

M.L. 2013 Minnesota Aquatic Invasive Species Research Center Subproject Abstract
For the Period Ending June 30, 2019

SUBPROJECT TITLE: MAISRC Subproject 3: Attracting carp so their presence can be accurately assessed

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LEGAL CITATION: M.L. 2013, Chp. 52, Sec. 2, Subd. 06a

SUBPROJECT BUDGET AMOUNT: \$682,969

AMOUNT SPENT: \$663,719

AMOUNT REMAINING: \$19,251

Sound bite of Subproject Outcomes and Results

A sound deterrent system that is over 98% effective at stopping invasive carp was developed in the laboratory and versions of it have been installed in two rivers. To complement this deterrent system we developed food and pheromone attractants which, when coupled with DNA measurements, detect carp with extreme sensitivity.

Overall Subproject Outcome and Results

This project developed several tools that can manage and control all species of invasive carp species in Minnesota. First, we developed ways using both food and sex pheromones to attract and measure the presence and density of carp using the environmental DNA (eDNA) they release to the water. This technique is superior to traditional netting because it can be performed in any habitat or water of any depth, including at low densities that are otherwise unmeasurable. eDNA can also determine carp gender. Second, we developed a deterrent system comprised of sound, light and air curtain that is 97% effective in the laboratory and could safely and effectively prevent invasive carp from swimming upstream through navigation locks in Mississippi River. If this deterrent system were to be paired with attractant-based eDNA surveillance methods in specific lock-and-dams whose gate was also adjusted to stop carp, it is extremely likely that enough carp could be prevented from passing through these lock-and-dams that the remainder could be removed by targeted commercial fishing. Field tests of the deterrent system are now underway.

Subproject Results Use and Dissemination

The first invasive carp deterrent system in the world is now in place in southern Minnesota using the sensory cues we identified. The USGS is now exploring the pheromone and food attractants we developed in the Great Lakes, and the sound/light stimuli we developed are being used at Barkley Dam in Kentucky by the UAFWS with whom we have partnered with. Sorensen and colleagues have at 5 peer-reviewed scientific publications in high quality journals and several technical reports. A PhD and a MS thesis are being produced. A dozen talks were given as part of this project.