

Mount Klappan Coal Project: February 2006 Update Series
**Baseline Studies for Mount Klappan Coal Project:
Fisheries and Aquatic Resources**



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Baseline Studies for Mount Klappan Coal Project: Fisheries and Aquatic Resources

Background and Purpose

As part of the ongoing environmental and socio-economic baseline studies and impact assessment being conducted for the proposed Mount Klappan Coal Project, this document describes the methods and reviews the results of the fisheries and aquatic resources component carried out in 2005. Fieldwork began in July 2005 and will continue through 2006. Data collected will form the backbone of the relevant section of the Environmental Impact Assessment (EIA) that will be submitted to all levels of government and affected First Nations later this year. This information will also provide an important basis for long-term monitoring of potential impacts of any development.

This document includes the location of sampling sites, a description of how sampling sites were chosen, a summary of the data collected to date, and a work plan for 2006.

A number of fisheries studies were conducted in the area prior to the field program carried out by RTEC in 2005. Two studies in the 1970s, plus baseline studies carried out by Gulf Canada in the 1980s, and a report prepared by Schell Consulting in 2001 indicate a simple fish community in the area of the Mount Klappan Coal Project. This is likely due to the headwater nature of the area which includes a number of small streams, many of which are partially or completely frozen for much of the year. Species found in the Spatsizi and Klappan river drainages were:

- Mountain whitefish
- Arctic grayling
- Burbot
- Rainbow trout
- Bull trout/Dolly Varden
- Longnose sucker

The presence of waterfalls and fast-flowing water limit the upstream distribution of some of these species. More fish species were found in the Nass and Skeena rivers but none of the streams within the Fortune Minerals claim block are part of these two river systems.

Despite the amount of fisheries information already available, a more complete fisheries evaluation by RTEC began in 2005 for the following purposes:

1. To collect baseline information on fish presence.
2. To aid in the planning of mine development (e.g. the location of water storage facilities).
3. To evaluate available fish habitat so that any loss of habitat can be compensated for.

In addition to the fish community and habitat sampling, sediment, periphyton (algae growing on rocks) and benthos samples (bugs living in streams) were collected to provide baseline data. Sampling sites are indicated on Figure 1, along with the fisheries information collected. Sites were chosen to include: a) sites that would be directly impacted by proposed mine development; b) sites downstream of mine development; and c) reference sites that would not be affected by mine development because they were not directly downstream, but were close enough to impacted

sites that you would expect natural conditions to be similar. A further reference site was located in the headwaters of the Nass River. A preliminary sampling of fish community and habitat also took place along the proposed 96.5 km new road route that runs southwest from the mine site to Bell II. All sampling methods followed BC provincial standards as outlined by the Resource Inventory Standards Committee.

Sampling Program

Sediment

Stream sediment was collected to provide background information on metal concentrations in the region and to allow monitoring of the potential accumulation of metals should mining proceed. Samples were collected as follows:

- Three samples collected from each of 12 sites.
- Top 2 cm of sediment analyzed for grain size, moisture, nutrients and metal concentrations.
- Lowest possible analytical detection limits were used.
- To test the quality of the samples, extra samples were collected at 10% of sites.

Periphyton

Periphyton are a diverse group of algae that grow in mats on rocks found on the streambed. The mats are used as shelter, substrate and food for other organisms such as bacteria and insects. The major advantage of periphyton as a biological indicator is that they are fixed to the rocks and cannot escape exposure to contaminants. Sampling proceeded as follows:

- Three samples collected at each of 12 sites.
- Samples collected during mid-summer when periphyton biomass is at its peak.
- Samples were analyzed for taxonomic composition and biomass.

Benthic Invertebrates

Benthic invertebrates (bugs living in streams) are important prey for fish and act as key early warning indicators of aquatic impacts because they are usually fixed to the substrate and hence cannot escape exposure to contaminants. They typically form the backbone of aquatic environmental effects monitoring programs. Samples were collected as follows:

- Samples collected at 18 sites; five samples collected at 12 sites identified as long-term monitoring sites and three samples collected at an additional 6 sites.
- Samples collected during mid-summer when the community is fully developed.
- Results expressed as number of organisms per m² for each taxonomic group.
- Additional samples collected for analysis of selenium concentrations.



Fish Community

Fish community was assessed at 23 sites in the Mount Klappan Coal Project area (Figure 1) and numerous sites along the proposed road route. It is very important to establish the presence or absence of fish species to help in the planning and development process and to protect this important resource. Sampling was carried out as follows:

- Sampling carried out using a backpack electrofisher and minnow traps.
- Electrofishing took place in July-August to avoid disrupting spring and fall spawning.
- Minnow traps were set overnight.
- Density estimates based on catch-per-unit-effort.
- DNA tissue samples collected from Dolly Varden/bull trout to confirm identification (as visual species identification is not possible in the field)

Fish Habitat

Fish habitat assessments were conducted at the fish community sites in the Mount Klappan Coal Project area and along the proposed road route. Sampling proceeded as follows:

- Assessments were conducted over 100 or 200 m long sections.
- Habitat types (pool, glide, riffle and cascade) were identified.
- Physical features such as gradient, mean width, substrate composition, flow velocity and availability of cover for fish were measured or estimated.
- pH, conductivity and water temperature (both surface and in-gravel) were also recorded.

Results

Data on sediment, periphyton and benthic invertebrates are still being analyzed and processed. Results from the fisheries survey indicate that fish abundance was generally low in the Mount Klappan Coal Project area, presumably due to the headwater nature of the area, and that fish were absent from a large section of the proposed new road route.

The most notable result at the mine site was that no fish were either observed or captured in 11 sites in the Didene Creek watershed upstream of waterfalls located 1 km upstream of its confluence with the Spatsizi River. Previous work in the 1970s and by Schell Consulting in 2001 also failed to find any fish above these falls. The falls are therefore considered to be a permanent barrier to fish passage. Given that the falls lie within the watershed that contains the majority of the proposed mine infrastructure, it is important to note that in terms of watershed drainage there are no fish downstream of the main development present within 12 km of the proposed development (see Figure 1; and note the fish caught in the Little Klappan River are in a separate watershed that is not downstream of the proposed mine or waste rock areas).

Fish species captured in the 2005 survey of the Mount Klappan Coal Project area by RTEC were as follows:

- Dolly Varden (Little Klappan River, Hobbit Creek, Spatsizi River)
- Bull trout (tributary to the Little Klappan River, Hobbit Creek)

- Arctic grayling (mouth of Didene Creek, Spatsizi River)
- Mountain whitefish (Little Klappan River, Spatsizi River)
- Longnose sucker (Spatsizi River)
- Burbot (Hobbit Creek, mouth of Didene Creek, Spatsizi River)
- Rainbow and cutthroat trout (Nass River only).

The preliminary fisheries study of the road route suggests that 53.4 km of the 96.5 km route is located in sub-watershed basins that are fish bearing, with the remaining 43.1 km located in non-fish bearing areas. In summary:

- The 30 km nearest Bell II contained steelhead and rainbow trout, Dolly Varden, bull trout, mountain whitefish, coho salmon and chinook salmon in the Bell-Irving River and its tributaries.
- The following 35 km to the north-east are currently considered non-fish bearing as no fish were captured or observed. This area includes Craven Creek and much of Konigus Creek.
- The next 25 km of the road route approaching Mount Klappan consists mostly of Sweeney Creek, the Greater Klappan River and their tributaries. Bull trout, Dolly Varden, mountain whitefish and rainbow trout were found in this region.
- The remaining 5 km near the mine site are mostly non-fish bearing because of fish barriers at the headwaters of the Greater and Little Klappan rivers, although mountain whitefish and Dolly Varden/bull trout are present in the Little Klappan River.

The distribution of fish will be confirmed during the 2006 fieldwork program.

2006 Fieldwork Program

Sampling in 2006 will consist of the following:

- Additional baseline data collection of sediment, periphyton and benthos within the mine site.
- Additional collection of benthic invertebrates for selenium testing within the mine site.
- Collection of fish tissue for metals analysis (insufficient number of fish captured in 2005).
- Further fish community sampling in Upper Hobbit Creek and at six new sites on the Little Klappan River.
- Fish community and habitat surveys will take place at every stream crossing in fish bearing areas along the proposed road, and at sites with the most suitable fish habitat in non-fish bearing areas.
- All sampling methods will be the same as those used in 2005.

The baseline data collected will accurately characterize the aquatic and fisheries resources of the area that is likely to be affected by the proposed mine development. As required by federal and provincial laws, the mine operators are then required to monitor the ongoing environmental impacts and report on changes over time. If mining-related impacts are unacceptable (for example, metal concentrations in water rise above levels listed in the mine's license or considered unsafe for the resident fish, plants and bugs) the operator has to resolve the situation immediately. The reference point for these decisions is the baseline data currently being collected.