**PROJECT TITLE:** Applying New Tools and Techniques against Invasive Carp

**I. PROJECT STATEMENT**

Early detection and response efforts are important for protecting MN resources from the negative environmental and economic impacts of invasive carp. When abundant, invasive carp can harm native fish populations and make water recreation dangerous due to leaping fish. With the capture in Minnesota of three bighead carp in 2018 and one silver carp so far in 2019, it is apparent that invasive carp are at our doorstep but that control efforts are showing success. The Minnesota Department of Natural Resources (DNR) began its grant-funded invasive carp program in 2012, and expanded the program using 2013 and 2017 LCCMR grants. DNR is seeking additional funding to continue our invasive carp work, and implement promising new techniques.

DNR regularly communicates with researchers and similar programs in other states to improve our effectiveness. Several new advancements show promise to increase our effectiveness to disrupt invasive carp before they become established in Minnesota. This proposal builds on the previous successes from LCCMR-funded work, expanding effective techniques while adding others. Improving fish tracking capability, investment in specialized nets, incorporating new technologies, and implementing new capture methods outlined in the proposal will increase our ability to disrupt invasive carp before they become established. We have chosen to focus our efforts on the St. Croix, Minnesota, and Mississippi Rivers near the Twin Cities to detect invasive carp and remove early invaders. These are locations where our other effective detection and removal tool, commercial angling, is not as common as further south on the Mississippi. Our program targets the leading edge of the invasion, and protects waters further upstream.

The public knows relatively little about invasive carp in MN, creating an opportunity to increase credible sightings by “citizen scientists” through enhanced outreach included in this grant. Credible sightings can increase our understanding of when and where invasive carp can be effectively be targeted for removal.
**II. PROJECT ACTIVITIES AND OUTCOMES**
**Activity 1 Title:** Integrate new techniques and outreach into detection and removal of invasive carp

**Description:** New techniques are proposed to be added to our current netting and electrofishing to detect and remove invasive carp. We plan to target Mississippi tributary streams that are similar to locations frequented by invasive carp in other states. The United States Geologic Survey (USGS), in partnership with Illinois and Missouri, has tested an intensive method utilized in China to capture invasive carp. The technique, known as the “unified method”, uses a large amount of net tended by several fishing crews to surround and then herd fish into a smaller area where they can be captured. This method has only been tested at locations in Illinois and Missouri where a large number of invasive carp were present. DNR fisheries staff, in collaboration with USGS Researchers, would use this method in conjunction with tagged invasive carp to learn about the ability to capture fish in locations with low densities found in Minnesota. By disrupting pre-spawn activities in this way, the DNR may be able to reduce the potential for invasive carp to spawn successfully.

A second promising area of research we propose to implement is food attractants. USGS and the University of Minnesota (U of MN) have found attractants can concentrate invasive carp, but have only tested them in high-density locations. We plan to test the effectiveness of attractants in low-density waters of Minnesota in conjunction with our detection and removal netting to see if they can be effective here.

The public has limited knowledge of invasive carp. Using printed and online material, we will encourage public participation in detection of these species. DNR social media accounts on Twitter and Facebook will post invasive carp-related information to better inform the public of the threats of invasive carp, and aid in identification and reporting. DNR will also share successful control and detection techniques with other states.

**ENRTF BUDGET: $471,000**

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| **Outcome** | **Completion Date** |
| 1. Add one unified method exercise to disrupt pre-spawn invasive carp activities. Detect and remove carp via 25 netting days and 25 days of electrofishing per year. | June 30, 2023 |
| 2. Work with USGS to build and deploy a mechanism to deliver food attractant over a 3-week period, twice yearly, in conjunction with targeted netting efforts. | June 30, 2023 |
| 3. Work with creative services to print and distribute 1,000 flyers/brochures, update the DNR’s web page, and post 10 or more social media messages to increase public awareness. Incorporate public sightings into our dataset. Present control methods at a national meeting attended by control programs from other states. | June 30, 2023 |
| **Activity 2 Title:** Invasive carp tracking**Description:** The DNR, in partnership with the US Fish and Wildlife Service (USFWS) and other upper Mississippi River states, built a receiver network in the Mississippi River to track tagged fish including invasive carp. Minnesota law was changed in 2017 to allow DNR to tag and track invasive carp; DNR tagged and began tracking a captured bighead carp in July 2017. Tracking has provided DNR staff with previously unknown information about preferred habitats and seasonal movements in Minnesota waters. Netting in a location frequented by this fish led to the capture and removal of two additional bighead carp in the spring of 2018. These captures would not have occurred without the ability to track a tagged carp. Funding will be used to tag additional carp, track them, target removal in habitats being used by tagged carp, and analyze tagging data to identify seasons and locations where invasive carp congregate, allowing planning for future removal efforts.**ENRTF BUDGET: $22,000** |  |
| **Outcome** | **Completion Date** |
| 1. Year round tracking and annual analysis of data over 3 years to monitor for overwintering locations, potential spawning habitat/behavior and environmental cues. | June 30, 2023 |
| 2. Use tagged carp as “traitor” (aka “Judas fish”) fish to identify opportunistic locations and attempt 4 full-scale netting efforts in such locations.  | June 30, 2023 |
| 3. Maintain 50-70 tracking receivers and annually contract for professional data analysis | June 30, 2023 |
| **Activity 3 Title:** Contracted commercial fishing and incorporating deep water sampling**Description:** Funding to contract with commercial anglers is vital to MN DNR detection and removal efforts because of their ability to deploy large-scale and specialized gears, as evidenced by past success of commercial anglers in capturing >70% of invasive carp found to date in Minnesota. Without new funding, there is currently no alternative funding to contract for commercial fishing in the waters targeted by our program. Tracking data indicates that invasive carp spend a large portion of time in the deeper waters of Lake St. Croix. To improve capture probability in deep areas, the DNR purchased a large seine that is more commonly used in deep reservoir and marine habitats. The 2,000-foot purse seine requires specialized boats and equipment to deploy and retrieve. The MN DNR does not own this equipment but contracts with a commercial angler who has this capability. **ENRTF BUDGET: $85,000** |  |
| **Outcome** | **Completion Date** |
| 1. Contract commercial fishermen to deploy 14 seine days and 32 gill nets days in probable invasive carp habitats to remove invasive carp | June 30, 2023 |
| 2. Employ deep water sampling gears 3 times per year to sample habitats used by carp but where standard gear is ineffective | June 30, 2023 |

**III. PROJECT PARTNERS AND COLLABORATORS:** USGS, USFWS, U of MN, and National Park Service (NPS)

**IV. LONG-TERM IMPLEMENTATION AND FUNDING:** The DNR invasive carp field program is grant supported. It has been and is funded by a variety of sources that include: Minnesota Environment and Natural Resource Trust Fund, DNR Fisheries operation funds, Minnesota Outdoor Heritage Fund, and USFWS grants. NPS and USFWS field crews have provided additional field support. DNR will continue seeking additional grants and partnerships.

Years, agency and grant: FY 13/FY 15 Lessard Sams Outdoor Heritage Council $109K, FY 16 USFWS Invasive Carp Grant $60K, FY 17 USFWS Invasive Carp Grant $142.2K, FY 18 USFWS Invasive Carp Grant $72K, FY 19 USFWS Invasive Carp Grant $85K, FY 18 USFWS/Interstate ANS Grant $20K, FY 19 USFWS/Interstate ANS Grant $20K

**V. SEE ADDITIONAL PROPOSAL COMPONENTS:** A. Project Budget Spreadsheet, E. Project Manager Qualifications and Organization Description