

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

For the Period Ending June 30, 2025

SUBPROJECT TITLE: MAISRC Subproject 58: Evaluating the source and status of invasive signal crayfish in Minnesota

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SUBPROJECT BUDGET AMOUNT: \$37,262

AMOUNT SPENT: \$35,285

AMOUNT REMAINING: \$1,037

Sound bite of Project Outcomes and Results

Although no invasive signal crayfish were trapped, weak eDNA detections from Lake Winona and two nearby lakes mean their presence can't be ruled out. The low-level eDNA signals, combined with no trapped specimens, suggest either a very sparse population or unlikely sample contamination.

Overall Subproject Outcome and Results

Signal crayfish (*Pacifastacus leniusculus*), a highly invasive species in many parts of the world, were confirmed in Lake Winona, Minnesota in the fall of 2023 after being caught by a local bait harvester. In 2024, we carried out an extensive monitoring effort to learn more about their presence and check for possible spread to nearby lakes. Over several months, we used a variety of trapping methods but did not physically catch any signal crayfish. Alongside trapping, we collected 142 total water samples from Lake Winona and nine nearby lakes, testing them using environmental DNA (eDNA) assays, a method that detects genetic material that animals shed into the water. eDNA testing found very small traces of signal crayfish DNA in four samples: two from Lake Winona (the original detection site), one from Lake Henry, and one from Lake Carlos. The eDNA levels were extremely low, with only one single positive result in repeated testing for each of these samples. Trapping and eDNA results suggest a potential low-density population of signal crayfish in Lake Winona, although it is possible that eDNA was detected for other reasons. Because eDNA can detect species at very early stages of an invasion, continued monitoring will be important for understanding whether signal crayfish are becoming established or spreading in the region. Early detection is key to preventing further impacts on native species and lake ecosystems.

Subproject Results Use and Dissemination

Throughout our research, we maintained regular communication with the Minnesota Department of Natural Resources, Douglas County, and local watershed communities, sharing updates through these channels. We presented our work on signal crayfish and the use of eDNA for detection at a Minnesota Department of Natural Resources Aquatic Invasive Species Unit seminar. Our work has been shared at academic conferences, including the Midwest Fish and Wildlife Conference, and through collaborator presentations such as at the Upper

Midwest Invasive Species Conference. We plan to submit our data to the University of Minnesota's Data Repository to document our findings and impact. In all, the general findings of our research have been widely distributed from regional to local levels, with data documentation to persist into the future.

Select Presentations

- Link, D., Larson, E.R., Hansen, G.J.A. 2025. Responding to AIS Invasion, Signal Crayfish. Minnesota Department of Natural Resources Aquatic Invasive Species Seminar Series (virtual).
- Larson, E.R. Bloomer, C.C., Eaton, D. Link, D., Oller, R. and Hansen G.J.A. 2025. Molecular surveillance of a potential signal crayfish (*Pacifastacus leniusculus*) invasion in the Midwest United States. Crayfish Conservation and Management Special Session, Midwest Fish and Wildlife Conference, St. Louis, Missouri.
- Oller, R., Jaquet, I.S., Bloomer, C.C., Davis, M.A., Eaton, D., Hansen, G.J.A., Link, D. and Larson, E.R. 2025. Environmental DNA (eDNA) as a tool for early detection of signal crayfish (*Pacifastacucs leniusculus*) in midwestern USA. University of Illinois Undergraduate Research Symposium, Urbana, Illinois.

Factsheets/Informational Documents

- A fact sheet summarizing project findings is currently in review. Once finalized, it will be posted on the MAISRC website: <https://maisrc.umn.edu/research/58>