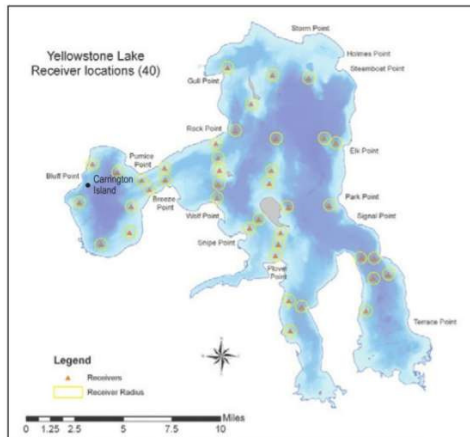


## **“Judas fish” to help kill lake trout, save cutthroat**

By Cory Hatch



Triangles mark the sites of acoustic receivers in Yellowstone Lake that will detect transmitter-equipped lake trout and lead scientists to spawning beds, like one believed to be around Carrington Island, so they can destroy eggs and young fish.



**In Yellowstone Lake, non-native lake trout like this eat native cutthroats.**

Lake trout equipped with transmitters could betray their kin this summer as conservationists and Park Service officials escalate efforts to eradicate the species from Yellowstone Lake. Biologists hope these so-called ‘Judas fish’ will lead them to spawning beds, where new techniques will be used to destroy mackinaw eggs and young.

The non-native lake trout were illegally introduced to Yellowstone Lake sometime in the mid-1980s and gained a foothold by 1994. The predatory species eats Yellowstone cutthroat trout, and spawning populations of the native fish have plummeted 99 percent.

After years of marginally successful efforts to kill lake trout using fishing boats and nets -from 2001 to about 2010, park personnel have removed about 500,000 fish from Yellowstone Lake -some began looking for new solutions, said Dave Sweet, a representative of Wyoming Trout Unlimited's East Yellowstone Chapter.

People began asking, “Isn't there a better way to kill these lake trout?” Sweet said.

U.S. Geological Survey research



**A lake trout from Yellowstone Lake is fitted with a transmitter that will turn it into a "Judas fish" that helps eradicate its own kind.**

biologist Robert Gresswell is working on one idea: destroying lake trout eggs before they hatch.

What makes the egg solution so promising is the difference in how lake trout and cutthroat spawn. In the fall, lake trout spawn en masse in the shallow waters of Yellowstone Lake, whereas cutthroat spawn in pairs in the spring in the lake's tributaries. This separation means it's possible to kill lake trout eggs without worrying about killing cutthroat eggs by mistake.

"A small increase in the mortality of young has a big effect on the population," Gresswell said. "Only about 3 to 4 percent of the eggs that are laid each year mature to adults. If you can increase that mortality so that only 1.5 percent survive, that has a huge effect."

The trick is locating lake trout spawning beds. To find them, Gresswell has collaborated with the Park Service to surgically implant acoustic transmitters in nearly 150 lake trout. Unlike radio waves, which send out radio signals to a receiver, the acoustic transmitters send out sound.

"Acoustic waves travel through water, and radio waves don't very well," Gresswell said.

The transmitters send out a sound in a radius of about 550 feet, and that sound is then picked up by 40 receivers submerged at various locations around the lake.

The data Gresswell has collected so far suggest lake trout are concentrated in the southern end of Yellowstone Lake, particularly West Thumb. Researchers think one spawning bed is located in the shallow waters surrounding Carrington Island, just north of West Thumb Geyser Basin.

"It is the tiniest of islands," Sweet said. "It has one tree on it."

That said, even transmitters in the most remote parts of the lake have detected fish.

The problem is that Yellowstone Lake is huge, more than 2.2 million acres.

"Ideally, we'd have around 70 to 100 receivers," Gresswell said. "We have to put them out in lots of places." To get more transmitters and receivers, Trout Unlimited joined with the Greater Yellowstone Coalition and the National Parks Conservation Association to begin a campaign called Save the Yellowstone Cutthroat. The transmitters cost between \$400 and \$700, and the receivers run about

\$1,400. The conservation groups aim to raise \$85,000 by next spring, when the ice comes off the lake.

The cost is worth it, says Scott Christensen, climate change program director for the Greater Yellowstone Coalition.

"The population of Yellowstone cutthroat in Yellowstone Lake is one of the most important populations of

that fish anywhere where it still exists, especially when you look through the lens of climate change," Christensen said.

Yellowstone Lake is more resilient than some other cutthroat habitats because it is located in a big, high-elevation basin in a national park that is "relatively pristine and free from stressors that other populations are suffering from," Christensen said.

"Historically, it was a large, connected population," he said. "These fish that were in the lake moved up and down the Yellowstone River and up and down the tributaries, and there were no non-native species to compete with or, in the instance of rainbow trout, to hybridize with. If we want to maintain these fish long term, Yellowstone Lake is a very important place to have a stronghold population." One of Gresswell's USGS colleagues is working on ways to kill eggs and young fish at the spawning areas once they're located. The most promising solution is a form of electro-fishing, which could be deployed as early as this fall.

Other ideas include a sort of vacuum that would suck up the eggs, "sonic guns" that would use loud sound to break them, and carbon dioxide, which is lethal to young fish just emerged from eggs.

While the vacuum and the sonic gun could take a decade or more to develop, carbon dioxide in the form of dry ice, weighted to sink to the bottom of the lake, is a good option, Gresswell said.

"That would have no negative consequences in a lake the size of Yellowstone Lake," he said.

These technologies could eventually prove useful to suppress lake trout once the cutthroat population has recovered, Gresswell said. While gill netting is effective now, the public might eventually lose its taste for the expense. Going after the eggs and the young lake trout could be a cost-effective solution.

"We would predict that we could hold the lake trout at a reduced level using these technologies focused on these developing young," he said.

Visit <http://wyomingtu.org> or <http://www.eastyellowstonetu.org> for information on Save the Yellowstone Cutthroat.