

Project Summary

Rocky Mountains Cooperative Ecosystem Studies Unit

Project Title: Chemical and biological analysis of comparative streams in the Elk and Flathead River drainage to demonstrate mine effects.

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 - 12/31/2011
Funding Amount: \$25,000

Investigators and Agency Representative:

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Project Abstract:

The University is conducting a baseline and environmental impact assessment of surface water quality, suspended sediment and stream and river aquatic life primarily in the Upper North Fork Flathead River drainage, broken down into the following objectives:

1. Water Quality Assessment

Objective: Measure and assess the concentrations and annual load of chemical constituents in water associated with the Lodgepole/Foisey coal mine site, other coal deposits that might be exploited in the future, and ground and surface waters of the North Fork of the Flathead River and extending to Flathead Lake.

- a) Determine comparative groundwater and surface water geochemistry of coal and associated deposit chemistry of Flathead and Crowsnest coal deposits.
- b) Determine stream/river geochemistry of ground and surface waters of the North Fork of the Flathead River with risk analysis and potential affects on Glacier National Park, the Flathead River corridor and Flathead Lake.
 - Field Physiochemistry
 - All Major Cations (Na, K, Ca, Mg)
 - All Major Anions (chlorides and sulfates)
 - Metals (Al, As, B, Be, Cd, Cr, Cu, Fe, Hg, Mn, Ni, Pb, Se, Zn)
 - Nutrients (All Phosphorus and Nitrogen Forms)
- c) Determine sediment transport and deposition characteristics as they affect in-stream biogeochemistry and aquatic life.

2. Suspended Sediment Assessment

Objective: Measure the load of suspended sediment (kg/yr) from the Canadian North Fork including the sediment type, size distribution and mineralogical composition of the inorganic portion. Measure the rate of sedimentation in Flathead Lake and determine what portion of the annual deposition is related to the influx of sediments and nutrients from the Coal mining.

- a) Determine the annual load of suspended sediment (kg / yr), composition (organic mass vs inorganic mass), and the particle size distribution, and mineralogical composition of the inorganic portion of the suspended sediment load being delivered by that portion of the North Fork watershed of located above the Canadian / U.S. Border.
- b) Determine the annual load of suspended sediment (kg / yr), composition (organic mass vs inorganic mass), and the particle size distribution, and mineralogical composition of the inorganic portion of the suspended sediment load being delivered to Flathead Lake by the rest of the Flathead River drainage.
- c) Measure the annual sediment load being deposited in Flathead Lake.
- d) Determine what portion of the sediment load being deposited in Flathead Lake comes from Canada and related mining activities.

3. Stream and River Aquatic Life Assessment

Objective: Measure and assess the aquatic life in water associated with the Lodgepole/Foisey coal mine site, other coal deposits that might be exploited in the future, and ground and surface waters of the North Fork of the Flathead River and the river extending to Flathead Lake.

- a) Determine baseline stream/river algal community distribution and abundance.
- b) Determine baseline stream/river macroinvertebrate (food-web) community distribution and abundance.
- c) Conduct risk analysis (i.e., vulnerability to mining pollution) and potential response to increased nutrient and/or pollution and effects on algal and invertebrate food web structure.
- d) Directly compare response of aquatic life use among existing Elk Basin stream communities receiving coal mine discharge with potential risk associated with proposed Lodgepole/Foisey coal mine.
- e) Assess benthic sediment flux (source, storage, movement) and risk analysis in relation to proposed mining and related activities.
- f) Determine potential of cumulative impacts (e.g., all potential mining activity, , roads) on indicator aquatic life and its use.

The purpose of the project herein is to conduct laboratory analyses on the field collected samples.

Outcomes with Completion Dates: Due Date for Final Report and/or Other Products: December 31, 2011

Keywords: Coal mine development, environmental assessment, surface water quality, sediment transport, habitat assessment, Glacier National Park, University of Montana, Flathead Lake Biological Station