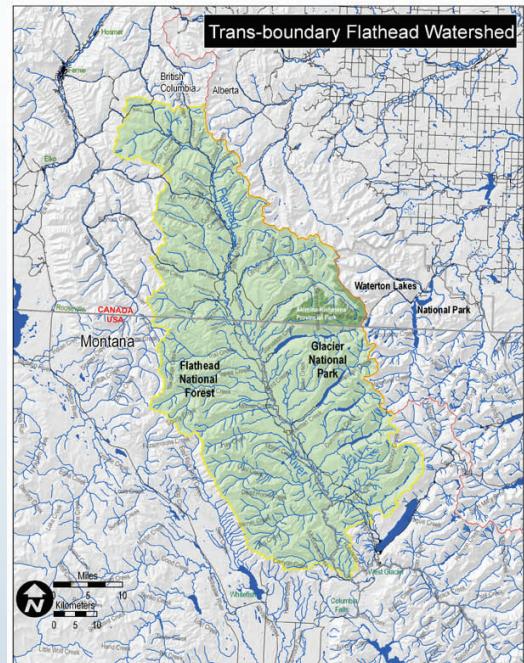


Implications of Mining in the Transboundary Flathead Basin Aquatic Ecosystem

The Transboundary Flathead Basin in Montana (U.S.) and British Columbia (Canada) hosts one of the most diverse and unique native aquatic ecosystems throughout North America. Headwaters of the basin feed into Waterton-Glacier International Peace Park (U.S. and Canada) and Flathead Lake in the U.S. Despite the tremendous historical and ecological value of the region, the Canadian headwaters are targeted for coalbed methane drilling and open-pit coal mining. This can threaten water and habitat quality, migratory fish populations, and all aquatic life downstream. A history of coal mining and coalbed methane extraction in the nearby Elk River in Canada and preliminary data from the North Fork of the Flathead River strongly suggest that sediment and water pollution from proposed mining activities may degrade waters downstream, thus posing a threat to the shared environment of the Transboundary Flathead, Waterton-Glacier International Peace Park, the Flathead Valley and Flathead Lake. In 2008 USGS led an international aquatics research project to help the U.S. prepare to meet this challenge and protect the ecosystems of one of the Crown Jewels of our National Park System and the irreplaceable and extraordinary international value of the Transboundary Flathead Basin Ecosystem.



Map of study area

Collaborators:

This is a cooperative project with Montana Fish, Wildlife and Parks, the University of Montana, the State of Montana, BC Ministry of Environment, and the Ktunaxa (too-nah-hah) First Nation of Southeast British Columbia to manage a shared transboundary watershed.

Study Area:

The Transboundary Flathead Basin comprises the North Fork of the Flathead River, which flows across the U.S.-Canadian border just over the divide from Glacier National Park.

Project:

This project is assessing the distribution, abundance, life-history, and genetic characteristics of native fishes in Glacier National Park and the Canadian portion of the drainage. These baseline data will be used as a reference point for long-term population and habitat monitoring prior to potential mining or coalbed methane development.

Science at Work:

In September 2009, a joint United Nations Educational, Scientific and Cultural Organization and the International Union for Conservation of Nature (UNESCO/IUCN) team visited the Flathead in Montana and British Columbia to investigate whether the proposed mining was a threat to Waterton-Glacier International Peace Park, a UNESCO designated World Heritage Site and Biosphere Reserve. During this trip, USGS scientists and their partners presented their current research findings to the team. In January 2010 a draft report was released which included the team's analysis of the potential impacts of mining in the Flathead. Currently mining in the region is not being implemented. Whatever the long term outcome of potential mining in the region, science from USGS and their partners provided the data to inform conservation and management decisions impacting this diverse and sensitive transboundary system.

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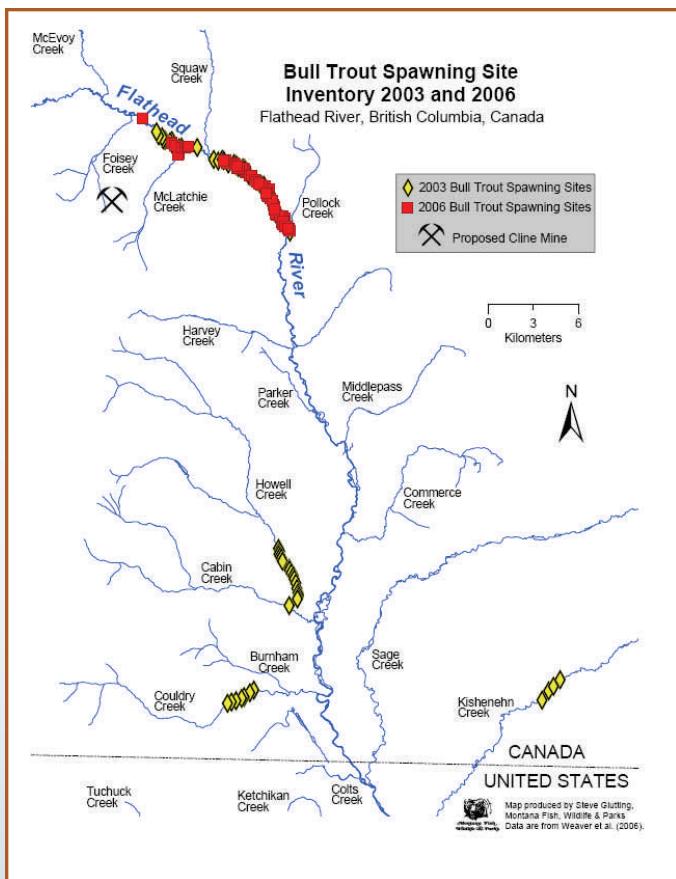


Figure 1. The spawning and movement of bull trout in the Transboundary Flathead Basin.

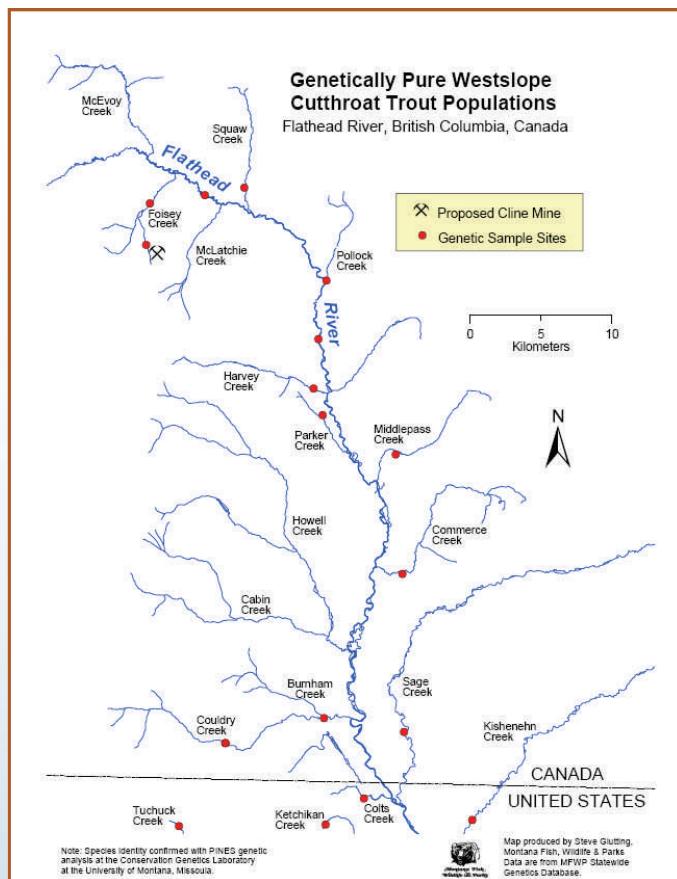


Figure 2. The location of genetically pure cutthroat trout in the Transboundary Flathead Basin.

Fish distribution surveys: In 2008, USGS initiated a basin-wide fish population and habitat survey to assess the distribution, abundance, life-history, and genetic characteristics of native fishes in Glacier National Park and the Canadian headwaters. These baseline data will be used as a reference point for long-term population and habitat monitoring prior to potential mining or CBM development. Data were collected at 119 sites in Canada and GNP. Native fishes were found throughout much of the system, including proposed mining locations (Figure 1).

Bull trout spawning surveys: Research conducted by USGS shows that a majority of bull and cutthroat trout migrate up to 250 km from Flathead Lake to spawn in the Canadian headwaters- the same areas proposed for gas and oil development. Spawning surveys from 2003 and 2008 indicate that the river section immediately downstream of the proposed mine and CBM well sites contained the highest number of bull trout nesting areas where eggs are laid in river gravels, known as redds, in the interconnected river and lake transboundary system.

Westslope cutthroat trout spawning study: Radiotelemetry was used to assess the spawning distributions of westslope cutthroat trout in the upper Flathead River system, Montana and British Columbia. Approximately 50% of the tagged fish spawned in the British Columbia portion of the North Fork. These results indicate that these areas are important spawning and rearing areas for migratory cutthroat trout in the basin, and suggest that these behaviors are critical to maintain life history diversity and population persistence in the transboundary system.

Westslope cutthroat trout genetics studies: Tissue samples were collected at 13 sites in the British Columbia portion of the Flathead River system to determine the genetic integrity of migratory westslope cutthroat trout populations. Results showed that all of the populations contained genetically pure westslope cutthroat trout, demonstrating the importance of the BC headwaters as a genetic refuge for this sensitive species (Figure 2). Additionally, genetically pure westslope cutthroat trout were found throughout the Foisey Creek drainage, the site of the proposed Cline Mine, in a diversity of high-quality, connected habitats.