

**Environment and Natural Resources Trust Fund
2017 Request for Proposals (RFP)**

Project Title:

ENRTF ID: 126-D

Commercial Fisheries Management Project

Category: D. Aquatic and Terrestrial Invasive Species

Total Project Budget: \$ 115,720

Proposed Project Time Period for the Funding Requested: 3 years, July 2017 - June 2020

Summary:

In Minnesota, no harvest quotas exist for commercial fish. Working with the DNR, this 3 year project will determine harvest levels, establish conservation practices, and assist in Asian Carp removal.

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Sponsoring Organization: Aquatic Research & Conservation Society, Inc.

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Location

Region: Metro, Southeast

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

City / Township: Multiple

Alternate Text for Visual:

ARCS will monitor commercially managed fish to establish harvest levels, conservation methods, and assist with the prevention of Asian Carp establishment.

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



PROJECT TITLE: Commercial Fisheries Management Project

I. PROJECT STATEMENT

Currently, there are no harvest quotas for commercially managed fisheries in Minnesota. This 3 year project will provide size and age composition for these species in the Mississippi and St. Croix rivers. This data will determine sustainable levels of harvest to avoid overfishing and to develop conservation management quotas and practices while assisting with the prevention of Asian Carp establishment. We will be working directly with the Minnesota Department of Natural Resources (MN DNR) by providing capture data and laboratory analyses and assist with the development of harvest quotas and management plans. According to the DNR, the number or size of commercially managed fish has not yet been regulated with the exception of catfish from the Mississippi River boundary waters (MN DNR Commercial Fishing Regulations 2011). This project will monitor commercially managed fish in an effort to characterize size distribution, abundance, movement, and habitat use to determine age-class structure, recruitment, reproductive potential, growth rates, sex ratio, and mortality to better understand their populations. These measures are necessary to sustainably manage the fishery. Commercially managed fish sustain an economically valuable fishery and are ecologically valuable native species in Minnesota.

The native species targeted in this project have contributed the most to the commercial fishery in the Mississippi River: Smallmouth Buffalo, Bigmouth Buffalo, River Carpsucker, Highfin, and Quillback (MN DNR Commercial Harvest Report 2014). When species of interest are captured, length and weight measurements will be taken and a fin clip will be removed for ageing analysis. A sub-sample will be euthanized to determine sex and reproductive status, eggs will be taken from females to determine reproductive potential, and otoliths and fin rays will be taken for ageing. Buffalo will be tagged using external tags and will be released alive. Buffalo are native to the United States occupying a distinct ecological niche that may ultimately be filled by Asian Carp species should Buffalo populations become overfished. In many areas, Asian Carp have become the predominant species with few other species able to co-exist. Bighead and Silver Carp have adverse effects on all life stages of native fish because they feed on plankton, the primary food source of several adult fish (Irons et al. 2007), all larval fish (Schrank et. al. 2003), and all mussels (Kolar et al. 2007) creating cascading effects throughout the food web. This project will provide recommendations for future monitoring and conservation methods including an extensive model to determine sustainable levels of harvest by species.

This research will be reported directly to the MN DNR to produce a robust age and size composition model. Results will include: 1) a scientific peer-reviewed publication on the age and size composition of commercially managed fish species including analysis of movement patterns; 2) an extensive model to determine levels of sustainable commercial harvest; and 3) will provide data to be contrasted in the future to determine if changes have occurred to native populations from increasing Asian Carp abundance. The results will be made available in scientific and educational publications, newspaper and magazine articles, at outreach events, to local and federal management agencies, and presentations at scientific conferences.

II. PROJECT ACTIVITIES AND OUTCOMES

Activity 1: Ageing, Reproduction, and Length-Weight Analysis

Budget: \$62,620

Activities include capturing, measuring, weighing, and ageing species collected from the Mississippi and St. Croix Rivers. A sub sample of all species will be collected to determine sex, sampling eggs from females to determine reproductive potential. Length-weight relationships will be established from capture data analysis. This information will be used to determine the size distribution, age-class structure, reproductive potential, and sex ratio parameters for harvest management models.



Outcome	Completion Date
1. Commercial fish collected and samples taken.	November 30, 2019
2. Fin rays and otoliths analyzed and number of eggs per female determined.	January 1, 2020
3. Develop management models with MN DNR input.	January 1, 2020
4. Final results reported to MN DNR, including management model outcomes.	June 30, 2020

Activity 2: Determination of Population Estimates from Tagged Buffalo

Budget: \$53,100

Over 3 years, a total of 3,000 Buffalo will be externally tagged from the Mississippi and St. Croix Rivers and movement patterns will be analyzed using re-capture data to determine estimates of population abundance and connectivity. This information will determine growth, mortality, recruitment, abundance, habitat use, and movement parameters for harvest management models.

Outcome	Completion Date
1. Buffalo are tagged and re-capture data will be collected.	November 30, 2019
2. Movement patterns will be analyzed to determine population connectivity.	January 1, 2020
3. Develop population estimates and incorporate into management models with MN DNR input.	June 30, 2020

III. PROJECT STRATEGY

A. Project Team/Partners

An Aquatic Research & Conservation Society, Inc. (ARCS) project manager will be dedicated to this study. With the project manager, ARCS staff will conduct field and laboratory research and data analysis. The MN DNR will collaborate in logistical development to establish management quotas and conservation methods. The MN DNR will not be receiving fiscal support for this project.

B. Project Impact and Long-Term Strategy

This project will work directly with the MN DNR to determine sustainable levels of commercial harvest to be used to produce commercial harvest quotas to avoid overfishing and to establish conservation methods. This project will provide size and age data and monitoring for commercially managed fish to supplement the state’s knowledge of the number, extent, patterns, and biology of these species. The project will also support the state’s monitoring efforts for Asian Carp. Results will be provided to the MN DNR in a final report, including a robust age and size composition model. The results will be used into the future as a template for management planning to develop new quotas as populations and harvest levels change.

C. Timeline Requirements

3 years, July 2017 through June 2020.

Field sampling and laboratory analysis will occur during field seasons (April through November, weather dependent) and will continue through the entire project period. This project will include 3 field seasons of sample collection and 12 months of data and laboratory analysis to be conducted during winter months.

2017 Detailed Project Budget

Project Title: *Commercial Fisheries Management Project*

IV. TOTAL ENRTF REQUEST BUDGET 3 years

<u>BUDGET ITEM</u>	<u>AMOUNT</u>
Personnel:	\$ 90,000
Project Manager (100% salary) for 3 years	\$ 90,000
Equipment/Tools/Supplies:	\$ 15,780
Technical Equipment: Multiparameter water quality meter (1 for \$1,800), Handheld GPS (1 for \$240)	\$ 2,040
Ageing Equipment: Isomet saw blades (2 for \$472), Microscope (1 for \$2,608), Immersion oil (1 for \$20), Epoxy (2 quarts for \$93)	\$ 3,193
Field and Laboratory Equipment: Gill Nets: 4" mesh/50' long/8' deep gillnet (2 for \$270), 4" mesh/100' long/8' deep gillnet (2 for \$270), 4" mesh/200 yd/6" deep gillnet (2 for \$1,300), Claw Anchors (4 for \$130), Mushroom Anchors (10 for \$180), Floats (10 for \$350), Measuring Boards (4 for \$200), Scales (5 for \$240), Net Tubs (3 for \$96), Alcohol (20 gal. for \$644.84), Formalin (20 gal. for \$240), Benzadine (6 qts. for \$90), Buffer and KCL Solution (9 pints for \$465.63), Glass and Scintillation Vials (644 for \$310), Field gear (rain pants 4 for \$280, rain jackets 4 for \$240, aqua shoes 4 for \$100, gloves 10 for \$40, waders 4 for \$320), Coolers (2 large for \$400, 2 small for \$70), Boat hook (2 for \$50), Needle Nose Pliers (2 for \$50), Filet Knives (4 standard for \$48, 4 serrated for \$60), Tweezer (2 large stainless steel for \$60), Scientific Rulers (10 for \$6), Zip Lock Bags (3 bulk various size boxes for \$90), Secchi Disc (2 for \$60), Field Boxes (2 tool boxes for \$60, 2 dry boxes for \$24), Zip Ties (6 bulk various size kits for \$96), Aerator (2 for \$34), Waterproof Paper and Pencils (2 boxes of each for \$220), Hemostats (2 for \$14), Nitrile Gloves (2 boxes for \$50), Scalpel Blades (1 box for \$40), Funnel (4 for \$20), Dissection Tray (2 for \$90), Petri Dishes (4 for \$6.40), Laboratory Scissors (4 for \$68), Scalpel (2 for \$34)	\$ 7,417
Tagging Equipment: External Floy anchor tags (3,000 for \$3,000), Tagging guns and needles (2 guns (comes with needles) for \$130)	\$ 3,130
Travel:	\$ 9,940
Vehicle travel to ramps for 3 years (13,300 miles at \$0.54/mile = \$7,182), Field sampling boat travel between ramp and sampling sites (5,108 miles at \$0.54/mile = \$2,758.32). Total Cost For Mileage \$7,182 and \$2,758.32 is \$9,940.32	\$9,940
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST =	\$ 115,720

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

<u>SOURCE OF FUNDS</u>	<u>AMOUNT</u>	<u>Status</u>
Other Non-State \$ To Be Applied To Project During Project Period: Mahaffey Company: \$5,000 secured 2017, G. Unger Vetlesen Foundation: \$10,000 pending 2017-2018.	\$ 15,000	<i>Secured (\$5,000) and Pending (\$10,000)</i>
Other State \$ To Be Applied To Project During Project Period: N/A	0	N/A
In-kind Services To Be Applied To Project During Project Period: N/A	0	N/A
Funding History: N/A	0	N/A
Remaining \$ From Current ENRTF Appropriation: N/A	0	N/A

Commercially managed fish are ecologically and economically valuable and little is known about their life history and populations.



Commercial fish occupy the same habitats as Asian Carp. Asian Carp have negative effects on native populations by:



Out-numbering

Over-crowding

Out-competing

ARCS will determine sustainable levels of harvest, conservation methods, and assist with the prevention of Asian Carp establishment.

Project Manager Qualifications for Amy A. Waters

Aquatic Research & Conservation Society, Inc. (ARCS), Little Canada, MN (2012 to current)

Vice President, Biological Scientist. As Vice President, responsibilities include submitting documentation for IRS approval as a 501(c)(3) non-profit organization, including drafting Articles of Incorporation and Bylaws. Uphold, safeguard and promote the organization's values and philosophy relating to ethics, integrity and environmental responsibility. Contribute to formulation of policy and strategies as a board member by planning and managing the organizations direction, mission, goals and projects. Manage field sampling, website development, fundraising, outreach activities, grant writing, marketing and accountings as per regulatory and legal requirements. Collaborate with local fisheries professionals to develop project plans for future research. Evaluate and make executive decisions of proposed projects methods and implementation. Monitor, record, analyze and report on trends and recommendations relating to project development.

Commercial Fisheries Management Project-Responsibilities include leading fisheries crews to catch, measure, weigh and sample commercial fish species using a variety of gears. Fish will be measured and weighed, and a fin clip will be taken for ageing analysis. Buffalo will be tagged to determine movement patterns and to validate ageing analysis. Identification of all fish to species and enter data all into a database. GPS coordinates, habitat, water quality and environmental data will be recorded at each site. Conduct laboratory research for ageing analysis. Conduct YSI calibration and troubleshooting when necessary. Analyses will provide measures of relative abundance, movement patterns, reproductive status and age structure. Results will be reported in a final publication to the public and the MN DNR.

MN Department of Natural Resources, St. Paul, MN (2013-current) *Volunteer.* Volunteer as a biologist participating in fisheries sampling in the St. Croix and Mississippi Rivers using a variety of gears, while conducting fish identification and species specific culling. Assist in the lab preparing and aging otoliths and fin rays.

Florida Fish & Wildlife Conservation Commission (FWC), Pt. Charlotte, FL. (2004-2011)

Biological Scientist. I was responsible for planning, managing and conducting water quality and fisheries sampling trips in Charlotte Harbor and surrounding areas as a captain and an active crew member. Responsibilities include identifying fish, conducting assessments of aquatic ecosystems using standardized methods and analyzing findings to support habitat research methods. Data was entered into GIS, Arcview, and Excel, as well as conducting database queries using Access. Supervised and trained new employees and volunteers. Organized and maintained staff schedules, managed outreach events and manufactured outreach exhibits. Collaboration with senior officials regarding project management. Managed the Length-Weight and Mercury Projects for Charlotte Harbor and surrounding areas. Organized and managed the Smalltooth Sawfish Project (established in 2004) and was actively involved in collaborative efforts, implementation, goals, and strategies of the Smalltooth Sawfish Recovery Plan which included developing policies, procedures and protection methods. Maintained all records for the project, and prepared and presented monthly status, budgets and financial reports. Managed day to day operations, field sampling, purchasing, and organized travel plans and itineraries. Analyzed data and presented results through reports, scientific publications, and articles as an author, as well as writing grants to secure funding.

Organization Description

The Aquatic Research & Conservation Society, Inc. (ARCS) is a 501(c)(3) not-for-profit organization dedicated to furthering the research and understanding of the world's aquatic resources through science and education-based initiatives. The organization conducts scientific fisheries research through field sampling involving collaborative efforts with other agencies. We participate in the conservation of native fishes through research and outreach and collaborate with educational entities to prepare students for careers in wildlife biology, conservation, and management through field, laboratory, and data analysis experiences. We are actively organizing outreach activities that expand knowledge of fisheries science and management. We ensure the continuation of the corporation through ongoing recruitment of volunteers, citizen scientists, and any individuals who have an interest in furthering the mission of the corporation.