

Project Summary

Rocky Mountains Cooperative Ecosystem Studies Unit

Project Title: Contaminants testing in fish from Glacier National Park

Type of Project: Research

Discipline: Natural Resources

Funding Agency: National Park Service

Other Partners/Cooperators: University of Montana, Flathead Lake Biological Station

Effective Dates: 9/30/2009 - 12/30/2011

Funding Amount: \$25,000

Investigators and Agency Representative:

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Project Abstract: To assess the extent of mercury contamination in low elevation lakes of Glacier National Park a preliminary survey was conducted in 2008 (Downs and Stafford 2009). This survey focused on lake trout from four lakes with more limited testing of lake whitefish, burbot, and bull trout. Mercury levels of substantial concern (>0.5 ppm wet weight) were found in muscle tissue from larger lake trout and burbot. These findings have resulted in human fish consumption advisories in all of the sampled lakes, and exceed guidelines for piscivorous wildlife. No northern pike were tested in 2008, however in other locales this species has high mercury levels (i.e. Phillips et al. 1980) and this likely is the case with northern pike in GNP.

Given the results of the 2008 survey additional mercury testing is warranted to better assess the risk to humans and wildlife, and to make informed management decisions. The 2008 survey focused on lake trout as this species has a high propensity to accumulate mercury and is a popular sport fish, however key information gaps remain for other high risk fishes and fishes consumed primarily by wildlife. To meet these information needs we propose additional testing in 2010 to meet the following objectives.

Objective 1: To assess the risk to wildlife we propose to test all the common fish species present in one east side lake (St Mary) and one west side lake (Logging). This sampling will provide information on the various minnows, suckers, and other non game fish that are primarily utilized by wildlife consumers. For the wildlife risk assessment we will estimate whole body mercury concentrations from muscle tissue using a relationship developed by Peterson and Van Sickle (2007) as wildlife typically consume all or most of a fish's body. We also will use the St Mary and Logging data to establish the relationships between lake trout mercury levels and those in the other fish. These relationships will allow us to approximate mercury levels in the other fish from lakes where only lake trout have been sampled, greatly expanding the scope of our human and wildlife risk assessments.

Objective 2: To complete our lake trout assessment we propose to extend mercury testing to Cosley and Logging lakes, and also increase our sample size (particularly of larger fish) from St Mary lake. This testing will provide more mercury information on a widely consumed, high risk species and also provides the baseline to estimate mercury levels in other fish sampled in Objective 1.

Objective 3: To determine mercury levels in bull trout relative to lake trout. This work will primarily be conducted in Logging Lake, but any additional bull trout mortalities from other lakes will be analyzed for mercury as well. This assessment is particularly relevant because lake trout suppression is starting in GNP to restore bull trout populations, and information is needed to understand the toxicological implications of this management activity. The 2008 data from Lake McDonald suggest that bull trout have lower mercury levels, but the sample sizes were too small to make statistically based conclusions.

Objective 4: Test northern pike from Sherburne Reservoir for mercury concentrations. We will also likely test cutthroat trout from one high elevation lake to fill information gaps.

Objective 5: Establish a robust baseline of fish mercury levels for future assessments. By testing a moderately large number of fish from multiple lakes we will produce a data set that will serve as a baseline to assess any future changes in fish mercury levels.

Objective 6: To determine baseline selenium levels in the fish community from Logging and St Mary lakes. Selenium has been shown to inhibit the toxicity of methyl mercury and thus provides key

information on the human and wildlife risks associated with fish consumption. Selenium can also be toxic to fish at sufficiently high levels.

Outcomes with Completion Dates:

Due Date for *Draft* Final Report: January 31, 2011; Due Date for all Final Products: December 30, 2011

Keywords: lakes, airborne contaminants, risk, fish species, Glacier National Park, University of Montana,