

## **Project Summary**

### **Rocky Mountains Cooperative Ecosystem Studies Unit**

**Project Title:** Destruction of Lake Trout Embryos in Yellowstone Lake

**Discipline:** Natural Resources

**Type of Project:** Research

**Funding Agency:** National Park Service

**Other Partners/Cooperators:** Montana State University

**Effective Dates:** 8/1/2008 - 3/31/2010

**Funding Amount:** \$25,000

**Investigators and Agency Representative:**

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**Project Abstract:**

Since 1994 when the lake trout *Salvelinus namaycush* was first discovered in Yellowstone Lake, the National Park Service has been actively attempting to reduce the effects of this nonnative predator on the native Yellowstone cutthroat trout *Oncorhynchus bouvieri*, primarily by capture with gill nets. Over 200,000 lake trout have been removed from the lake, and up to 23 km of gill nets have been used at one time. There are signs of success; however, the number of lake trout caught annually remains high (>50,000 each year since 2006).

Although gill nets are an effective means to reduce the number of lake trout, there are several negative factors associated with this technique. For example, by-catch of Yellowstone cutthroat trout is a major concern of the gillnetting operation, and methods must be continually monitored to insure that by-catch is not excessive. Furthermore, the expense of equipment and a trained workforce may eventually necessitate reductions in effort. One effective alternative, electrofishing, has been used since 2004 to capture lake trout as they moved into shallow water to spawn in September. In addition to increasing the total number of lake trout captured, this technique targets the reproductively active portion of the lake trout population and directly reduces the probability of recruitment.

Unfortunately, traditional electrofishing is also limited by logistical constraints. An unknown number of lake trout successfully spawn each year, but there has been no effort to destroy the potentially large numbers of developing embryos on the spawning grounds. For example, it has been demonstrated that experimentally applied electrical current will cause mortality to trout eggs. Furthermore, a senior project (2004) conducted by undergraduate students at Montana State University identified four additional techniques that might be effective for destroying lake trout embryos in natural settings (ultrasonics, microwaves, biodegradable polymers, and topical application of antimycin). At present, however, research to explore the practical application of these alternatives has not been initiated. To this end, we propose to investigate techniques for killing lake trout embryos. More specifically, we propose to develop and validate a technique that can be used to destroy lake trout embryos in natural settings, such as Yellowstone Lake.

A technique for destroying lake trout embryos on spawning grounds will provide an important tool for controlling lake trout numbers. Such a tool could be used synergistically with methods that target free-swimming individuals (e.g., gill nets or electrofishing), or potentially, it could be effective alone. Although this project will be focused on lake trout in Yellowstone Lake, results from this project could

enhance efforts to protect bull trout *Salvelinus confluentus* in lacustrine habitats, and it may be critical in attempts to preclude listing of Yellowstone cutthroat trout and westslope cutthroat trout *Oncorhynchus clarkii lewisi* under the Endangered Species Act.

**Outcomes with Completion Dates:**

- 1) 31 January 2009 - Progress Report
- 2) 30 September 2009 - Final Report

**Keywords:** Lake trout, embryos, Yellowstone Lake, Yellowstone National Park, Montana State University