

M.L. 2021 Minnesota Aquatic Invasive Species Research Center Subproject Abstract

For the Period Ending December 31, 2024

SUBPROJECT TITLE: MAISRC Subproject 56: Developing streamlined detection assays for invasive fish pathogens

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FUNDING SOURCE: Environment and Natural Resources Trust Fund (ENRTF)

LEGAL CITATION: M.L. 2021, First Special Session, Chp. 6, Art. 6, Sec. 2, Subd. 06e

SUBPROJECT BUDGET AMOUNT: \$57,200

AMOUNT SPENT: \$53,590

AMOUNT REMAINING: \$3,610

Sound bite of Project Outcomes and Results

Our project improved the MN DNR fish health program's ability to detect invasive fish pathogens. Improved detection helps us stop the introduction and spread of pathogens in Minnesota Fisheries. This work saves resources for agency and private producers that rely on diagnostic tests to conduct their operations safely and legally.

Overall Subproject Outcome and Results

This project addresses an overdue need to develop and streamline surveillance tests for certifiable (i.e. legally required testing), emergency and emerging pathogens, including five pathogens on the MAISRC priority species list (PSL) for harmful microbes (viral hemorrhagic septicemia virus, largemouth bass virus, *Renibacterium salmoninarum*, *Myxobolus cerebralis*, and *Tetracapsuloides bryosalmonae*) and a previously listed pathogen (*Heterosporis sutherlandae*). Modernizing and improving disease testing that directly applies to the diagnostic testing needs of state agency and private aquaculture producers will simplify sample collection/transport logistics, lower costs of testing (material and labor), and improve the capacity and scalability of Minnesota's fish health program, resulting in direct benefits to all stakeholders in Minnesota fisheries.

We identified available diagnostic tests for the six MAISRC PSL microbes and three certifiable fish pathogens (2 bacteria: *Yersinia ruckeri* and *Aeromonas salmonicida* and 1 parasite: *Ceratomyxa shasta*) and validated a practical set of multiplexed quantitative polymerase chain reaction (qPCR) assays relevant to Minnesota's fish health program and other Great Lakes States.

- Assay 1: Three bacterial pathogens screened for in coldwater (salmonid) fish inspections.
- Assay 2: Parasitic pathogens screened for in coldwater fish inspections.
- Assay 3: Two viruses and a parasite screened for in coolwater (percids and centrarchids) fish inspections.

Assay 2 and 3 were determined to perform well and will be implemented in Minnesota state fish health inspections available to agency and private aquaculture producers. Assay 1 was not determined to be suitable as a stand-alone test for fish health inspections and will require additional development. Although additional steps

are necessary for full validation of these tools, the current project advanced the state's diagnostic capacity, allowing for their deployment in the near future.

Subproject Results Use and Dissemination

This work has been shared with the Great Lakes Fish Health Committee and further dissemination will occur in communications with other fish health professionals and in reports or publications that the assays are used in in the future, as we are able to complete validation steps of the tests. The assays will be used internally in the MN DNR's fish health program and we also anticipate offering these tests as a service to private aquaculture producers requiring fish health certificates.

Presentations

- 2024 MAISRC Research & Management Showcase: Fishing for pathogens with cheaper, faster, better diagnostic tools. September 2024.