

# Researchers testing ability of floating wetlands to survive winter

January 17 2020, by Shawna Richter-Ryerson

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Assistant Professor Tiffany Messer (left) and graduate student Alexa Davis stand in the Messer Laboratory, surrounded by floating wetland experiments. Credit: University of Nebraska-Lincoln

The grasses are dormant, their brown leaves poking the sky as they float in one of the frigid lily ponds in Lincoln's Sunken Gardens, the 1.5-acre public garden at 27th Street and Capital Parkway.

During the summer, the garden contains 30,000 living [plants](#), bright bursts of color layered upon layer on the pocket of land where koi fish swim in their ponds. It is here that Alexa Davis, [graduate student](#) with the School of Natural Resources, first anchored her floating treatment wetland, a collection of 12 Nebraska-native wetland sedges and milkweed "planted" in the holes of a buoyant rubber mat, the roots hanging down into the [shallow water](#).

She set out to discover two things: whether the floating treatment wetland would reduce excess nutrients, such as nitrogen, from the water; and whether the plants can survive Nebraska's harsh winter.

To answer the first, Davis collected and tested water samples from the middle of the two koi ponds—one a control site—and from the base of the fountain that feeds water into the two ponds. She needed measurements of temperature, as well as the water's acidity, salinity and [oxygen levels](#), and wanted to know what levels of E. coli, nitrogen and phosphorus were present.

After placing her floating wetland in the [pond](#), she tested those same variables weekly for the next four weeks.

Early results from the [pilot study](#) suggested a reduction in nitrogen levels but also brought up a number of new questions that still need answers: Would older plants do better? How many more plants would it take to see drastic reduction in nutrients? If the researchers sample the water more often, can they gain better insight into potential nutrient removal?

And while those questions will wait for a future project and another student, Davis is still waiting to answer part two of her research as cold and snow and ice fall on Lincoln: Will the plants survive? Whether they do could have long-lasting implications and [cost savings](#) for Midwestern states wanting to reduce nutrients from entering—and potentially

contaminating—local streams and rivers.

"Whether they survive will provide us guidance on maintenance practices when we do full-scale projects," said Tiffany Messer, assistant professor of biological systems engineering and Davis's adviser on the project. "In the Southeast (United States), people just leave the floating wetlands year-round. But they don't have freezing ponds."

Survival would mean floating wetlands could be planned, installed and forgotten about until the plants or mats need replacing decades down the road. But if the plants die, costs will increase as it becomes necessary to remove the floating plants each fall, store them and then reinstall them each spring. They may be costs that cities, counties or states are not be willing to pay.

As of late December, the researchers were still hopeful: The plants were still alive.

"Looking sad, but still alive," Davis said.

With two more months of winter left, nature could still take the native species out. The geese may see dinner in the sedges' long shoots or the cold could damage the plant beyond recovery. But maybe, come spring, the sedges and milkweed will bounce back, shooting their green leaves into the sky and sucking nutrients from the ponds again.

Only time will tell.

Provided by University of Nebraska-Lincoln

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