail. Our study sites double the size of current allowances to 30 feet to explicitly explore the ecological and social tradeoffs of allowing landowners to remove more cattails. Where results warrant the increase, we would recommend more flexible permitting policies.

ENRTF BUDGET: \$ 15,752

Outcome	Completion Date
1. Analyze all data and compare environmental, plant, and fish community variables between cattail and control sites across lakes within ecoregion.	<i>June 2023</i>
2. Provide written completion report and recommendations to DNR APM program.	<i>June 2023</i>

III. PROJECT PARTNERS AND COLLABORATORS:

A. Partners receiving ENRTF funding

Name	Title	Affiliation	Role
Amy Schrank	Project Manager	University of Minnesota	Project PI
Daniel Larkin	Project Co-Manager	University of Minnesota	Project co-PI
TBD	Master’s Student –fish focus	University of Minnesota	Research Assistant
TBD	Master’s Student – vegetation focus	University of Minnesota	Research Assistant

B. Partners not receiving ENRTF funding

Name	Title	Affiliation	Role
Jon Hansen	Fisheries Program Consultant: Please see the DNR letter of support for the project	DNR	Landowner, lake, and site selection
Donna Dustin	Fisheries Research Biologist	DNR	Aquatic plant mapping, fish sampling

IV. LONG-TERM IMPLEMENTATION AND FUNDING:

- Our direct, long-term goal is to identify ways to maintain or enhance shoreline ecological function while empowering landowners. We will deliver recommendations to DNR’s permitting process and provide landowner-relevant, actionable science to support nearshore fish habitat and ecological function in Minnesota’s lakes.
- This research-management project addresses invasive taxa (narrowleaf/hybrid cattail) that are included in MAISRC’s priority list. We have discussed this project with MAISRC Director Dr. Nick Phelps and would implement this as a MAISRC partnership project. We did not apply to the December 2018 MAISRC RFP for two reasons: (1) the proposed research was not identified in the MAISRC research priorities list, and (2) the work involves a substantial management component—DNR-regulated aquatic plant management on public and private lands—in addition to research. This management component is beyond the scope of the MAISRC RFP’s research focus.

Attachment A: Project Budget Spreadsheet
 Environment and Natural Resources Trust Fund
 M.L. 2020 Budget Spreadsheet



Legal Citation:
 Project Manager: Amy Schrank
 Project Title: Enhancing habitat and diversity in cattail-dominated shorelines
 Organization: University of Minnesota
 Project Budget: \$582,994
 Project Length and Completion Date: 3 years, June 2023
 Today's Date: March 14, 2019

ENVIRONMENT AND NATURAL RESOURCES TRUST FUND BUDGET	Budget	Amount Spent	Balance
BUDGET ITEM			
Personnel (Wages and Benefits)	\$ 321,472	\$ -	\$ 321,472
A. Schrank, Project Manager (fishes): \$56,238, (74% salary, 26% benefits) 0.15 FTE for 3 years (2 months per year for 3 years)			
D. Larkin, Project Co-manager (plants): \$17,517, (74% salary, 26% benefits) 0.04 FTE for years 1,2 (2 weeks per year for 2 years)			
Two graduate research assistants: \$236,517 (52% salary, 48% benefits during academic year, 85% salary and 15% benefits during summer), .50 FTE for 2.5 years			
Two undergraduate research technicians (10 weeks during summer, \$14 per hour): \$11,200 (100% salary, 0% benefits summer), 0.19 FTE for years 2, 3			
Professional/Technical/Service Contracts	\$ 185,000	\$ -	\$ 185,000
<i>Lab analytical services: nutrients and water chemistry analysis: \$5000</i>			
<i>Cattail removal: Contractors throughout the state will be selected based on University of Minnesota contracting procedures for competitive bidding: 36 lakes x \$5000 per job = \$180,000</i>			
Equipment/Tools/Supplies	\$ 44,332	\$ -	\$ 44,332
<i>Fish sampling: minnow traps: 720 @ \$12.50 = \$9,000, 600 ft rope: 32 @ \$41 = \$1312</i>			
<i>Environmental data sampling equipment: temperature loggers: 144 @ \$130 = \$18,720, Dissolved oxygen loggers: 4 at \$1250 = \$5000, YSI Professional plus meter plus sensors \$3300</i>			
<i>Miscellaneous field equipment: Rite in the Rain paper, buckets, sharpies, label tape, thermometers, batteries, data logger installation equipment \$7000</i>			
Capital Expenditures Over \$5,000	\$ -	\$ -	\$ -
Fee Title Acquisition	\$ -	\$ -	\$ -
Easement Acquisition	\$ -	\$ -	\$ -
Professional Services for Acquisition	\$ -	\$ -	\$ -
Printing	\$ 2,000	\$ -	\$ 2,000
<i>Publication in journals: \$1500, Summary reports: \$500</i>			
Travel expenses in Minnesota	\$ 30,190	\$ -	\$ 30,190
<i>Vehicle rental: (\$912 per month for 2.5 months + 0.23 per mile for 2500 miles)*2 years = \$5710, Lodging for 4 people: (\$94 per night for 60 nights) x 2 = \$11,280, Per diem for 4 people: \$55 per day 60 days over two years = \$13,200</i>			
Other	\$ -	\$ -	\$ -
COLUMN TOTAL	\$ 582,994	\$ -	\$ 582,994

SOURCE AND USE OF OTHER FUNDS CONTRIBUTED TO THE PROJECT	Status (secured or pending)	Budget	Spent	Balance
Non-State:		\$ -	\$ -	\$ -
State:		\$ -	\$ -	\$ -
In kind: Minnesota DNR Fisheries Program Consultant Jon Hansen would contribute 60 hours over two years (\$5,040)	secured	\$ 5,040	\$ -	\$ 5,040
In kind: Minnesota DNR Fisheries Research Scientist Donna Dustin would contribute 150 hours over two years (\$15,000)	secured	\$ 15,000	\$ -	\$ 15,000
Other ENRTF APPROPRIATIONS AWARDED IN THE LAST SIX YEARS	Amount legally obligated but not yet spent	Budget	Spent	Balance
		\$ -	\$ -	\$ -

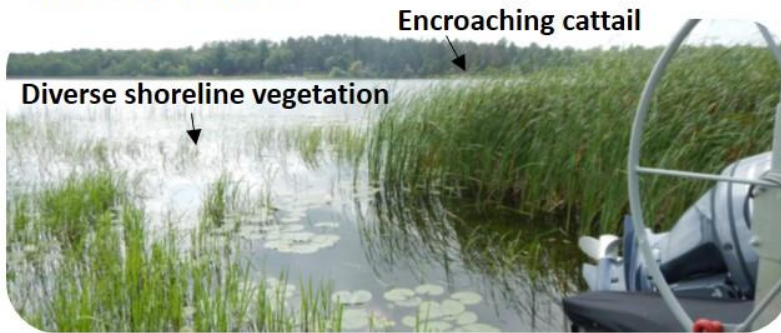
Enhancing habitat and diversity in cattail-dominated shorelines



Diverse native plants along Minnesota lake shorelines provide biodiversity and fish habitat.



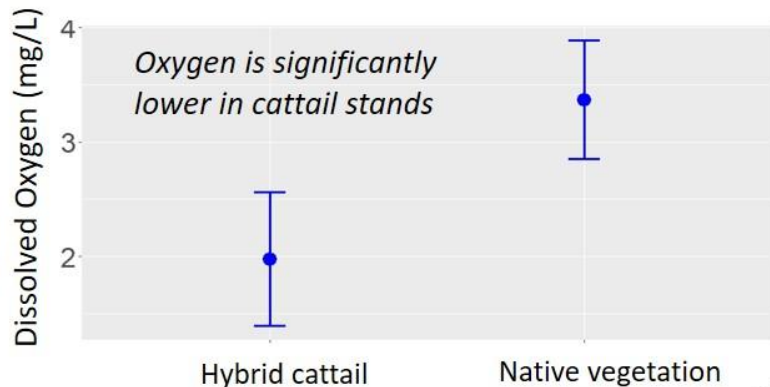
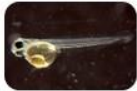
Problem: Lake shorelines can become dominated by hybrid cattails creating dense monocultures likely to have reduced habitat value.



Cattail grows more densely, taller, and produces more litter compared to native plants.



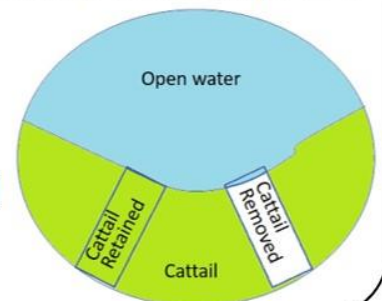
Dense cattail and litter close to shorelines can displace native plants, and reduce habitat availability and quality for fishes.



Question/Solution: Can cattail removal on the landowner scale improve shoreline ecological function?



We will compare environmental variables, plants, and fishes in paired cattail removal and control (cattail retained) sites in 36 lakes across 3 ecoregions of MN.





**Environment and Natural Resources Trust Fund (ENRTF)
2020 Project manager qualifications**

PROJECT TITLE: Enhancing habitat and diversity in cattail-dominated shorelines

Project Manager Qualifications

Dr. Amy J. Schrank is an Adjunct Assistant Professor and Teaching Specialist in the Department of Fisheries, Wildlife, and Conservation Biology at the University of Minnesota. Schrank's expertise is in fish and aquatic ecology, aquatic ecosystem management, and conservation. She has conducted field research in aquatic ecosystems over the last 23 years in both streams and lakes and with life stages of fishes ranging from larvae to adults. Since 2017, Schrank has worked in cattail dominated ecosystems in the Great Lakes as a co-PI on an EPA, Great Lakes Restoration Initiative grant to understand the effects of hybrid cattail on Great Lakes coastal wetland fish communities. This research is resulting in manuscripts for journal publication, presentations, and public outreach about the effects of cattails on fishes and potential management solutions.

Professional Preparation

- **University of Wyoming:** Ph.D. Zoology and Physiology, Statistics minor, Research: Movement patterns of cutthroat trout in streams, 2002
- **University of Michigan:** M.S. Resource Ecology and Management: Aquatic Ecosystems, Research: Fish maneuverability, 1997
- **University of Michigan:** B.S. Biology and Spanish, 1995

Relevant recent grant funding:

- 2017-2019 **EPA: Environmental Education Local Grants Program (\$122,788)**
Title: Creating Great Lakes Stewards to Promote Clean Water & Healthy Urban Watersheds in Detroit
PI: J. Chadde, Evaluator: **A. Schrank**
- 2017-2019 **EPA: Great Lakes Restoration Initiative (\$649,695)**
Title: Increasing biodiversity and habitat complexity in invaded wetlands
PIs: N. Tuchman & S. Lishawa, Co-PIs: D. Albert, E. Clark, N. Reo, **A. Schrank**, B. Lawrence
- 2015 - 2016 **PI: Research Excellence Fund – Research Seed Grant (REF-RS), Michigan Tech (\$23,000)**
Title: Biophysical factors affecting stream fish movement and community biodiversity.
PI: **A. Schrank**

ORGANIZATION DESCRIPTION:

The Department of Fisheries, Wildlife, and Conservation Biology at the University of Minnesota Twin Cities provides world-class training and expertise to contribute to the management, conservation, and sustainable use of fisheries and wildlife resources. Our goal is to use innovative teaching, research, and outreach to respond to societal needs for information and education pertaining to natural resources.