

Project Summary
Rocky Mountains Cooperative Ecosystem Studies Unit

Project Title: Amphipods of Yellowstone Lake Related to Lake Trout Suppression Strategies

Discipline: Natural

Type of Project: Research/Technical Assistance

Funding Agency: National Park Service

Other Partners/Cooperators: USGS, Montana Cooperative Fishery Research Unit

Student Involvement: Yes, MS Graduate Assistant

Effective Dates: 09/01/2017 - 06/30/2021

Funding Amount: \$125,615

Investigators and Agency Representative:

NPS Contact: Todd M. Koel, Supervisory Fisheries Biologist, P.O. Box 168 Yellowstone National Park, WY 82190; (307) 344-2281; todd_koel@nps.gov

Investigator: Lindsey K. Albertson, Leader, Department of Ecology, Montana State University, Bozeman, MT 59717; (406) 994-3725; lindsey.albertson@montana.edu

Project Abstract: In the late-1990s, soon after lake trout were discovered, studies of lake trout diets indicated that native cutthroat trout were the primary items consumed (Ruzyki and Beauchamp 1997). More recently, however, diet studies have shown that although the lake trout still consume native cutthroat trout, the most common food item found in lake trout stomachs are freshwater crustaceans (amphipods; Syslo et al. 2016). More than 300,000 lake trout are killed annually by the aggressive NPS gillnetting program, with >1.5 million killed during just the past five years (2012-2016). Since the beginning of the lake trout gillnetting program in 1995, the dead lake trout have been returned to deep areas of Yellowstone Lake. This has been done primarily so nutrients are retained in the lake rather than being removed through marketing or other exporting of the fish carcasses from the system.

The amphipods of Yellowstone Lake are known to feed upon the dead lake trout carcasses. Because a large number/biomass of carcasses are now deposited in the lake each year, there is a need to understand the ecological implications of this management action, especially as it relates to the production of amphipods and (potentially) lake trout. NPS is also investigating the use of lake trout carcasses and fine sediments (sand, silt) as an alternative suppression method for smothering lake trout embryos on spawning sites following the peak spawning period in late fall. Because these carcasses and sediments will be placed in relatively shallow water and within the photic zone, there is a need to document any impacts of these actions on the ecology and overall productivity of these sites.

The overall goal of this project is to determine the potential effects of lake trout suppression strategies on the ecology of Yellowstone Lake.

Specific objectives are to:

- 1) Document the large-scale spatial variation of amphipods among lake basins, depths, river inlets, geothermal features, and/or other significant habitat characteristics of Yellowstone Lake.
- 2) Determine if amphipod spatial distribution and abundance is related to lake trout carcass deposition by the suppression program.
- 3) Assess effects of alternative suppression methods including carcass and sediment placement on the ecology of lake trout spawning sites.
- 4) Make recommendations to NPS managers regarding the need (if any) for changes in lake trout suppression strategies.

Keywords:

Yellowstone National Park, Montana State University, Yellowstone Lake, lake trout, amphipods