EDI ENVIRONMENTAL DYNAMICS INC.
Natural Resource Consultants

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September 22, 2009

EDI Job Number: 09-YC-0030

Assessment and Abandoned Mines Branch
Department of Energy, Mines and Resources
Yukon Government
Box 2703, K- 419
Whitehorse, YT Y1A 2C6

Attention: Frank Patch, Senior Project Manager

Re: Dome Creek Fish and Fish Habitat Assessment

The purpose of this letter report is to describe the fish and fish habitat present in Dome Creek, a small stream that runs through the Mt. Nansen abandoned mine site. Fish habitat in Dome Creek was assessed in August 2009 by a biologist from EDI Environmental Dynamics Inc., together with two assistants from the Little Salmon Carmacks First Nation (LSCFN). In addition, this creek was investigated as part of the 2005 Aquatic and Terrestrial Effects Project on the Mt. Nansen site (EDI 2007).

Dome Creek is a small watercourse that originates northwest of the mill site and flows southeast past the mill before entering the diversion channel, which directs it around the tailings pond facilities (Figure 1). Downstream of the tailings and seepage dam Dome Creek re-enters its original channel and continues east to where it crosses the mine road, and ultimately enters Victoria Creek. For the purpose of this assessment the reach of study was from the road crossing to the confluence with Victoria Creek. This area represents the most likely area of fish presence due to its proximity to a fish bearing stream and habitat values.

Habitat in Dome Creek

Downstream of the road Dome Creek is a small channel that runs through a grassy wetland area. While it is mostly channelized the water periodically disperses to flow unconfined through the grass (Photo 1). In channelized areas the wetted width and channel were equivalent, and ranged from 0.30 to 0.65 m. Average water depth of the creek was 0.46 to 0.68 m. Pools were few and shallow with residual depths ranging from 0.05 to 0.21 m. The gradient of the stream bed was very shallow, only 1 to 2%.

Photo 1. View of Dome Creek valley, showing a section of the watercourse with no distinct channel.

In most areas there was very little cover present for the use of fish, generally taking the form of overhanging and instream grasses combined with some small woody debris. Both banks were vertical in shape, and were composed of grasses. Riparian vegetation was composed of grasses with some shrubs and willows. The stream substrate was composed entirely of organic fines. The stream followed a sinuous pattern and no islands or bars were noted within the reach investigated. Dome Creek was decoupled from surrounding terrain and unconfined (Photo 2). Finally a significant waterfall was noted where Dome Creek flows into Victoria Creek (Photo 3)[1]. This fall had a height of 0.94 m, with a relatively shallow plunge pool of 0.09 m depth. A waterfall of this height without a plunge pool of significant depth likely does not permit fish passage for species found in this area. Parker (2000) indicates that adult grayling have the ability to jump heights of 1.0 m if there is a minimum pool size of 1.25 m. The waterfall's location at the mouth of Dome Creek likely precludes entry to Dome Creek by any fish in Victoria Creek.

[1] Note that the falls were not bedrock and thus could change over time. During a high water event in 2005, Dome Creek was observed to flow into Victoria Creek at more than one location; however, all locations had notable falls associated with them due to a high bank height on Victoria Creek. It is not expected that these falls will cease to exist in the near future due to the current height combined with the low volume of water flowing in Dome Creek.

Photo 2. View of Dome Creek showing general stream attributes and surroundings.

Potential habitat for fish use can be divided into three broad categories; rearing, spawning and overwintering habitat. Rearing habitat in Dome Creek was poor to fair (most suitable to juvenile fish or slimy sculpin) as there was sufficient flow present in many areas, however overall depth was shallow and little cover was present. Spawning habitat was poor as the streambed was composed of fines and organic material; there were no appropriate spawning substrates (gravels/cobbles) for salmonids. Finally, overwintering habitat was poor as there was not sufficient depth, even in pool areas, to allow for under-ice survival in winter months. In most, if not all areas, Dome Creek freezes to substrate from early November through late April (this information comes from knowledge gained by EDI through extensive water quality sampling efforts completed from 2005 to present).

Photo 3. View of waterfall at the mouth of Dome Creek, as it flows into Victoria Creek.

Presence/Absence Sampling

Sampling was conducted on Dome Creek to determine whether any fish presence could be detected. Both minnow trapping and electrofishing methods were used (Table 1). No fish were captured using either method. In addition, electrofishing was conducted in the September 2005 as part of the Aquatic and Terrestrial Effects study (EDI 2007), and no fish were captured as part of that sampling.

Table 1: Sampling methods, effort and results in Dome Creek in September 2005 and August 2009.

Method	Effort	Fish Captured
Electrofishing (2005)	339 seconds	No fish captured
Minnow Trapping (2009)	4 traps for a total of 87 hours	No fish captured
Electrofishing (2009)	261 seconds	No fish captured

Following determination of the physical attributes of the stream including the lack of a distinct channel in some areas and the presence of a significant waterfall at the mouth of the stream, combined with the absence of fish through all sampling efforts leads us to designate Dome Creek as **non-fish bearing**. It is difficult to impossible for fish to gain access to the creek, and entry be gained due to a high water event, fish would not be able to survive a winter season due to the shallow depths present in the creek. As such, use would be limited to species that complete seasonal migration such as sub-adult and adult grayling for which there is no or limited rearing habitat.

If you have any questions or concerns with the findings in the report please do not hesitate to contact me at (867) 393-4882.

Yours truly,

EDI ENVIRONMENTAL DYNAMICS INC.

Lyndsay Doetzel, M.Sc., R.P.Bio.

Aquatic Biologist

References

EDI Environmental Dynamics Inc. 2007. Mt. Nansen Terrestrial and Aquatic Effects Study 2005-06. Prepared for Government of Yukon, Abandoned Mines Branch (Type II).

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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Back Creek

Pony Creek

Victoria Creek

Brown-McDade Pit

Mine Access Road

Mill Site

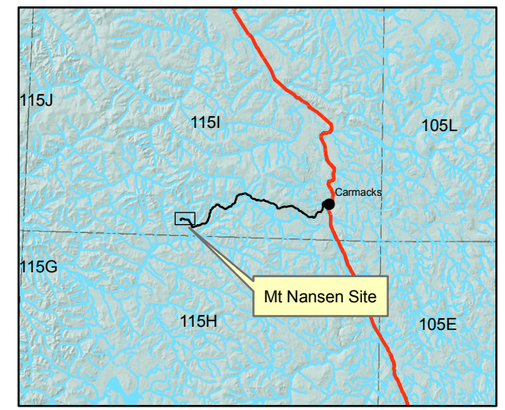
Tailings Pond

Dome Creek

Dry Creek

no distinct stream channel

waterfall



Legend

- .....Minnow Trap Locations
- .....Potential Barriers to Fish Movement
- .....Area of Investigation
- .....Site of Mining Disturbance
- .....Access (Mining) Road
- .....Waterbody
- .....Watercourse

Data Input/Drawn by:	M. Marjanovic
Checked By:	L. Doetzel
Date:	Date: 21 September 09
EDI Project Number:	09-YC-0030
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

Inset Map Sources:

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

Figure 1. Investigation of Fish and Fish Habitat in Dome Creek

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