



EDI ENVIRONMENTAL DYNAMICS INC.
Natural Resource Consultants

**FISH AND FISH HABITAT
ASSESSMENT OF BACK AND
PONY CREEKS NEAR THE MT.
NANSEN MINE SITE**

PREPARED FOR:

YUKON ENERGY MINES AND RESOURCES

ABANDONED MINES PROJECT OFFICE (TYPE II)

BOX 2703 (K-149)

WHITEHORSE, YT Y1A 2C6

PREPARED BY:

P. TOBLER, R.P.BIO., CPESC

EDI ENVIRONMENTAL DYNAMICS INC.

402 HAWKINS ST

WHITEHORSE, YT

Y1A 1X8

EDI CONTACT:

PAT TOBLER, R.P.BIO., CPESC (867) 393-4882

LYNDSAY DOETZEL, M.SC. (867) 393-4882

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PRINCE GEORGE, BC ▪ VANCOUVER, BC ▪ WHITEHORSE, YT ▪ GRANDE PRAIRIE, AB

WWW.EDYNAMICS.COM



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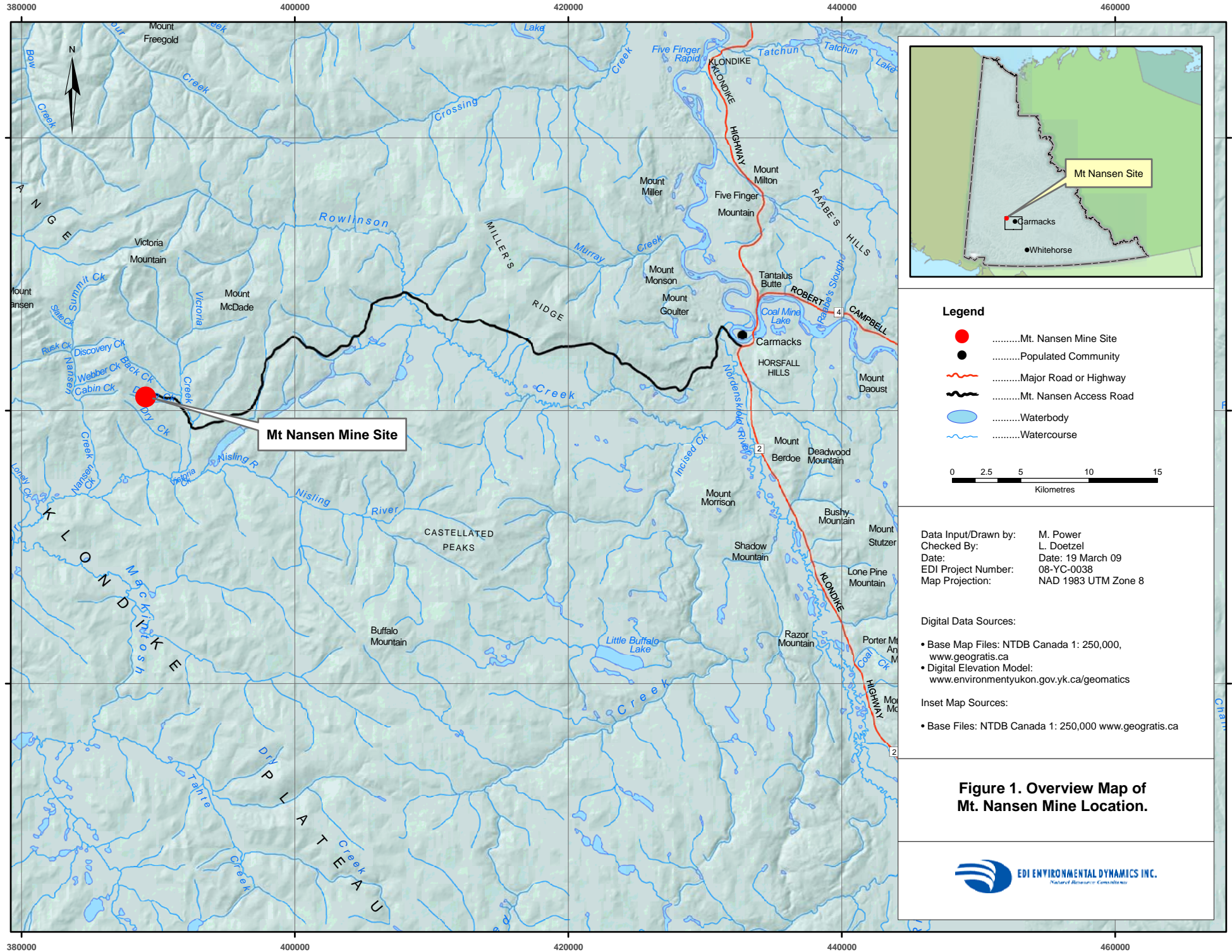
1 INTRODUCTION

The Yukon Government's Assessment and Abandoned Mines Branch is currently working towards reclamation of the Mt. Nansen gold and silver mine site. Previous fisheries work around the mine site focused on Victoria Creek and to a lesser extent, Dome Creek. These investigations documented Arctic grayling (*Thymallus arcticus*), burbot (*Lota lota*) and slimy sculpin (*Cottus cognatus*) in Victoria Creek (upstream of the Mt. Nansen Road) and determined that Dome Creek is non-fish bearing. During reclamation planning works there has been some question whether fish were present in Pony and Back creeks. In 2008, a fish and fish habitat assessment was conducted in portions of these streams.

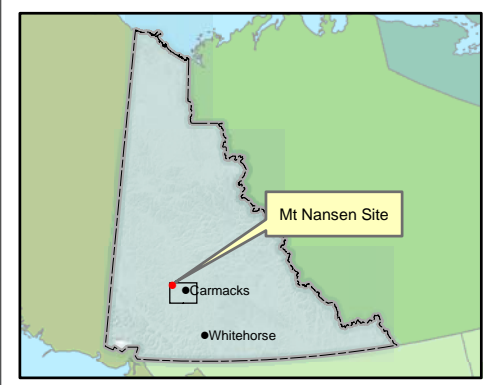
1.1 STUDY AREA

The Mt. Nansen mine is located approximately 60 kilometres west of Carmacks, Yukon. The site is accessed via a gravel-surface road connecting the mine site to Carmacks (Figure 1). The mine site lies within the watershed of Victoria Creek, a tributary stream to the Nisling River, which is a medium sized river in the Donjek/White Rivers drainage basin.

Two small streams drain the majority of the mine footprint. The primary drainage is Dome Creek which flows from above the mill site, past the tailings facilities into Victoria Creek. In addition, Pony Creek drains a small portion of the mine site north of the Brown-McDade Pit and eventually flows into Back Creek, which is a tributary to Victoria Creek (Figure 2). There is also an active placer mining operation present on Back Creek upstream of the mouth of Pony Creek.



Mt Nansen Mine Site



Legend

-Mt. Nansen Mine Site
-Populated Community
-Major Road or Highway
-Mt. Nansen Access Road
-Waterbody
-Watercourse



Data Input/Drawn by: M. Power
 Checked By: L. Doetzel
 Date: 19 March 09
 EDI Project Number: 08-YC-0038
 Map Projection: NAD 1983 UTM Zone 8

Digital Data Sources:

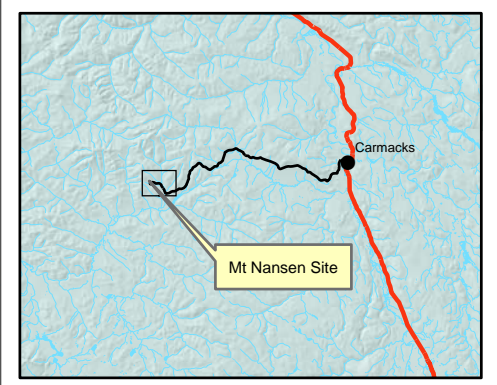
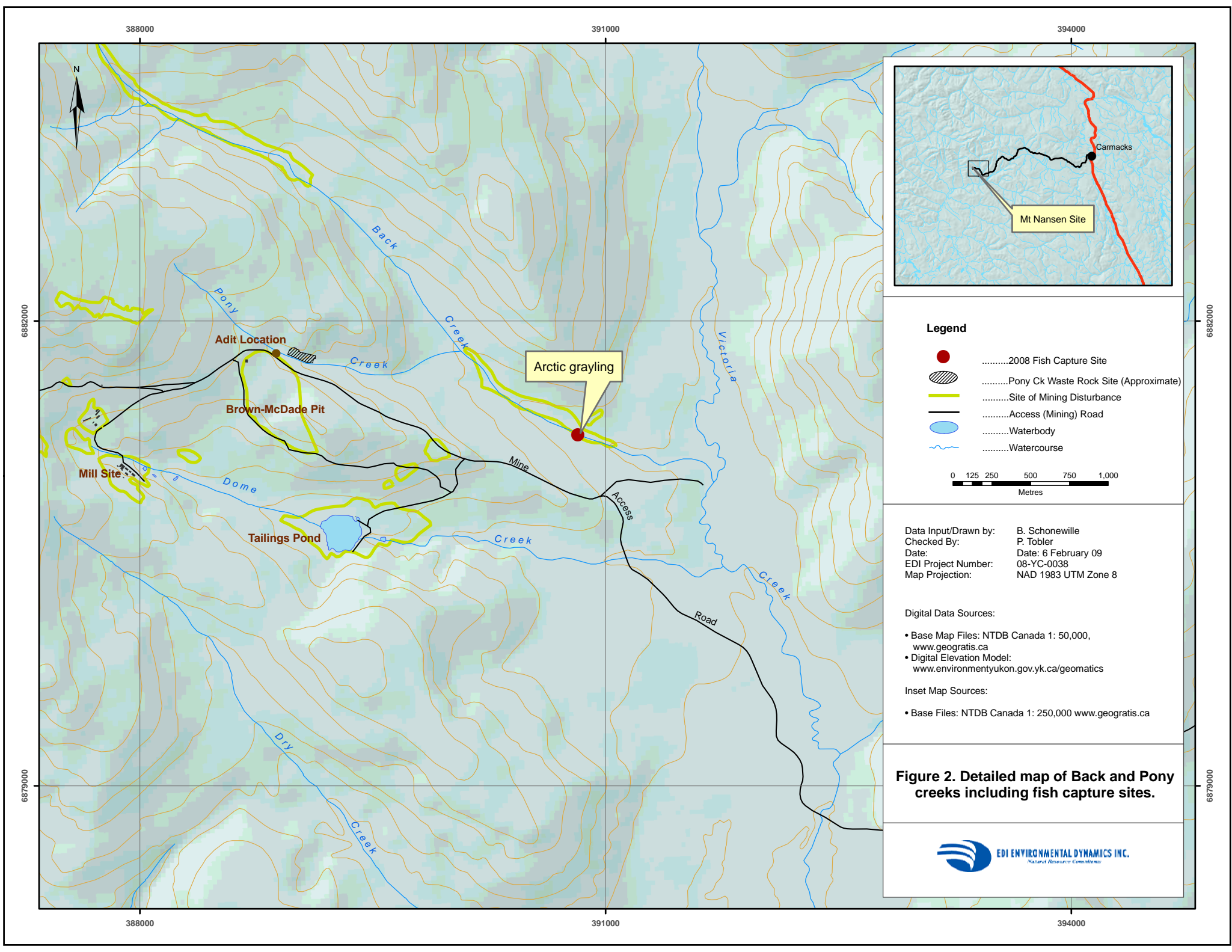
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- Digital Elevation Model: www.environmentyukon.gov.yk.ca/geomatics

Inset Map Sources:

- Base Files: NTDB Canada 1: 250,000 www.geogratis.ca

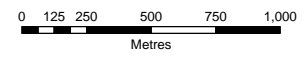
Figure 1. Overview Map of Mt. Nansen Mine Location.





Legend

-2008 Fish Capture Site
-Pony Ck Waste Rock Site (Approximate)
-Site of Mining Disturbance
-Access (Mining) Road
-Waterbody
-Watercourse



Data Input/Drawn by: B. Schonewille
 Checked By: P. Tobler
 Date: Date: 6 February 09
 EDI Project Number: 08-YC-0038
 Map Projection: NAD 1983 UTM Zone 8

Digital Data Sources:

- Base Map Files: NTDB Canada 1: 50,000, www.geogratis.ca
- Digital Elevation Model: www.environmentyukon.gov.yk.ca/geomatics

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Figure 2. Detailed map of Back and Pony creeks including fish capture sites.





2 METHODS

On September 3, 2008, EDI carried out an assessment of Pony and Back creeks assisted by representatives of the Little Salmon Carmacks First Nation and the Yukon Assessment and Abandoned Mines Branch. The lower portion of Back Creek, downstream of the confluence with Pony Creek, was investigated. Pony Creek was assessed from the mouth upstream approximately 1 km to the Pony Creek Adit. Both streams were assessed for fish habitat quality and electrofishing was completed in each stream in attempt to determine fish presence. Minnow traps were also set in Pony Creek near the adit. Stream channel and habitat features were recorded using the BC Reconnaissance Fish and Fish Habitat Inventory Site Card (BC Environment 1999).



3 RESULTS AND DISCUSSION

The following section presents the results and discussion of the fish and fish habitat assessments completed on Back and Pony creeks.

3.1 BACK CREEK

The lower 200 m of Back Creek extending upstream from its confluence with Victoria Creek has a narrow channel (2-4 m channel width) flowing through a well developed riparian area made up of sparse conifers and notable deciduous vegetation (mainly willows). There was also sign of seasonal flow through the vegetated area above the banks of the main stream channel. There were a few notable drops where the stream flows over obstructions approximately 50 cm in height. These are not hard obstructions (i.e. bedrock falls) and as such are likely dynamic in nature (Photo 1). Regardless, at the time of survey they may have posed a barrier to juvenile fish or species with limited jumping ability (i.e. slimy sculpin).



Photo 1. Photo of 50 cm drop near the mouth of Back Creek.



Photo 2. Upstream view of Back Creek near the confluence with Victoria Creek.

Starting approximately 300 upstream of confluence with Victoria Creek, the Back Creek channel becomes wider with notable signs of disturbance (Photo 2). The channel appears to be impacted either by historical placer activity in this area and/or placer activity towards the upstream end of the stream. Regardless, the channel is wide, generally unstable with numerous signs of significant bed load movement through this area. There are also many actively eroding banks in this area (Photo 3). Stream channel and fish habitat data was collected on Back Creek near its confluence with Back Creek (Table 1).

Table 1. Summary of stream channel and habitat attributes in Back Creek, near the mouth of Pony Creek (Sept 3, 2008).

Average Channel Width (m)	Average Wetted Width (m)	Average Gradient (%)	Total Cover	Cover Types (Dominant / Subdominant)	Bed Material (Dominant / Subdominant)	Morphology	Stream Pattern
10-30*	2.70	4	trace	deep pools / undercut banks, overhanging vegetation	gravel / cobble	riffle pool	sinuous

*Channel width appears to be excessive in area due to disturbance.

The stream provides minimal rearing habitat for salmonids; habitat is mainly in the form of small pools often associated with large rocks or woody debris in the channel. There were no quality spawning habitats (i.e. clean pea sized gravels for grayling spawning) documented and overwintering



potential of this stream as the stream is shallow with few deep pools. Sampling for fish resulted in the capture of a single juvenile Arctic grayling (Table 2; Figure 2). It is expected that this grayling migrated into this stream for summer rearing purposes and would return to Victoria Creek or larger downstream water bodies for overwintering.

Table 2. Summary of fish sampling effort in Back Creek.

Sampling Date	General Location	Sampling Method	Sampling Effort	Fish Captured
Sept 3, 2008	Lower 1 km of stream	Electrofishing	448 seconds	1 juvenile Arctic grayling (18 cm)



Photo 3. Upstream view of Back Creek, note the erodible banks adjacent to the stream channel.



Photo 4. Upstream view of Back Creek near Pony Creek confluence.

3.2 PONY CREEK

Pony Creek is braided near the mouth and enters Back Creek in a number of locations. All access points appear to be very steep or have notable drops at the point of entry. At the time of survey, the entire flow was entering Back Creek at a location that had two notable waterfalls within the lower 6 m. The lower drop (Photo 5) was 93 cm high and the second was 95 cm; average gradient over this area was 40%. The maximum jump height of Arctic grayling is 1 m, provided there is a pool depth of 1.25 m (Parker, 2000). As there were only shallow pools at the outlets, these drops would be a barrier to all life stages of Arctic grayling.



Photo 5. Pony Creek entering Back Creek, note the waterfall at this location.

Upstream of the barriers, Pony Creek is a dynamic stream with some channelized sections, some areas of extensive underground flow and areas with spread out flow over organics and through vegetation. Pony Creek is generally narrow with a moderate gradient 5-10%. Bed material is variable with many areas composed largely of fines/organics with some areas with gravel and/or cobble. Riparian vegetation was dominated by dense willow, shrubs, grasses and sparse conifers. The stream is generally quite shallow with few significant pools (Photo 6 and Photo 7). The stream does not provide spawning or overwintering habitat and rearing habitat for salmonids was determined to be of a very poor quality. Fish habitat data was collected at a representative site on Pony Creek (Table 3).

Table 3. Summary of fish habitat assessment in Pony Creek (Sept 3, 2008).

Average Channel Width (m)	Average Wetted Width (m)	Average Gradient (%)	Total Cover	Cover Types (Dominant / Subdominant)	Bed Material (Dominant / Subdominant)	Morphology	Stream Pattern
2.4	1.23	5.25	trace	overhanging vegetation / NA	gravel / fines	riffle pool	sinuous



Photo 6. Downstream view of Pony Creek.



Photo 7. Upstream view of Pony Creek.



Fish sampling was conducted in Pony Creek using a combination of electrofishing and minnow trapping and no fish were captured (Table 4). The steep gradient and barriers to fish passage near the mouth and poor quality habitat throughout the stream precludes fish from using this stream.

Table 4. Summary of fish sampling effort in Back Creek.

Sampling Date	General Location	Sampling Method	Sampling Effort	Fish Captured
Sept 3-4, 2008	Downstream Adit Location	Minnow trapping	4 traps, total of 73.58 hrs	None
Sept 3, 2008	Lower 250 m of Stream	Electrofishing	224 seconds	None



4 CONCLUSIONS

The following conclusions were made from this study.

- Based on the results of this study it is clear that Pony Creek is non fish bearing.
- Low densities of grayling appear to use Back Creek for summer/fall rearing purposes, despite this stream being impacted by upstream placer activity.
- Reclamation planning should consider ensuring water quality from Pony Creek is of suitable quality that it does not negatively impact the fish populations in Back and Victoria creeks.



5 LITERATURE CITED

BC Environment. 1999. Reconnaissance (1:20,000) Fish and Fish Habitat Inventory: Site Card Field Guide. <http://ilmbwww.gov.bc.ca/risc/pubs/aquatic/sitecard/>

Parker, M.A., 2000. Fish Passage—Culvert Inspection Procedures. Watershed Restoration Technical Circular; no. 11. Ministry of Environment, Lands, and Parks. Province of British Columbia, 2000.

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