One fish, two fish: Camera counts freshwater fish, which could help combat hydrilla

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Former UF/IFAS graduate student Kyle Wilson gets ready to lower a camera into fresh water so the video can count fish, even in the densest areas of underwater vegetation. Credit: Former UF/IFAS doctoral student Andrew Barbour.

A camera can accurately count freshwater fish, even in the thickest of underwater vegetation, a key finding for those who manage fisheries and control the invasive plant hydrilla, new University of Florida research shows.

The finding by UF/IFAS scientists can help researchers understand how many and which fish species are using dense plant habitats, said former UF/IFAS graduate student Kyle Wilson.

While cameras have been used to document fish behavior – including eating and breeding — this marks the first time scientists have used video to count fish in underwater plant habitats, Wilson said. In addition, no prior studies that used cameras to count fish verified their fish populations.

"It is commonly assumed that dense and invasive plants, like hydrilla, can drastically change fish habitat quality, primarily through changes in dissolved oxygen levels, water chemistry and habitat structure," Wilson said. "Whether these changes are good or bad for fish has previously remained uncertain due to sampling problems in dense plant habitats. Using underwater cameras, we have shown that fish can and do use habitats we previously thought were too stressful for fish habitat."

This is a big problem, especially with hydrilla, a plant that has invaded lakes throughout Florida, much of the U.S., Central America, South Africa and Australia, Wilson said. He estimated Florida spent up to $14 million per year throughout the 2000s to manage hydrilla, while the U.S. spent about $100 million per year in the 2000s for aquatic plant management.

In practical terms, researchers and conservation managers could use the UF/IFAS techniques to better understand how fish use other invasive aquatic plants as well, like Eurasian Watermilfoil, because it's similar to hydrilla, Wilson said. Such approaches can be quite valuable in advising conservation plans and can help resolve stakeholder issues associated with these invasive plants.

"This ability to use video cameras to estimate fish abundance is a

tremendous asset to fisheries management, allowing us to evaluate fish habitat use in areas where previously no sampling method was effective," Wilson said. Australian researchers studying fish ecology have used cameras to count fish in the relatively clear waters at the Great Barrier Reef, but no research has peered through a lens to detect fish in thick vegetation like this study. "Previously, researchers that used cameras have had to make several broad assumptions that cameras work well in sampling fish. Now we know they work well."

UF/IFAS researchers specifically focused their study on ponds with plenty of hydrilla, Wilson said, but have also conducted preliminary camera work on Lake Tohopekaliga in the Kissimmee Chain of Lakes Area.

To research his master's thesis, Wilson lowered a camera into the water from a boat in three experimental ponds in Gainesville. He discovered the video counted freshwater fish, such as largemouth bass and bluegill sunfish – even those hidden in the nooks and crannies of hydrilla and other vegetation. Wilson counted fish during 13 weeks in the summers of 2011 and 2012, and then drained the ponds to obtain actual fish densities.

He conducted his research under the supervision of Micheal Allen, a professor of fisheries ecology at UF's Institute of Food and Agricultural Sciences.

"We tested and verified the use of our camera techniques in extremely dense hydrilla habitats," said Wilson, now a doctoral student in ecology at the University of Calgary.

The UF/IFAS study is published in the January issue of the journal *Marine and Freshwater Research*.

Provided by University of Florida