

Project Summary

Rocky Mountains Cooperative Ecosystem Studies Unit

Project Title: Laboratory Assessment of Yellowstone Cutthroat Trout Whirling Disease Infection as a part of the Yellowstone National Park Whirling Disease Study

Type of Project: Research

Funding Agency: National Park Service

Other Partners/Cooperators: Montana State University

Effective Dates: 8/15/2004 - 12/31/2007

Funding Amount: \$17,879

Investigators and Agency Representative:

NPS Contact: Todd M. Koel, Center for Resources, Fisheries and Aquatic Sciences Section, P.O. Box 168, Yellowstone National Park, WY 82190; 307-344-2281, todd_koel@nps.gov

Investigator: Crystal Hudson, MSU Department of Veterinary and Molecular Biology, Montana State University, Bozeman, MT; 406-582-8656, crystal_hudson@fws.gov

Project Abstract:

The Yellowstone cutthroat trout *Oncorhynchus clarki bouvieri* subspecies is indigenous to the Snake River upstream from Shoshone Falls, Idaho and the Yellowstone River upstream from the confluence of the Tongue River in Montana. Since the subspecies was geographically isolated following deglaciation of the Yellowstone region some 10,000-12,000 years ago, individual populations have adapted and evolved a variety of life history characteristics in response to a diversity of environmental conditions throughout their natural range. Activities of humans have resulted in a dramatic loss in the historical range of this subspecies. This range reduction is attributed to several factors, including hybridization with rainbow trout, genetic homogenization due to widespread stocking of Yellowstone cutthroat trout from Yellowstone Lake, competition/predation by brook trout (*S. fontinalis*) and brown trout (*Salmo trutta*), habitat loss and fragmentation, and over-harvest. Yellowstone Lake, its numerous tributary streams, and the Yellowstone River above the upper falls form the core of the remaining, natural habitat for native, genetically pure, Yellowstone cutthroat trout. The Yellowstone National Park Whirling Disease Study will allow for assessment of the impacts of the exotic parasite *Myxobolus cerebralis* (cause of whirling disease) on native Yellowstone cutthroat trout of Yellowstone Lake and its tributary streams. Results will allow for the development of management strategies for the preservation of this important resource.

Specific objectives are to:

- 1) Analyze 28 samples of Yellowstone cutthroat trout fry exposed in sentinel cages on southern Yellowstone Lake tributaries in 2003 for presence of *M. cerebralis* using PCR. Determine *M. cerebralis* infection severity by conducting histological examination of all fish that tested positive for *M. cerebralis*.
- 2) Analyze 240 samples of Yellowstone cutthroat trout fry exposed or collected as wild fry by Silvia Murcia in 2002 and 2003 for presence of *M. cerebralis* using PCR.
- 3) Analyze 10 samples of Yellowstone cutthroat trout fry exposed in sentinel cages on Pelican Creek in 2004 using PCR. Determine *M. cerebralis* infection severity by conducting histological examination of all fish that tested positive for *M. cerebralis*. Phase 2 includes histological scoring of 61 samples from 2005 sentinel cage exposures.
- 4) Analyze 400 Yellowstone cutthroat trout head samples from fish collected by gillnetting on Yellowstone Lake in 2004 using Pepsin/Trypsin digest screening and PCR confirmation. Phase 2 includes PCR confirmation of 400 head samples of YCT collected in Yellowstone Lake in 2005.

Outcomes with Completion Dates:

- 1) 1 June 2006 - results of task 1, PCR and histological scoring of 28 samples from 2003 sentinel cage exposures on southern tributaries to Yellowstone Lake

- 2) 1 June 2006 - results of task 2, PCR analysis of Silvia Murcia's 240 sample backlog
- 3) 1 June 2006 - results of task 3, PCR analysis and histological scoring of 10 samples from 2004 sentinel cage exposures on Pelican Creek
- 4) 01 June 2006 - results of task 4, PTD screening and PCR confirmation of 400 head samples collected by gillnetting from Yellowstone Lake in 2004;
- 5)31 July 2006 - results of task 1a, histological scoring of 61 samples from 2005 sentinel cage exposures on Pelican Creek;
- 6)30 September 2006 - results of task 2a, PTD screening and PCR confirmation of 400 head samples collected by gillnetting from Yellowstone Lake in 2005

Keywords: Yellowstone cutthroat trout, whirling disease, PCR, Yellowstone Lake, genetic analysis, Montana State University, Yellowstone National Park

For Administrative Use Only:

Date Annual Report Received:

Date Final Report Received:

Publications, etc. on file: