Appendix V5-6D

2009 Freshwater Fish and Fish Habitat Baseline Report, Hope Bay Belt Project

TMAC RESOURCES

Hope Bay Mining Limited

2009 Freshwater Fish and Fish Habitat Baseline Report, Hope Bay Belt Project

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2009 FRESHWATER FISH AND FISH HABITAT BASELINE REPORT, HOPE BAY BELT PROJECT

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Prepared for:

Hope Bay Mining Limited

Prepared by:

Rescan™ Environmental Services Ltd.
Kamloops, British Columbia

Executive Summary

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Executive Summary

Environmental baseline studies were conducted by Rescan Environmental Services Ltd. (Rescan) on behalf of Hope Bay Mining Ltd. (HBML) at the Hope Bay Belt Project in 2009. The Hope Bay Belt property is located approximately 125 km southwest of Cambridge Bay, Nunavut, on the southern shore of Melville Sound.

The purpose of the 2009 environmental baseline program was to collect additional information to support the design and permitting of a future expanded Hope Bay Belt Project. The objective of the 2009 freshwater fish baseline work was to characterize fish habitat and fish communities in lakes, ponds, rivers and streams of the Project area. Fish communities were characterized in terms of species richness, relative abundance (i.e., catch-per-unit-effort), absolute abundance (only in Doris and Patch lakes which were surveyed by hydroacoustic gear) and biological features (e.g., length, weight, age). Lake trout diet and tissue metal concentrations were sampled from five lakes. Historical information on fish and fish habitat from 1995 to 2007 was summarized to assist Project planning, permitting and future environmental monitoring.

Studies of fish habitat found that lakes supplied the greatest amount of perennial fish habitat in the Project area. Fines were the predominant substrate at potential receiving environment lakes, while bedrock and boulder substrates were most prevalent at reference lakes. Large rivers and lake outlet streams supplied good quality habitat for fish. Ninespine stickleback, juvenile Arctic char and lake trout were the predominant species captured from streams. Ponds and small, ephemeral streams assessed were generally non-fish-bearing and rated as poor habitat quality.

The fish communities of lake, river, stream and pond habitats were also assessed. The fish communities of lakes were assessed using gillnets and/or hydroacoustic gear. Large river sites were assessed with a combination of gillnets, minnow traps and electrofishing gear. The fish community of stream sites was primarily assessed using backpack electrofishing gear. Fish communities displayed very low species richness. A total of seven species were identified in freshwater environments, including Arctic char, Arctic grayling, cisco, lake trout, lake whitefish, ninespine stickleback and slimy sculpin. Cisco, lake whitefish and lake trout represented the majority of fish captured. Hydroacoustic gear was used to estimate fish absolute abundance at Doris and Patch lakes. The total number of fish was estimated as 55,806 and 33,619, respectively. Hydroacoustic and gillnetting data both showed that fish abundance generally increased with depth in Doris and Patch lakes. Taxonomic analysis of stomach contents was conducted on lake trout and lake whitefish stomachs. These analyses found several food sources derived from marine and freshwater environments. Lake trout muscle and liver tissue samples were analysed for total metal concentrations from five lakes in the Project area. All lake trout samples, both muscle and liver, had concentrations below the Health Canada guideline for mercury.

Acknowledgements

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Acknowledgements

This report was prepared for Hope Bay Mining Ltd. by Rescan Environmental Services Ltd. The 2009 freshwater fish and fish habitat fieldwork was conducted by Kevin Esseltine (M.Sc.), Kirsten MacKenzie (M.Sc., R.P.Bio.), Erika Genrich (B.Sc.), Michael Stamford (M.Sc.) and François Landry (M.Sc., R.P.Bio.). Hydroacoustic assessments were conducted by Brock Stables (M.Sc.) with the assistance of K. Esseltine and K. MacKenzie. The report was prepared by K. Esseltine with support from E. Genrich, David Fauquier (B.Sc.) and Carolyn Duckham (B.Sc.), and reviewed by Michael McGurk (Ph.D., R.P.Bio.). The Hope Bay Belt Project was managed by Deborah Muggli (Ph.D., R.P.Bio.).

Rescan staff were assisted in the field by Tannis Bolt, Aaron Halushka, Janet Kadlun, Darcy Kanayok, Clarence Klengenberg, Stephen Kuhoktak, Wynter Kuliktana and Irvin Kuptana.

Field-related support was provided by the Newmont Environment and Social Responsibility (ESR) Department, Health, Safety and Loss Prevention (HSLP) Department, Great Slave Helicopters, Braden Burry Expediting and Nuna Logistics.

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1. Introduction

1. Introduction

The Hope Bay Belt Property is located approximately 125 km southwest of Cambridge Bay, Nunavut, on the south shore of Melville Sound (Figure 1-1). The nearest communities are Omingmaktok (75 km to the southwest of the property), Cambridge Bay, and Kingaok (Bathurst Inlet; 160 km to the southwest of the property).

The property consists of a greenstone belt running in a north/south direction, approximately 80 km long, with three main gold deposit areas. The Doris and Madrid deposits are located in the northern portion of the belt and the Boston deposit is located in the southern end. The northern portion of the property consists of several watershed systems that drain into Roberts Bay and a large river (Koignuk River) that drains into Hope Bay. Watersheds in the southern portion of the belt ultimately drain into the upper Koignuk, which drains into Hope Bay.

Newmont Mining Corporation (Newmont) acquired the property in 2008, and initially decided to consider the property as a whole to evaluate various options for responsible, long-term development of the belt. However, as of the fall of 2009, Hope Bay Mining Ltd. (HBML), a fully owned subsidiary of Newmont, has decided to proceed with developing the already-permitted Doris North Project, which consists of a two year underground gold mine in the north end of the belt.

The environmental baseline program conducted in 2009 was based on the plan to develop multiple deposits in the belt, as illustrated in Figure 1-2. The 2009 program was also based on Newmont's priorities as of early 2009, which included regulatory compliance with the existing Doris North Project permits and licences. Baseline programs for ecosystem mapping, vegetation, soils and socio-community were deferred to 2010. Baseline work was primarily focused on the north end of the belt in 2009.

Results from the 2009 environmental baseline program are being reported in a series of reports, as follows:

- 2009 Hydrology Baseline Report;
- 2009 Meteorology Baseline Report;
- 2009 Freshwater Baseline Report;
- 2009 Freshwater Fish and Fish Habitat Baseline Report;
- 2009 Marine Baseline Report; and
- 2009 Marine Fish and Fish Habitat Baseline Report.

In addition, baseline information obtained during 2009 was used to generate various compliance reports as specified in the Doris North Project Certificate (e.g., the Wildlife Monitoring & Mitigation Program Report), the Doris North Type A Water Licence and the Doris North Roberts Bay Jetty Fisheries Authorization. Archaeology work was also conducted in 2009 and is being reported separately.

This report presents the results from the freshwater fish and fish habitat portion of the 2009 environmental baseline program.

Figure 1-1

Hope Bay Belt Project Location

PROJECT # 1009-002-01 GIS # HB-15-009 May 26 2009

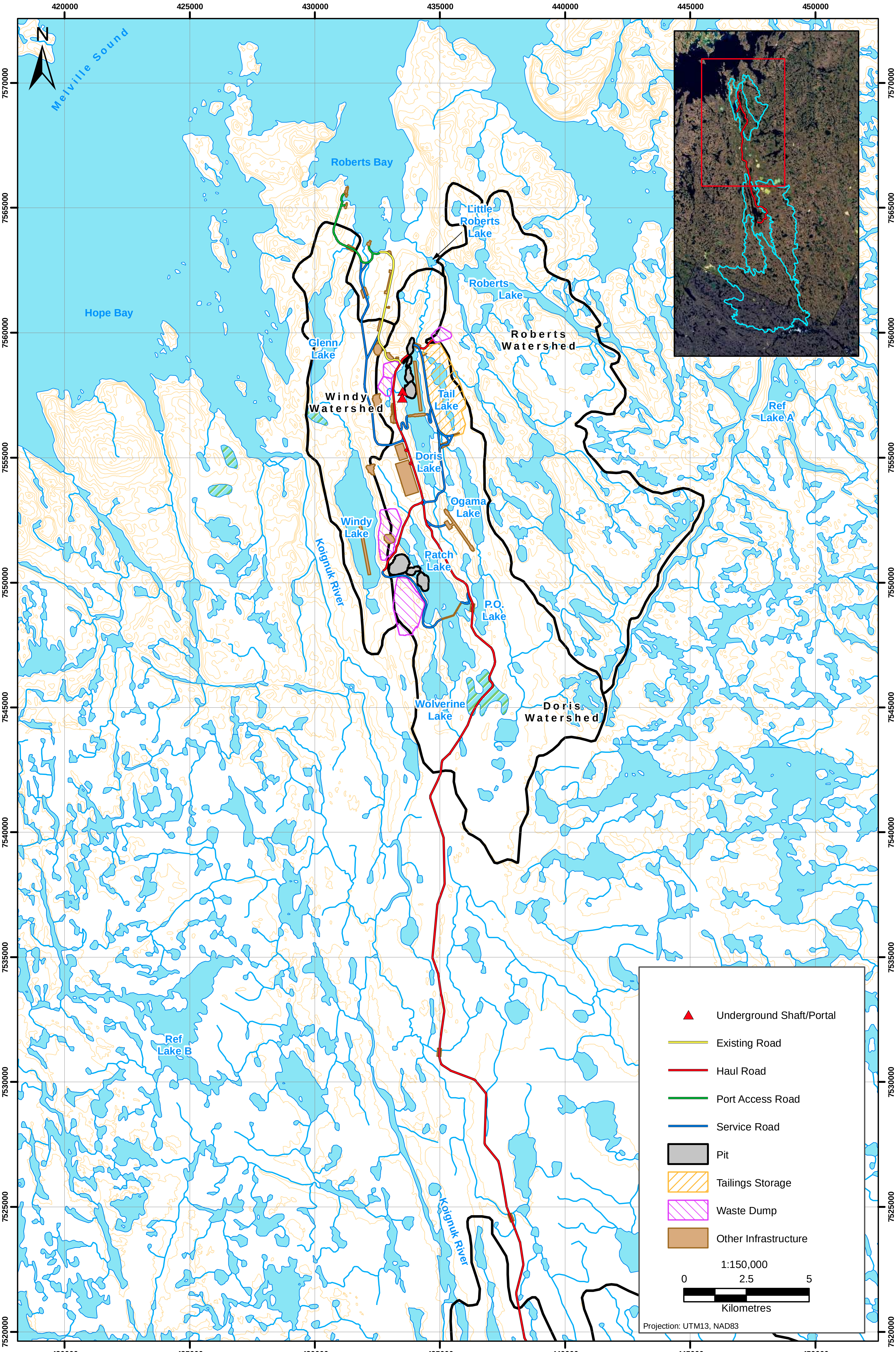

Figure 1-2

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Site Layout Options Considered for 2009 Baseline Program

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The primary objective of the 2009 freshwater fish and fish habitat baseline work was to characterize fish habitat and fish communities in the Project area. Fish habitat was defined as those environmental components that are required either directly or indirectly by fish to carry out their life processes, including spawning and rearing areas, food production areas, migration routes and over-wintering areas. These areas included lakes, ponds, large rivers and streams. The fish communities were defined in terms of total number and number-by-species at each sampling location, total catch-per-unit-effort (CPUE) and species-specific CPUE for each type of assessment gear. Biological features of fish such as length, weight, condition, age and diet were also measured. Lake trout (*Salvelinus namaycush*) tissue metal concentrations were evaluated at three lakes in the potential receiving environment and at two reference lakes. Hydroacoustic methods were also used to estimate absolute fish abundance and evaluate fish habitat in Doris and Patch lakes, respectively.

The secondary objective of this report was to summarize historical data on freshwater fish and fish habitat in the Hope Bay Belt study area to provide context to the results of the 2009 work.

2. Materials and Methods

2. Materials and Methods

2.1 FISH HABITAT

2.1.1 Lake Habitat

2.1.1.1 Visual

Fish habitat surveys were conducted at four lakes (Little Roberts, Glenn, Windy and Reference A) in the Project area in 2009 (Figure 2.1-1 and Table 2.1-1). Other water bodies in the Project area including Doris, Patch, P.O., Ogama and Tail lakes, and the Koignuk River were assessed using similar methods in previous studies conducted in 2005 to 2007. Surveys were conducted by walking or slowly boating along the shoreline and delineating habitat units based on the substrate composition of the littoral zone. Substrate composition was recorded as a percent coverage (e.g., 70% cobble and 30% boulder) within delineated zones. The habitat types were classified as bedrock, boulder, cobble, gravel, sand, silt and organic material. Patches of emergent and submergent vegetation were noted and recorded on a field map. Photographs were taken to illustrate various habitat types.

Table 2.1-1. Lakes Assessed for Littoral Zone Fish Habitat, Hope Bay Belt Project, 2009

			UTM	
Lake	**Watershed**	**Date Assessed**	**Easting**	**Northing**
Little Roberts	Doris/Roberts	28-Jul-2009	434600	7562800
Glenn	Windy	4-Aug-2009	430500	7560000
Windy	Windy	29-Jul-2009	432000	7552500
Reference A	Reference A	26-Jul-2009	449000	7558000

2.1.1.2 Hydroacoustics and Underwater Video

<u>Substrate Classification</u>

Data Collection

The site infrastructure options considered for 2009 included the construction of dykes at the central portion of Doris and Patch lakes, in order to develop open pits at the northern end of each lake. The development of these open pits would require de-watering of a portion of each lake, which would result in the loss of fish habitat. Thus, hydroacoustic methods were used to quantify fish habitat in Doris and Patch lakes, in order to obtain information on lake productive capacity and habitat quality for fish habitat compensation purposes.

Hydroacoustics were used for substrate classification (or bottom typing) at Doris and Patch lakes on August 22 and 27, 2009, respectively. Data were collected from a 4.3 m-long aluminum boat with a low-horsepower outboard motor (Plate 2.1-1). The echo sounding system consisted of a dual-transducer, 200 kHz, BioSonics DT-X split-beam scientific echo sounder linked to a Garmin model 182 differential GPS. The transducers were mounted on a metal pole that was attached to the port side of the boat, with one transducer aimed downward (down-looking) and the other aimed sideways (side-looking) perpendicular to the direction of travel, tilted slightly downward. The down-looking transducer was aimed 1° to 3° sternward to aid in the identification of bubbles. The side-looking transducer was tilted 5° down from horizontal to reduce echoes from the lake surface as described by Yule (2000). The system was controlled by a laptop computer that displayed electronic echograms for monitoring sounder performance during data collection. Hydroacoustic data merged with geographic coordinates from the GPS were logged to the computer hard drive. Other system specifications appear in Table 2.1-2. Only data from the down-looking transducer was used for bottom typing.

Plate 2.1-1. Hydroacoustics system used to conduct substrate classification and fish abundance estimates at Doris and Patch lakes, Hope Bay Belt Project, 2009.

Table 2.1-2. Hydroacoustic System Specifications for Surveys of Doris and Patch Lakes, Hope Bay Belt Project, 2009

Project Phase	Category	Variable	Value
Data Collection	Transducers	Type	Split-beam[1]
		Sound frequency	201 kHz down-looking
			199 kHz side-looking
		Nominal beam angle	6.7° down-looking
			6.5 side-looking
		Depth of transducer face	0.55 m
	Settings (both transducers)	Pulse width	0.4 msec
		Transmit power level	low (-10.3 dB)
		Data collection threshold	-60 dB
		Minimum data range[2]	0.5 m
		Time varied threshold	40 log R
		Ping rate	8 pps/transducer
	DGPS	Type	WAAS-differential[3]
		Datum	NAD83
	Other	Transecting speed	1.4 to 1.9 m/sec

(continued)

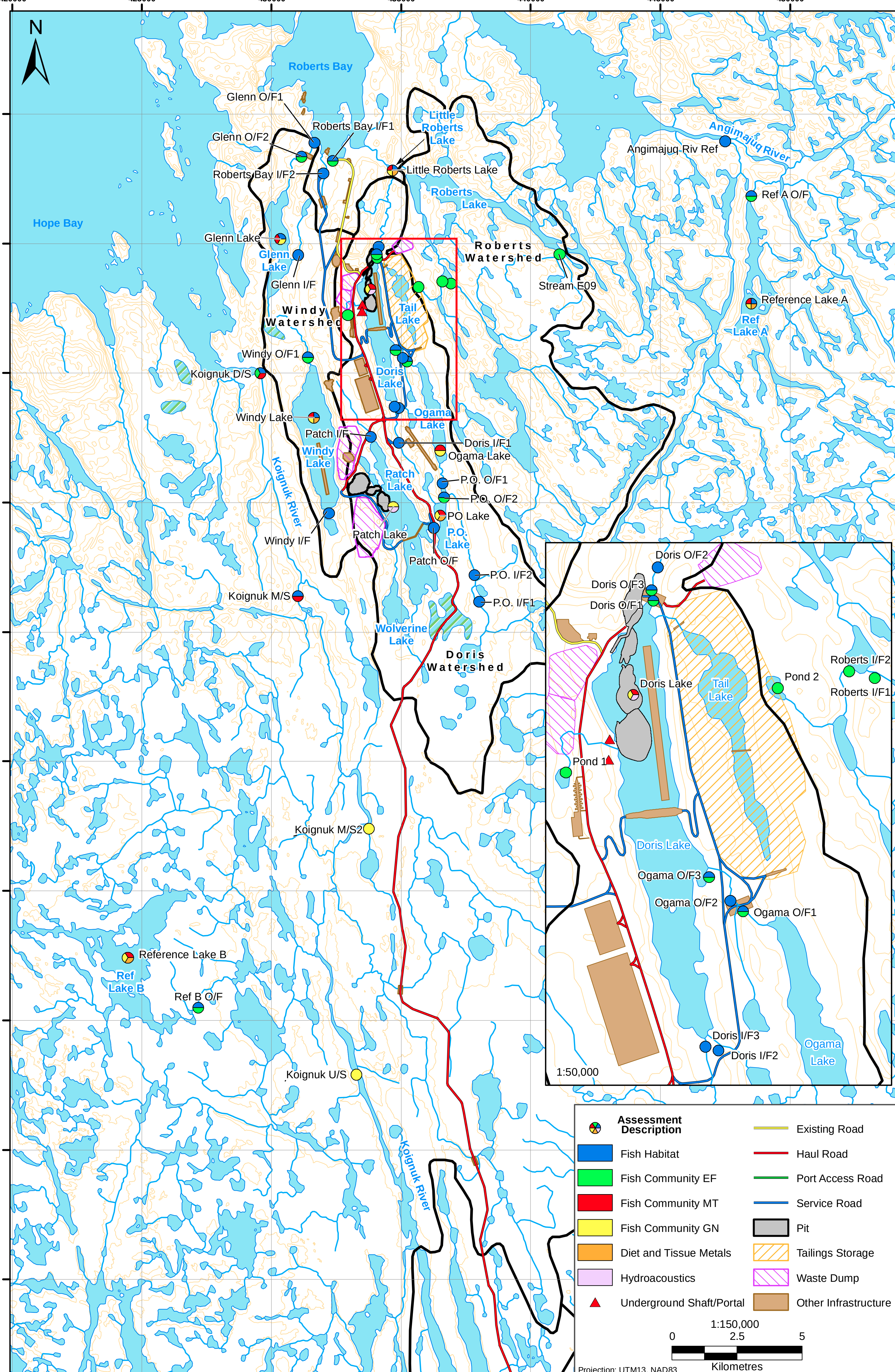

Figure 2.1-1

Fish Habitat and Fish Community Assessment Locations, Hope Bay Belt Project, 2009

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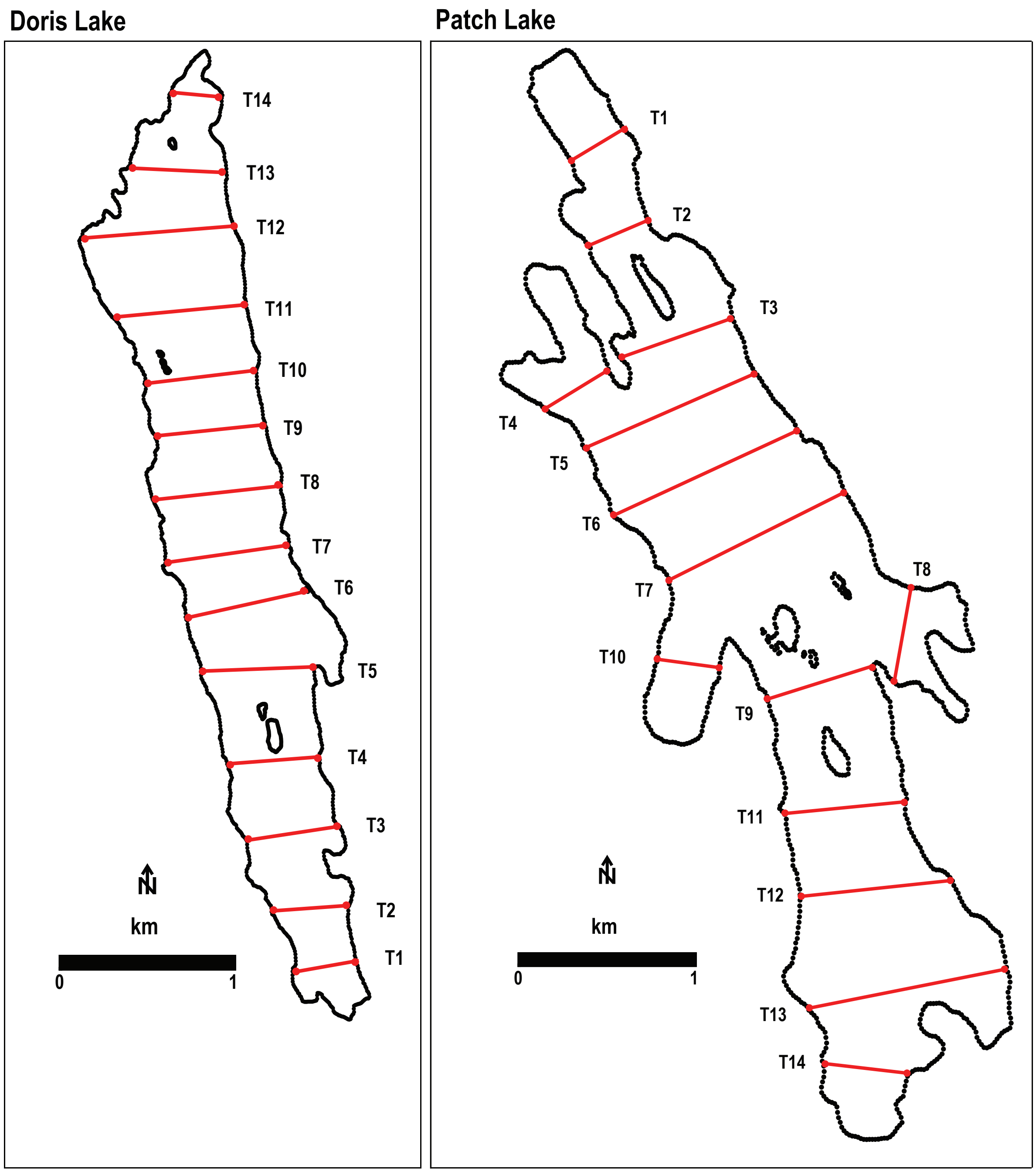
Table 2.1-2. Hydroacoustic System Specifications for Surveys of Doris and Patch Lakes, Hope Bay Belt Project, 2009 (completed)

Project Phase	Category	Variable	Value
Data Analysis	General	Calibration offset	-0.7 dB down-looking
			-0.5 dB side-looking
		Time varied gain	40 log R
		Minimum threshold[4]	-60 dB
		Maximum threshold[4]	none
		Beam pattern threshold	-6 dB
		Beam full angle	6.7° down-looking
			6.5° side-looking
		Single target filters	0.8 to 1.5 @ -6 dB
		Range processed[2]	2 to 20 m down-looking
			10 to 30 m side-looking
	Fish tracking, per fish	Minimum number echoes	1 down-looking
			2 side-looking
		Maximum range change	0.2 m
		Maximum ping gap	1

[1] *BioSonics DT-X split-beam digital scientific echo sounder.*
[2] *Range from transducer.*
[3] *A WAAS satellite signal was received during sampling with typical nominal position accuracy 2 to 3 m.*
[4] *Processing threshold after application of calibration offset.*

Sampling was performed by piloting the boat with the hydroacoustics system along pre-mapped transects (Figure 2.1-2) at a speed of 1.4 to 1.9 m/s. A total of 14 transects on each lake were performed. Supplemental transects (between pre-mapped transects) were performed to capture additional data in key habitat areas. Transects 6, 10, 11 and 13 were selected as reference transects. These transects were also surveyed using underwater video to obtain a continuous record of substrate types and to verify hydroacoustic classification of bottom type at the same locations.

Video recordings of the lake bottom were conducted on August 29, 2009, using the same boat and motor used for hydroacoustic surveys. Images were collected with a Deltavision Splashcam recording to a Sony VRD-VC20 DVD recorder (Plate 2.1-2). The camera was suspended from a rope held over the side of the boat with the lens aimed straight down about 50 to 100 cm above bottom. Transects were performed at 0.27 to 0.54 m/s. Occasionally, the boat was stopped to obtain a clear stationary image. Parallel lasers 10 cm apart were used as a reference for the distance that the camera was above bottom and as a scale for substrate size estimates. Time and boat positions (latitude and longitude), provided by a Garmin GPSmap 182 differential GPS, were continuously recorded to the video image by way of a video overlay device. Nominal position accuracy of the GPS (indicated by the instrument) was 2 to 3 m during the survey. GPS tracks from both the video and hydroacoustic transect lines showed nearly perfect overlap. Thus, the calibration of the video and hydroacoustics substrate data were deemed highly accurate.



Pre-mapped Transects used for Hydroacoustic Surveys of Substrate Classification and Fish Abundance Estimates at Doris and Patch Lakes, Hope Bay Belt Project, 2009

Figure 2.1-2

Plate 2.1-2. Underwater video system used to observe substrate at Patch Lake, Hope Bay Belt Project, 2009.

Data Processing and Analysis

Substrate composition was determined from hydroacoustic data using the RoxAnn method (Chivers et. al. 1990), which was implemented through BioSonics Visual Bottom Typing (VBT) version 1.12 software (Burczynski 2007). This method uses the ratio of first and second bottom echo energy levels to distinguish bottom types. Energy from the first echo (E1) represents substrate roughness, while energy from the second echo (E2) represents hardness. Scatter plots of these variables are used to characterize substrate types through a form of cluster analysis. Because E1 and E2 can vary from ping to ping, even at a single location with a homogeneous bottom type, VBT estimates bottom type by averaging values from groups of contiguous pings (or reports). In this study, VBT reports were 20 pings long (equivalent to 4 to 5 m along a transect at a speed of 1.4 to 1.9 m/s). Other processing settings appear in Table 2.1-3.

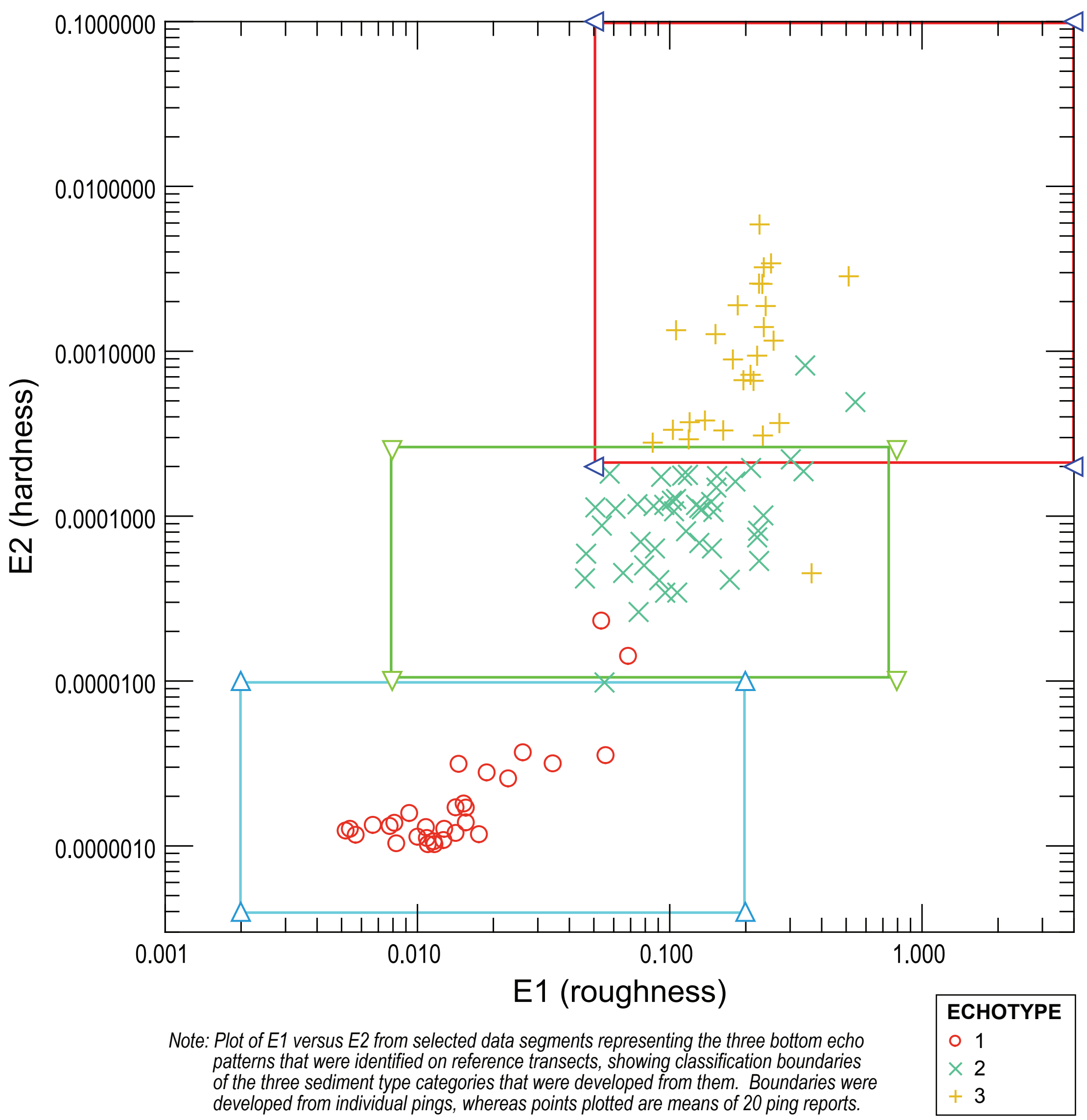
The substrate classification scheme used for Patch and Doris Lakes was developed using data from Patch Lake reference transects (6, 10, 11 and 13). Echograms from these transects were examined with Echoview software (settings 20 log R, -80 dB threshold) to identify distinct bottom echo patterns that might represent different types of substrate. Three main types were recognized: strong, moderate and weak second bottom echo. One or more data segments representing each pattern were then chosen from Transect 6 and processed in VBT. Plots of the resulting E1 and E2 values showed three main data clusters, suggesting three main substrate types on Transect 6, and boundaries were developed for these clusters (Figure 2.1-3).

Table 2.1-3. Visual Bottom Typing (VBT) Processing Settings used to Distinguish Bottom Types of Doris and Patch Lakes, Hope Bay Belt Project, 2009

Item	Setting
Data processing threshold	-80 dB
TVG	30 log R
Bottom Sampling Windows	
First bottom, first part	16 samples
First bottom, second part	40 samples
Second bottom	100 samples
Sediment layer	16 samples
Bottom Tracker Settings	
Peak threshold	-45 to -30 dB (typically -40 dB)
Peak width	5 samples
Bottom detection threshold	-60 dB
Above bottom blanking	1 samples
Alarm limit	8 samples
Tracking window	25 samples
Tracking domain	20 log R
Bottom typing method	B2 (E1/E2)
Depth normalization	none
Pings per report	20
Energy filter	75%

Video recordings were analyzed in the lab by playing them back on a computer using Windows Media Player and visually observing the substrate type and degree of plant coverage. For each minute of each transect, all substrate size classes observed and an overall estimate of plant coverage were recorded on a data form. At a boat speed of 0.27 to 0.54 m/s (or 1 to 2 km/hr), a 1 minute segment would be 17 to 33 m long. Substrate size classes followed the modified Wentworth scale for particle size (<2 mm = fines, 2 to 64 mm = gravel, 64 to 256 mm = cobble, >256 mm = boulder; Orth 1983) and plant coverage was classed as sparse (0 to 25% of the bottom covered), intermediate (25 to 50% covered), or extensive (75 to 100% covered). A screen-capture that included sampling time and geo-coordinates was taken at the end of each segment.

The physical composition of these hydroacoustic categories (e.g., mud or rock) was mainly determined by comparing them to the video classifications within several reference transect segments where video indicated that the substrate type was uniform for some distance. Hydroacoustic categories 1 and 2 (moderate and weak second bottom echoes) were soft, fine sediments that could not be distinguished from each other with the video (Figures 2.1-3 and 2.1-4). However, in a later test at Lake Whatcom, Washington (B. Stables, unpublished data), hydroacoustic data from mud matched category 2, suggesting that category 2 also represented mud in Patch Lake. Hydroacoustic category 3, with a strong second bottom echo, represented rocky substrates. Video data from the reference transects indicated little gravel, and that gravel, cobble and boulder were mixed or in patches smaller than 45 m, the length of VBT reports. Therefore, hydroacoustic category 3 corresponds to a mix of mainly cobble and boulder, occasionally interspersed with gravel or fines.



Note: Plot of E1 versus E2 from selected data segments representing the three bottom echo patterns that were identified on reference transects, showing classification boundaries of the three sediment type categories that were developed from them. Boundaries were developed from individual pings, whereas points plotted are means of 20 ping reports.

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Plot of Substrate Hardness on Roughness from Hydroacoustic Ecotype Data used to Determine Substrate Categories, Hope Bay Belt Project, 2009

Figure 2.1-3

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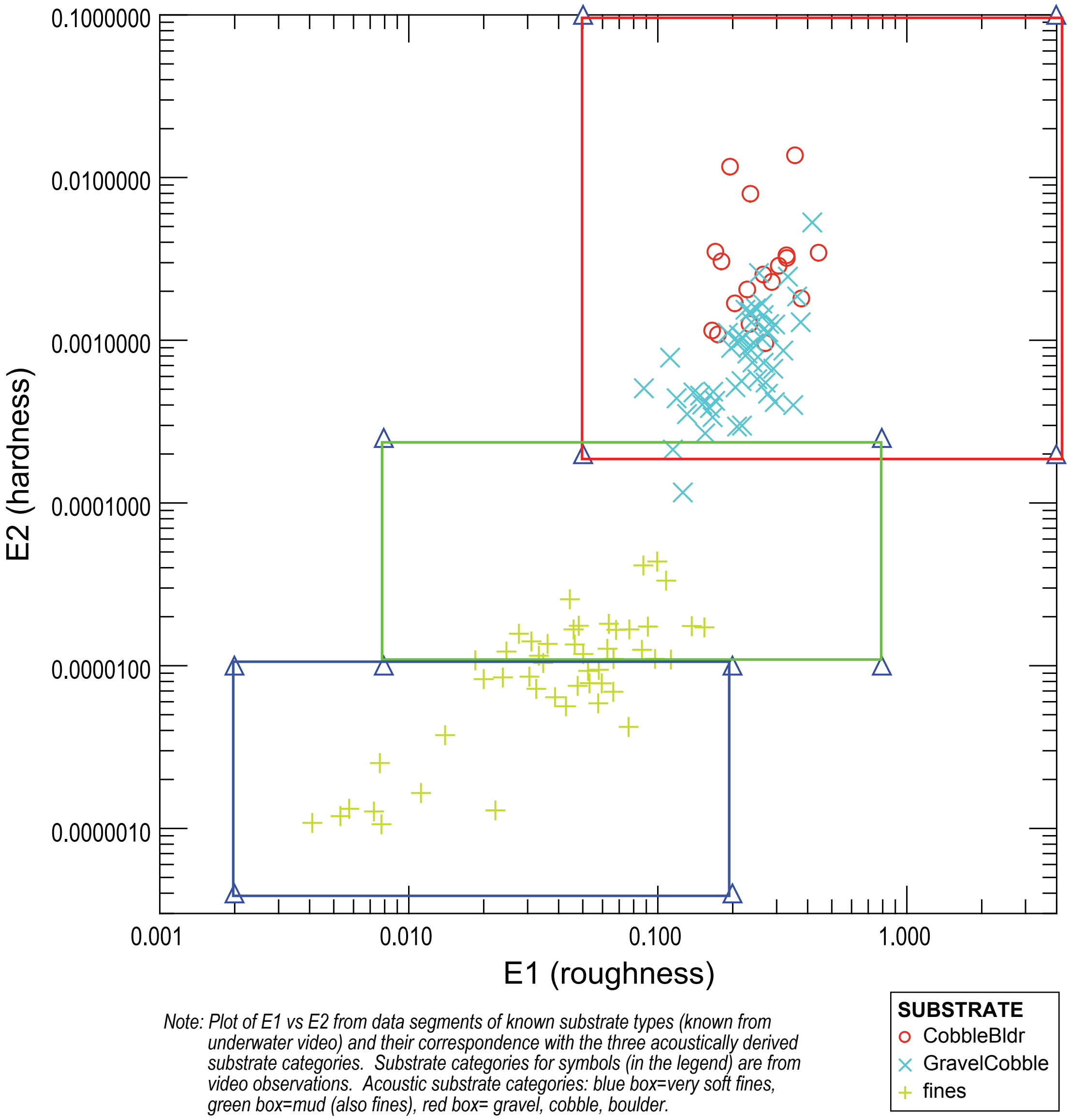


Note: Plot of E1 vs E2 from data segments of known substrate types (known from underwater video) and their correspondence with the three acoustically derived substrate categories. Substrate categories for symbols (in the legend) are from video observations. Acoustic substrate categories: blue box=very soft fines, green box=mud (also fines), red box= gravel, cobble, boulder.

Plot of Substrate Hardness on Roughness from Underwater Video Data used to Calibrate Substrate Categories at Patch Lake, Hope Bay Belt Project, 2009

Figure 2.1-4

A comparison of video and hydroacoustic substrate categories along the reference transects showed a close correspondence between results of the two methods (Figure 2.1-5 and Table 2.1-4). With video results used as a standard, classification accuracy exceeded 95% when additional data from over 235 m of reference transects 11 and 13 were used to test the hydroacoustic classification model.

Table 2.1-4. Tests of the Substrate Classification Model using Data from Reference Transects at Patch Lake, Hope Bay Belt Project, 2009

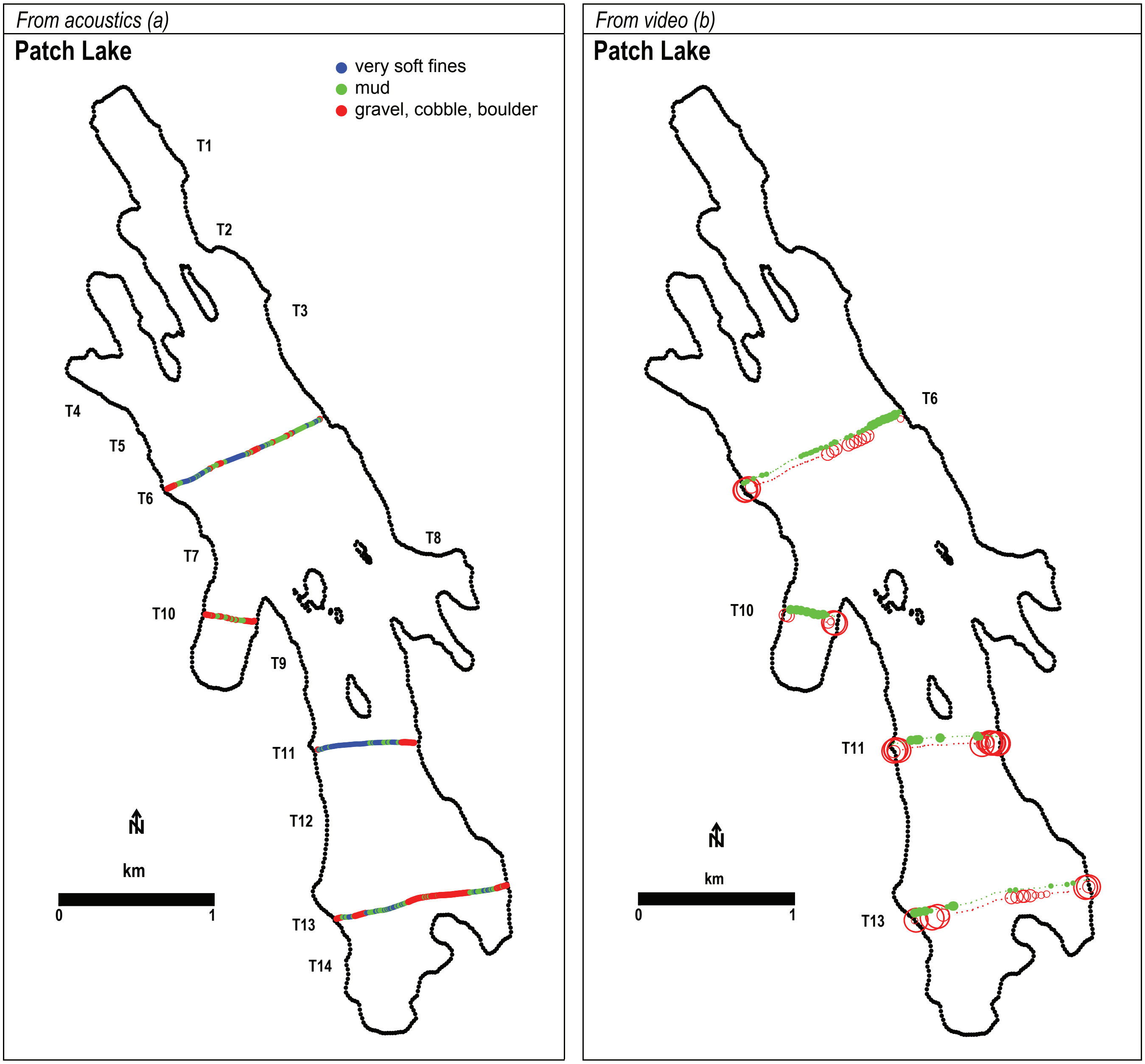
			Acoustic Classification from E1/E2					
			Number of Reports			Percentage of Reports		
Transect	Video Classification	Total Number of VBT Reports	Very Soft Fines (1)	Mud (2)	Gravel, Cobble, Boulder (3)	Very Soft Fines (1)	Mud (2)	Gravel, Cobble, Boulder (3)
11	fines	9	9	0	0	100	0	0
11	cobble and boulders	18	0	0	18	0	0	100
13	fines	40	19	21	0	48	53	0
13	gravel and cobble	51	0	2	49	0	4	96

2.1.2 Stream Habitat

A total of 26 stream sites were surveyed in the Project area (Table 2.1-5 and Figure 2.1-1). The inflows (I/F) and outflows (O/F) of the lakes and ponds sampled in the Project area were surveyed to identify which streams provided fish habitat and allowed fish passage between lakes. Streams that had clearly defined channels were split into units defined by habitat type and underwent an assessment that followed the protocol originally developed by Johnston and Slaney (1996) for the BC Watershed Restoration Program. A field data sheet template is shown in Appendix 2.1-1. The following habitat types were identified: pool, glide, riffle, and cascade. Within each habitat unit, the physical features (e.g., gradient, mean depth, mean width, substrate composition, water velocity, availability of cover for fish, potential barriers, bank stability and bank height) were measured. Data were collected with a measuring tape, meter stick, clinometer (for gradient), and by visual inspection.

Some streams in the Project area had no clearly defined channel, with water flowing among boulder gardens and tundra vegetation. In these circumstances, a description of the flow characteristics and potential fish habitat was provided, but a detailed breakdown into different habitat types was not conducted.

Data collected on the habitat variables listed above were used to evaluate the overall quality of fish habitat at sites within the Project area. Fish habitat quality was evaluated for all fish life-stages (e.g., spawning, rearing, adult feeding, and overwintering) and categorized as none, poor, fair or good. These observations of fish habitat and fish catch data were used to determine if a stream site is fish bearing, and to classify fish habitat as none, marginal, important or critical on a watershed scale. Based on the fish-bearing status of each site and the streams wetted width, streams were classified as shown in Table 2.1-6.



Note: Map (b) - green dots indicate degree of algae coverage (small=0-25%, medium=25-75%, large=75-100%) and red circles indicate the largest substrate particle size observed per 1 minute segment of transect.

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Comparison of Substrate Maps using Hydroacoustics and Video Data at Four Reference Transects at Patch Lake, Hope Bay Belt Project, 2009

Figure 2.1-5

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Table 2.1-5. Steam and River Fish Habitat Assessment Locations, Hope Bay Belt Project, 2009

Site	Watershed	UTM	
		Easting	Northing
Doris O/F1	Doris	434067	7559440
Doris O/F2	Doris	434124	7559869
Doris O/F3	Doris	434044	7559575
Doris I/F1	Doris	434901	7552300
Doris I/F2	Doris	434906	7553648
Doris I/F3	Doris	434738	7553696
P.O. O/F1	Doris	436591	7550740
P.O. O/F2	Doris	436649	7550190
P.O. I/F1	Doris	438010	7546164
P.O. I/F2	Doris	437821	7547195
Ogama O/F1	Doris	435223	7555438
Ogama O/F2	Doris	435059	7555575
Ogama O/F3	Doris	434784	7555878
Patch O/F	Doris	436255	7549016
Patch I/F	Doris	433821	7552530
Roberts Bay I/F1	Roberts Bay	431028	7559547
Roberts Bay I/F2	Roberts Bay	432218	7549585
Glenn O/F1	Windy	433745	7537391
Glenn O/F2	Windy	433263	7527897
Glenn I/F	Windy	431657	7563884
Windy O/F1	Windy	431154	7563342
Windy I/F	Windy	431405	7555594
Ref A O/F	Reference	436914	7558445
Ref B O/F	Reference	436584	7558531
Koignuk D/S	Koignuk	429569	7554988
Koignuk M/S	Koignuk	431015	7546380
Angimajuq Riv Ref	Reference	441106	7559574

Table 2.1-6. Classification System for Streams, Hope Bay Belt Project, 2009

Stream Class	Channel Width (m)	Fish-Bearing Status
S1 - Large River	> 100	Fish
S1	> 20	Fish
S2	20 to 5	Fish
S3	5 to 1.5	Fish
S4	< 1.5	Fish
S5	> 3.0	No Fish
S6	< 3.0	No Fish

2.2 FISH COMMUNITY

2.2.1 Field Sample Collection and Processing

The fish communities of seven lakes, two large river sites, 13 stream sites and two ponds were sampled in July and August 2009 (Figure 2.2-1). These sites were sampled using a combination of sinking and floating gillnets (Plate 2.2-1), seine nets, minnow traps and backpack electrofishing (Plate 2.2-2). Gillnets and minnow traps were set in lakes that could accommodate a boat, while minnow traps and electrofishing were used at the lake inflows and outflows, or along the shoreline areas. Fishing effort with gillnets and minnow traps was spread over the entirety of each lake to ensure that all habitat types were sampled and to capture fish of different ages and species with varying habitat preferences. For lakes where the fish community was known (from past studies), the fish community studies were conducted for one of three purposes: 1) to estimate relative fish abundance and species-specific population sizes in Doris and Patch lakes; or 2) to collect lake trout tissue metals samples from Little Roberts Lake, P.O. Lake, Windy Lake, Reference Lake A and Reference Lake B; or 3) to collect general fish community data (i.e., community composition and fish biological data) for baseline reporting.

Site layout options considered in 2009 included the construction of dykes at the central portion of Doris and Patch lakes. Gillnetting and hydroacoustic methods were used to estimate fish abundance and populations, and to determine fish distribution (vertical and horizontal) in Doris and Patch lakes to document information that would be required to develop a compensation plan for the resulting loss of fish habitat.

Plate 2.2-1. Gillnetting at Doris Lake, Hope Bay Belt Project, 2009.

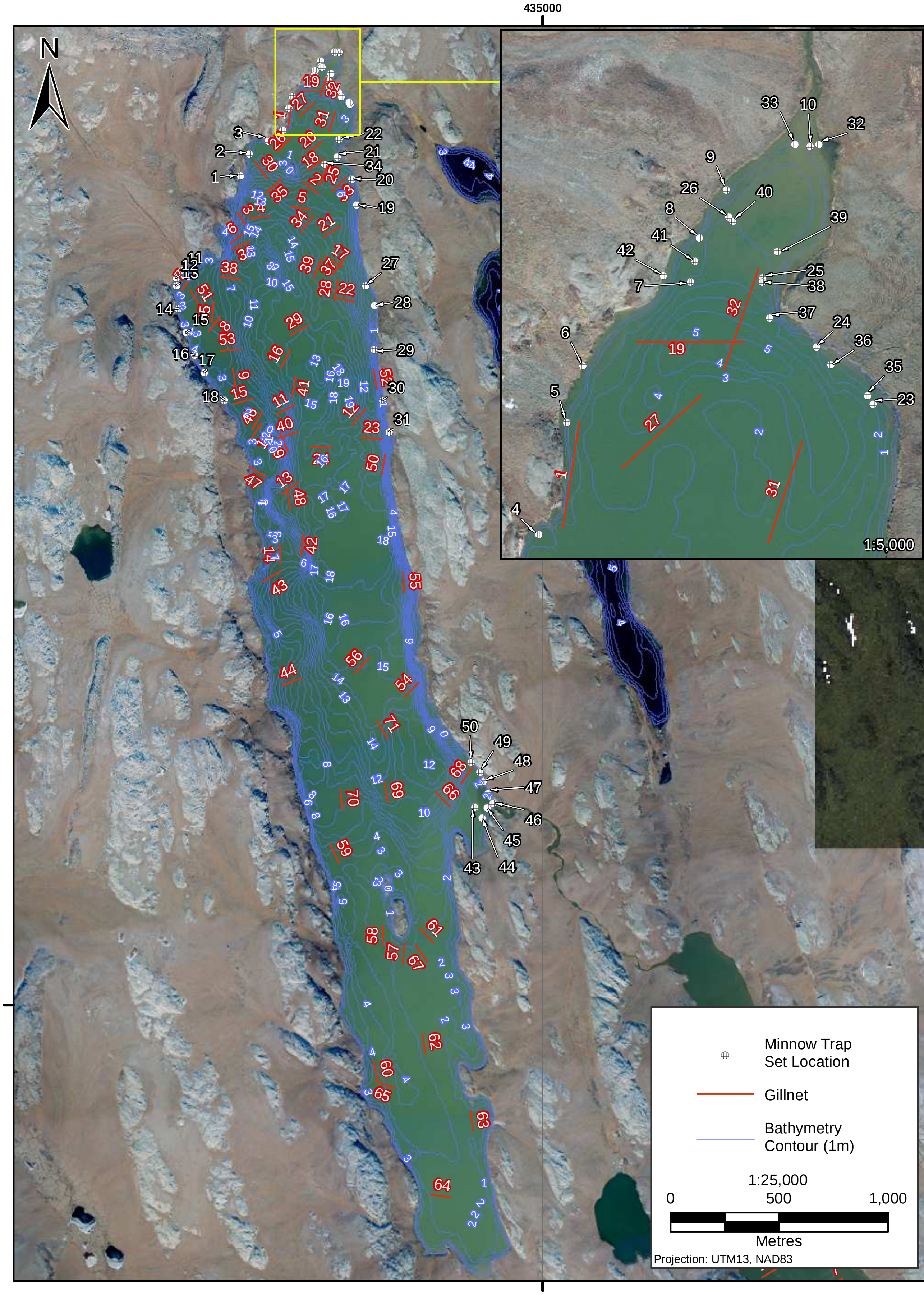

Figure 2.2-1

Gillnet and Minnow Trap Set Locations on Doris Lake, Hope Bay Belt Project, 2009

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Plate 2.2-2. Backpack electrofishing gear used to assess the fish communities in streams, Hope Bay Belt Project, 2009.

Table 2.2-1 shows the lakes sampled for fish community and tissue metals in the Project area in 2009. Figures 2.2-1 to 2.2-10 show the location of gillnets and minnow traps. Appendices 2.2-1 and 2.2-2 present the set and retrieval times, and locations for gillnets and minnow traps, respectively.

Table 2.2-1. Fish Community and Tissue Metals Sampling Locations, Hope Bay Belt Project, 2009

		UTM		Community				
Site	**Watershed**	**Easting**	**Northing**	**AG**	**EF**	**GN**	**MT**	**Tissue Metals**
Lakes								
Doris Lake	Doris	433819	7558230	X	X	X	X	-
Ogama Lake	Doris	436553	7552003	-	-	X	X	-
P.O. Lake	Doris	436489	7549473	X	-	X	X	LKTR, LKWH
Patch Lake	Doris	434660	7549739	X	-	X	X	-
Little Roberts Lake	Doris/Roberts	434660	7562817	X	-	X	X	LKTR
Glenn Lake	Windy	430110	7560232	-	-	X	X	-
Windy Lake	Windy	431631	7553268	X	-	X	X	LKTR
Reference Lake A	Reference A	448583	7557621	-	-	X	X	LKTR
Reference Lake B	Reference B	425613	7534367	-	-	X	X	LKTR
Rivers and Streams								
Doris Outflow	Doris	434056	7559407	-	X	-	X	-
Ogama Outflow	Doris	435250	7555393	-	X	-	X	-

(continued)

Table 2.2-1. Fish Community and Tissue Metals Sampling Locations, Hope Bay Belt Project, 2009 (completed)

Site	Watershed	UTM		Community				Tissue Metals
		Easting	Easting	AG	EF	GN	MT	
Patch Outflow	Doris	436305	7548985	-	-	-	-	-
P.O. Outflow	Doris	436652	7550175	-	X	-	X	-
Tail Lake Outflow	Doris	434507	7558925	-	X	-	X	-
Koignuk U/S	Koignuk	431940	7545536	-	X	X	X	-
Koignuk M/S	Koignuk	436490	7549055	-	X	X	X	-
Koignuk D/S	Koignuk	429580	7554915	-	X	X	X	-
Stream E09	Roberts	441123	7559626	-	X	-	X	-
Glenn Outflow	Windy	431548	7563357	-	X	-	X	-
Windy Lake Outflow	Windy	431410	7555417	-	X	-	X	-
Reference Lake A Outflow	Reference A	448502	7561748	-	X	-	X	-
Reference Lake B Outflow	Reference B	427083	7530373	-	X	-	X	-

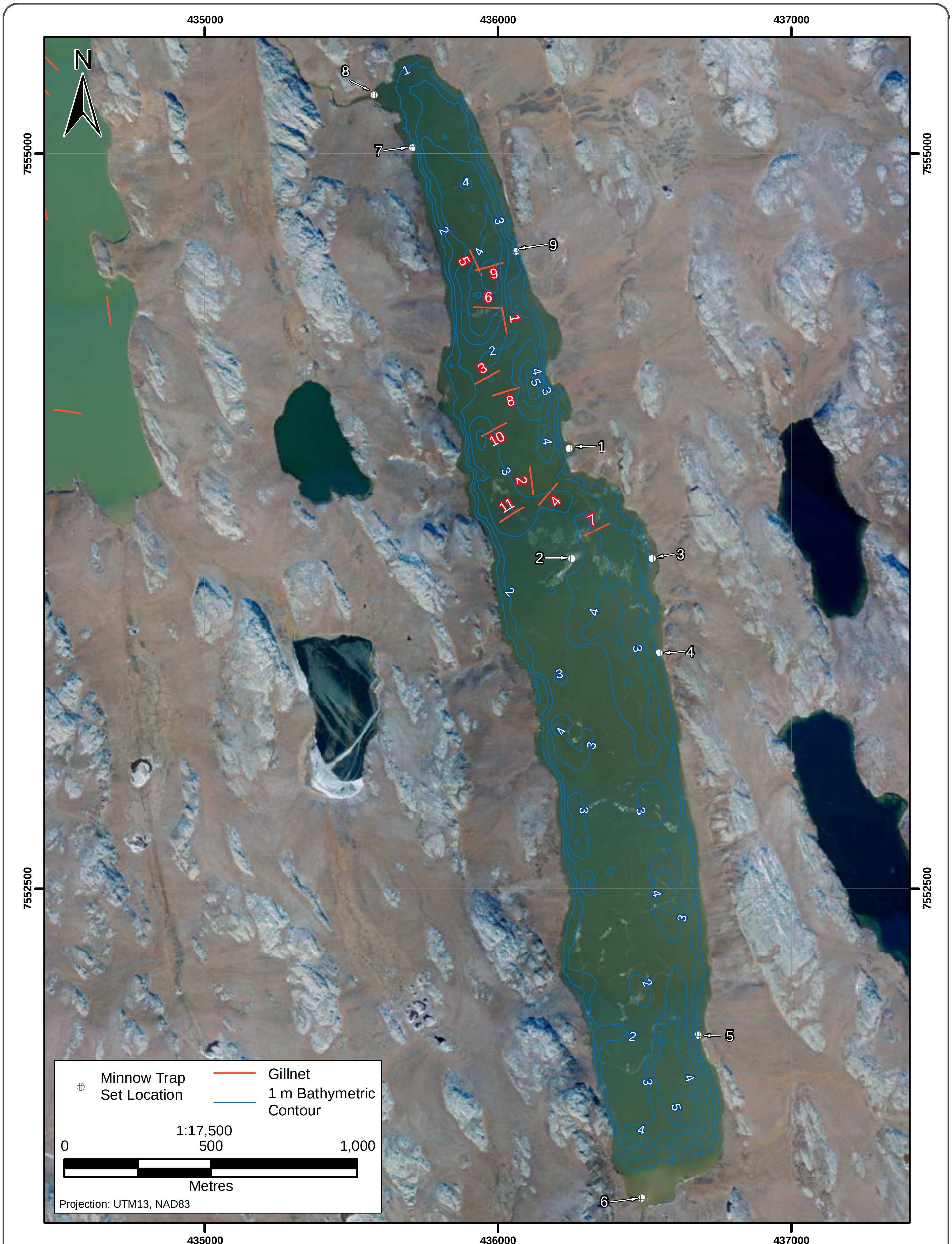
Community Assessment Codes: AG = angling, EF = electrofishing, GN = gillnet, MT = minnow trap.
Fish Species Codes: LKTR = lake trout; LKWH = lake whitefish.
Stream sampling locations: U/S = upstream, D/S = downstream
Dashes indicate no sampling.

The lakes were sampled using monofilament index gillnet gangs. Standard RISC gillnet gangs consisted of six panels, ranging from 25 to 89 mm stretched mesh. Each RISC gillnet gang was tied in the following order: Panel 1 – 25 mm; Panel 2 – 76 mm; Panel 3 – 51 mm; Panel 4 – 89 mm; Panel 5 – 38 mm; and Panel 6 – 64 mm. Each panel measured 15.2 m long by 2.4 m deep for an area of 36.48 m^2 and a total area of 218.88 m^2 per gang. A short, small mesh sinking gillnet was also used to target juvenile or small-bodied fish at Doris and Patch lakes to augment hydroacoustic assessments. This gillnet consisted of three panels of 19 mm stretched mesh. Each panel measured 15.2 m long by 2.4 m deep for an area of 36.48 m^2, with a total area of 109.44 m^2. All gillnets consisted of a lead line at the bottom and a floating line at the top of the net. Sinking nets were designed to fish at the bottom of the lake, while floating nets were designed to fish at the lake surface.

Data (geographic coordinates, depths, catch-per-unit-effort or CPUE; see Section 2.4) for individual RISC gillnets set at Doris and Patch lakes were examined graphically to show general trends in fish distribution patterns. Maps using a graduated colour scale were produced to represent areas of relatively high (red) to low (purple) CPUE. Gillnet CPUE patterns were compared with estimates of absolute fish abundance (fish/m^3 or fish/ha) generated from hydroacoustic surveys.

Minnow traps consisted of two wire mesh cylinders that were locked together using a clip attached to a rope and marker buoy. Each minnow trap was baited with a small amount of dry crab bait. Minnow traps were then placed on the streambed or along the shore of lakes or ponds so that the trap was resting on the substrate.

Captured fish were identified to species, measured for fork length to the nearest 1 mm, weighed to the nearest 0.1 g and sampled for various structures (scales, fin rays and otoliths) used to determine the age of the fish. Otoliths were only collected from incidental mortalities or from fish lethally sampled for tissues (e.g., muscle and liver). Scales were collected with a knife below the posterior margin of the dorsal fin on the left side of the fish. Two to three rays of the left pelvic fin were collected with scissors or pliers (Plate 2.2-3). Aging structures were placed in envelopes (Plate 2.2-4) labelled with the site, date, species and sample number.

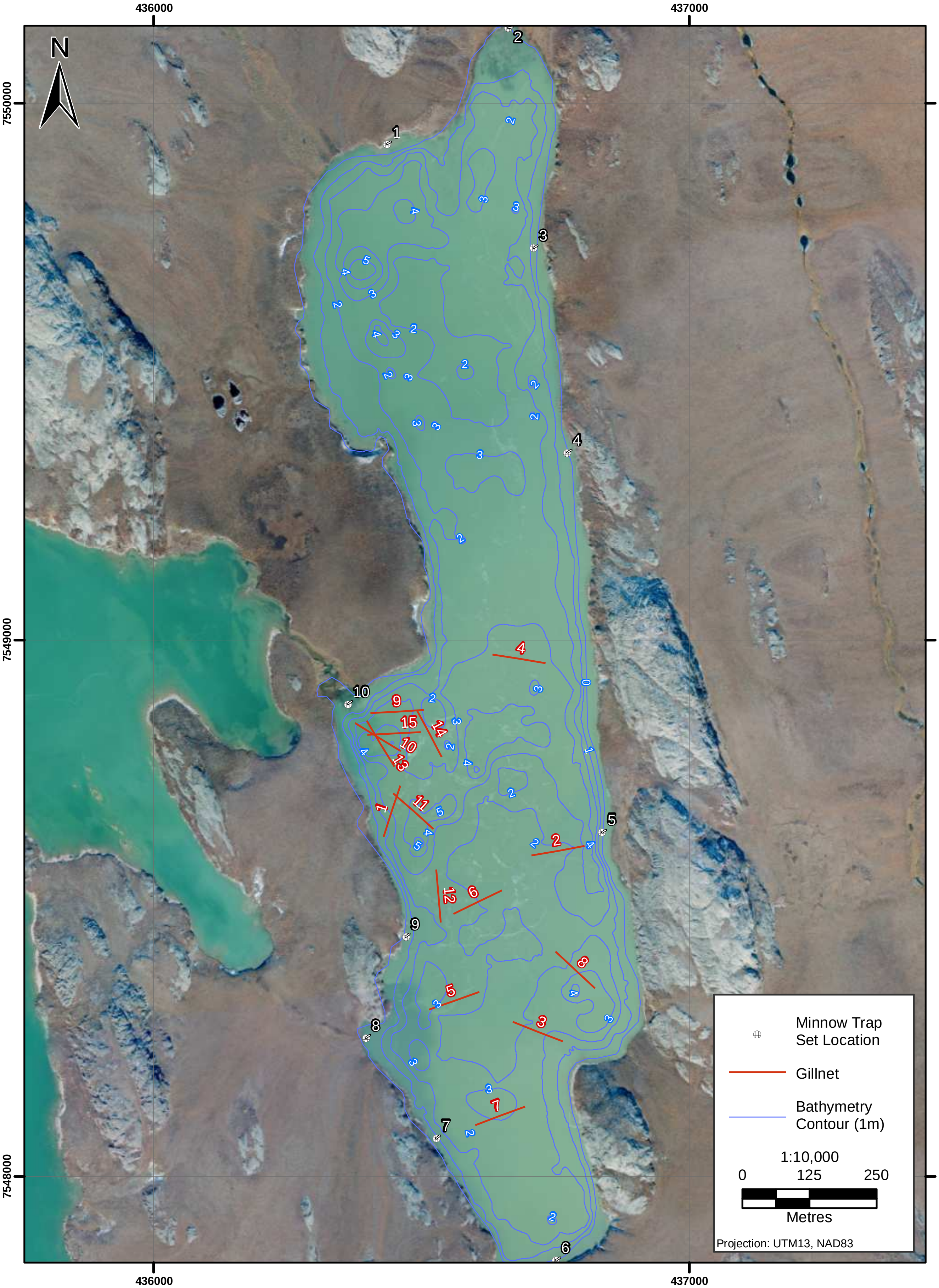


NEWMONT NORTH AMERICA

Gillnet and Minnow Trap Set Locations on Ogama Lake, Hope Bay Belt Project, 2009

Figure 2.2-2

Rescan™ Engineers & Scientists



NEWMONT NORTH AMERICA

Gillnet and Minnow Trap Set Locations on P.O. Lake, Hope Bay Belt Project, 2009

Figure 2.2-3

Rescan Engineers & Scientists

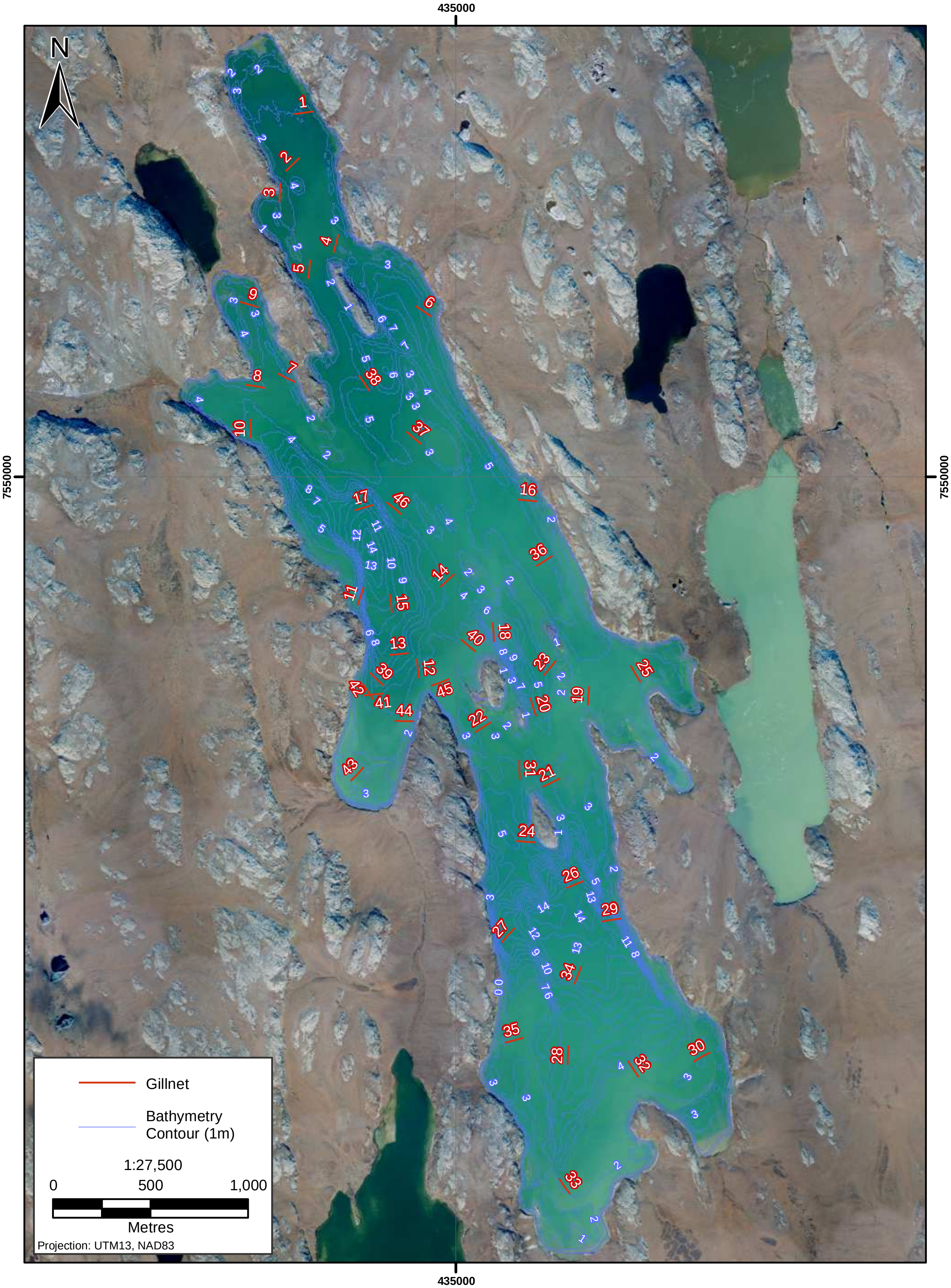
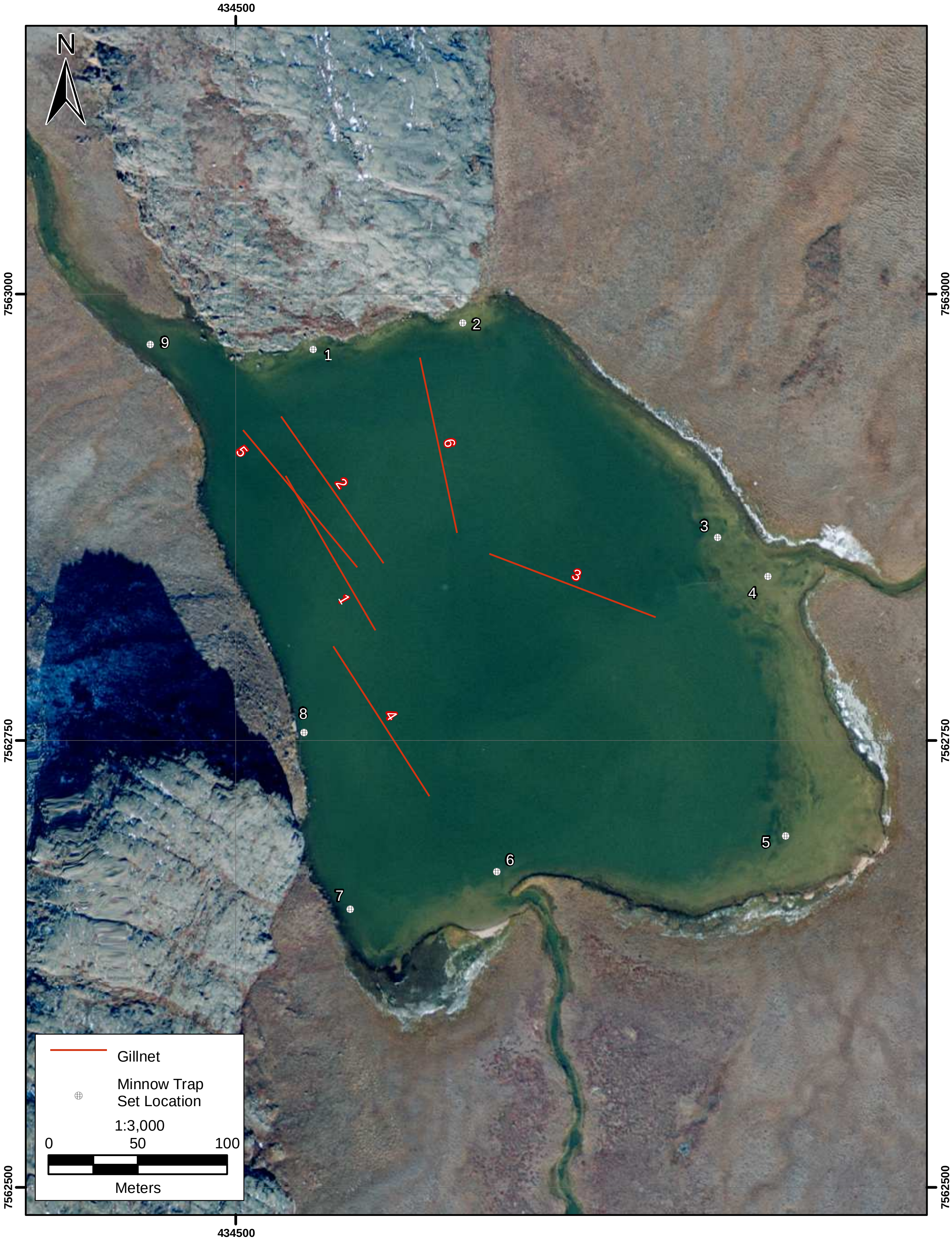


Figure 2.2-4

Gillnet Set Locations on Patch Lake, Hope Bay Belt Project, 2009

NEWMONT NORTH AMERICA

Rescan Engineers & Scientists



NEWMONT NORTH AMERICA

Gillnet and Minnow Trap Set Locations on Little Roberts Lake, Hope Bay Belt Project, 2009

Figure 2.2-5

Rescan Engineers & Scientists

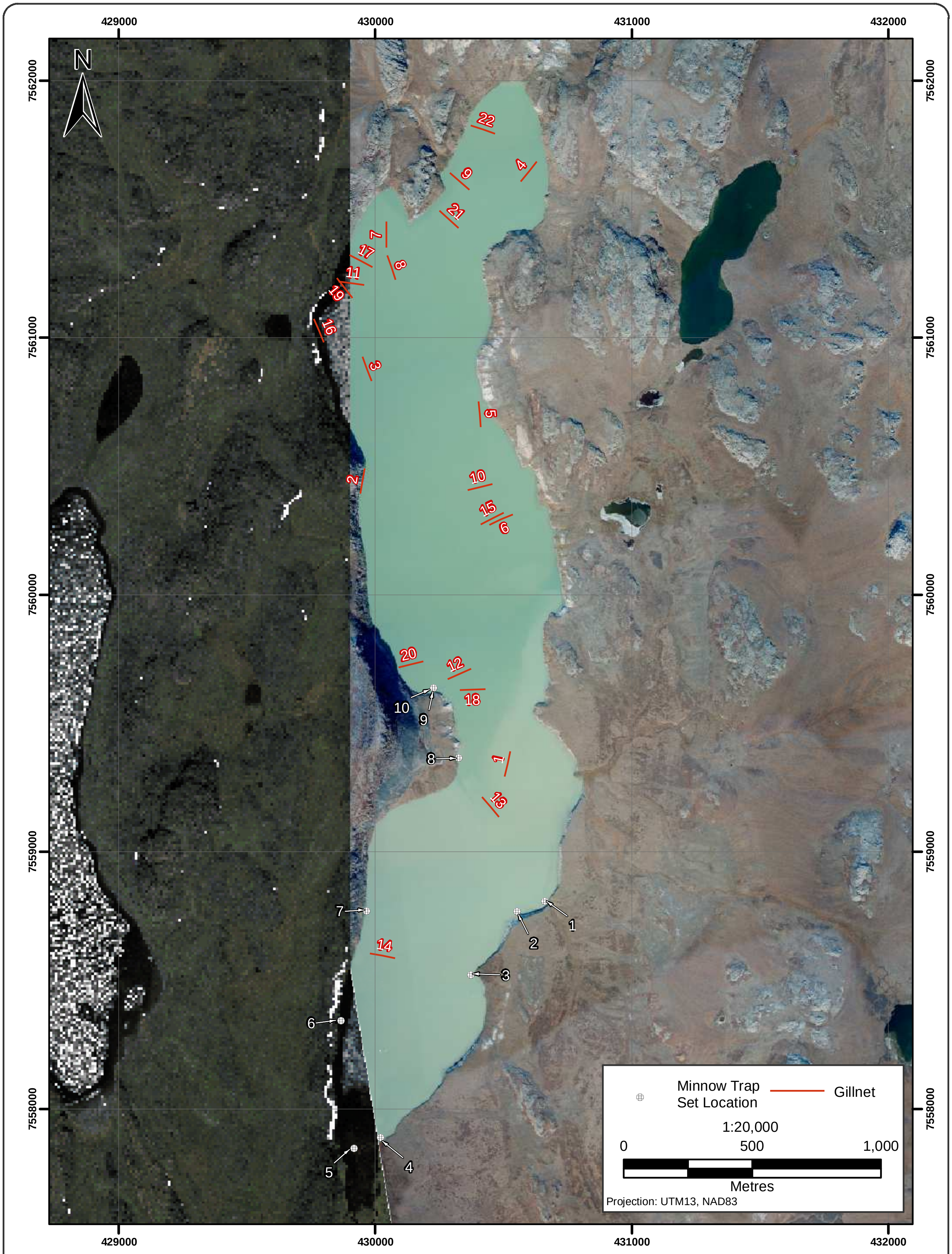


Figure 2.2-6

Gillnet and Minnow Trap Set Locations on Glenn Lake, Hope Bay Belt Project, 2009

NEWMONT NORTH AMERICA

Rescan™ Engineers & Scientists

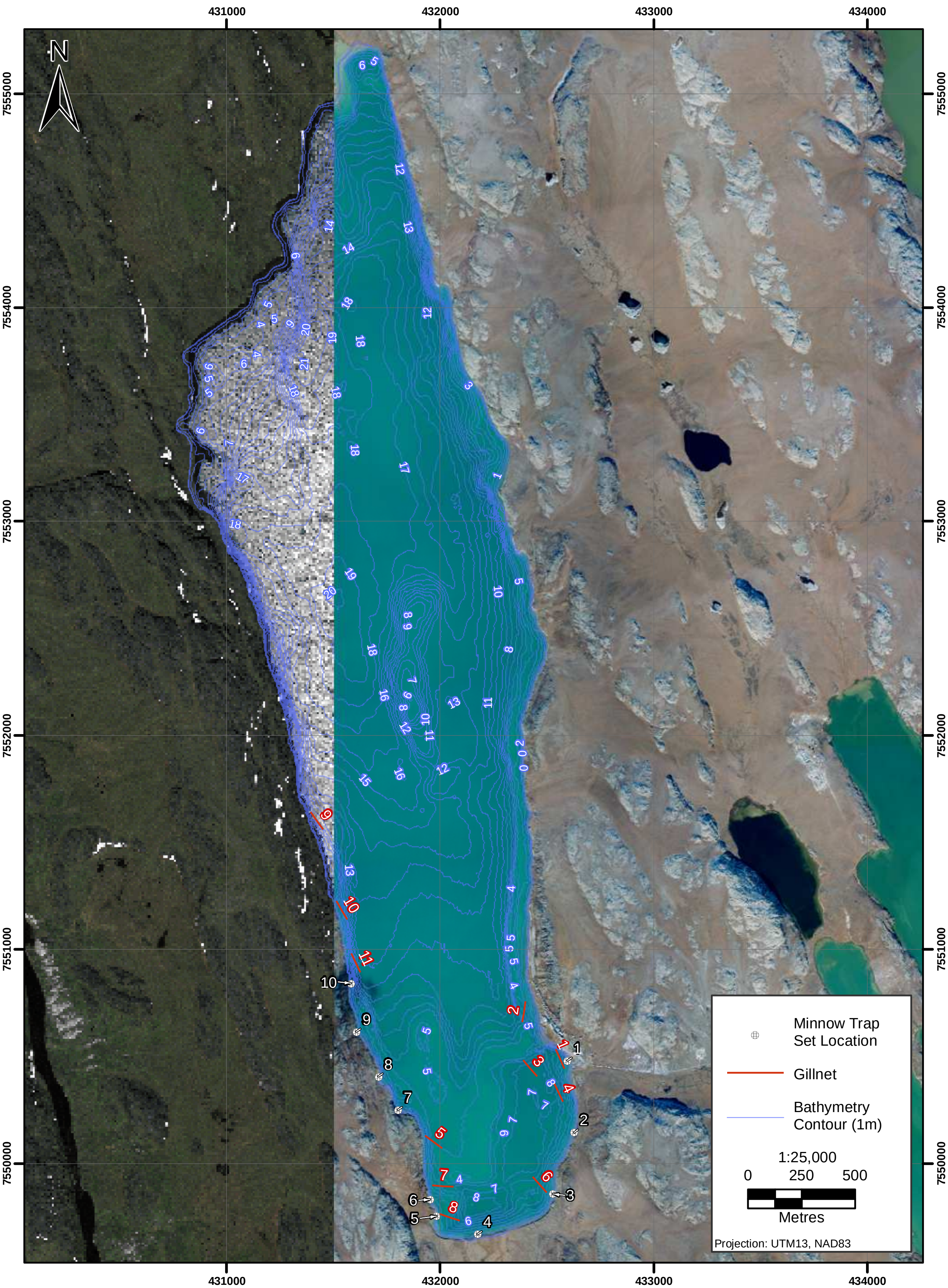


Figure 2.2-7

Gillnet and Minnow Trap Set Locations on Windy Lake, Hope Bay Belt Project, 2009

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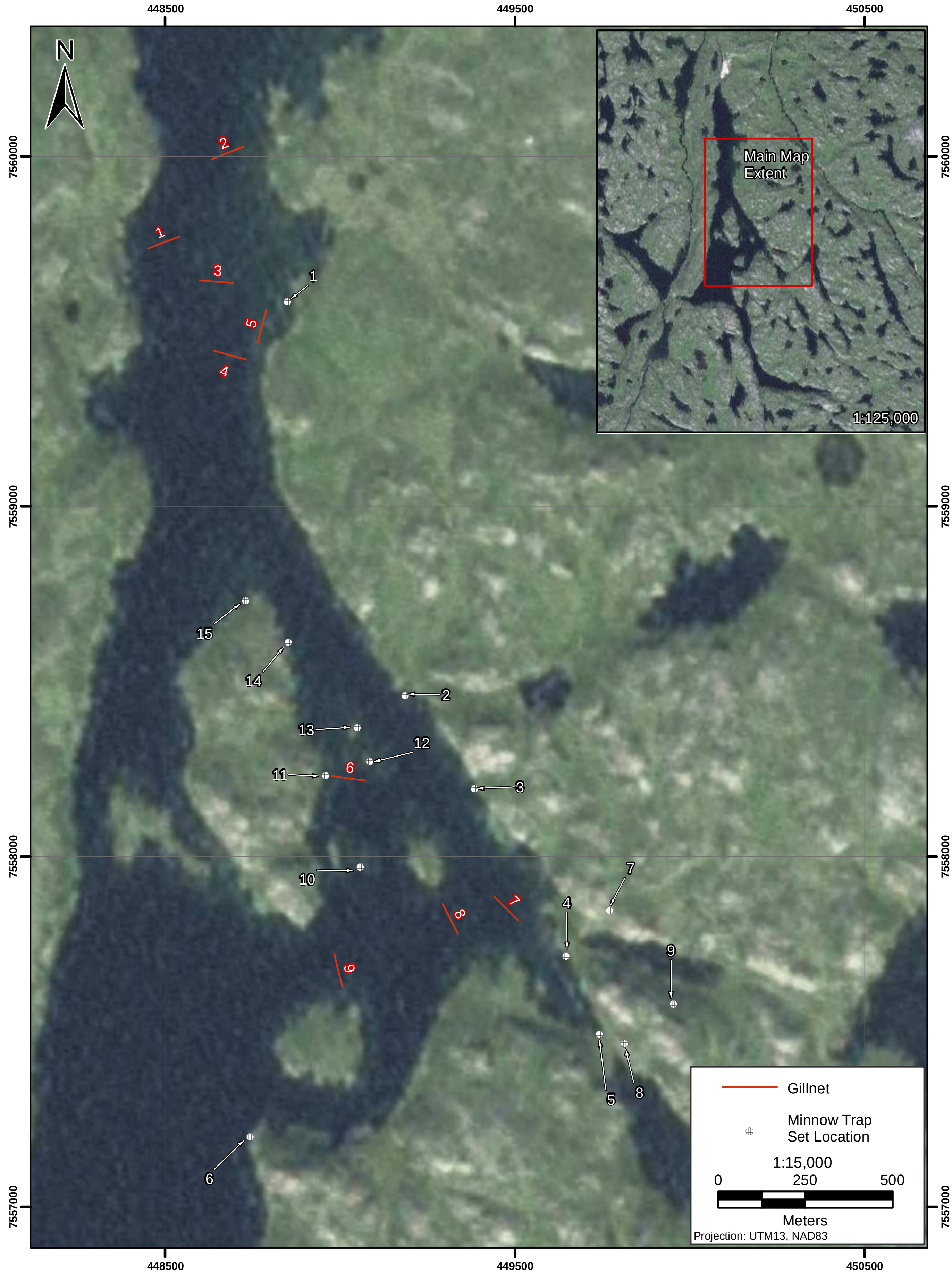

NEWMONT NORTH AMERICA

Gillnet and Minnow Trap Set Locations on Reference Lake A, Hope Bay Belt Project, 2009

Figure 2.2-8

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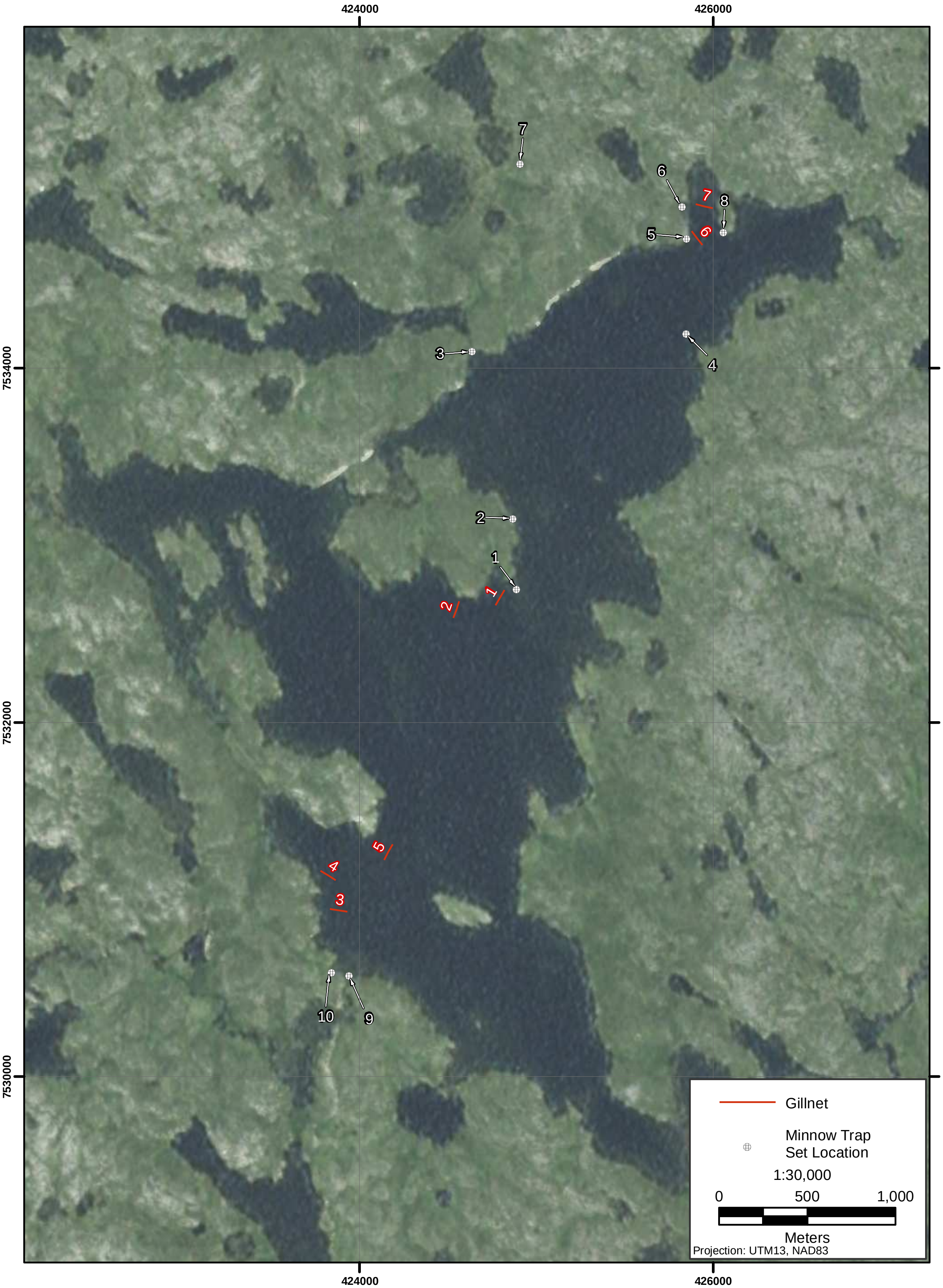

Figure 2.2-9

Gillnet and Minnow Trap Set Locations on Reference Lake B, Hope Bay Belt Project, 2009

NEWMONT NORTH AMERICA

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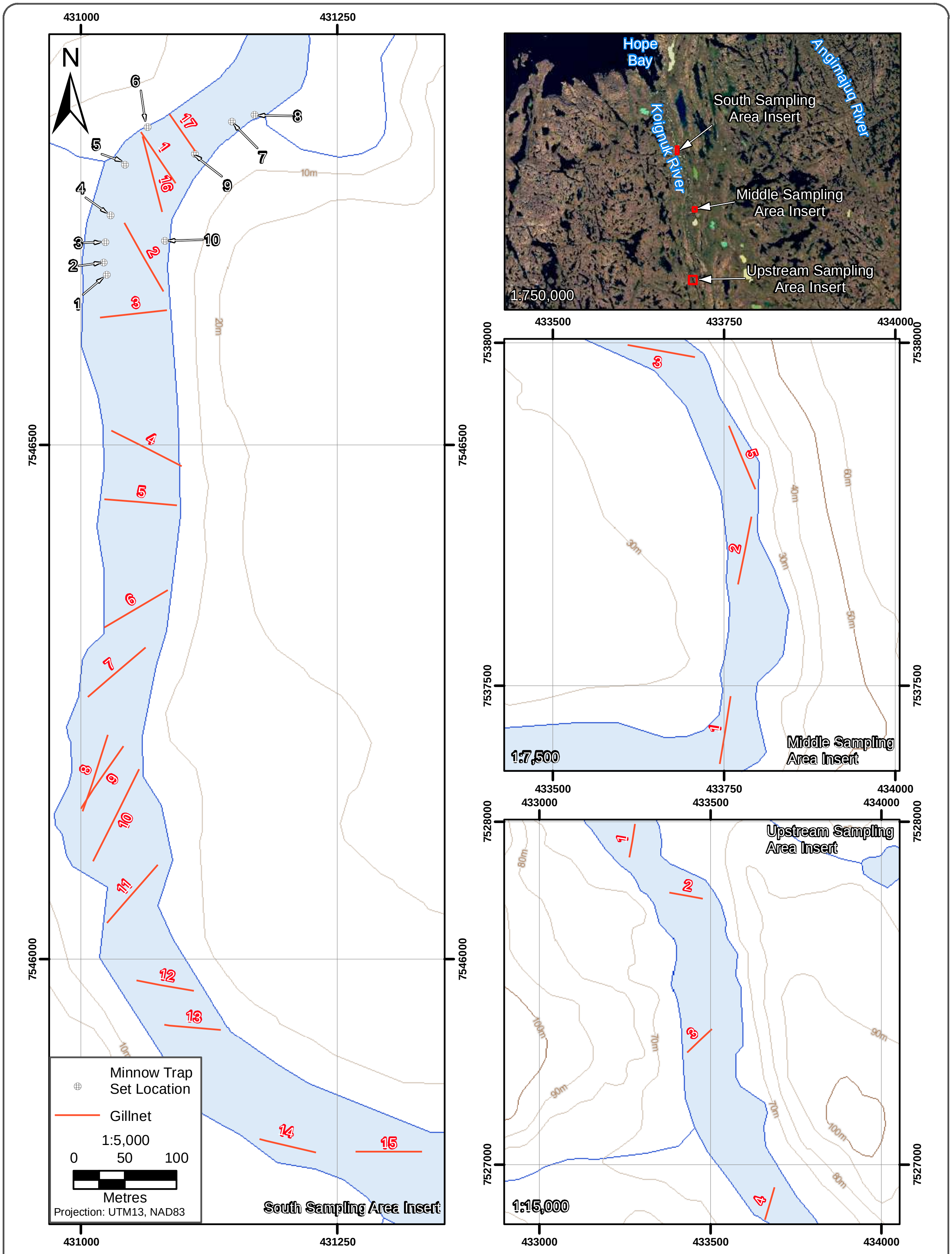
PROJECT # 1009-002-06 GIS # HB-06-028c December 29 2009



Gillnet and Minnow Trap Set Locations on the Koignuk River, Hope Bay Belt Project, 2009

Figure 2.2-10

NEWMONT NORTH AMERICA

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Plate 2.2-3. Field sampling equipment used to collect fish biological data, Hope Bay Belt Project, 2009.

Plate 2.2-4. Envelopes used for the storage of fish aging structures, Hope Bay Belt Project, 2009.

Lake trout captured from Doris and Patch lakes were marked using a T-bar tag gun, and a uniquely labelled T-bar tag was affixed at the base of the dorsal fin into the musculature of the fish. The unique tag number was then recorded. Lake trout collected from Doris and Patch lakes were also marked using Passive Integrated Transponder (PIT) tags. The use of PIT tags was necessary due to concerns about T-bar tag loss and infection caused by T-bar tags. A PIT tag gun was used to insert a uniquely numbered PIT tag under the skin at the pelvic girdle of each lake trout. The PIT tag was scanned using an AVID microchip scanner (PETIDCO, Calgary, Canada) and the unique number was recorded. Fish were then released live.

All aging analysis of scales, fin rays and otoliths was performed by John Tost of North Shore Environmental Services, Thunder Bay, Ontario. Age was estimated by counting the number of annuli (or yearly rings) in each structure. Scales were attached to plastic fiches and annuli were counted with a microfiche reader. The fin rays were air-dried and then mounted in a 50:50 epoxy medium. Microsections were cut using a Beuler Isomet diamond saw and mounted on slides and annuli were counted with a compound microscope. Otoliths were air-dried, cracked and passed over a flame to increase the visibility of annuli. Otoliths were then mounted in Plasticine and immersed in oil for better inspection using a compound microscope. When more than one structure was used for aging, the one with the highest confidence in the annuli count was used.

Stomachs were removed from any incidental lake trout mortalities, preserved in formalin and sent to Applied Technical Services in Victoria for detailed taxonomic analysis of their contents.

Fish are the preferred organism for tissue metal sampling in primary monitoring programs (Environment Canada 2001, 2005). Hence, fish tissue metal sampling was a key component of the 2009 baseline study of fish populations in the Hope Bay study area.

The purpose of collecting samples of fish tissue was to measure the concentrations of metals and describe their magnitudes and interrelationships. Baseline data on lake trout and lake whitefish tissue metal concentrations will also be used for future monitoring programs and human health assessments.

Metal concentrations were measured in muscle and liver tissue of lake trout collected from three lakes within the proposed area of development (Little Roberts, P.O. and Windy lakes) and from two reference lakes (Reference Lake A and Reference Lake B).

In addition, muscle and liver tissue samples were taken from four lake whitefish (*Coregonus clupeaformis*) collected from P.O. Lake. These data were not analyzed or compared with lake trout metals concentrations because of the low sample size.

The overall goal of the tissue metals study was to collect a minimum of 10 lake trout from each sampling location (where “location” is defined as an individual lake). This sample size was the maximum allowed by Fisheries and Oceans Canada (Fish Collection Licence no. S-09/10-10032-NU) for lethal sampling. In 2009, a total of 49 lake trout muscle and liver tissue samples were taken from five lakes: Little Roberts, P.O., Windy, Reference A and Reference B. The total sample numbers for each lake ranged from a low of 9 muscles and 9 livers for Little Roberts Lake, while 10 muscles and 10 livers were collected from the remaining lakes. Therefore, for muscle and liver tissues, the minimum recommended sample size of 10 was equalled by all lakes except Little Roberts Lake.

For each fish, after collection of biological data, a 1 to 5 g piece of muscle tissue was taken, stripped of bones and skin, rinsed in clean lake water and placed in an individually labelled Whirl-Pak bag (Plate 2.2-5). Whole livers from each fish were collected and stored in the same manner. The tissue samples were frozen immediately and were kept frozen until they were delivered to ALS Environmental in Vancouver for analysis of metal concentrations.

Plate 2.2-5. Example of a lake trout muscle tissue sample collected for analysis of metals concentrations, Hope Bay Belt Project, 2009.

ALS Environmental analyzed the tissue samples for metals concentrations according to procedures adapted from the United States Environmental Protection Agency (EPA) (US EPA 1995). Samples were divided into two parts: one part for measurement of metal concentrations (on a wet weight basis) and a second part for measurement of percent moisture so that the results could be converted to mg/kg dry weight, if required. The latter objective was considered secondary, hence percent moisture was sometimes not measured if all the sample volume was required for metals analysis. All of the 98 samples collected had sufficient volume to allow an accurate measurement of percent moisture. Since metal concentrations were measured before percent moisture, this had no effect on measurement of metal concentrations for that tissue sample.

Each sample was homogenized either mechanically or manually prior to digestion. The hotplate digestion method involved the use of nitric acid followed by repeated additions of hydrogen peroxide. Total concentrations of 25 metals were measured by Inductively Coupled Plasma – Mass Spectroscopy (or ICPMS). The 25 metals and their analytical detection limits are shown in Table 2.2-2. Iron, phosphorus, potassium, sodium and titanium were not measured in this study.

2.2.2 Hydroacoustics

2.2.2.1 General

Mobile hydroacoustic surveys were conducted in August 2009 to describe fish population characteristics of Patch and Doris Lakes. Survey methods generally followed protocols for the sampling of fish populations with hydroacoustics described in Thorne (1983), MacLennan and Simmonds (1992), Brandt (1996) and Beauchamp et al. (2009).

Table 2.2-2. Metals and Detection Limits for Lake Trout and Lake Whitefish Tissue Analysis, Hope Bay Belt Project, 2009

Total Metal	Detection Limit (mg/kg WW)	Total Metal	Detection Limit (mg/kg WW)
Aluminum	2 to 4	Magnesium	2
Antimony	0.02	Manganese	0.02
Arsenic	0.02	Mercury	0.003
Barium	0.02	Molybdenum	0.02
Beryllium	0.2	Nickel	0.2
Bismuth	0.06	Selenium	0.4
Cadmium	0.01	Strontium	0.02
Calcium	4	Thallium	0.02
Chromium	0.2	Tin	0.1
Cobalt	0.04	Uranium	0.004
Copper	0.02	Vanadium	0.2
Lead	0.04	Zinc	0.2
Lithium	0.2		

WW = wet weight.

Main survey objectives were to: 1) estimate total fish abundance with 95% confidence intervals; 2) estimate relative abundance for each fish species in the respective fish species assemblage; and 3) describe spatial distribution of fish (vertical and horizontal) in each lake.

2.2.2.2 Data Collection

In most situations, night is the preferred time for hydroacoustic sampling to determine fish abundance (Thorne 1983); however, it was unclear which period would be best for the study lakes and their species assemblages. Therefore, Doris Lake was surveyed both during the day (August 22, 1700 to 2000 hours) and at night (August 25, 0000 to 0300 hours) to compare abundance estimates and distribution patterns between periods. Patch Lake was surveyed only at night (August 27 to 28, 2230 to 0300 hours) since wind and wave conditions were unsuitable for hydroacoustic surveys during the day. Darkness was fairly complete but not absolute during the night surveys.

Hydroacoustic sampling was conducted from a 4.3 m-long power boat traveling at 1.4 to 1.9 m/s along pre-mapped transect lines (Figure 2.1-2). The echo sounding system consisted of a dual-transducer, 200 kHz, BioSonics DT-X split-beam scientific echo sounder linked to a Garmin model 182 differential GPS. Full beam angles of the transducers (at the half power point) were 6.7° (down-looking) and 6.5° (side-looking). Other system specifications appear in Table 2.1-2. The sounder was controlled by a laptop computer that displayed electronic echograms for monitoring system performance during data collection. Hydroacoustic data merged with geo-coordinates from the GPS were logged to the computer hard disk to await processing at a later date.

The transducers were mounted on a metal pole that was attached to the boats port side (Plate 2.1-1), with one transducer aimed downward (down-looking) and the other aimed sideways (side-looking) perpendicular to the boat’s direction of travel, tilted slightly downward. The down-looking transducer was aimed 1° to 3° sternward to aid in the identification of bubbles. The side-looking transducer was tilted 5° down from horizontal to reduce echoes from the lake surface as described by Yule (2000). Conditions were quite calm during the fish surveys, so a stabilizer was not required to reduce boat roll. The side-looking transducer was necessary to obtain an adequate sampling volume in the many shallow parts of the lakes and to minimize boat avoidance by fish, as recommended by Kubecka et al. (1994) and Kubecka and Whittengerova (1998). During sampling, pings (sound transmissions) alternated between transducers, giving a rate per transducer of eight pings per second. Because the lakes were shallow, all data were collected using a low transmit power setting (-10.3 dB) to avoid signal saturation. Also, a pulse width of 0.4 ms and a data collection threshold of -60 dB were used for all sampling. Other settings used for data collection appear in Table 2.1-2.

Each lake was sampled on 14 transects spaced approximately 500 m apart, perpendicular to the long axis of the lake using a systematic sampling design according to Cochran (1977). Transects covered all parts of the lakes, including shallow bays and flats, although it was expected that data from the shallowest areas would not be usable for fish abundance estimates. In the field, crews sampled to a minimum bottom depth of about 1 m and to within a few metres of shore where possible.

2.2.2.3 Data Processing and Analysis

Hydroacoustic data files were processed using Myriax Echoview software to count fish, measure target strength (TS, the hydroacoustic size of fish), and determine sampling volumes according to standard split-beam trace counting and TS methods (Thorne 1983; MacLennan and Simmonds 1992; Brandt 1996). The side-looking transducer represented the upper 5 m of the water column, so, considering the transducer deployment depth (0.55 m), beam angle (6.5°), and downward tilt (5°), data 10 to 30 m from the transducer were processed. From the down-looking transducer, data from the 2 to 20 m range were processed, but results from less than 5 m were not used for the population estimate.

Fish tracks were recognized on echograms by their shape, cohesiveness and TS. For down-looking data, at least one echo with a TS ≥ -60 dB was required for acceptance as a fish track. At least two echoes with a minimum TS of -60 dB were required for acceptance as a side-looking fish track. Additionally, only echoes within the main portion of the hydroacoustic beam (6.7° or 6.5°) were accepted. No bubbles were seen during any of the surveys, so no correction for their presence was necessary.

The accuracy of hydroacoustic measurements was verified by manufacturer and field calibration tests. The echo sounder was calibrated by its manufacturer (BioSonics) prior to the study, and in-situ TS measurements of a standard sphere were made during the survey. Results of field tests were 0.7 dB greater than the expected value (-39.5 dB) for the down-looking transducer and 0.5 dB greater than the expected value for the side-looking transducer. Corrections for these deviations were applied during processing in Echoview.

Depth intervals for data analysis were 0 to 5 m, 5 to 10 m, etc., to 20 m at the deepest parts of the lakes. Fish densities were summarized as fish/m^3 within depth intervals of transects for population estimates, and as fish/ha in 50 m-long segments of transects for spatial analysis. For each spatial cell of interest, fish/m^3 was calculated as the total number of fish counted divided by the volume sampled. The volume sampled in each spatial cell was calculated according to the wedge model (Keiser and Mulligan 1984) using the hydroacoustic beam angle, distance transected, and a correction for bottom intrusion. The effective beam angle for each depth interval was modeled considering the transducer half-power beam angle (6.7° down-looking, 6.5° side-looking), boat speed and ping rate, and the sampling volume was adjusted accordingly at ranges where the effective beam angle was less than the half-power angle. Under the conditions of the survey, the effective beam angle was never less than 6.1° for the ranges used.

Fish density estimates (fish/m^3 and fish/ha) from individual surveys were examined graphically for trends in horizontal and vertical distribution patterns. Maps using a graduated colour scale were produced to represent areas of relatively high (red) to low (purple) fish density. Based on bathymetry and fish density patterns observed with hydroacoustics and gillnetting, the lakes were divided into two horizontal and vertical strata. Vertical strata were delineated by 5 m depth intervals. Horizontal strata were defined as north (lake area north of proposed dyke) and south (lake area south of proposed dyke). Separate fish population estimates were computed for areas north and south of the proposed dyke for Doris and Patch lakes, respectively.

Each transect pass provided one replicate of each depth interval that it included (shallow transects did not contain all intervals). For each spatial cell (depth interval x lake section), mean fish density was expanded in proportion to total cell volume, and resulting abundance estimates were summed to obtain a total population estimate for all species combined. The volume of each depth interval of each lake section was estimated from a digital bathymetric map using ArcView GIS software assuming a surface elevation of 21.4 m above sea level for Doris Lake and 26.3 m above sea level for Patch Lake. Variance and 95% confidence intervals of the population estimates were calculated for a random sample stratified by horizontal and vertical strata (Cochran 1977).

Because hydroacoustics cannot differentiate fish species, gillnetting was conducted within a few days of hydroacoustic surveys to estimate species composition and other biological characteristics of the fish community (e.g., age composition). The relative catches of each species (see Section 2.4) was used as an estimate of its relative abundance for apportioning the hydroacoustic estimate. This method was only effective for fish large enough to be captured in the mesh sizes that were used (19 to 89 mm stretched mesh), and it assumes equal selectivity for all sizes and species of fish that were present.

2.3 QUALITY ASSURANCE/QUALITY CONTROL

For all fish habitat and community surveys, data sheets were reviewed at the end of each field day to ensure data were complete and collected properly. Field notes were transcribed onto electronic spreadsheets once in the office and all transcriptions were checked visually against the field forms and any errors corrected. The data were also plotted to identify any outliers that may have resulted from transcription errors that occurred in the field.

To assess the accuracy of the metal analyses, ALS conducted two measures of quality control: method blanks (or MB) and comparison with reference material (or CRM). A method blank is a test in which no tissue was added. Six method blanks were run with 25 metals measured for each blank, resulting in a total of 150 comparisons between measurements and targets. Only three of the measurements (or 2%) were above the method detection limit (or MDL) and were classified by ALS as “MB-LOR” (Appendix 2.2-3). This result was considered to be of acceptable quality (Amber Springer, ALS Environmental, pers. comm.).

To further assess the accuracy of the metal analyses, samples of a reference material, VA-NRC-TORT2 or lobster hepatopancreas, certified by the National Research Council of Canada, were subjected to the same analytical procedures as the lake trout tissue samples. The measured concentrations of each metal were then compared to the known metal concentrations in the certified material to determine if they fell within the 95% confidence limits expected for each metal. Of the 35 comparisons performed, 31 fell within the 95% confidence limits around the target value and four fell outside the limits (an incidence of 11%), but only by 0 to -4% (Appendix 2.2-3). These results are considered to be an acceptable range of analytical accuracy (Amber Springer, ALS Environmental, pers. comm.).

To assess the variability of fish tissue metal analysis, and hence the homogeneity of the samples, six of the 98 samples (or ~6% of the total number of samples) were each split into two replicates and the relative percent difference (RPD) between replicate metal concentrations (and percent moisture) was calculated as:

RPD = 100((sample - duplicate)/((sample + duplicate)/2))).

Since 26 variables were measured for each of the six samples (percent moisture and concentrations of 25 metals), this gave a total of 156 potential RPD (Appendix 2.2-4).

However, 46% of those potential RPD were not calculated because one or both of the values were less than the MDL. In general, analytical variability is much higher near the MDL than is considered acceptable. Therefore, those RPD were classified as “RPD-not available” or RPD-NA (Table 2.2-3).

Table 2.2-3. Tests of Variability of Fish Tissue Metal Concentrations, Hope Bay Belt Project, 2009

Qualifier	Number of Potential RPD	Percent
RPD-NA	72	46
J	34	22
RPD	48	31
DUP-H	2	1
Total	**156**	**100**

RPD = Relative Percent Difference.
RPD-NA = RPD Not Available because one or both values were at or below the MDL.
J = Absolute difference between duplicates. RPD not available because one or both values were less than five times greater than the MDL.
DUP-H = Duplicate results outside of ALS data quality objectives due to sample heterogeneity.

Another 22% of those potential RPD were not calculated because both values were between one and five times higher than the MDL. The *British Columbia Field Sampling Manual* recommends that only RPD calculated from concentrations each of which is greater than five times the MDL should be used for assessing data quality (BCMWLAP 2003). Instead of an RPD, the absolute difference between the values was calculated. These results were qualified by ALS as “J” in Appendix 2.2-4.

The remaining 50 comparisons were considered to be valid RPD. They ranged from 0.06 to 68% with a median of 5%. A total of one RPD exceeded the RPD limits established by ALS (30% for percent moisture and 45% for metals). ALS interpreted these results as showing low variability of analyses (Amber Springer, ALS Environmental, pers. comm.).

2.4 DATA ANALYSIS

The variables used to assess the fish community included: relative species abundance, length, weight, condition and catch-per-unit-effort (CPUE). Data analysis and interpretation for these variables followed Guy and Brown (2007). Several of these variables required calculation. A description of the calculations undertaken is presented below.

The CPUE statistic is used as an estimate of relative abundance of fish (Hubert and Fabrizio 2007). A key factor that allows comparison of CPUE data is the standardization (type of net, mesh size, etc.) of sampling devices. The same nets, traps and amount of bait were used at all sites allowing comparisons of CPUE data to be made.

For gillnets, CPUE was the number of fish caught per 100 m^2 of net per 1 hour.

$$\text{CPUE} = \text{number of fish caught per net} \times [100/\text{total net area } (m^2)] \times [1/\text{set time (h)}]$$

For minnow traps, CPUE was calculated from the number of fish caught per trap per day.

$$\text{CPUE} = \text{number of fish} \times [\text{set time (h)}/24 \text{ h (day)}]$$

For electrofishing, CPUE was calculated as the number of fish caught per 100 s of electrofishing.

$$\text{CPUE} = \text{number of fish caught}/100 \text{ s}$$

Condition and weight-length regressions are indicators of the relative health of fish within a lake. Condition factor was based on the following formula from Ricker (1975):

$$\text{Condition} = \text{weight (g)} \times 10^5/\text{length}^3 \text{ (mm)}$$

Weight was multiplied by 10^5 to avoid fractional values, and a weight-length exponent of exactly 3 was assumed to apply to all species of fish. Weight-length relationships (Pope and Kruse 2007) were calculated for fish species captured in significant numbers (e.g., greater than 10). Logarithmic transformations were performed on the data prior to conducting the regression.

$$\ln(\text{weight}) = \ln(a) + b[\ln(\text{length})]$$

Weight is in grams, a is a coefficient, b is the slope of the regression, and length is in mm.

Length-age relationships were described with the von Bertalanffy growth model (Isley and Grabowski 2007):

$$L_t = L_\infty(1 - \exp(-K(t - t_0)))$$

where L_t = length at age (mm), L_∞ = asymptotic length (mm) (i.e., length at infinite age), K = growth rate (year^{-1}) and t_0 = age (years) at L = 0 mm. Where length and age data was limited for small and/or young fish, t_0 was fixed at zero to force the x-intercept through the graph origin and create a more realistic model of juvenile growth.

For tissue metals, metals in which 90% of the all concentrations were below the MDL were excluded from analyses. The 90% limit was calculated from muscle and liver tissues together, hence a few of the metals (e.g., arsenic, thallium, and uranium) that were enriched in livers but rare in muscle had greater than 90% of their values for muscle below the MDL. For the included metals, all values below the MDL were assigned values of one-half the MDL in order to use those values in statistical analyses.

Average metal concentrations—with standard error (SE), minimum and maximum—were calculated from that dataset for each type of tissue for each of the five lakes. To compare mean tissue metal concentrations among lakes and tissues, concentrations were ln-transformed to normalize their frequency distributions—a pre-requisite of parametric statistics. Then, mean ln(concentrations) were compared among the five lakes and the two types of tissues with two-way analysis of variance (ANOVA).

Principle Component Analysis (or PCA) was used to reduce redundancy in the tissue metals data set and to allow clearer interpretation of trends in the data. PCA is a statistical routine that reduces a dataset containing a large number of correlated observations into a smaller number of uncorrelated artificial variables called components. PCA is also called data reduction because there are always fewer components than original variables once the redundant information has been removed.

PCA was applied to a single matrix containing the ln-transformed tissue metal concentrations (in mg/kg WW) and ln-transformed fish length. Metals were excluded from the analysis if more than 90% of their values had concentrations below the MDL, and for the remaining metals, values below the MDL were replaced with one-half the detection limit. To help interpret the components, the loadings on the components (i.e., the correlation coefficients between the components and the original metal concentrations) were rotated with the Varimax option and sorted by their relative magnitude. The amounts of variance explained by each component and a scree plot (not shown here) were used to determine how many of those components were important and which were trivial. A scree plot is a plot of the variance explained by a component against the order in which the components were extracted. Important components appear as a 'cliff face' and trivial components appear as the 'scree' at the bottom of the cliff.

All statistics were conducted according to Zar (1984) using SYSTAT (2004). All linear regressions were reported with the appropriate sample size (n), coefficient of determination (r^2, the fraction of variation in the independent parameter that was explained by the dependent parameter) and P value. Only n and r^2 were reported for non-linear regressions. All r^2 for linear or non-linear regressions were not adjusted for the degrees of freedom of the regression.

3. Results and Discussion

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3. Results and Discussion

3.1 FISH HABITAT

3.1.1 Lake Habitat

3.1.1.1 Visual

The littoral zones of Little Roberts Lake, Glenn Lake, Windy Lake and Reference Lake A were surveyed to document baseline fish habitat. The substrate composition of Doris Lake, Ogama Lake and P.O. Lake were surveyed in previous baseline studies. Reference Lake B was not surveyed for fish habitat due to uncertainties regarding its use as an appropriate reference (e.g., due to the lake's size and physical characteristics). Littoral zones were divided by substrate types. The substrate composition of each habitat unit is described as a percent for each substrate type, and the total area of each substrate type. These data are summarized in Table 3.1-1.

<u>Little Roberts Lake</u>

The littoral habitat of Little Roberts Lake was divided into eight habitat units (Figure 3.1-1). Fines were the dominant substrate observed, covering 76% of the total littoral area. Fines were particularly evident at the two inflows and at the outflow of the lake (Plate 3.1-1). Organics were also noted in 8% of the littoral zone, which was commonly found in association with fines at the inlets and outlet. Boulder and bedrock comprised 8 and 6% of the littoral area, respectively. These substrates were mainly found along the western and northern shorelines. Cobble was observed as the subdominant substrate at three habitat zones, representing 2% of the littoral area of Little Roberts Lake.

Plate 3.1-1. Organic and fine substrate observed at Little Roberts Lake, Hope Bay Belt Project, 2009.

Table 3.1-1. Littoral Zone Substrate Composition of Lakes, Hope Bay Belt Project, 2009

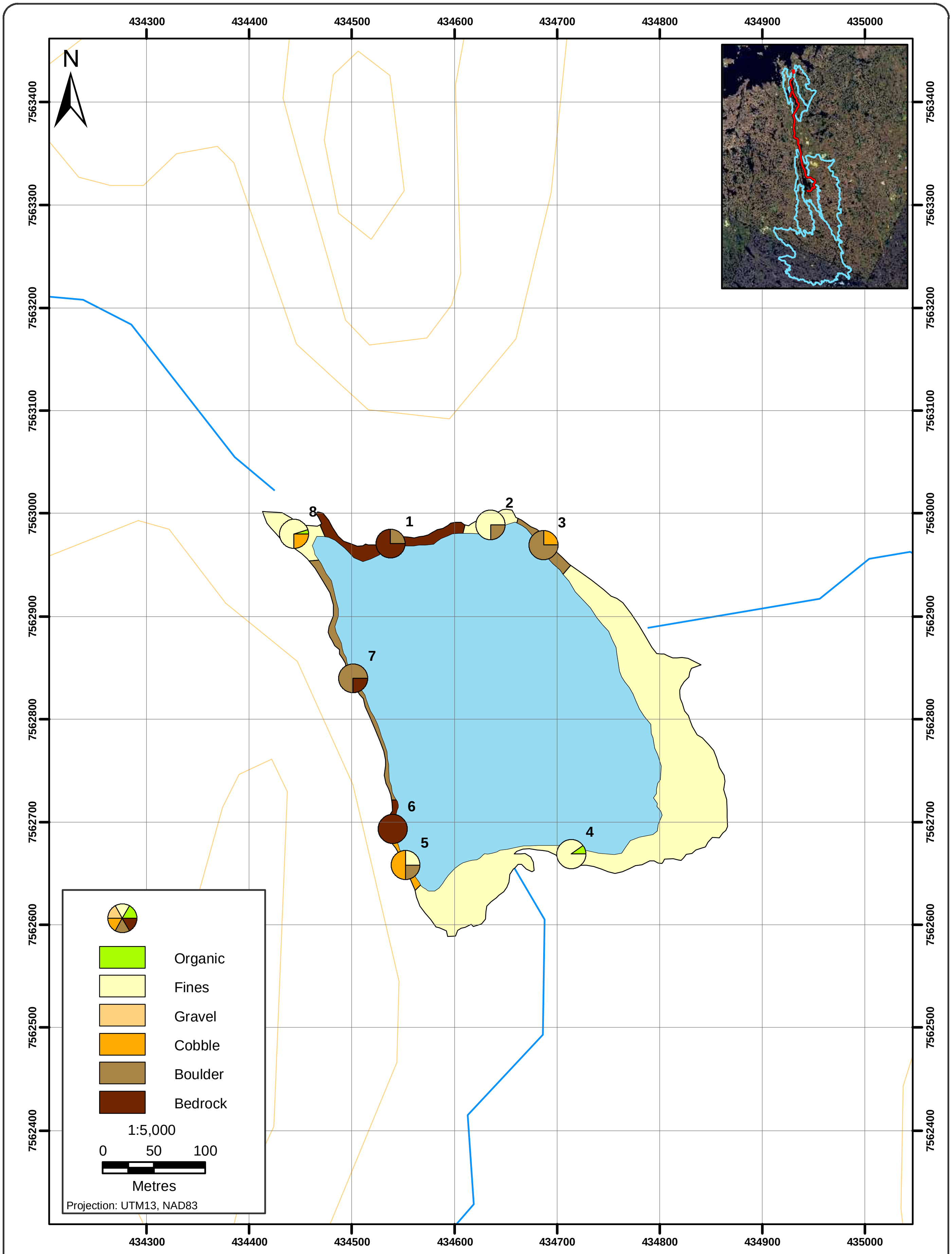
Habitat Number	Area (m^2)	Organics (%)	Fines (%)	Gravel (%)	Cobble (%)	Boulder (%)	Bedrock (%)	Organics (m^2)	Fines (m^2)	Gravel (m^2)	Cobble (m^2)	Boulder (m^2)	Bedrock (m^2)
Little Roberts Lake													
1	1,554	0	0	0	0	25	75	0	0	0	0	388	1,165
2	692	0	75	0	0	25	0	0	519	0	0	173	0
3	608	0	0	0	25	75	0	0	0	0	152	456	0
4	20,548	10	90	0	0	0	0	2,055	18,493	0	0	0	0
5	303	0	25	0	50	25	0	0	76	0	152	76	0
6	140	0	0	0	0	0	100	0	0	0	0	0	140
7	1,179	0	0	0	0	75	25	0	0	0	0	885	295
8	1,311	5	70	0	25	0	0	66	918	0	328	0	0
Total Littoral Zone	**26,336**						**Total**	**2,120**	**20,006**	**0**	**631**	**1,978**	**1,600**
							%	**8**	**76**	**0**	**2**	**8**	**6**
Glenn Lake													
1	35,396	0	50	0	0	50	0	0	17,698	0	0	17,698	0
2	79,903	0	0	0	0	0	100	0	0	0	0	0	79,903
3	64,035	0	0	0	5	15	80	0	0	0	3,202	9,605	51,228
4	19,987	0	0	0	0	80	20	0	0	0	0	15,990	3,997
5	13,516	0	0	0	100	0	0	0	0	0	13,516	0	0
6	51,329	0	95	0	0	5	0	0	48,763	0	0	2,566	0
7	12,397	0	10	0	0	90	0	0	1,240	0	0	11,157	0
8	36,710	0	85	0	0	15	0	0	31,204	0	0	5,507	0
9	43,272	0	97	0	0	3	0	0	41,974	0	0	1,298	0
10	17,128	0	0	0	35	20	45	0	0	0	5,995	3,426	7,708
11	37,997	0	0	0	0	0	100	0	0	0	0	0	37,997
12	13,599	0	80	0	10	10	0	0	10,879	0	1,360	1,360	0
13	8,388	0	80	5	5	10	0	0	6,710	419	419	839	0
14	14,684	0	10	0	10	20	60	0	1,468	0	1,468	2,937	8,810
15	15,187	0	100	0	0	0	0	0	15,187	0	0	0	0
16	13,138	0	80	0	0	20	0	0	10,510	0	0	2,628	0
17	8,973	0	20	0	0	0	80	0	1,795	0	0	0	7,178
18	8,797	0	60	0	20	20	0	0	5,278	0	1,759	1,759	0
19	5,489	0	100	0	0	0	0	0	5,489	0	0	0	0
20	49,332	0	40	5	25	30	0	0	19,733	2,467	12,333	14,800	0
21	13,391	0	0	0	0	10	90	0	0	0	0	1,339	12,052
22	21,379	0	0	0	5	20	75	0	0	0	1,069	4,276	16,034
23	14,728	0	0	0	3	0	97	0	0	0	442	0	14,286
24	7,879	0	0	0	20	20	60	0	0	0	1,576	1,576	4,727
25	13,137	0	90	5	0	5	0	0	11,823	657	0	657	0
26	13,997	0	0	0	0	0	100	0	0	0	0	0	13,997
27	10,342	0	0	0	0	15	85	0	0	0	0	1,551	8,791
28	10,798	0	100	0	0	0	0	0	10,798	0	0	0	0
29	11,066	0	0	0	0	0	100	0	0	0	0	0	11,066
30	48,244	0	70	0	15	15	0	0	33,771	0	7,237	7,237	0
31	50,219	0	50	0	10	30	10	0	25,110	0	5,022	15,066	5,022
Total Littoral Zone	**764,437**						**Total**	**0**	**299,429**	**3,543**	**55,398**	**123,270**	**282,797**
							%	**0**	**39**	**0**	**7**	**16**	**37**
Windy Lake													
1	35,359	0	70	10	10	10	0	0	24,751	3,536	3,536	3,536	0
2	51,735	0	15	15	40	30	0	0	7,760	7,760	20,694	15,521	0
3	24,004	0	5	5	20	30	40	0	1,200	1,200	4,801	7,201	9,602
4	40,439	0	0	10	50	30	10	0	0	4,044	20,220	12,132	4,044
5	39,696	0	25	25	25	10	15	0	9,924	9,924	9,924	3,970	5,954
6	31,315	0	25	55	10	5	5	0	7,829	17,223	3,131	1,566	1,566
7	18,157	0	16	16	36	6	26	0	2,905	2,905	6,536	1,089	4,721
8	16,491	0	30	10	30	10	20	0	4,947	1,649	4,947	1,649	3,298
9	3,789	0	0	0	10	10	80	0	0	0	379	379	3,032
10	31,336	0	70	10	10	10	0	0	21,935	3,134	3,134	3,134	0
11	21,893	0	30	20	30	10	10	0	6,568	4,379	6,568	2,189	2,189
12	18,465	0	70	0	20	10	0	0	12,926	0	3,693	1,847	0
13	33,962	0	60	10	20	5	5	0	20,377	3,396	6,792	1,698	1,698
14	10,611	0	30	20	30	15	5	0	3,183	2,122	3,183	1,592	531
15	2,116	0	0	0	10	10	80	0	0	0	212	212	1,693
16	2,574	0	0	0	10	10	80	0	0	0	257	257	2,059
17	1,749	0	0	0	10	10	80	0	0	0	175	175	1,399
18	1,721	0	0	0	10	10	80	0	0	0	172	172	1,377
19	4,503	0	0	0	10	10	80	0	0	0	450	450	3,602
20	6,683	0	5	5	10	20	60	0	334	334	668	1,337	4,010
21	43,126	0	60	10	10	10	10	0	25,876	4,313	4,313	4,313	4,313
22	8,678	0	30	10	30	0	30	0	2,603	868	2,603	0	2,603
Total Littoral Zone	**448,404**						**Total**	**0**	**153,119**	**66,787**	**106,390**	**64,417**	**57,691**
							%	**0**	**34**	**15**	**24**	**14**	**13**

(continued)

Table 3.1-1. Littoral Zone Substrate Composition of Lakes, Hope Bay Belt Project, 2009 (completed)

Habitat Number	Area (m^2)	Organics (%)	Fines (%)	Gravel (%)	Cobble (%)	Boulder (%)	Bedrock (%)	Organics (m^2)	Fines (m^2)	Gravel (m^2)	Cobble (m^2)	Boulder (m^2)	Bedrock (m^2)
Reference Lake A													
1	10,357	0	10	0	30	60	0	0	1,036	0	3,107	6,214	0
2	1,372	0	0	0	0	15	85	0	0	0	0	206	1,166
3	6,076	0	25	0	30	45	0	0	1,519	0	1,823	2,734	0
4	3,270	0	65	0	20	15	0	0	2,125	0	654	490	0
5	1,889	0	0	0	0	15	85	0	0	0	0	283	1,605
6	3,292	0	70	0	0	30	0	0	2,305	0	0	988	0
7	782	0	0	0	0	0	100	0	0	0	0	0	782
8	4,691	0	0	0	15	70	15	0	0	0	704	3,284	704
9	755	0	0	0	0	20	80	0	0	0	0	151	604
10	36,468	0	10	0	0	80	10	0	3,647	0	0	29,175	3,647
11	18,286	0	0	0	0	5	95	0	0	0	0	914	17,372
12	13,811	0	0	0	70	10	20	0	0	0	9,667	1,381	2,762
13	28,560	0	0	0	0	10	90	0	0	0	0	2,856	25,704
14	30,777	0	85	0	0	5	10	0	26,160	0	0	1,539	3,078
15	7,952	0	0	0	30	60	10	0	0	0	2,386	4,771	795
16	4,424	0	0	0	10	35	55	0	0	0	442	1,548	2,433
17	18,003	0	0	0	0	5	95	0	0	0	0	900	17,103
18	16,451	0	0	0	30	60	10	0	0	0	4,935	9,871	1,645
19	3,773	0	80	0	0	20	0	0	3,019	0	0	755	0
20	6,126	0	0	0	0	0	100	0	0	0	0	0	6,126
21	2,828	0	85	0	0	15	0	0	2,404	0	0	424	0
22	15,315	0	0	0	0	10	90	0	0	0	0	1,532	13,784
23	11,030	0	0	0	10	70	20	0	0	0	1,103	7,721	2,206
24	1,158	0	90	0	0	10	0	0	1,042	0	0	116	0
25	455	0	0	0	0	0	100	0	0	0	0	0	455
26	944	0	90	0	0	10	0	0	850	0	0	94	0
27	5,492	0	0	0	0	10	90	0	0	0	0	549	4,943
28	31,440	0	0	0	20	70	10	0	0	0	6,288	22,008	3,144
29	1,239	0	0	0	0	10	90	0	0	0	0	124	1,115
30	8,132	0	0	0	40	60	0	0	0	0	3,253	4,879	0
31	5,059	0	0	0	10	90	0	0	0	0	506	4,553	0
32	1,975	0	0	75	25	0	0	0	0	1,481	494	0	0
33	3,554	0	0	0	0	25	75	0	0	0	0	889	2,666
34	25,865	0	0	0	15	75	10	0	0	0	3,880	19,399	2,587
35	9,462	0	0	0	0	15	85	0	0	0	0	1,419	8,043
36	4,616	0	0	0	0	100	0	0	0	0	0	4,616	0
37	58,361	0	0	0	10	20	70	0	0	0	5,836	11,672	40,852
38	39,713	0	75	0	10	15	0	0	29,784	0	3,971	5,957	0
39	81,277	0	0	0	25	0	75	0	0	0	20,319	0	60,958
Total Littoral Zone	**525,030**						**Total**	**0**	**73,891**	**1,481**	**69,368**	**154,012**	**226,277**
							%	**0**	**14**	**0**	**13**	**29**	**43**

PROJECT # 1009-002-06 GIS # HB-06-030d January 14 2010



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Fish Habitat Map of Little Roberts Lake Littoral Zone, Hope Bay Belt Project, 2009

Figure 3.1-1

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<u>Glenn Lake</u>

Glenn Lake was divided into 31 littoral habitat units (Figure 3.1-2). The dominant substrate type was fines and bedrock, representing 39 and 37% of the total littoral area, respectively. Bedrock substrate was primarily observed along the steep western shoreline (Plate 3.1-2), while fines formed the dominant substrate type along the eastern shoreline (Plate 3.1-3). Boulder and cobble were observed as the subdominant forms of substrate, usually in association with bedrock along the western shoreline. These substrates formed 16 and 7% of the total littoral habitat, respectively. Gravel was also observed in very small proportions in three habitat units.

<u>Windy Lake</u>

The littoral habitat of Windy Lake was divided into 22 habitat units (Figure 3.1-3). The littoral habitat of the lake was distributed relatively evenly amongst the five substrate categories. Fines formed the dominant substrate type, representing 34% of the total littoral habitat. Cobble was identified as the subdominant substrate type at 24% of the total littoral habitat. Gravel, boulder and bedrock represented 15%, 14%, and 13%, respectively. As with Glenn Lake, the majority of bedrock substrate was located in the western littoral zone, while the eastern littoral zone was predominately fine substrate. Due to the content of round cobble observed at habitat zones 12 and 14, these areas may be suitable as lake trout spawning habitat (Plate 3.1-4).

Plate 3.1-2. Bedrock along the western shoreline of Glenn Lake, Hope Bay Belt Project, 2009.

PROJECT # 1009-002-06 GIS # HB-06-030b January 14 2009

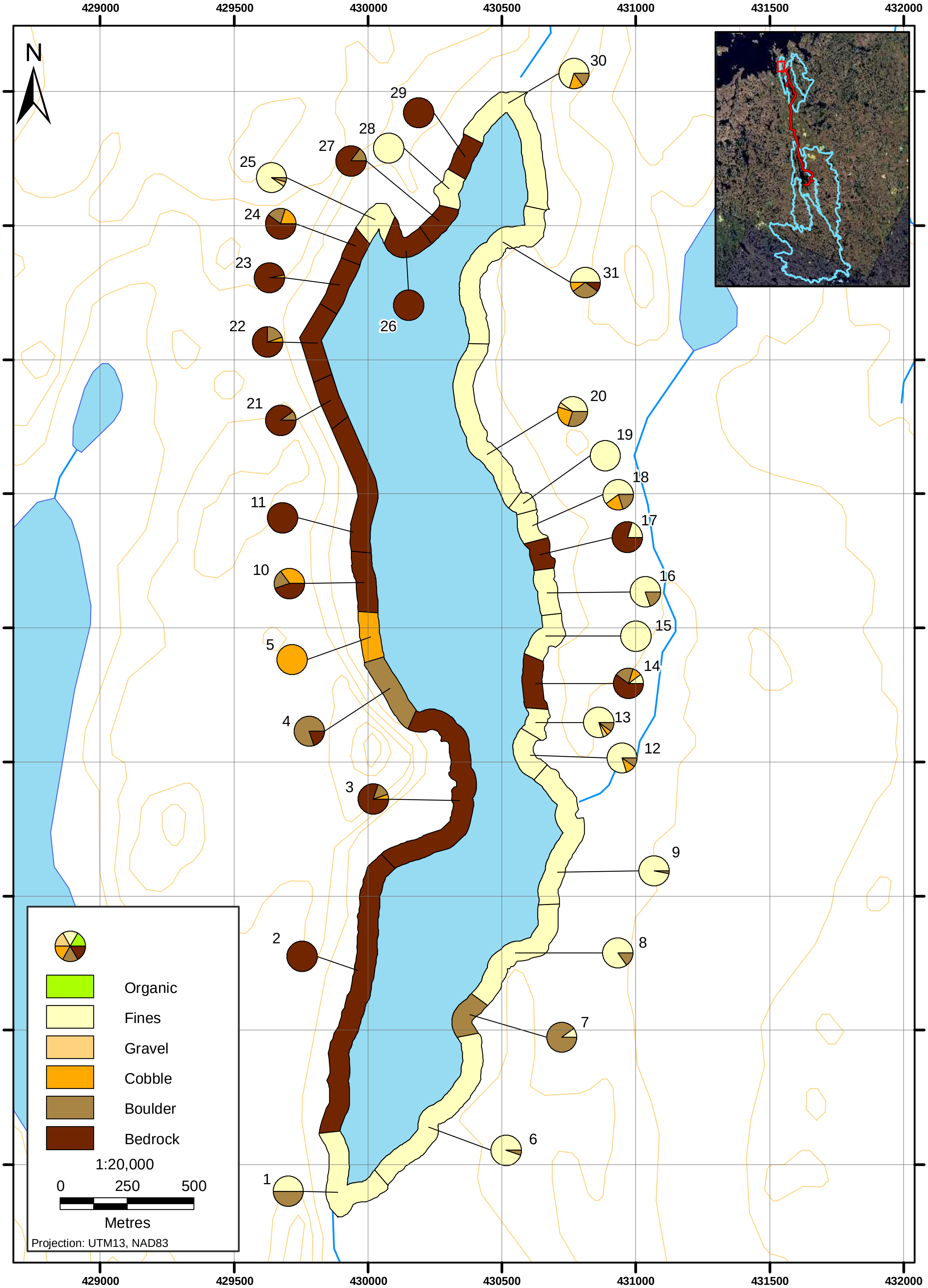

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Figure 3.1-2

Fish Habitat Map of Glenn Lake Littoral Zone, Hope Bay Belt Project, 2009

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Plate 3.1-3. Fine substrate along the eastern shoreline of Glenn Lake, Hope Bay Belt Project, 2009.

Plate 3.1-4. Clean cobble suitable for lake trout spawning habitat at habitat zone 14 of Windy Lake, Hope Bay Belt Project, 2009.

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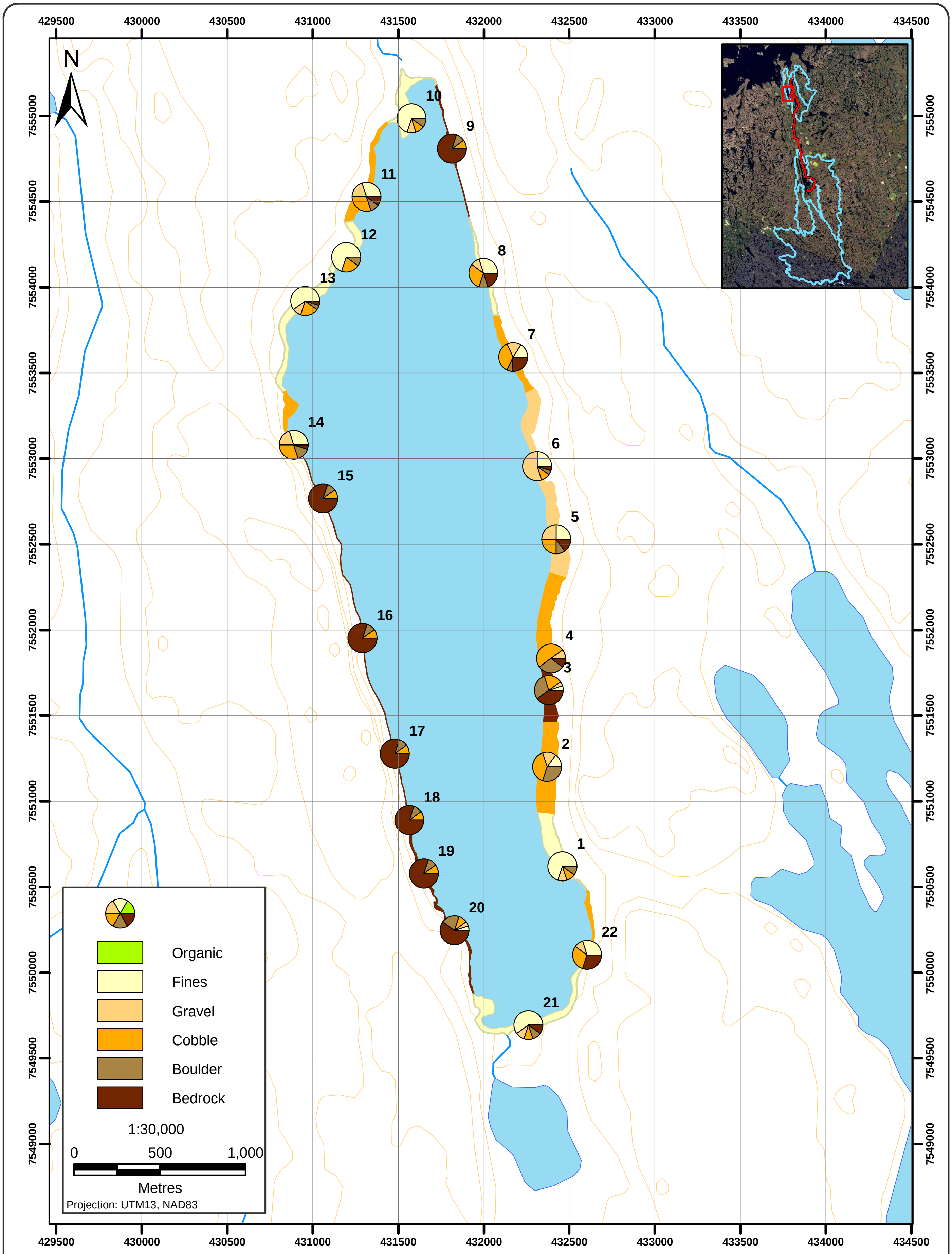

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Fish Habitat Map of Windy Lake Littoral Zone, Hope Bay Belt Project, 2009

Figure 3.1-3

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Reference Lake A

Reference Lake A was divided into 39 littoral habitat zones (Figure 3.1-4). Bedrock was identified as the dominant substrate type, representing 43% of the total littoral area. Again, much of the bedrock substrate was found on the western shore of this lake. Bedrock substrate was also found in conjunction with minimal littoral zone due to the steep shoreline. Boulder accounted for 29% of the total littoral area and represented the subdominant substrate type. The remaining substrate composition was represented as fines (14%) and cobble (13%). Several potential lake trout spawning shoals were identified in Reference Lake A. These sites included habitat zones 1, 12, 15, 18 and 30. Generally, these locations were characterized by clean, round cobble and boulder with large interstitial spaces within the substrate.

3.1.1.2 Hydroacoustics and Underwater Video

Appendices 3.1-1 and 3.1-2 present data collected from hydroacoustics surveys of Doris and Patch lakes, respectively. Figures 3.1-5 and 3.1-6 illustrate the distribution of substrates in Doris and Patch lakes, respectively. The predominant substrate category found at Doris Lake was ‘very soft fines’, representing 53% of the overall bottom area. The subdominant bottom types were comprised of hard substrate (gravel, cobble, boulder) and mud. These categories represented 25% and 22% of the overall bottom type. Very soft fines and mud were generally associated with the deep water sections of Doris Lake. Hard substrates such as gravel, cobble and boulder were associated with near-shore locations and around islands. Underwater video was not used at Doris Lake due to very poor visibility caused by high turbidity.

The predominant substrate type found at Patch Lake was mud, representing 41% of the total bottom area. Hard substrates (gravel, cobble, boulder) were similarly abundant, representing 37% of the total bottom area. Very soft fines represented 22% of the total bottom area. As with Doris Lake, fines and mud were associated with deeper portions of the lake, particularly in the mid-basin. Hard substrates were also found most commonly along shorelines, bays and near off-shore islands. Underwater video was able to be used at Patch Lake to calibrate hydroacoustic signals. The underwater video footage showed that nearly all mud and fine substrates were covered with green algae and some larger aquatic plant life (Plate 3.1-5).

Underwater video footage showed substrates ranging from fines (<2 mm) to boulders (>256 mm), including some >1 m in diameter, in Patch Lake. Video footage confirmed that fines and mud predominated in deeper parts of the lake (Figure 3.1-6 and Plate 3.1-5a). Rocky substrates (gravel, cobble, boulder) occurred near shore (Plates 3.1-5b and 3.1-5c) and in off shore areas near the proposed dyke (Plate 3.1-5d). Hard substrates were rounded in some locations and highly angular in others (Plates 3.1-5b and 3.1-5c). In many places, rocky substrates were coated with silt or algae or embedded with fines, especially in off-shore locations (Plates 3.1-5b and 3.1-5d). Typically, there was a zone of cobble and boulder interspersed among fines between a rocky shoreline and fine sediment in deeper water. Gravel, cobble and boulders were often mixed together or occurred in patches.

Aquatic plants were also observed using underwater video in Patch Lake. Two general forms of algae were observed: “filamentous” (Plate 3.1-6a) and “globular” (Plate 3.1-6b). These algae covered large areas of the lake bottom, with the exception of the deep basins and close to shore. Algal coverage was intermediate (25 to 75%) to extensive (75 to 100%) at many locations. Underwater video was unable to identify or confirm substrate composition at locations with 100% algae coverage.

PROJECT # 1009-002-06 GIS # HB-06-030a January 13 2009

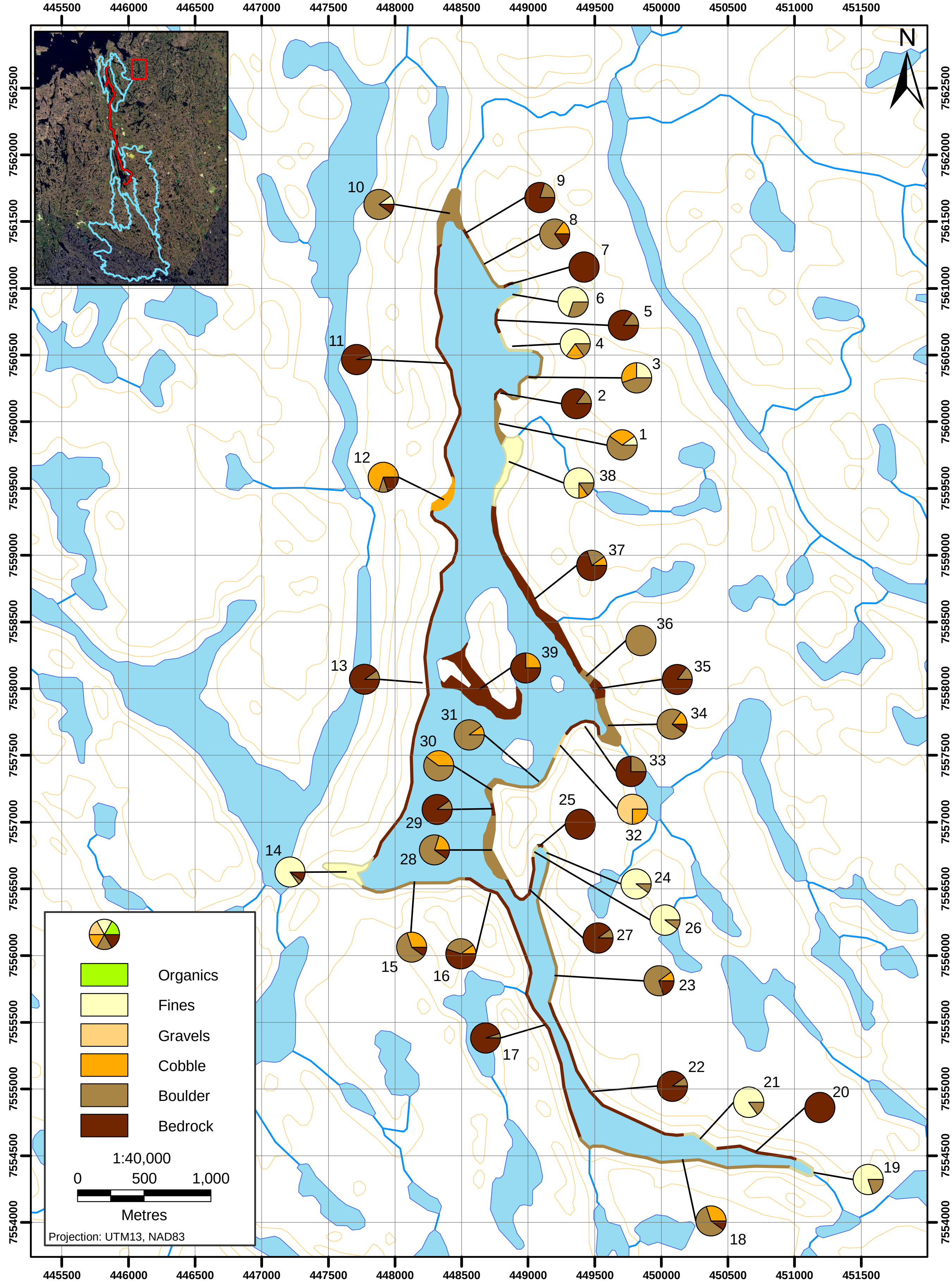

Figure 3.1-4

Fish Habitat Map of Reference Lake A Littoral Zone, Hope Bay Belt Project, 2009

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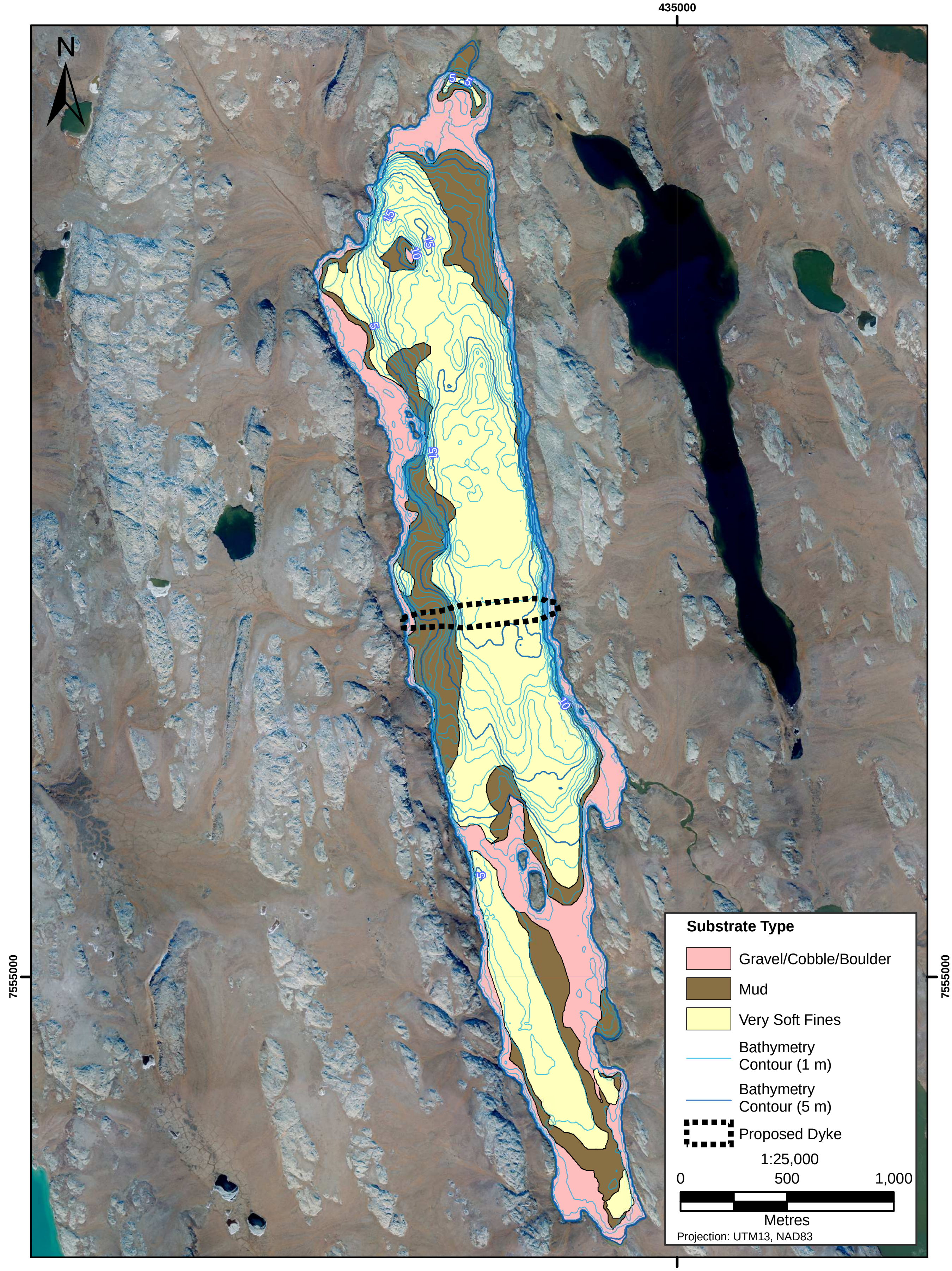

Substrate Composition of Doris Lake Derived from Hydroacoustic Surveys, Hope Bay Belt Project, 2009

Figure 3.1-5

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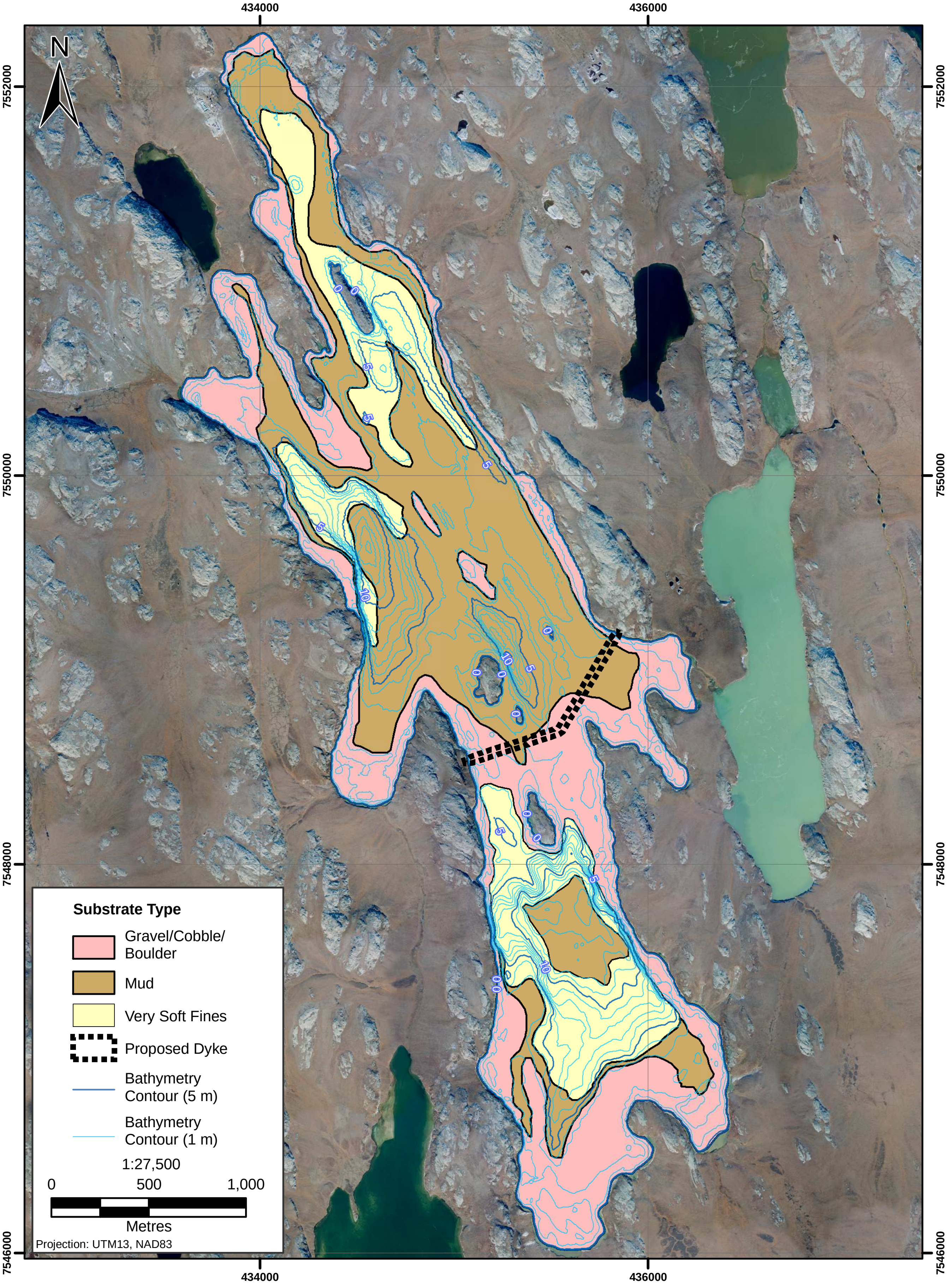

Substrate Composition of Patch Lake Derived from Hydroacoustic and Underwater Video Surveys, Hope Bay Belt Project, 2009

Figure 3.1-6

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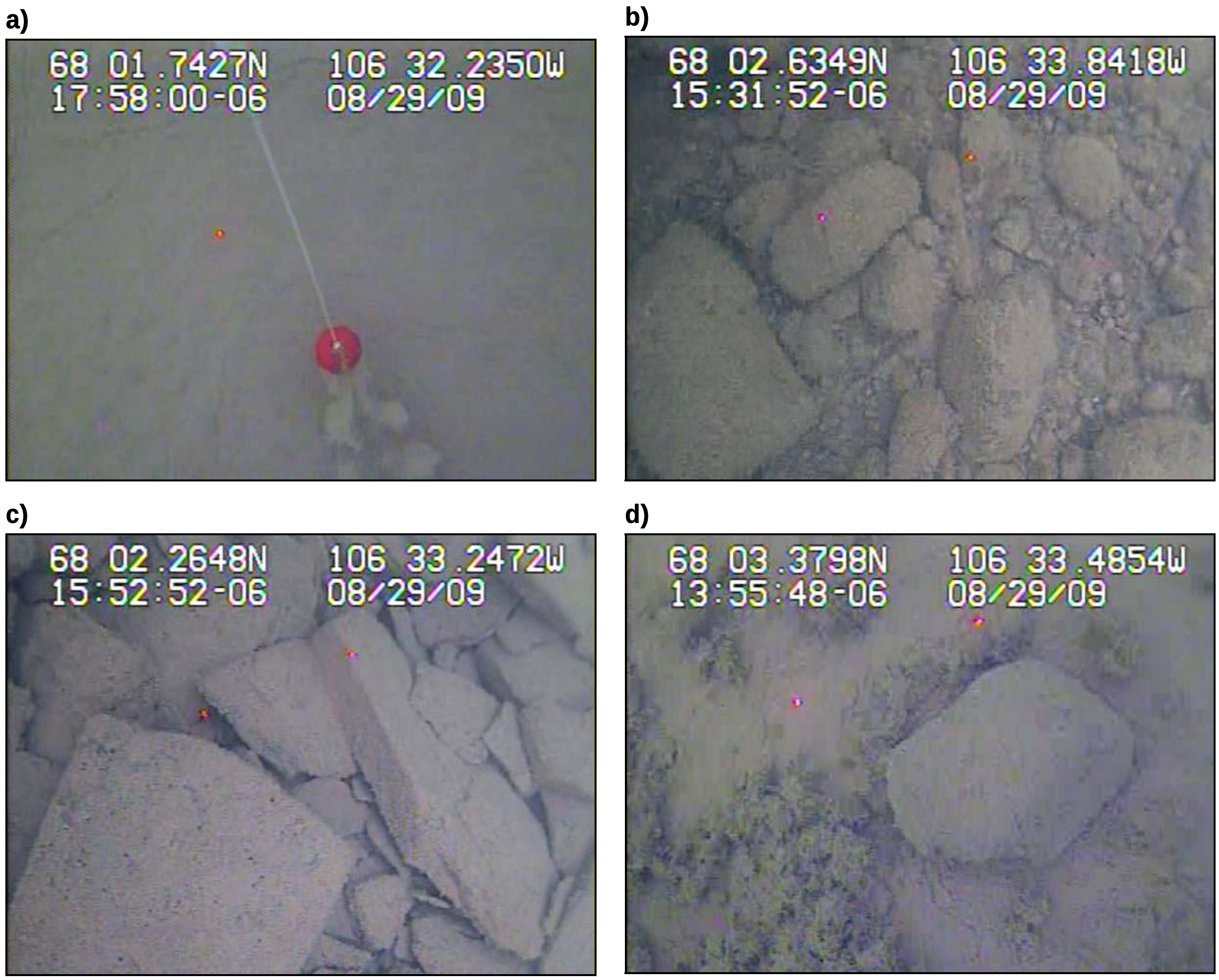


Plate 3.1-5. Examples of substrate types in Patch Lake: a) fines in the deepwater main basin; b) gravel and cobble in the near shore; c) angular cobbles in the near shore; and d) a piece of cobble among algae and fines in the off shore. Note: the red dots represent a distance of 10 cm.

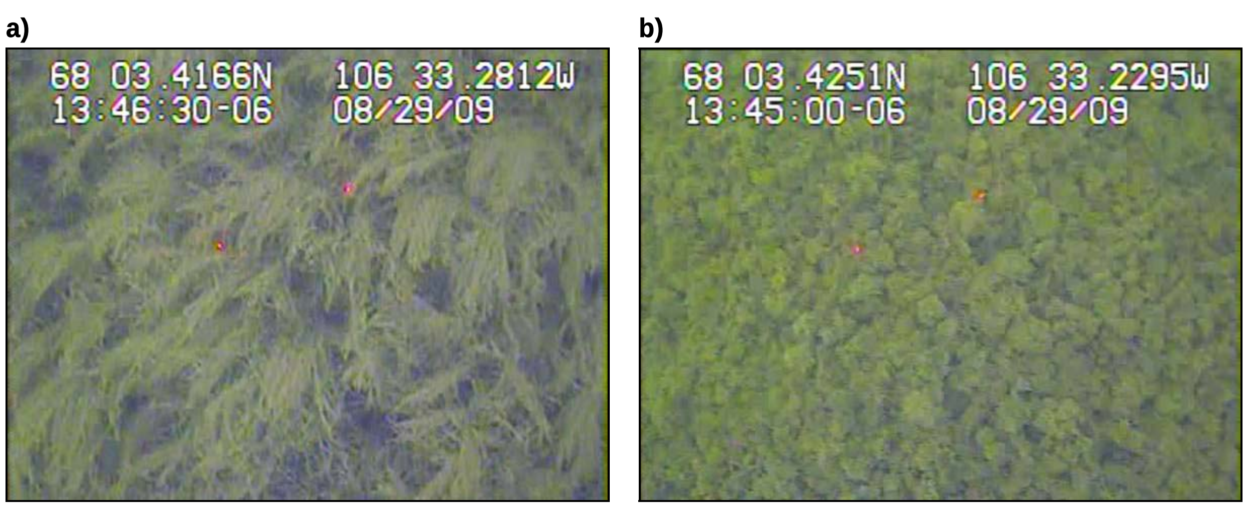


Plate 3.1-6. Filamentous (a) and globular (b) forms of algae on the bottom of Patch Lake. Note: the red dots represent a distance of 10 cm.

3.1.2 Stream Habitat

Detailed fish habitat surveys were completed at 27 sites in the Project area. Surveys were conducted from June to August 2009. Thirteen potential receiving environment streams were surveyed from four different watersheds (Doris, Koignuk, Windy and Roberts), while three reference environment streams were surveyed from three different watersheds. Fish habitat data sheets and photos are listed in Appendix 3.1-3. The data is summarized in Appendix 3.1-4.

Sections of streams assessed in the study area consisted of glide, riffle, pool and cascade habitat. Mean gradients, ranged from 0.8 to 10.6% (Figure 3.1-7). Reference B outflow, Angimajug River and Koignuk River were the largest systems surveyed, ranging in bankfull channel width from 40.5 m to 137.0 m (Figure 3.1-8). Streams within the Doris, Windy and Roberts Bay watersheds were considerably smaller, ranging from 1.0 m (Doris I/F) to 15.7 m (P.O. O/F). Mean bankfull depth ranged from 0.3 m (Doris I/F) to 2.4 (Doris I/F) (Figure 3.1-9). The bed material was primarily composed of fines and secondarily composed of varied amounts of bedrock, boulders, cobble and gravel (Figure 3.1-10). Fines were the dominant substrate for all streams within the receiving environment, while the bed material of the reference environment sites was a mixture of gravel, cobble, boulders and bedrock.

The Koignuk River was observed as having the least amount of total fish cover present (7%), while the Doris I/F and Windy I/F were observed as having the greatest amount of total fish cover present (100%) (Figure 3.1-11). Overall, instream cover (in the form of small woody debris) was identified as the primary cover type. Boulder and pool cover was the secondary type, while overhanging vegetation, undercut banks, large woody debris and small woody debris contributed small proportions of the available fish habitat.

Doris Watershed

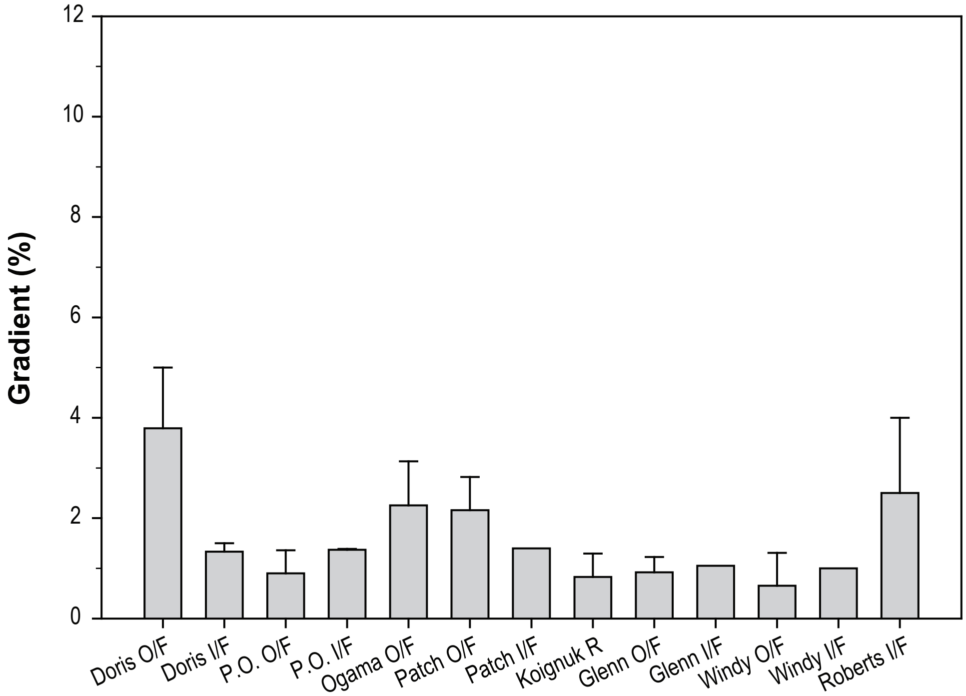
A total of 17 fish habitat surveys for seven different streams were completed within the Doris Watershed.

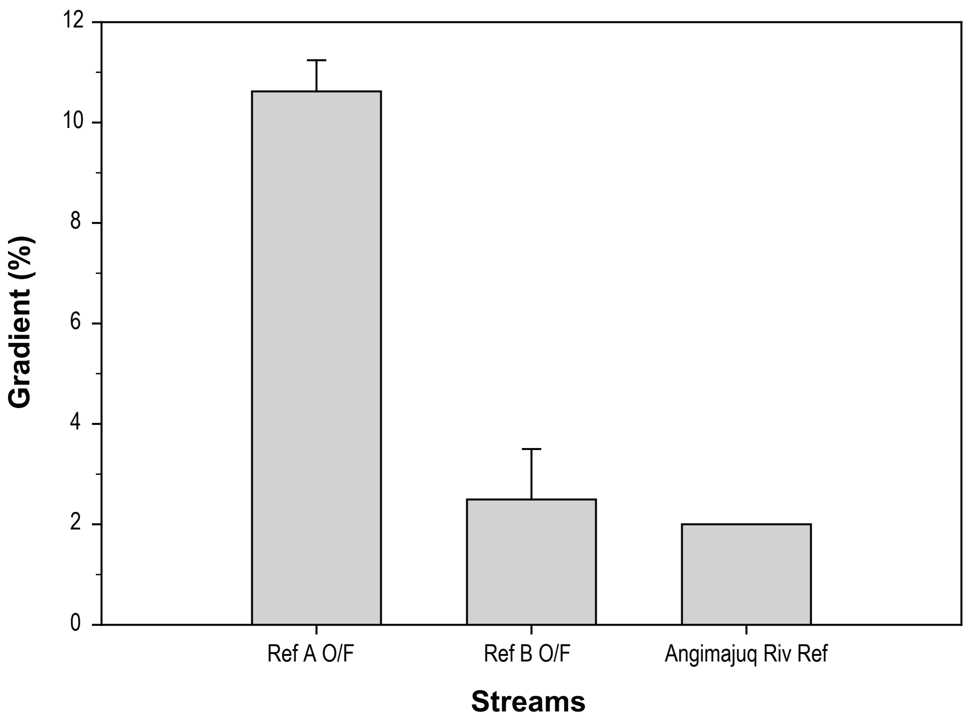
Doris Outflow

Three sections of Doris Outflow (Doris O/F1, Doris, O/F2 and Doris O/F3), covering a total of 800 m, were surveyed. Doris Outflow is characterized by long glide and riffle habitats with a mean gradient ranging from 1.4 to 5.0%. The mean bankfull depth ranged from 0.8 to 5.0 m, while the mean bankfull width ranged from 3.5 to 15.2 m. The primary substrate type present was fines, while gravel, cobble and boulders were less abundant. Fish habitat was present in the form of pools, boulders, instream vegetation and overhanging vegetation. A 3 m-high falls was identified downstream of Doris O/F1 as a barrier to fish migration. Several lake trout were observed holding in Doris Outflow in deep areas with relatively light flow. Fish habitat was rated as good due to the presence of adult lake trout using the habitat for feeding.

Doris Inflow

A total of 600 m of Doris Inflow was assessed for fish habitat. Doris Inflow was characterized as an ephemeral stream with a predominance of overland flow, which was observed during the freshet period. Stream gradient ranged from 1.0 to 1.5%. Bankfull width ranged from 0.3 m to 1.8 m, and bankfull depth ranged from 0.26 m to 0.30 m. The bed material of the stream was 100% composed of fines. Terrestrial vegetation was observed throughout the stream bed, which offered 100% of the stream area as cover for fish in the wetted portion of the stream. The predominance of fines and terrestrial vegetation is typical of ephemeral streams. Fish habitat was classified as none to marginal.





Note: Error bars represent the one standard error of the mean

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Mean Gradient of Streams Surveyed for Fish Habitat, Hope Bay Belt Project, 2009

Figure 3.1-7

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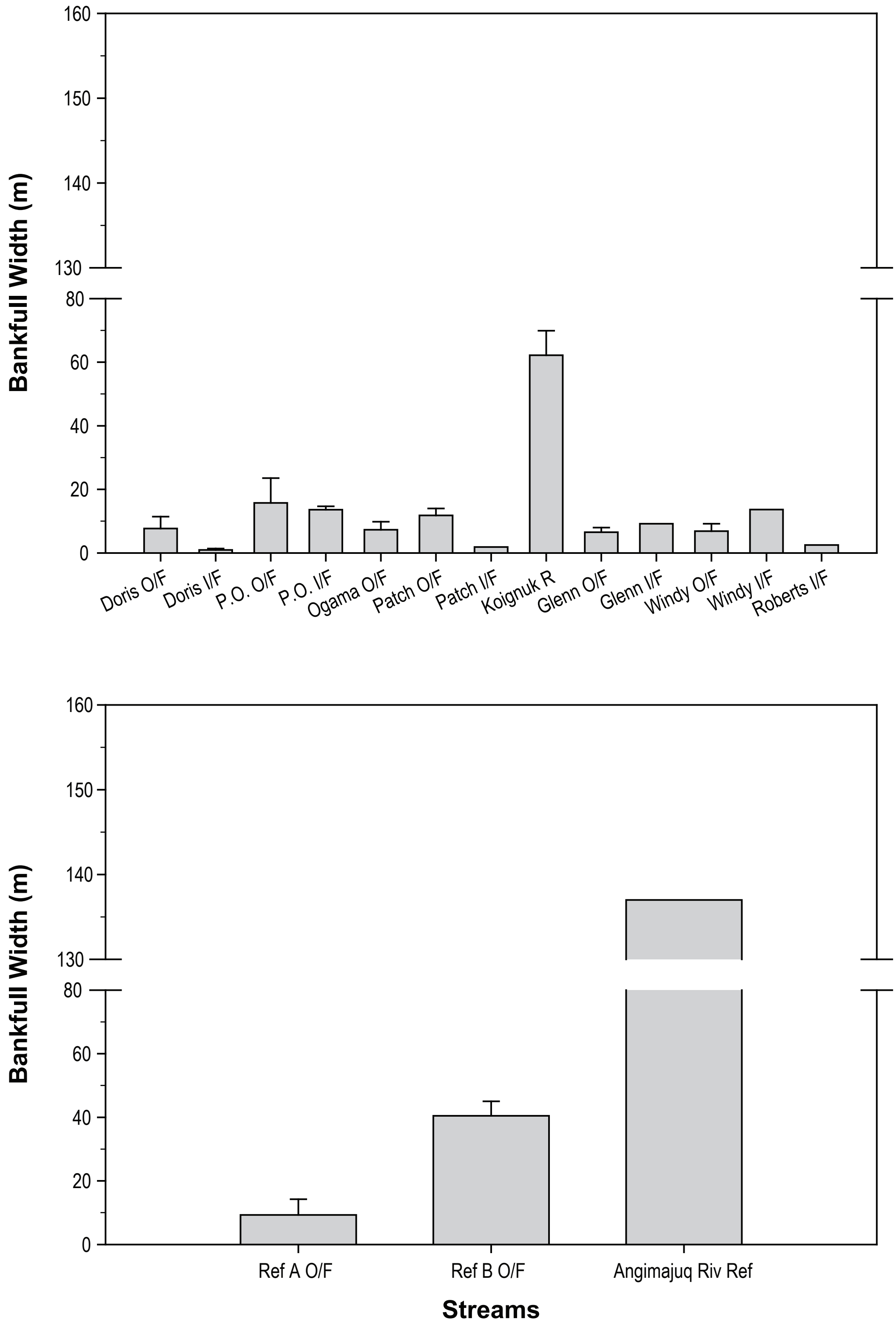

Note: Error bars represent the one standard error of the mean

Figure 3.1-8

Mean Bankfull Widths of Streams Surveyed for Fish Habitat, Hope Bay Belt Project, 2009

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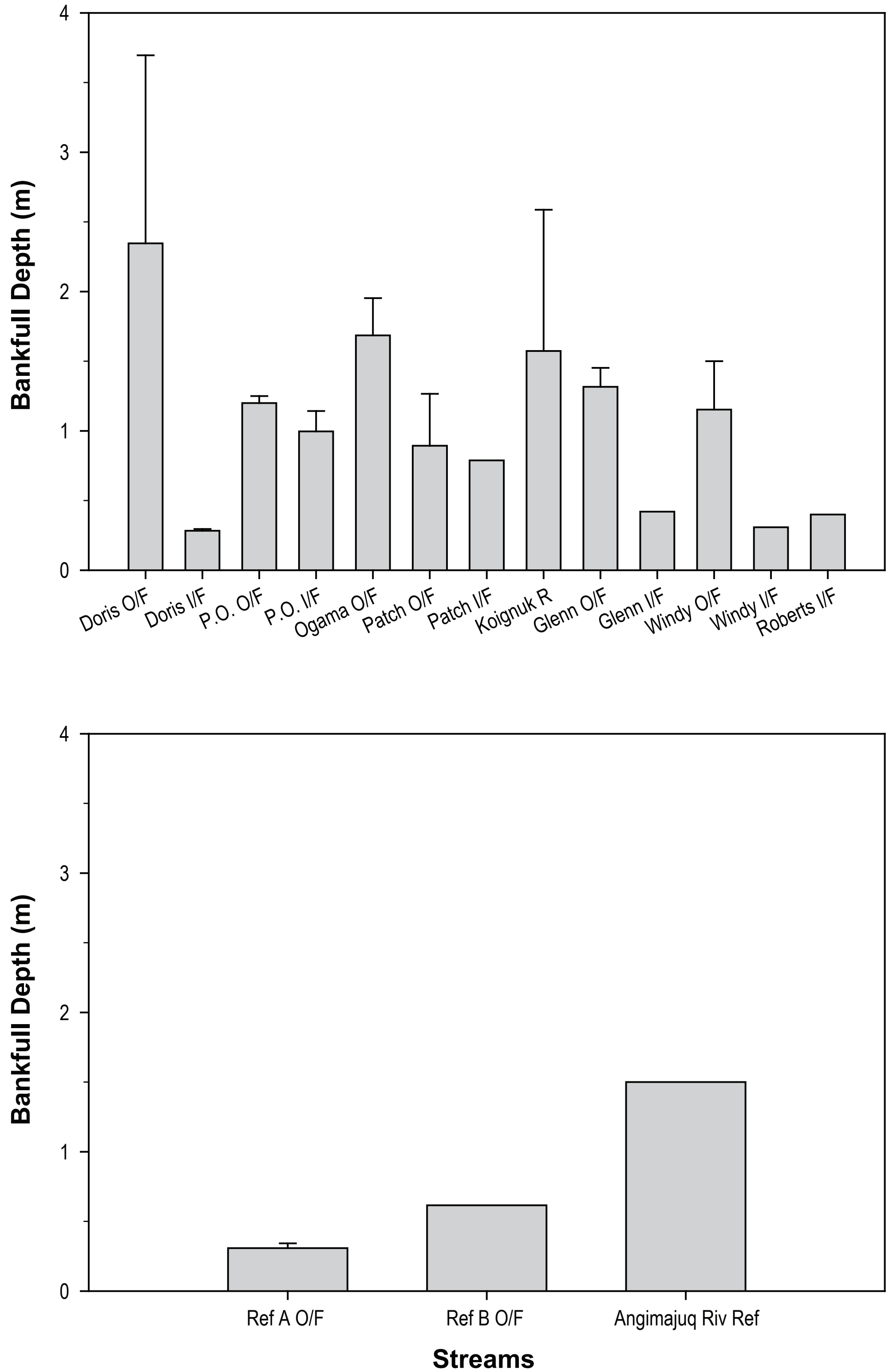

Note: Error bars represent the one standard error of the mean

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Mean Bankfull Depths of Streams Surveyed for Fish Habitat, Hope Bay Belt Project, 2009

Figure 3.1-9

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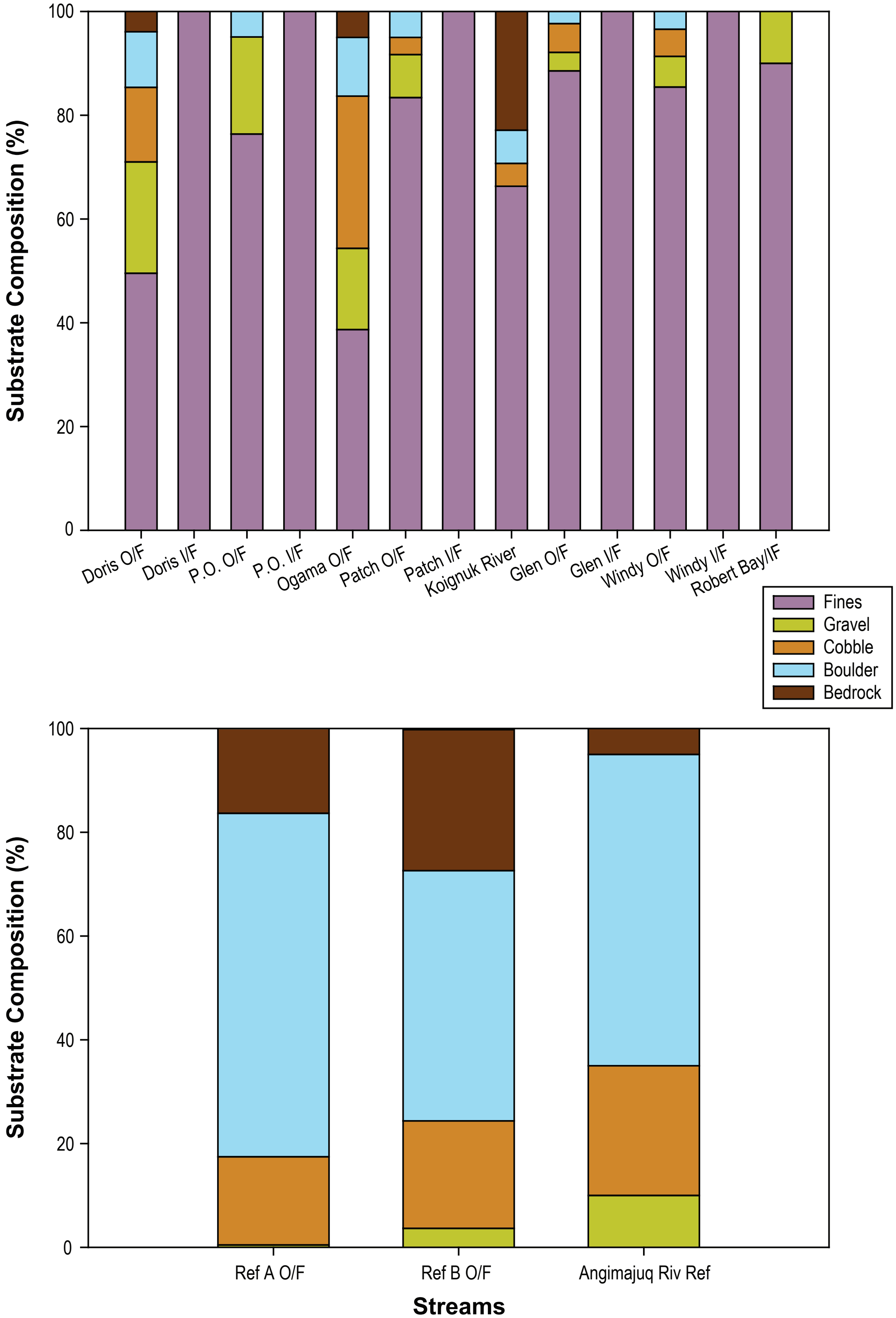

Figure 3.1-10

Cover for Fish in Streams Surveyed for Fish Habitat, Hope Bay Belt Project, 2009

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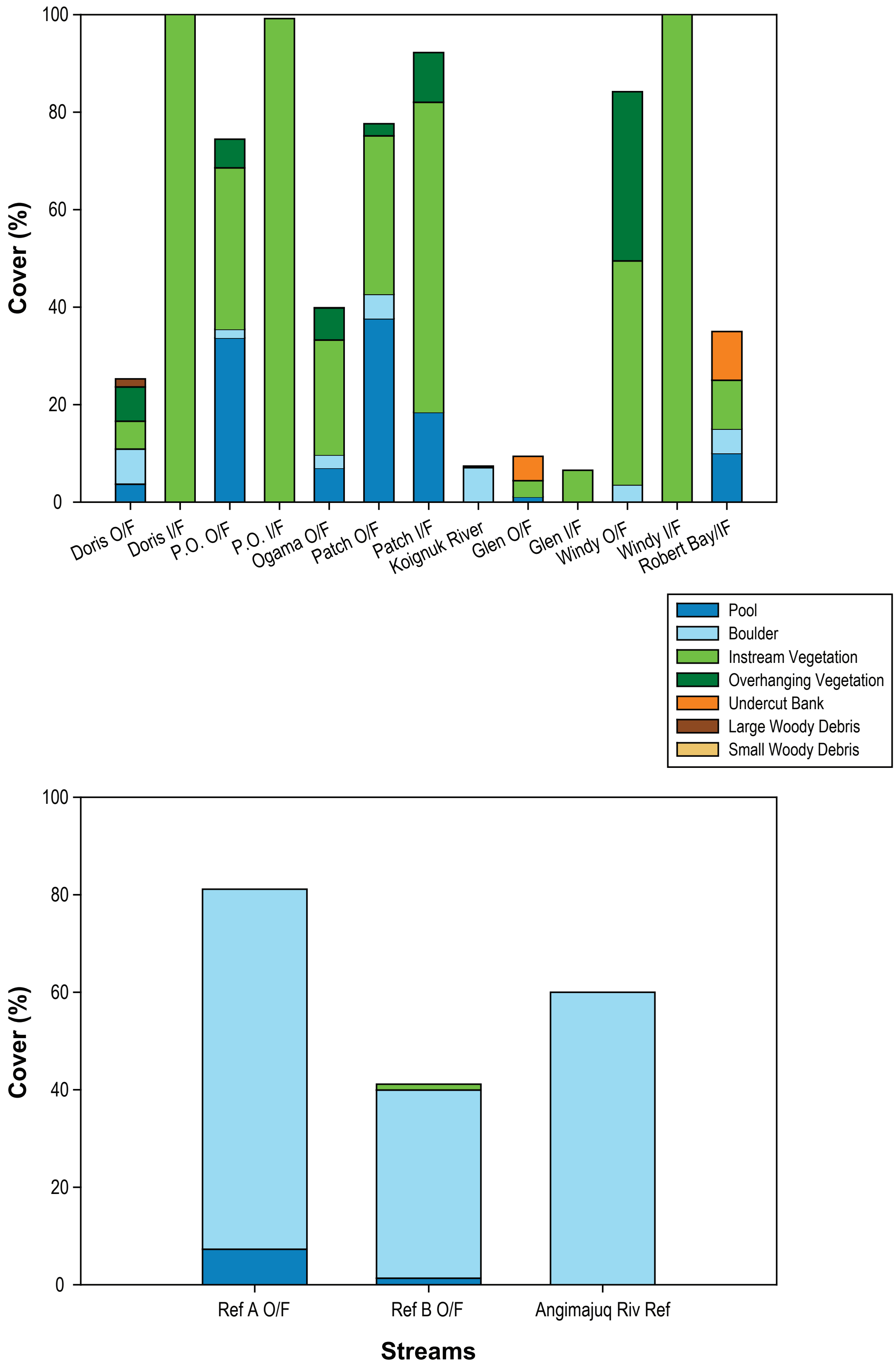

Figure 3.1-11

Substrate Composition of Streams Surveyed for Fish Habitat, Hope Bay Belt Project, 2009

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P.O. Outflow

Two surveys of P.O. Outflow were completed in June during the freshet period and one survey was completed in July during the low-flow summer period. Of the seven habitat units identified, three were glides, two were riffles, one was a cascade and one was a pool. The stream gradient ranged from 0 to 1.5%. Stream channel dimensions ranged from 1.3 m to 17.9 m for bankfull width, and 1.1 to 1.3 m for bankfull depth. Substrate was predominantly fines. Gravel and boulders were present in trace amounts. Instream vegetation and pools were noted as the predominant source of cover for fish. A small proportion of boulder and overhanging vegetation cover was observed. Overall fish habitat was rated as important.

P.O. Inflow

P.O. Inflow is characterized by long stretches of glide and riffle habitat (i.e., 25 to 65 m long) followed by shorter stretches of pool habitat (i.e., 19 to 22 m long). Mean stream gradient was 1.4%, while the stream channel dimensions ranged from 12.5 m to 14.7 m for bankfull width, and 0.9 m to 1.1 m for bankfull depth. Bed material was composed of 100% fines. Instream vegetation was the only source of cover for fish. The total amount of cover present was relatively high, ranging from 98 to 100%. Overall habitat quality was rated as important because of the presence of rare glide-pool habitat complexes.

Ogama Outflow

Ogama Outflow is characterized by long stretches (i.e., 100 m) of riffle and glide habitat, and short stretches (i.e., 10 m) of pool habitat. Stream gradient ranged from 1.2 to 4.0%. Stream channel dimensions ranged from 4.0 m to 12.2 m for bankfull width, and 1.5 m to 2.2 m for bankfull depth. While the primary bed material present was fines, there was a diverse mixture of substrates, at least relative to other streams within the Project area. The major source of cover for fish within Ogama Outflow was instream cover. Trace amounts of overhanging vegetation and large woody debris were also present. Overall habitat quality was rated as marginal.

Patch Outflow

Two surveys of Patch Outflow were completed. The first survey was completed in June during the freshet period, while the second survey was completed in July during the low-flow summer period. Habitat types were pools, riffles and glides. Stream gradient ranged from 1.5 to 2.8%, while the stream bank dimensions ranged from 9.6 m to 14.0 m for bankfull width, and 0.5 m to 1.3 m for bankfull depth. The primary substrate type was fines. A diverse range of cover types were observed at these sites. Pools and instream vegetation were noted as the dominant cover types. Trace amounts of boulder and overhanging vegetation were also present. Overall habitat quality was rated as important due to the observation of lake trout holding in pool areas and habitat use by ninespine stickleback in downstream sections of this stream. The majority of important fish habitat is located in the downstream section of this site where the stream flows into P.O. Lake. Present site designs indicate that a road may cross the Patch Lake Outflow. To protect important fish habitat, the road crossing should be situated immediately downstream of Patch Lake, if possible.

Patch Inflow

A total of nine habitat units were identified within a 200 m-long section of Patch Inflow. Of the nine habitat units, five were pools, two were glides and two were riffles. The mean stream gradient was 1.4%. The mean bankfull width was 1.9 m and the mean bankfull depth was 0.8 m. The bed material was composed of 100% fines. The primary source of cover was instream vegetation, while pool and overhanging vegetation were present in lesser abundances. Overall habitat quality as rated as marginal.

Koignuk Watershed

Koignuk River

Koignuk River is characterized as a large river with stream bank dimensions ranging from 44.0 to 80.0 m for bankfull width, and 0.6 m to 2.6 m for bankfull depth. Stream gradient ranged from 0 to 1.5%. The substrate type present was primarily fines with lesser amounts of cobble, boulders, and bedrock. The amount of total cover ranged from 1 to 10%, with insteam cover being the dominant cover type. Overall habitat quality was rated as important.

Windy Watershed

Glenn Outflow

Glenn Outflow was composed of pool, riffle and glide habitat types. The stream gradient ranged from 0 to 3.2%. Stream bank dimensions ranged from 5.1 m to 8.0 m for bankfull width, and 1.1 m to 1.5 m for bankfull depth. Fines were the predominant substrate type present. Cover available for fish in the outflow ranged from 3.2 to 20%. Instream cover and undercut banks were the primary cover types present. Overall habitat quality was rated as important because Glenn Outflow is a migratory route for anadromous lake trout moving to and from Glenn Lake and Roberts Bay. Juvenile Arctic char, lake trout, whitefish spp. and cisco have also been captured near Roberts Bay.

A road is presently proposed to cross at Glenn Outflow. It is important to note that any development should avoid disrupting habitat at this site for the protection of anadromous lake trout and other fish populations.

Glenn Inflow

Glide and riffle habitat units were identified within a 195 m section of Glenn Inflow. Stream gradient was 1.0%. Stream channel dimensions were 9.2 m for bankfull width and 0.4 m for bankfull depth. The stream bed material was composed of 100% fines. Instream vegetation was the sole source of cover, totalling 7%. Overall habitat quality was rated as marginal.

Windy Outflow

Windy Outflow is composed of pool, riffle and glide habitat types. Stream gradient ranged from 0 to 1.3%, while the stream bank dimensions ranged from 4.5 m to 9.2 m, for bankfull width, and 0.8 m to 1.5 m, for bankfull depth. The stream bed material was predominantly composed of fines. The total amount of cover available for fish within the stream was abundant, ranging from 78 to 90%. Overall habitat quality was rated as marginal.

Windy Inflow

Windy Inflow was characterized as wetland habitat. Field crews observed sculpin (*Cottus* sp.) within the shallow wetland section of the inflow. Mean stream gradient was 1.0%. Stream dimensions were 13.6 m for bankfull width and 0.3 m for bankfull depth. The stream bed material was composed of 100% fines. The total amount of cover present was 100%, which was exclusively instream vegetation. Overall habitat quality was rated as important.

Roberts Bay Watershed

Roberts Bay Inflow

Two surveys were completed for the Roberts Bay Inflow in June and August. During the June survey, fish habitat was limited to a section from the ocean coastline to a point 300 m upstream. Within this section the stream gradient ranged from 1 to 4%. Stream dimensions were 2.5 m for bankfull width and 0.4 m for bankfull depth. Cover for fish populations were present in the form of pools, boulders, instream vegetation and undercut banks. Overall habitat quality was rated as marginal.

Reference Watersheds

Reference A Outflow

Two branches of Reference A Outflow were surveyed in July. The two branches are characterized primarily as riffle habitat with a steep gradient up to 11%. The stream bank channel dimensions ranged from 4.3 to 14.3 m, for bankfull channel width, and the bankfull depth was 0.3 m. The stream bed material was a mixture of gravel, cobble, boulder and bedrock. While boulders were observed as the predominant substrate type, they were also identified as the greatest source of cover for fish populations within the outflow. Reference A Outflow was identified as a stream with a relatively high amount of total cover, ranging from 76 to 86%.

Reference B Outflow

Reference B Outflow is characterized as a stream with various types of pool, glide, riffle and cascade habitats. Stream gradient ranged from 1.5 to 3.5%. The bankfull channel width ranged from 35.9 m to 45.0 m while the mean bankfull channel depth was 0.6 m. The stream bed material was composed of gravel, cobble, boulders and bedrock. The total amount of cover ranged from 24.8 to 57.5% which was comprised of pool, boulders and instream vegetation. Similar to Reference A Outflow, boulders were identified as the primary source of cover for fish populations. Overall habitat quality was rated as important.

Angimajug River Reference

A 200 m-long section of the Angimajug River was surveyed for fish habitat. The river is a large system with a mean bankfull width of 137 m and a gradient of 2%. A single habitat unit was identified within the section of river surveyed – a 200 m-long glide. The mean bankfull depth was 1.5 m. The stream bed material was comprised of a mixture of gravel, cobble, boulder and bedrock substrates. Boulders were the single source of cover identified within the habitat unit. The total amount of cover available for fish in the Angimajug River was 60%. Overall habitat quality was rated as important because the site may be used by Arctic grayling (*Thymallus arcticus*) and Arctic char (*Salvelinus alpinus*) for spawning habitat.

3.2 FISH COMMUNITY

3.2.1 Lake Fish Community

3.2.1.1 Composition and CPUE

Biological data for fish sampled from lakes in the Project area are presented in Appendix 3.2-1. The fish assemblages in all lakes in the Project area displayed very low diversity. Most lakes contained only three species, including: lake trout (Plate 3.2-1), lake whitefish (Plate 3.2-2) and cisco (*Coregonus artedii)*; Plate 3.2-3). Arctic char (Plate 3.2-4) were captured only in Little Roberts Lake and Reference Lake B.

A total of 1,243 fish were captured using gillnets from lakes in the Project area. Of this number, 730 (59%) were cisco, 312 (25%) were lake whitefish, 186 (15%) were lake trout and 16 (1%) were Arctic char.

Plate 3.2-1. Lake trout captured by gillnetting from Ogama Lake, Hope Bay Belt Project, 2009.

Plate 3.2-2. Lake whitefish captured by gillnetting from Doris Lake, Hope Bay Belt Project, 2009.

Plate 3.2-3. Cisco captured by gillnetting from Windy Lake, Hope Bay Belt Project, 2009.

Plate 3.2-4. Arctic char captured by gillnetting from Little Roberts Lake, Hope Bay Belt Project, 2009.

Table 3.2-1 summarizes the total number of gillnet sets, total catch and mean total CPUE (defined as the mean of total CPUE from all gillnet sets). The total number of gillnets set ranged from six at Little Roberts Lake to 55 at Doris Lake, with an average of 19 sets per lake. The number of gillnets set per lake was dependant on lake size and assessment purpose (i.e., population assessment for Doris and Patch lakes). This trend was also reflected in total gillnet effort for each lake. All gillnet set locations are shown in Section 2.2.

Table 3.2-1. Total Lake Gillnet Sets, Catch and CPUE, Hope Bay Belt Project, 2009

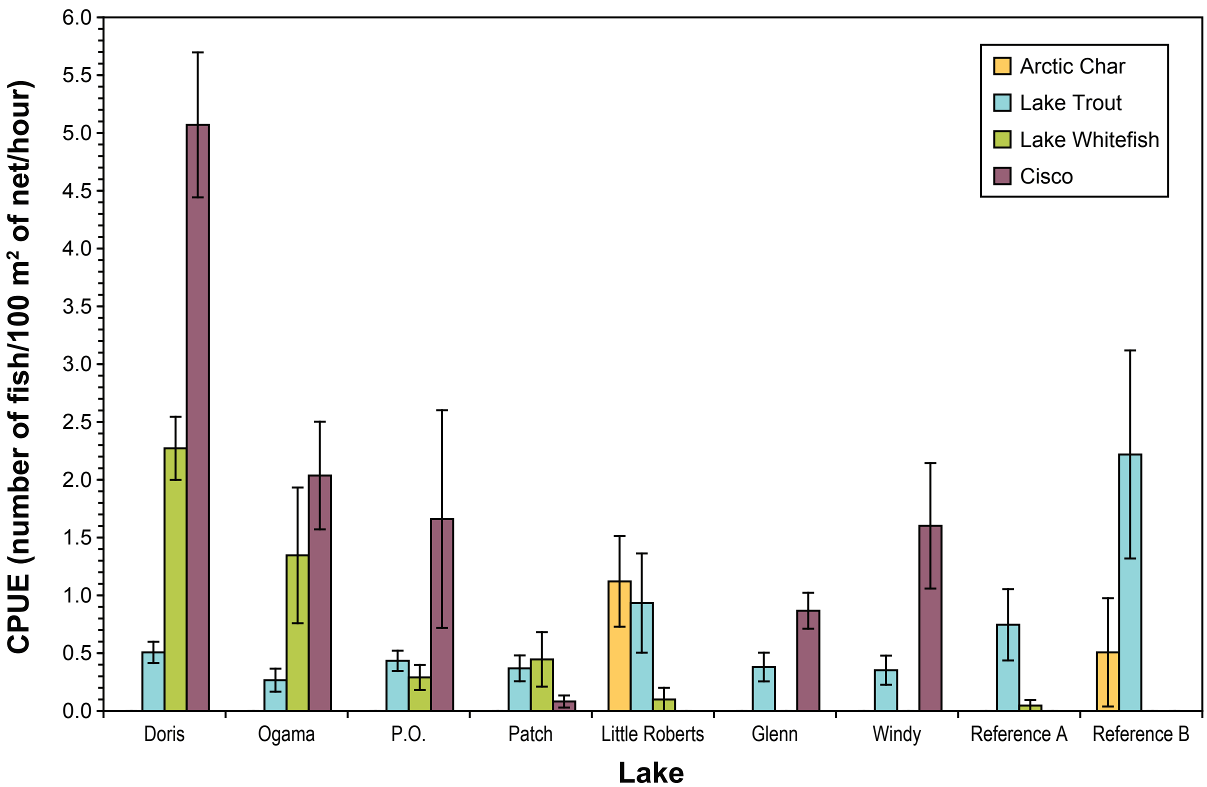
Lake	Watershed	Number of Sets	Catch (Number of fish)				Total Catch	Mean Total CPUE	SE
			ARCH	LKTR	LKWH	LCIS			
Doris	Doris	55	0	47	218	481	746	7.85	0.83
Ogama	Doris	11	0	7	42	65	114	3.65	0.96
P.O.	Doris	15	0	16	10	73	99	2.38	0.94
Patch	Doris	37	0	31	40	6	77	0.90	0.32
Little Roberts	Doris/Roberts	6	12	10	1	0	23	2.15	0.90
Glenn	Windy	22	0	20	0	45	65	1.25	0.19
Windy	Windy	11	0	14	0	60	73	1.91	0.62
Reference A	Reference A	9	0	16	1	0	17	0.79	0.33
Reference B	Reference B	7	4	25	0	0	29	2.73	1.31
Totals		**173**	**16**	**186**	**312**	**730**	**1,243**	**3.63**	**0.37**

Notes:
Species code: ARCH = Arctic char, LKTR = lake trout, LKWH = lake whitefish, LCIS = cisco
CPUE = number of fish/100 m^2 of net/hour
SE = standard error

Figure 3.2-1 shows mean RISC standard gillnet CPUE for each fish species for all lakes assessed in the Project area. Doris Lake had the highest mean CPUE for cisco and lake whitefish. Reference Lake B displayed the highest mean CPUE for lake trout, while Little Roberts Lake had the highest mean CPUE for Arctic char.

Table 3.2-2 summarizes the total effort, total catch and CPUE for minnow traps used at lakes in the Project area. The total minnow trap catch included 317 (99%) ninespine stickleback (*Pungitius pungitius*), three (1%) slimy sculpin and one (<1%) Arctic char. Minnow traps generally captured very few fish from lakes and had very low CPUE. Minnow traps were most successful in capturing ninespine stickleback from P.O. Lake and Reference Lake B.

Table 3.2-3 shows the CPUE of fish captured by RISC standard gillnets from the north and south basins and from three depth ranges. Figure 3.2-2 shows the distribution of RISC standard gillnet CPUE for Doris Lake. Lake trout CPUE showed a clear trend of increased CPUE with depth, with the highest CPUE from the 15 to 20 m depth range. Lake trout CPUE was relatively consistent between the north and south basins in depths ranging from 0 to 10 m. Lake whitefish also showed relatively consistent CPUE at all depth ranges and basins, with the highest CPUE coming from the 5 m to 10 m depth range in the southern basin. The highest CPUE for cisco occurred in the 10 to 15 m range in the southern basin and in the 15 to 20 m range in the northern basin.



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Mean CPUE for All Fish Species Captured using RISC Standard Gillnets from Lakes, Hope Bay Project Area, 2009

Figure 3.2-1

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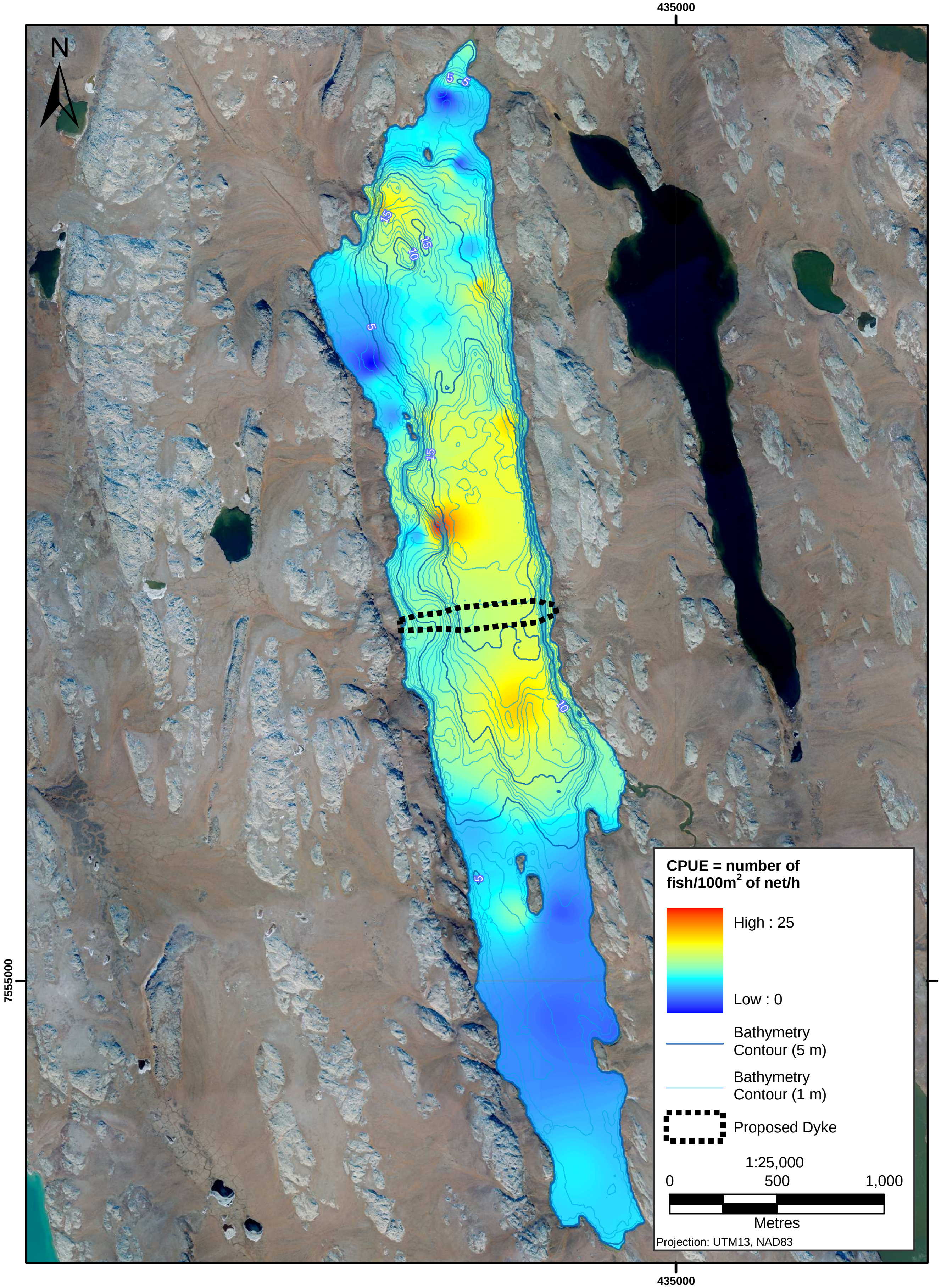

Distribution of RISC Standard Gillnet CPUE in Doris Lake, Hope Bay Belt Project, 2009

Figure 3.2-2

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Table 3.2-2. Minnow Trap Effort, Catch and CPUE for Lakes, Hope Bay Belt Project, 2009

Lake	Watershed	Number of Traps Set	Total Effort (h)	Catch (Number of fish)			Total Catch	Mean Total CPUE	SE
				ARCH	NSSB	SLSC			
Doris	Doris	50	1,107.4	0	2	0	2	0.04	0.03
Ogama	Doris	9	243.5	0	0	0	0	0.00	0.00
P.O.	Doris	10	251.2	0	231	0	231	22.08	5.36
Little Roberts	Doris/Roberts	9	214.2	0	3	0	3	0.34	0.24
Glenn	Windy	10	240.0	0	0	1	1	0.10	0.10
Windy	Windy	10	240.0	0	1	0	1	0.10	0.10
Reference A	Reference A	15	391.6	0	7	0	7	0.42	0.42
Reference B	Reference B	10	250.2	1	73	2	76	7.22	3.57
Totals		**123**	**2,938.0**	**1**	**317**	**3**	**321**	**2.49**	**0.75**

Notes:
Fish Species Codes: ARCH = Arctic char, NSSB = ninespine stickleback, SLSC = slimy sculpin
CPUE = number of fish/24 h
SE = standard error

Table 3.2-3. Mean CPUE for Fish Species Captured by RISC Standard Sinking Gillnets in Vertical and Horizontal Strata of Doris Lake, Hope Bay Belt Project, 2009

Lake Basin	Depth Range (m)	LKTR		LKWH		LCIS	
		CPUE	SE	CPUE	SE	CPUE	SE
North	0-5	0.44	0.19	3.12	0.90	3.15	1.01
	5-10	0.53	0.26	2.19	0.28	7.54	2.10
	10-15	0.91	0.31	2.37	0.41	7.45	0.93
	15-20	1.26	0.39	2.95	0.59	9.17	1.74
South	0-5	0.41	0.21	3.15	0.69	2.00	0.56
	5-10	0.50	0.50	4.82	1.16	10.60	0.86

Notes:
Fish Species Codes: LKTR = lake trout, LKWH = lake whitefish, LCIS = cisco.
CPUE = number of fish/100 m^2 of net/hour.
SE = standard error.

Figure 3.2-3 shows the distribution of RISC standard gillnet CPUE for Patch Lake. Areas of relatively high CPUE were adjacent to the deepest portion of Patch Lake along the western shoreline. Relatively low CPUE was associated with areas of shallow depth and the southern basin of Patch Lake.

Table 3.2-4 shows the CPUE of fish captured by RISC standard gillnets from the north and south basins and from three depth ranges of Patch Lake. Relative to Doris Lake, patterns of CPUE were less clearly defined, and CPUE was much lower for each species. Lake trout, lake whitefish and cisco CPUE was highest in the 5 to 10 m range at the northern basin of Patch Lake. The CPUE for cisco was the lowest for the three species.

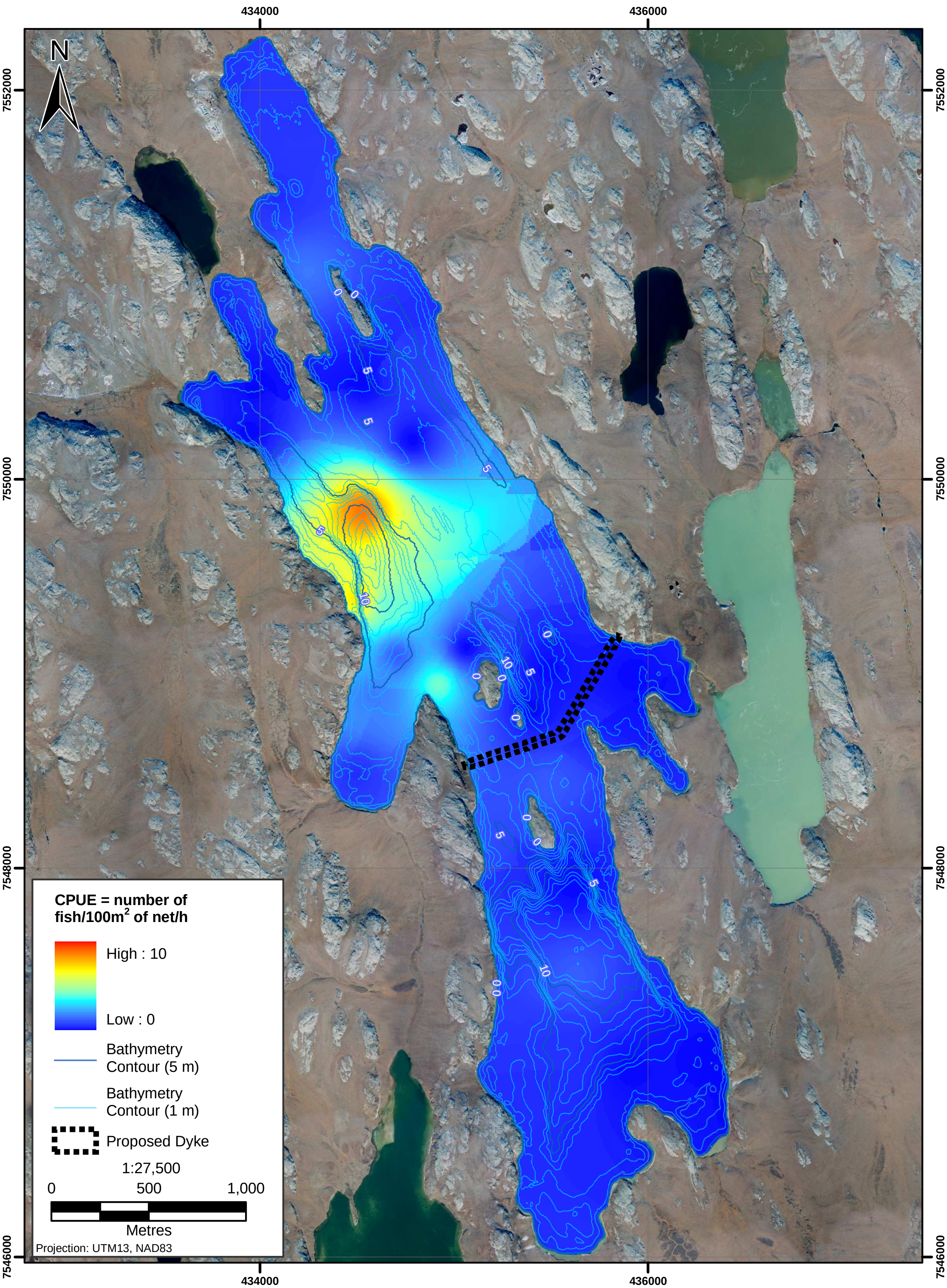

Figure 3.2-3

Distribution of RISC Standard Gillnet CPUE in Patch Lake, Hope Bay Belt Project, 2009

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Table 3.2-4. Mean CPUE for Fish Species Captured by RISC Standard Sinking Gillnets in Vertical and Horizontal Strata of Patch Lake, Hope Bay Belt Project, 2009

Lake Basin	Depth Range (m)	LKTR		LKWH		LCIS	
		CPUE	SE	CPUE	SE	CPUE	SE
North	0-5	0.39	0.14	0.24	0.24	0.00	0.00
	5-10	1.26	0.59	2.32	1.45	0.61	0.32
South	0-5	0.00	0.00	0.34	0.34	0.00	0.00
	5-10	0.44	0.00	0.00	0.00	0.00	0.00
	10-15	0.27	0.27	0.27	0.27	0.00	0.00

Notes:
Fish Species Codes: LKTR = lake trout, LKWH = lake whitefish, LCIS = cisco
CPUE = number of fish/100 m^2 of net/hour
SE = standard error

Hydroacoustics

Doris Lake

Appendix 3.2-2 presents fish density data collected during hydroacoustic surveys of Doris Lake. Figure 3.2-4 shows an example echogram from the down-looking transducer at a portion of Transects 5 and 9 showing the majority of fish below a depth of 5 m. Figure 3.2-5 illustrates patterns of fish density at Doris Lake. The highest density of fish observed in Doris Lake was 0.02 fish/m^3 or greater than 1,050 fish/ha. Areas of high fish density were most frequently observed below 10 m in depth in the main basin.

Relatively few fish were detected by either down-looking or side-looking transducers in shallow (<5 m deep) areas such as the southern (Transects 1 to 4) and northern (Transect 14) portions of Doris Lake. These patterns of fish density are similar to those of relative abundance derived from gillnet CPUE data, which showed the highest CPUE occurred in the relatively deep main basin and the lowest CPUE in the shallow north and south portions of Doris Lake.

Table 3.2-5 shows the estimated absolute abundance of fish in 5 m depth ranges, and between the north and south portions of Doris Lake. The total number of fish in Doris Lake was estimated at 55,806 with the 95% confidence limits ranging from 41,982 to 69,629. The northern portion of Doris Lake had an estimated 33,746 fish, while the southern portion of the lake had an estimated 22,060 fish. This difference was attributed to the greater proportion of deep water habitat available in the northern half of Doris Lake. The 10 to 15 m depth range in the northern portion of Doris Lake had the greatest number of fish (14,211). The 15 to 20 m depth ranged showed the highest density of fish at 0.00878 fish/m^3. These data lend further support to the fish density pattern illustrated in Figure 3.2-5, suggesting that fish density increases with increasing depth.

Table 3.2-6 shows the population estimates for lake trout, lake whitefish and cisco in Doris Lake. The species composition and proportions were derived from RISC standard sinking gillnet catches. Lake trout were relatively evenly distributed among depth ranges; however, greater total numbers of lake trout were estimated for the northern portion of Doris Lake. Lake whitefish estimates were highest in the 0 to 5 m depth range. The estimated lake whitefish population was nearly identical for the northern and southern portions at 8,018 and 7,795 fish, respectively. This observation suggests that although distribution patterns of fish density are highest in the deep basins, the shallow portions of Doris Lake may be important specifically for lake whitefish. In contrast, cisco were the predominant species in nearly all depth ranges and locations. The greatest proportion and numbers of cisco were found in the 10 to 15 m depth range at the northern portion of Doris Lake. These observations suggest that cisco are driving the trend of greater density of fish with increasing depth illustrated in Figures 3.2-2, 3.2-4, and 3.2-5.

Table 3.2-5. Fish Density and Estimate of Absolute Abundance (All Species Combined) Derived from Hydroacoustics Data for Doris Lake, Hope Bay Project, 2009

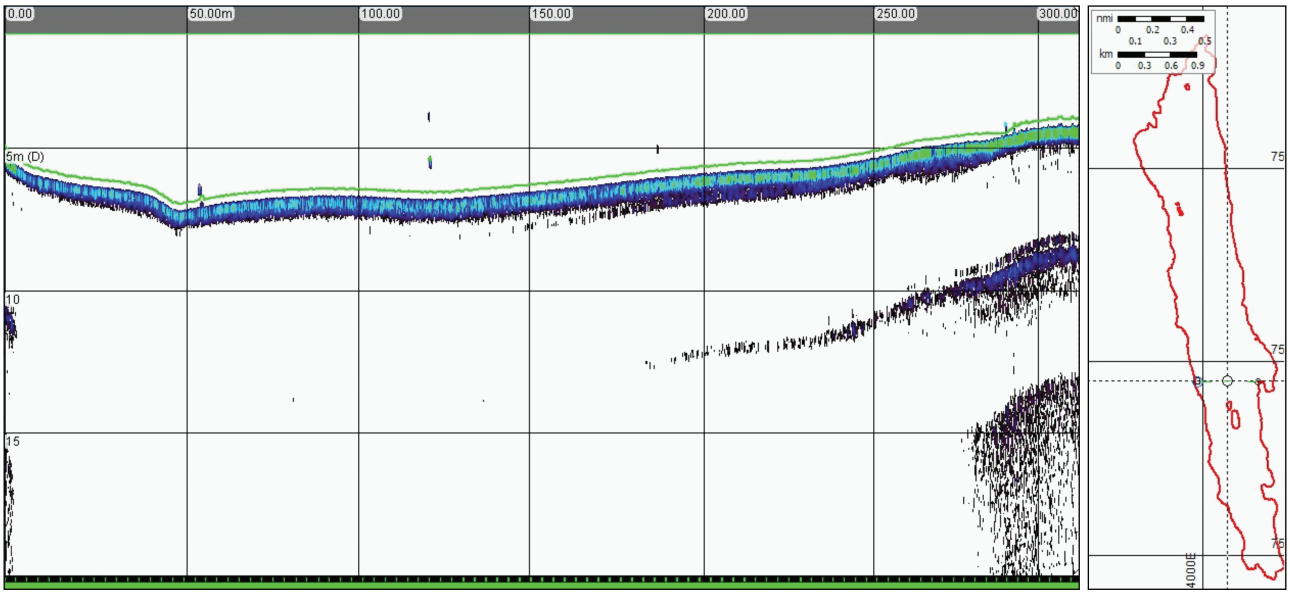
Lake Basin	Depth Range (m)	Mean Number/m^3	Variance	Sample Size **	Stratum Volume (m^3)	Estimate of Absolute Abundance	SE	95% CL Lower	95% CL Upper
North	0-5	0.00037	3.2E-08	7	7.2E+06	2,640	489	1,443	3,837
	5-10	0.00190	7.5E-07	6	5.3E+06	10,152	1,891	5,292	15,013
	10-15	0.00418	1.1E-05	6	3.4E+06	14,211	4,621	2,333	26,089
	15-20	0.00878	6.0E-05	5	7.7E+05	6,743	2,667	-662	14,147
	Basin Total			**24**	**1.7E+07**	**33,746**	**5,681**	**21,895**	**45,597**
South	0-5	0.00073	3.1E-07	7	5.9E+06	4,246	1,235	1,225	7,267
	5-10	0.00585	4.5E-06	3	2.4E+06	13,760	2,867	1,426	26,095
	10-15	0.00432	8.5E-06	2	9.3E+05	4,000	1,913	-20,311	28,312
	15-20*	0.00432	8.5E-06	1	1.2E+04	53	36	-403	509
	Basin Total			**13**	**9.1E+06**	**22,060**	**3,661**	**13,777**	**30,342**
Total (North + South Basins)						**55,806**	**6,759**	**41,982**	**69,629**

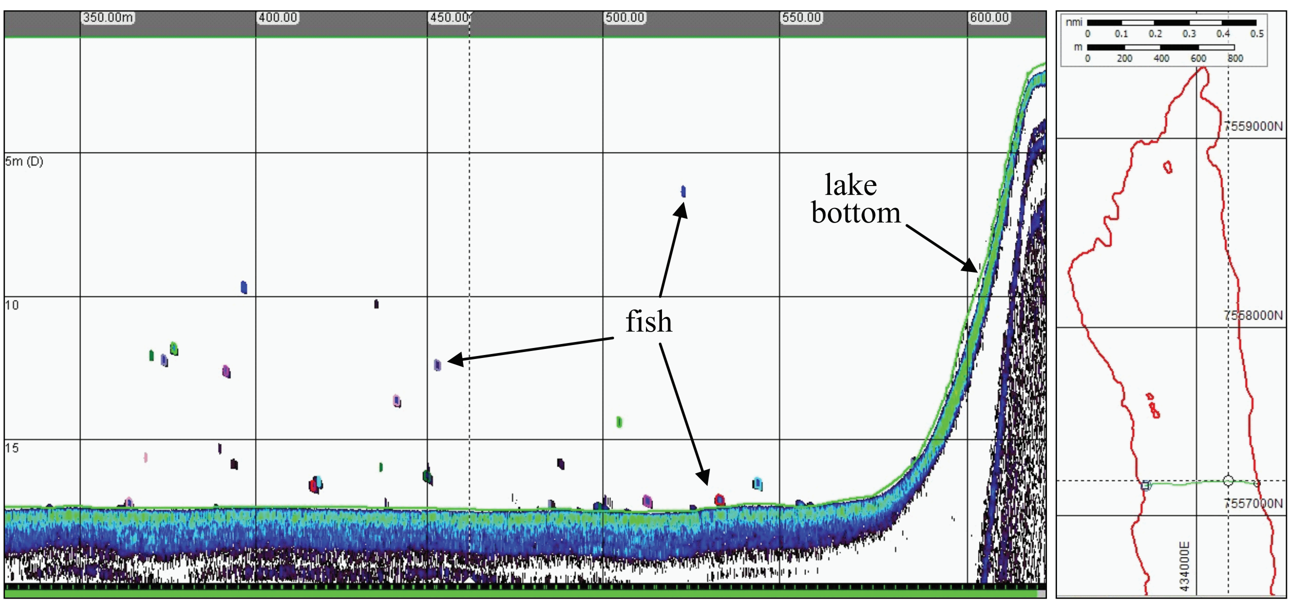
Notes:
** Variance estimated by regression using data from other depths.*
*** Number of transects with corresponding depth interval.*
CL = confidence limit; SE = standard error

Table 3.2-6. Relative Abundance and Population Estimates for Individual Fish Species Derived from Hydroacoustics Data for Doris Lake, Hope Bay Project, 2009

Lake Basin	Depth Range (m)	Percent by Species			Number by Species			Total Number
		LKTR	LKWH	LCIS	LKTR	LKWH	LCIS	
North	0-5	6.6	46.4	47.0	174	1,226	1,240	2,640
	5-10	5.2	21.3	73.5	527	2,167	7,458	10,152
	10-15	8.5	22.1	69.5	1,203	3,137	9,871	14,211
	15-20	9.4	22.1	68.5	633	1,487	4,622	6,743
	Basin Total				**2,537**	**8,018**	**23,191**	**33,746**
South	0-5	7.4	56.6	36.0	313	2,405	1,528	4,246
	5-10	3.1	30.3	66.6	431	4,164	9,166	13,760
	10-15	3.1	30.3	66.6	125	1,211	2,665	4,000
	15-20*	3.1	30.3	66.6	2	16	35	53
	Basin Total				**871**	**7,795**	**13,394**	**22,060**
Total (North + South Basins)					**3,408**	**15,813**	**36,584**	**55,806**

Notes:
** None of the acoustic transects were greater than 15 m deep. Density and variance of the 10 to 15 m layer were used as estimates of 15 to 20 m layer density and variance.*
Fish Species Codes: LKTR = lake trout; LKWH = lake whitefish; LCIS = cisco





Notes: Crosshairs on the maps to the right show the locations of the data illustrated.
The grid spacing on the ecograms is 5 m vertically and 50 m horizontally.

Example Echogram Produced from Hydroacoustic Surveys of Doris Lake, Hope Bay Belt Project, 2009

Figure 3.2-4

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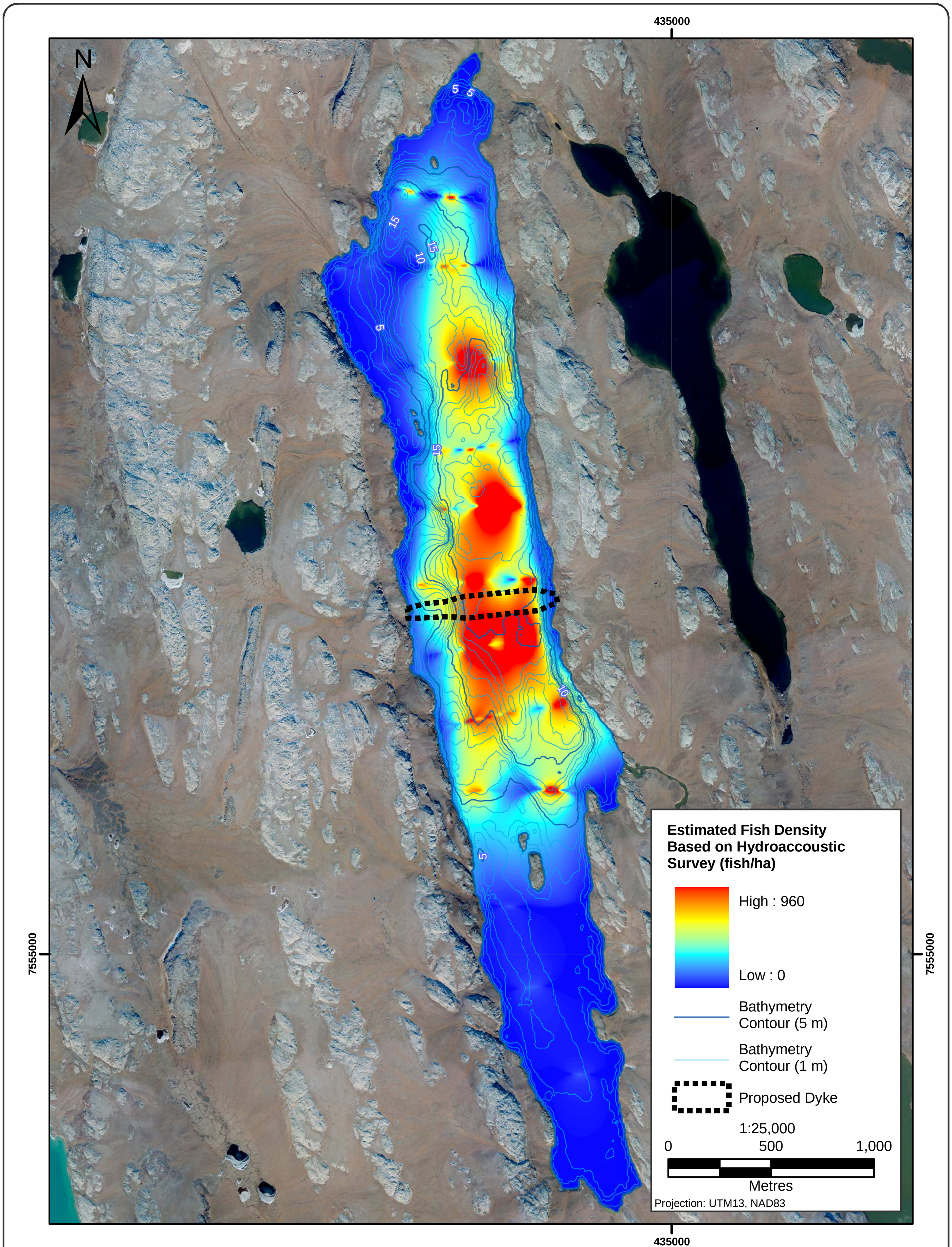

Estimated Fish Density Derived from Hydroacoustic Surveys for Doris Lake, Hope Bay Belt Project, 2009

Figure 3.2-5

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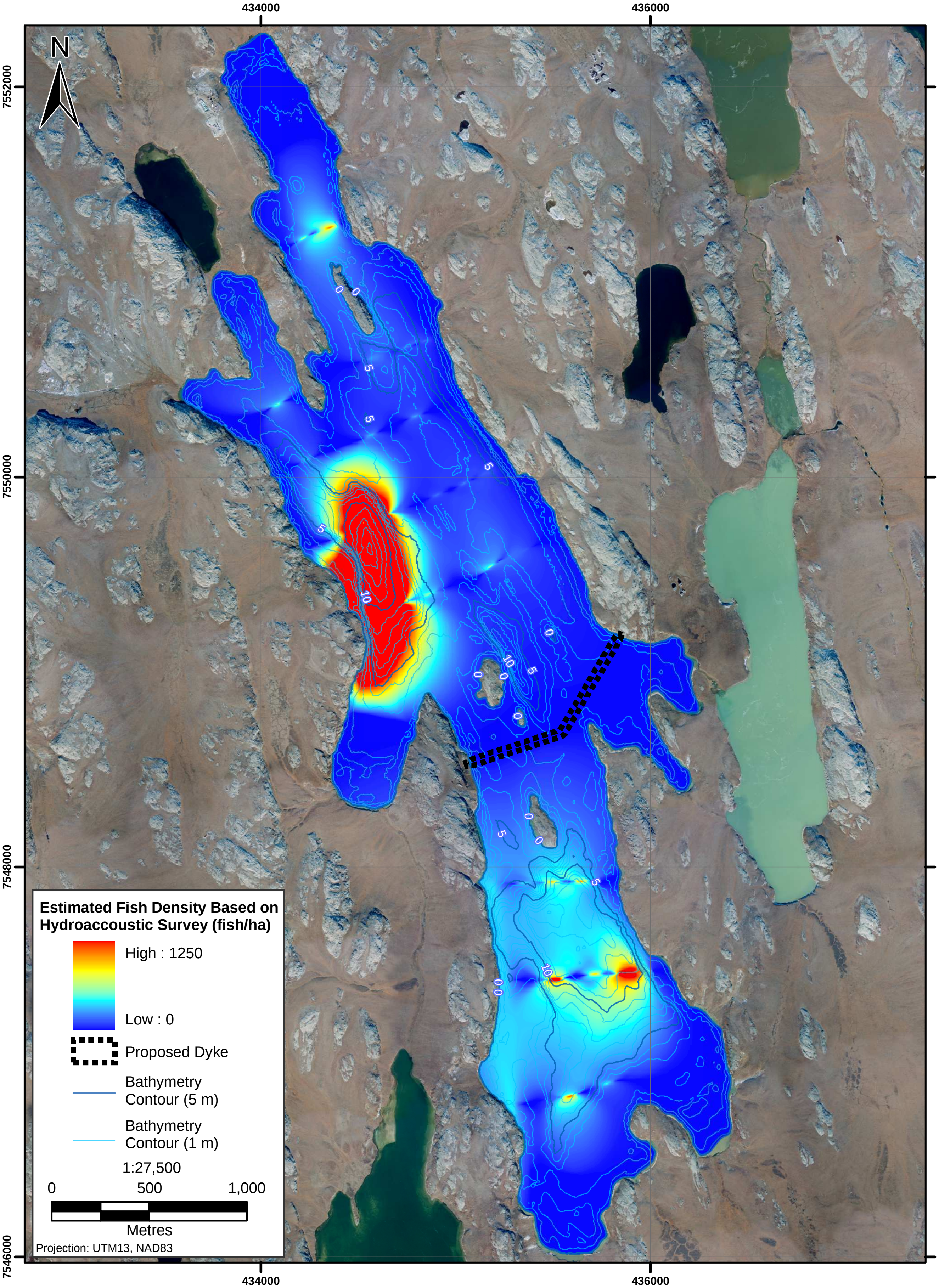

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Estimated Fish Density Derived from Hydroacoustic Surveys of Patch Lake, Hope Bay Belt Project, 2009

Figure 3.2-6

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Patch Lake

Appendix 3.2-3 presents fish density data collected during hydroacoustic surveys of Patch Lake. Transects 8, 9, 10 and 14 were too shallow (<3 m) for fish sampling with hydroacoustics, and thus were excluded from analysis. Data derived from remaining transects showed that fish density was greatest in relatively deep basins (Figure 3.2-6). This trend was most apparent at the deep basin in the northwest portion of Patch Lake where fish density exceeded 1,000 fish/ha. A similar pattern of fish abundance was also shown with gillnet CPUE data for Patch Lake.

Fish density was relatively low but uniform throughout the lake in the 0 to 5 m depth range, with slightly higher values over deep basins in the northern half of the lake and on Transect 2 near the north end of the lake. The highest fish densities were found in the 5 to 10 m and 10 to 15 m ranges in the deepest basins at the north half of the lake (Transects 6 and 7).

A small area of relatively high fish density was also observed at the east section of Transect 12 in the southern portion of Patch Lake where water depth ranged from 10 m to 15 m. The results of the hydroacoustic surveys for Patch Lake showed similar trends as Doris Lake, where greater fish density was observed with increasing water depth.

Table 3.2-7 shows the estimated absolute abundance of fish in 5 m depth ranges, and between the north and south portions of Patch Lake. The total number of fish in Patch Lake was estimated at 33,619 with 95% confidence limits ranging from 17,499 to 49,740. The relatively large 95% confidence interval of this abundance estimate (+/- 48%) is partly due to the fact that 5 of 14 transects were too shallow to use in the abundance estimate. The estimated fish abundance in the northern portion of Patch Lake was nearly double than that of the southern portion, with 22,352 and 11,268 fish, respectively. As Figure 3.2-6 illustrates, the highest fish density (0.00729 fish/m^3) was recorded in the 10 to 15 m depth range at the northwest portion of Patch Lake. Relatively high fish density was also recorded in the 5 to 10 m depth range in the northern portion (0.00590 fish/m^3) and in the southern portion (0.00321 fish/m^3).

Table 3.2-7. Fish Density and Estimate of Absolute Abundance (All Species Combined) Derived from Hydroacoustics Data for Patch Lake, Hope Bay Belt Project, 2009

Lake Basin	Depth Range (m)	Mean No. per m^3	Variance	Sample Size **	Stratum Volume (m^3)	Estimate of Absolute Abundance	SE	95% CL	
								Lower	Upper
North	0-5	0.00132	1.6E-06	6	1.1E+07	13,959	5,455	-64	27,982
	5-10	0.00590	5.3E-05	4	1.3E+06	7,434	4,593	-7,182	22,049
	10-15*	0.00729	5.5E-05	1	1.3E+05	959	973	-11,404	13,322
	Basin Total			**11**	**1.2E+07**	**22,352**	**7,197**	**5,755**	**38,948**
South	0-5	0.00058	6.4E-08	3	7.2E+06	4,188	1,051	-334	8,710
	5-10	0.00321	1.7E-06	3	2.2E+06	7,080	1,667	-93	14,252
	10-15	0.00000	0.0E+00	2	6.2E+05	0	0	0	0
	Basin Total			**8**	**1.0E+07**	**11,268**	**1,971**	**6,202**	**16,333**
Total (North + South Basins)					**2.2E+07**	**33,619**	**7,462**	**17,499**	**49,740**

Notes:
** Variance estimated by regression using data from other depths.*
*** Number of transects with corresponding depth interval.*
CL = confidence limit; SE = standard error

Table 3.2-8 shows the population estimate for lake trout, lake whitefish and cisco in Patch Lake. The species composition and proportions were derived from RISC standard sinking gillnet catches. Using these proportions, the lake trout population of Patch Lake was estimated as 18,259, while the lake whitefish and cisco populations were estimated as 14,142 and 1,218, respectively. This community composition is very different than Doris Lake where cisco and lake whitefish were the dominant fish species, and patterns for species density were less clearly defined. The highest estimated number of lake trout were located in the northern portion of Patch Lake in the 0 to 5 m depth range, and also in the southern portion in the 5 to 10 m depth range. Patterns of lake whitefish numbers were similar to Doris Lake, in that the majority of whitefish were estimated in the 0 to 5 m depth range. Cisco were much less abundant relative to Doris Lake; however, cisco were found at depths ranging from 5 to 15 m in the northern portion of Patch Lake.

Table 3.2-8. Relative Abundance and Population Estimates for Individual Fish Species Derived from Hydroacoustics Data for Patch Lake, Hope Bay Belt Project, 2009

Lake Basin	Depth Range (m)	Percent by Species			Number by Species			Total Number
		LKTR	LKWH	LCIS	LKTR	LKWH	LCIS	
North	0-5	62	38	0	8,658	5,301	0	13,959
	5-10	30	55.4	14.5	2,233	4,122	1,079	7,434
	10-15*	30	55.4	14.5	288	532	139	959
	Basin Total				**11,180**	**9,954**	**1,218**	**22,352**
South	0-5	0	100	0	0	4,188	0	4,188
	5-10	100	0	0	7,080	0	0	7,080
	10-15	50	50	0	0	0	0	0
	Basin Total				**7,080**	**4,188**	**0**	**11,268**
Total (North Basin + South Basin)					**18,259**	**14,142**	**1,218**	**33,619**

Notes:
** No fish were captured in gill nets 10-15 m deep in the north section, so species composition of this stratum was extrapolated (filled down) from the 5-10 m range.*
Fish Species Codes: LKTR = lake trout; LKWH = lake whitefish; LCIS = cisco

As the 95% confidence limits show, the fish abundance estimate in Patch Lake is not highly precise (+/-48%). This relatively large error is partly explained by the fact that 5 of 14 transects were too shallow to use in the estimate, which reduced the sample size (i.e., number of transects). Other sources of error associated with the abundance estimate for Patch Lake include: selectivity of gillnets for lake trout, improper spatial stratification (i.e., more gillnets set in shallow locations than deep locations), and mismatched gillnet and hydroacoustic data (e.g., gillnet catches were mostly from shallow locations and hydroacoustics detections were mostly from deep locations).

3.2.1.2 Length, Weight and Condition

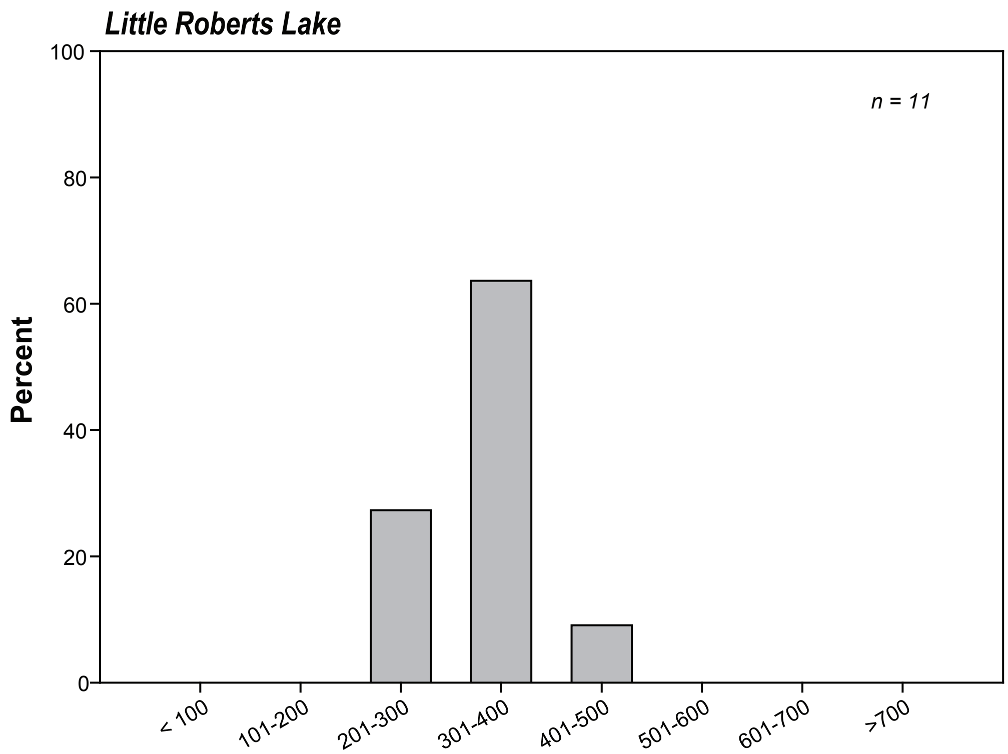
Length, weight and condition of fish captured in the Project area are summarized in Table 3.2-9. Figures 3.2-7 to 3.2-13 show the length-frequency distributions for Arctic char, lake trout, lake whitefish, and cisco sampled from lakes, respectively.

Table 3.2-9. Summary of Length, Weight and Condition Data for Fish Sampled from Lakes, Hope Bay Belt Project, 2009

Lake	Watershed	Species	Length (mm)				Weight (g)				Condition (g/mm^3)			
			n	Range	Mean	SE	n	Range	Mean	SE	n	Range	Mean	SE
Doris	Doris	LKTR	56	355 - 892	665	16	42	110 - 12,000	2,955	329	42	0.09 - 6.06	1.09	0.13
		ARCH	-	-	-	-	-	-	-	-	-	-	-	-
		LKWH	230	92 - 532	394	4	227	10 - 3,100	875	31	227	0.45 - 3.08	1.29	0.02
		LCIS	275	60 - 310	204	4	217	6 - 303	96	6	217	0.05 - 16.67	1.00	0.08
		NSSB	1	55	55	-	1	2	2	-	1	1.20	1.20	1.20
Ogama	Doris	LKTR	6	482 - 846	646	56	6	1,037 - 6,000	2,687	746	6	0.78 - 0.99	0.89	0.03
		ARCH	-	-	-	-	-	-	-	-	-	-	-	-
		LKWH	22	312 - 428	350	6	16	192 - 747	516	33	15	0.97 - 1.82	1.29	0.05
		LCIS	36	153 - 345	217	8	33	32 - 475	121	18	33	0.31 - 3.15	1.11	0.10
P.O.	Doris	LKTR	15	396 - 602	494	16	15	585 - 2,680	1,392	154	15	0.91 - 1.61	1.10	0.05
		ARCH	-	-	-	-	-	-	-	-	-	-	-	-
		LKWH	8	255 - 472	408	25	8	155 - 1,968	1,184	243	8	0.93 - 2.26	1.53	0.20
		LCIS	11	175 - 438	227	23	11	49 - 161	91	12	11	0.15 - 1.13	0.87	0.08
Patch	Doris	LKTR	45	321 - 732	585	18	45	328 - 4,134	2188	158	45	0.84 - 1.24	0.99	0.01
		ARCH	-	-	-	-	-	-	-	-	-	-	-	-
		LKWH	46	297 - 451	383	6	46	290 - 1,154	702	35	46	0.99 - 1.43	1.20	0.02
		LCIS	8	231 - 294	267	8	8	103 - 267	193	21	8	0.81 - 1.18	0.99	0.04
Little Roberts	Doris/Roberts	LKTR	10	344 - 593	426	22	10	402 - 2,821	973	219	10	0.96 - 1.35	1.12	0.04
		ARCH	11	249 - 419	323	17	11	135 - 678	358	56	11	0.86 - 1.24	0.99	0.03
		LKWH	1	428	428	-	1	1,162	1,162	-	1	1.48	1.48	-
		LCIS	-	-	-	-	-	-	-	-	-	-	-	-
Glenn	Windy	LKTR	18	304 - 726	527	31	18	240 - 4,400	1,619	336	18	0.40 - 1.23	0.85	0.05
		ARCH	-	-	-	-	-	-	-	-	-	-	-	-
		LKWH	-	-	-	-	-	-	-	-	-	-	-	-
		LCIS	44	126 - 322	225	6	44	22 - 296	118	8	44	0.59 - 2.35	1.02	0.04
Windy	Windy	LKTR	18	338 - 1,020	594	50	16	407 - 6,000	2,245	499	16	0.68 - 1.39	1.04	0.05
		ARCH	-	-	-	-	-	-	-	-	-	-	-	-
		LKWH	-	-	-	-	-	-	-	-	-	-	-	-
		LCIS	22	275 - 360	309	5	21	188 - 457	278	15	21	0.61 - 1.07	0.93	0.02
Reference A	Reference A	LKTR	17	348 - 867	478	37	16	359 - 1,348	736	78	14	0.72 - 1.40	0.99	0.05
		ARCH	-	-	-	-	-	-	-	-	-	-	-	-
		LKWH	1	423	423	-	1	898	898	-	1	1.19	1.19	-
		LCIS	-	-	-	-	-	-	-	-	-	-	-	-
Reference B	Reference B	LKTR	21	478 - 920	579	27	9	1,008 - 1,622	1,278	68	9	0.85 - 1.12	1.01	0.04
		ARCH	4	380 - 603	530	52	3	1,265 - 2,093	1,651	241	3	0.73 - 0.99	0.84	0.08
		LKWH	-	-	-	-	-	-	-	-	-	-	-	-
		LCIS	-	-	-	-	-	-	-	-	-	-	-	-

Species code: ARCH = Arctic char, LKTR = lake trout, LKWH = lake whitefish, LCIS = cisco, NSSB = ninespine stickleback

n = number, SE = standard error, min = minimum, max = maximum



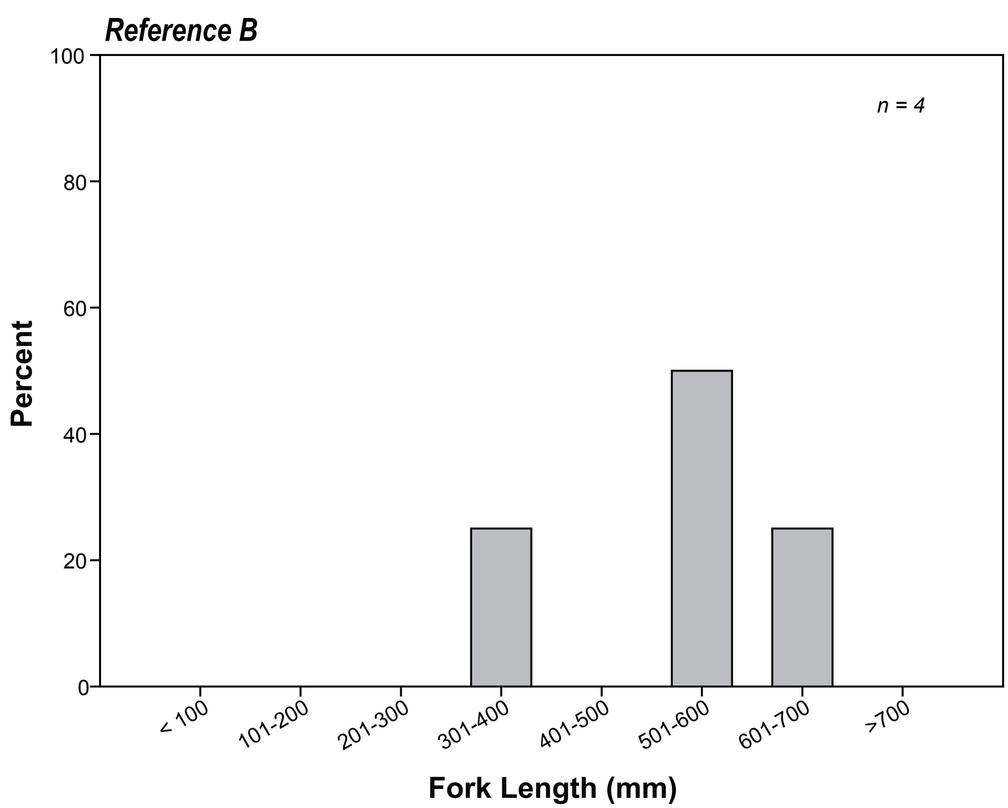


Figure 3.2-7

Length-Frequency Distributions for Arctic Char Sampled from Lakes, Hope Bay Belt Project, 2009

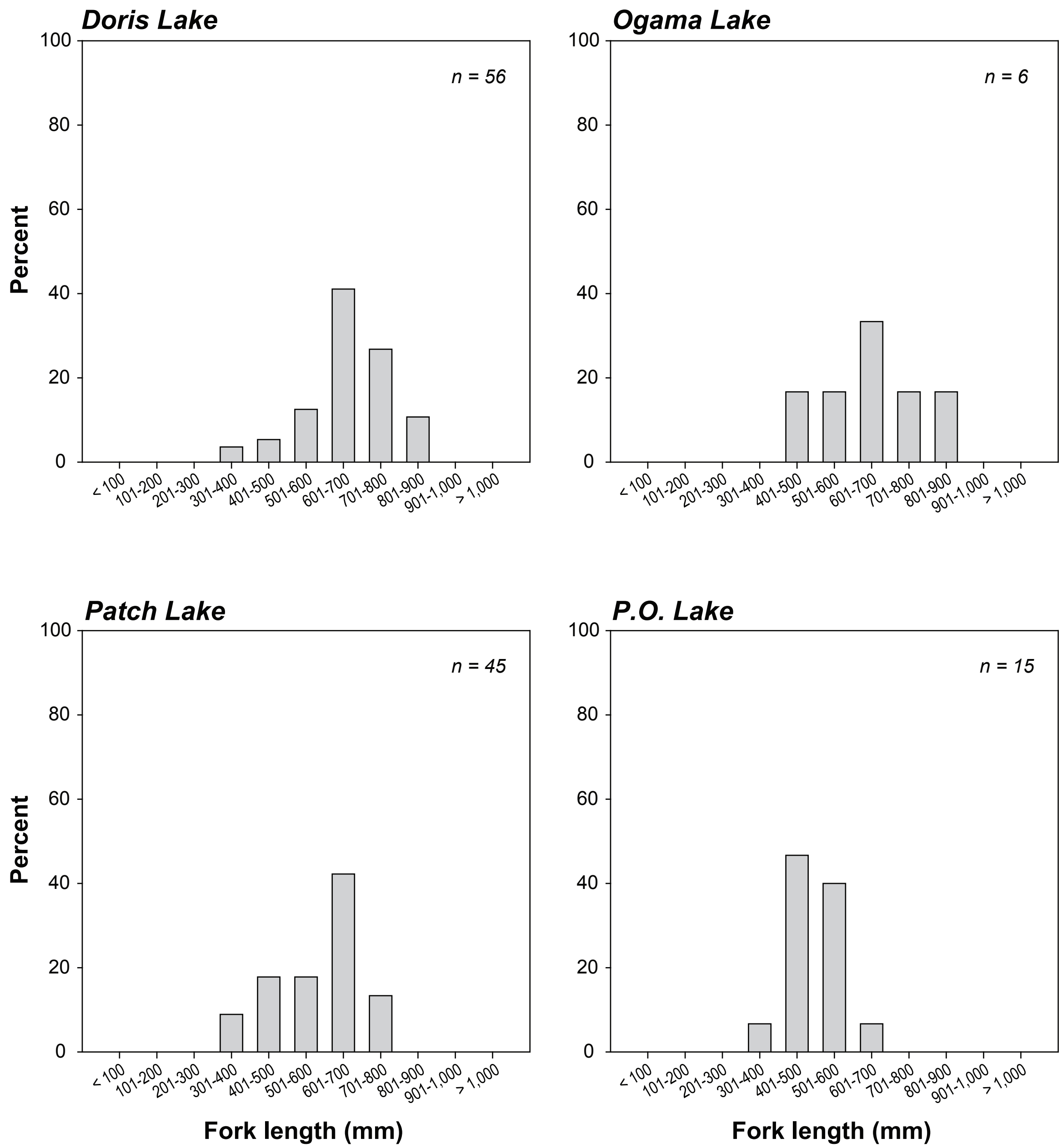


Figure 3.2-8

Length-Frequency Distributions for Lake Trout Sampled from the Doris Watershed, Hope Bay Belt Project, 2009

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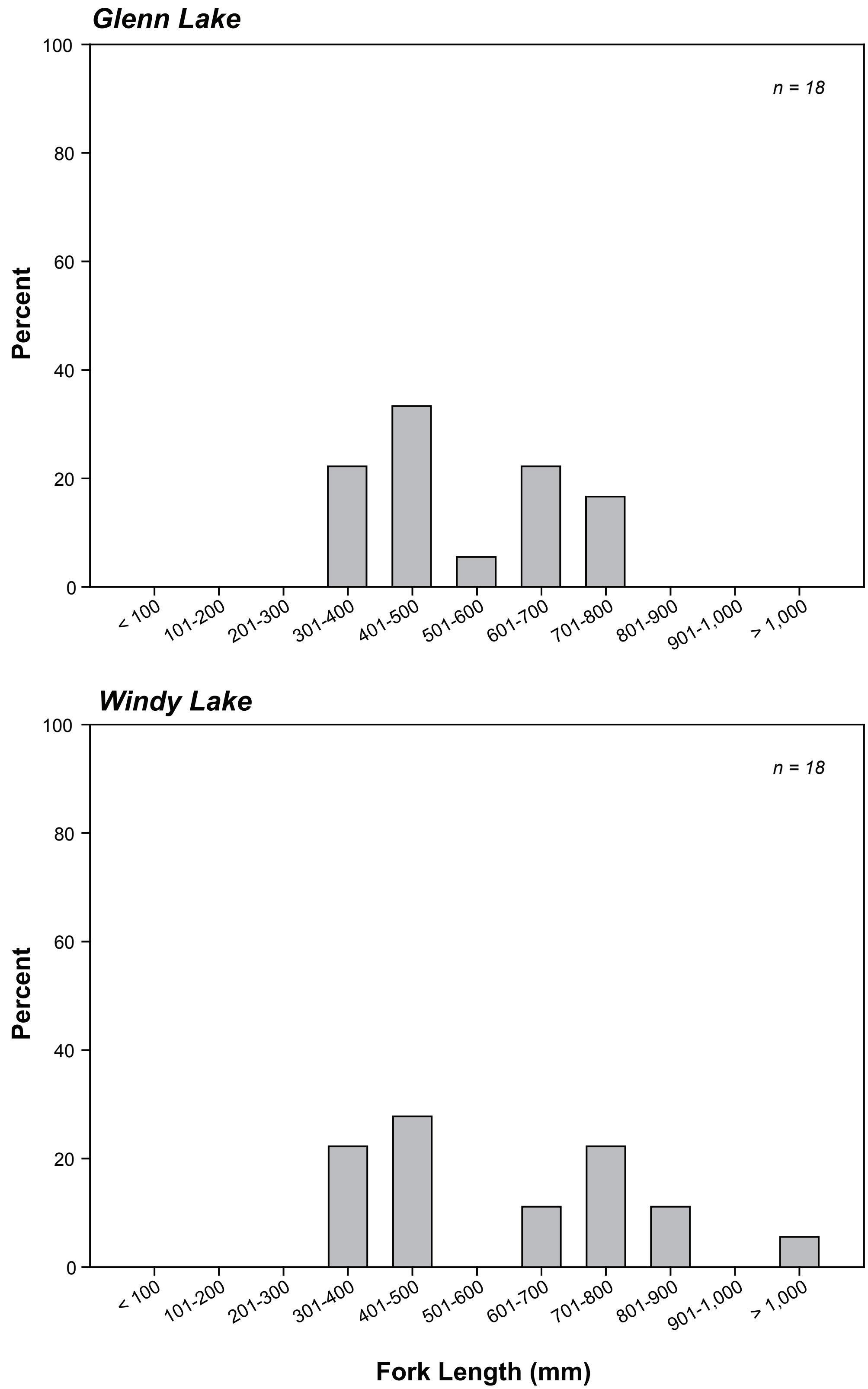

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Length-Frequency Distributions for Lake Trout Sampled from the Windy Watershed, Hope Bay Belt Project, 2009

Figure 3.2-9

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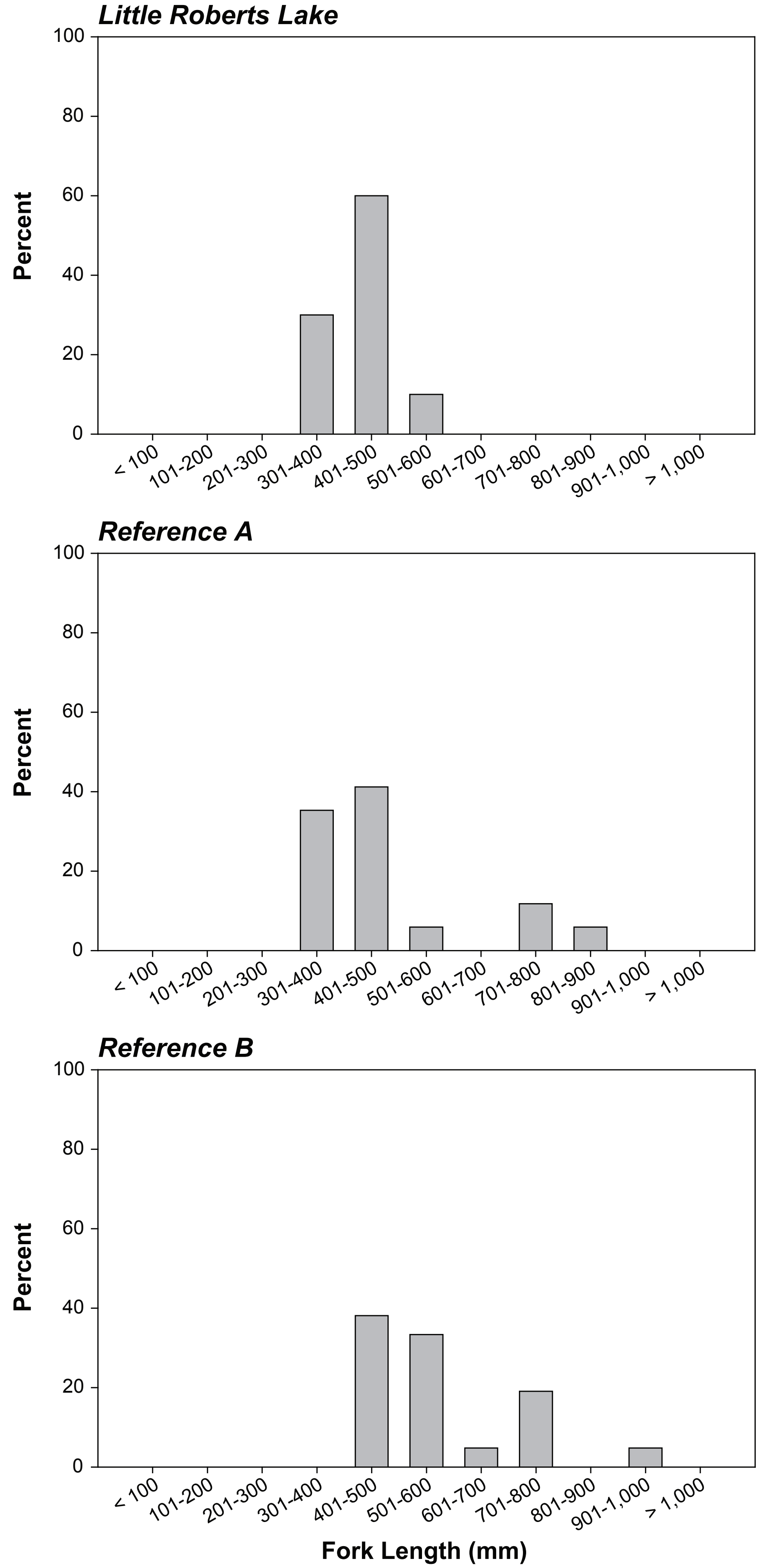

Length-Frequency Distributions for Lake Trout Sampled from Little Roberts Lake and Reference Watersheds, Hope Bay Belt Project, 2009

Figure 3.2-10

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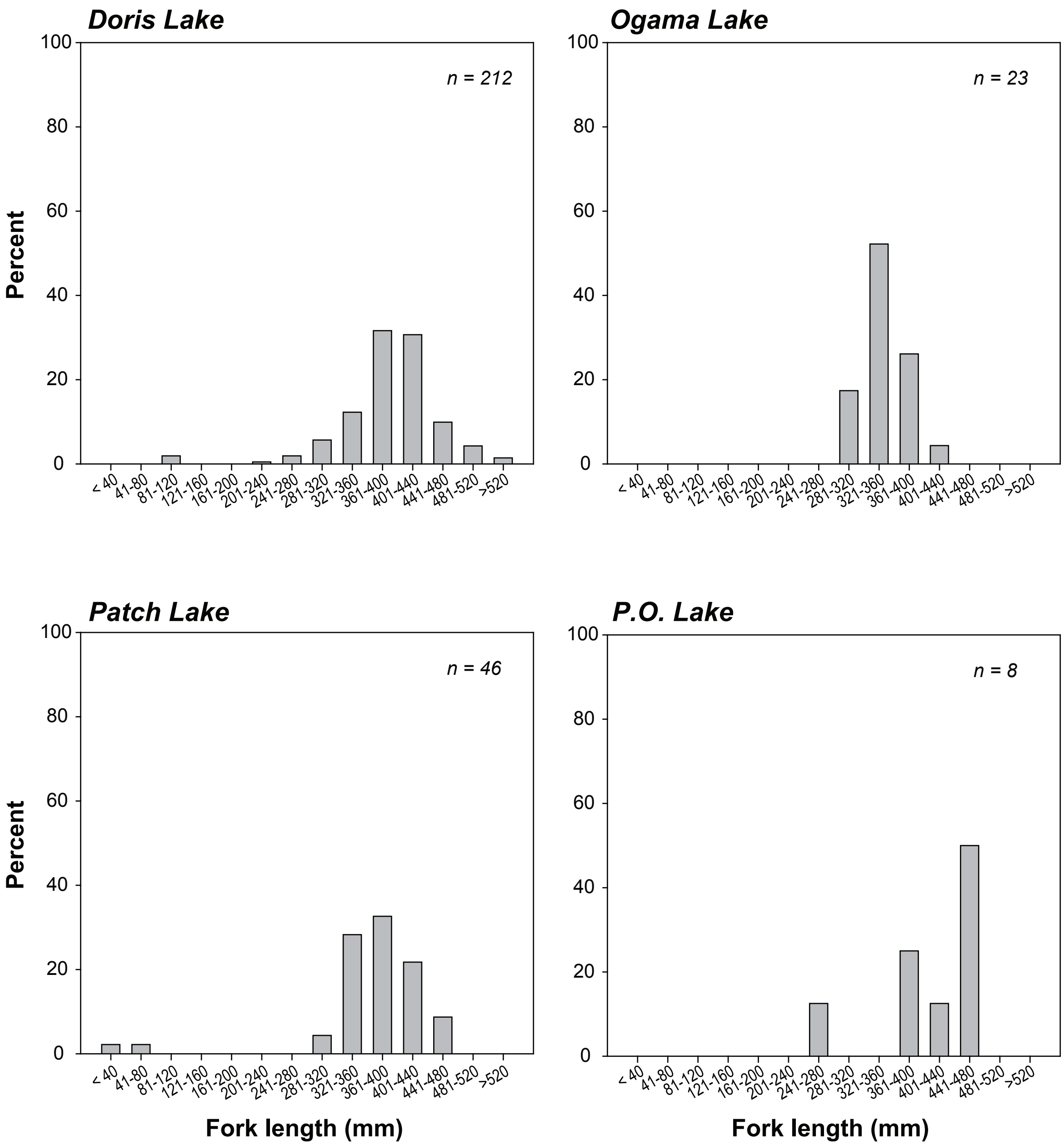
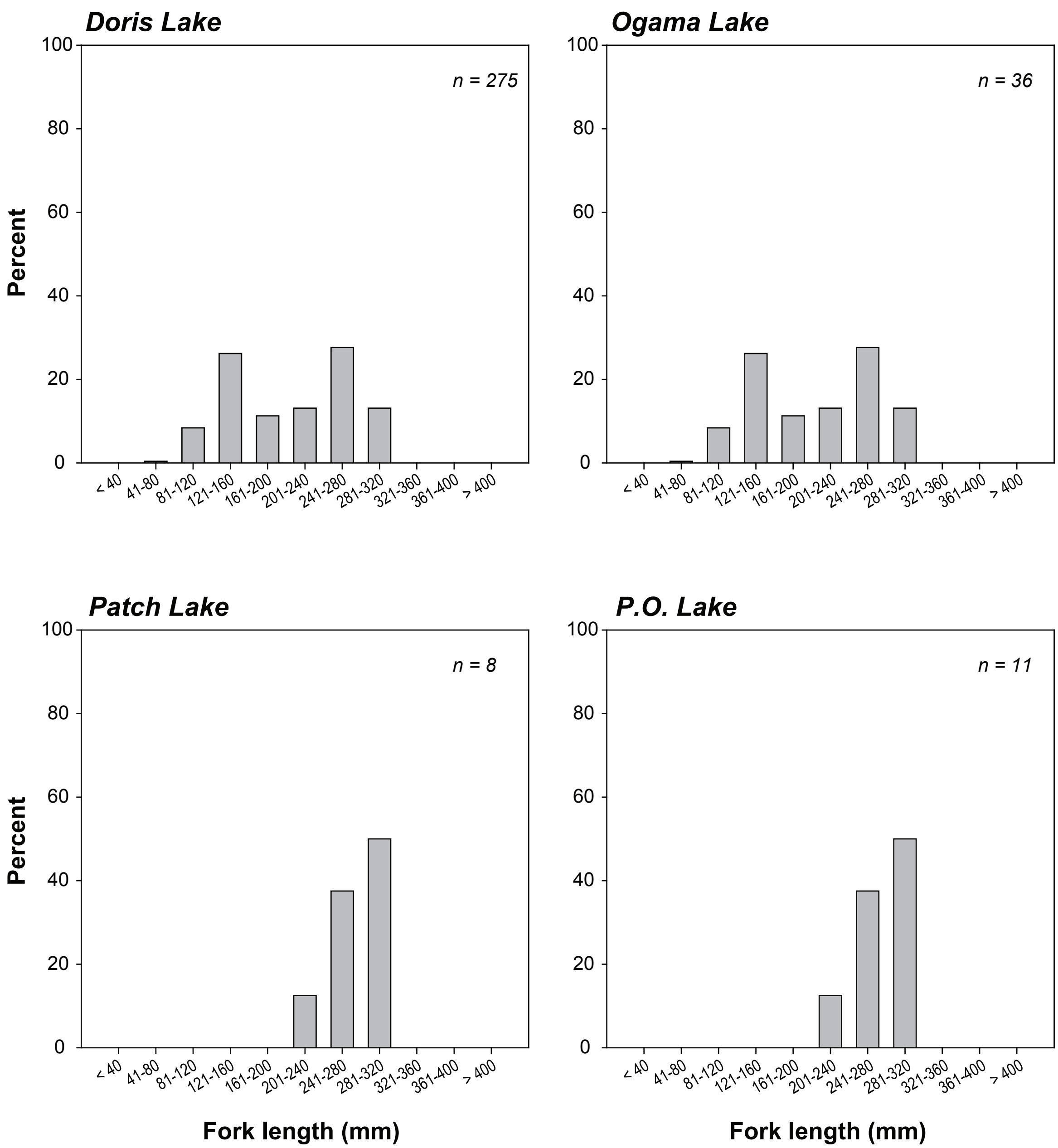


Figure 3.2-11

Length-Frequency Distributions for Lake Whitefish Sampled from the Doris Watershed, Hope Bay Belt Project, 2009



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Length-Frequency Distributions for Cisco Sampled from the Doris Watershed, Hope Bay Belt Project, 2009

Figure 3.2-12

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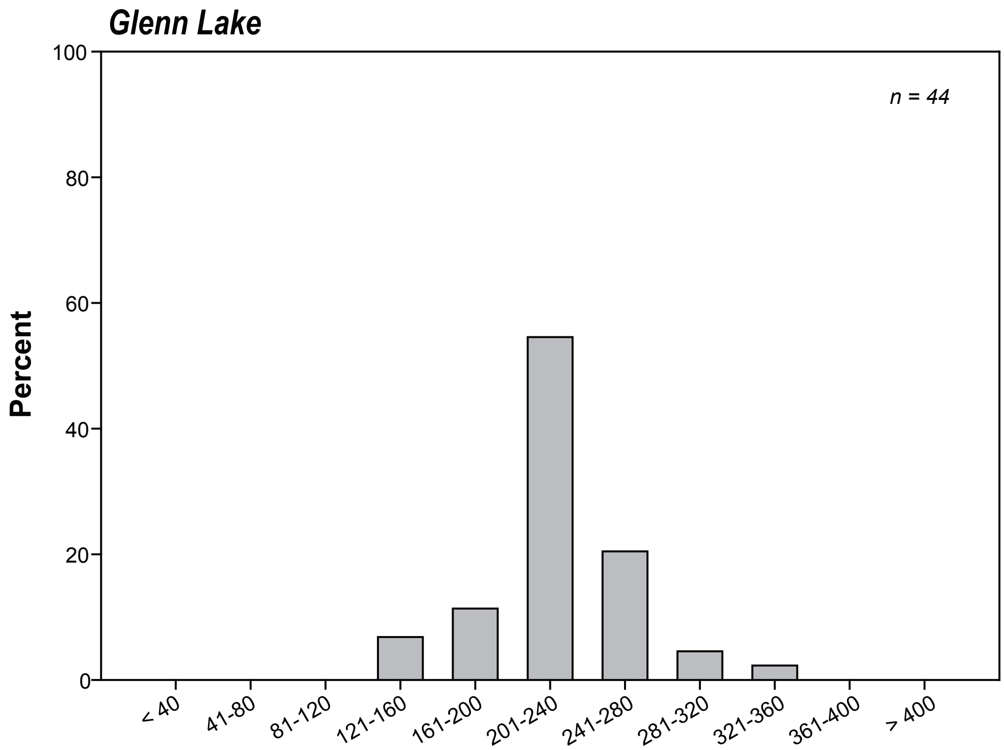

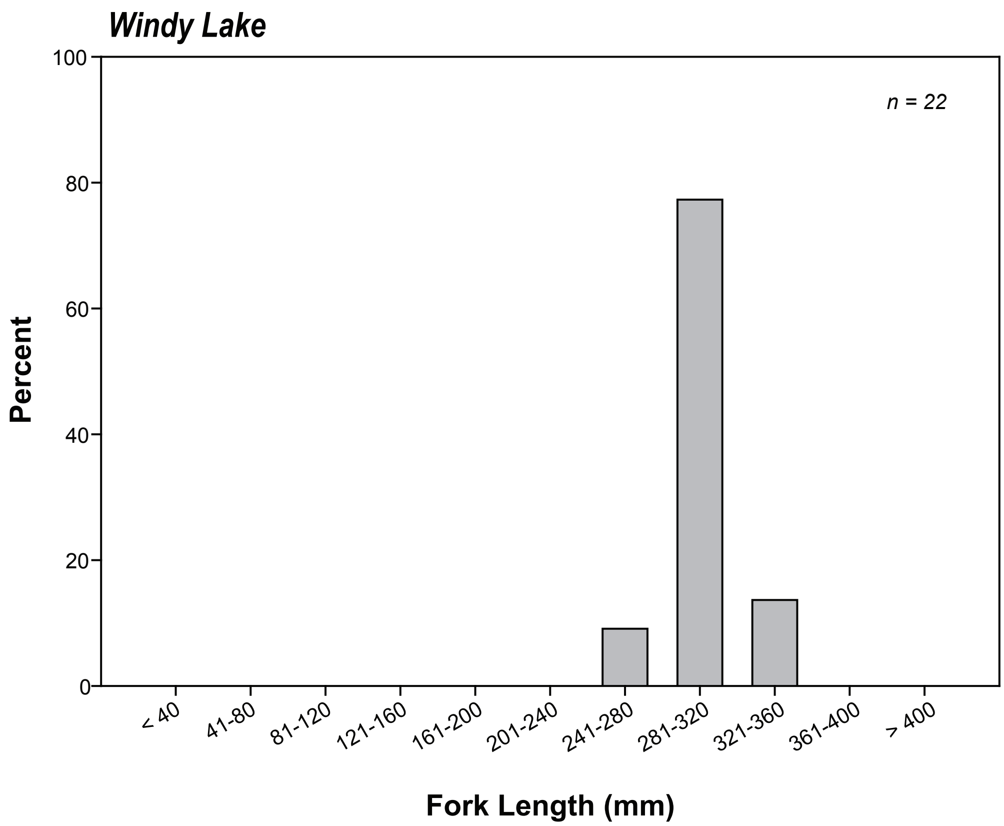

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Length-Frequency Distributions for Cisco Sampled from the Windy Watershed, Hope Bay Belt Project, 2009

Figure 3.2-13

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Lake trout were the largest fish species with mean lengths ranging from 426 mm (Little Roberts Lake) to 665 mm (Doris Lake). The dominant size classes of lake trout at Doris, Ogama and Patch lakes were between 601 to 700 mm. The dominant size classes of lake trout from other lakes ranged from 301 to 500 mm. Lake whitefish were the second largest fish caught, with mean lengths ranging from 350 mm (Ogama Lake) to 428 mm (Little Roberts Lake). The dominant size classes in Doris, Ogama and Patch lakes fell between 321 and 440 mm, while the dominant size class at Patch Lake was slightly higher (441 to 480 mm). Cisco mean lengths ranged from 204 mm (Doris Lake) to 309 mm (Windy Lake). Two dominant size classes were observed in Doris Lake: 121 to 160 mm and 241 to 280 mm. The highest frequency of lengths in Ogama and P.O. lakes were between 161 to 200 mm. Patch and Windy Lakes dominant size classes were between 281 to 320 mm, while the dominant size class at Glenn Lake was 201 to 240 mm. The mean length of Arctic char at Little Roberts Lake was 323 mm, and at Reference B Lake was 530 mm.

The dominant size classes were different between these two lakes, with Reference B Lake having a larger population (dominant size class between 501 to 600 mm), while Little Roberts Lake dominant size class was between 301 to 400 mm.

3.2.1.3 Age and Growth

Table 3.2-10 summarizes the age of fish species sampled in 2009. Mean ages of lake trout ranged from 11 years (P.O. Lake) to 21 years (Reference B Lake). Lake whitefish mean ages ranged from 13 years (Patch Lake) to 25 years (P.O. Lake), while cisco mean age ranged from 9 years (Windy Lake) to 12 years (Doris Lake). Arctic char captured in Little Roberts Lake and Reference B Lake had mean ages of 5 and 13 years, respectively. The eldest fish sampled was a 39 year-old lake whitefish captured from Doris Lake. Lake trout and lake whitefish occasionally had individuals aged over 25 years. The youngest fish sampled from lakes was a 3 year-old Arctic char from Little Roberts Lake.

Lake trout was also the heaviest species. Lake trout mean weights ranged from 736 g (Reference A Lake) to 2,955 g (Doris Lake). Arctic char mean weight ranged from 358 g (Little Roberts Lake) to 1,651 g (Reference B Lake). Lake whitefish mean weight ranged from 516 g (Ogama Lake) to 1,184 g (P.O. Lake). Cisco was the lightest fish, with the mean weight ranging from 91 g (P.O. Lake) to 278 g (Windy Lake).

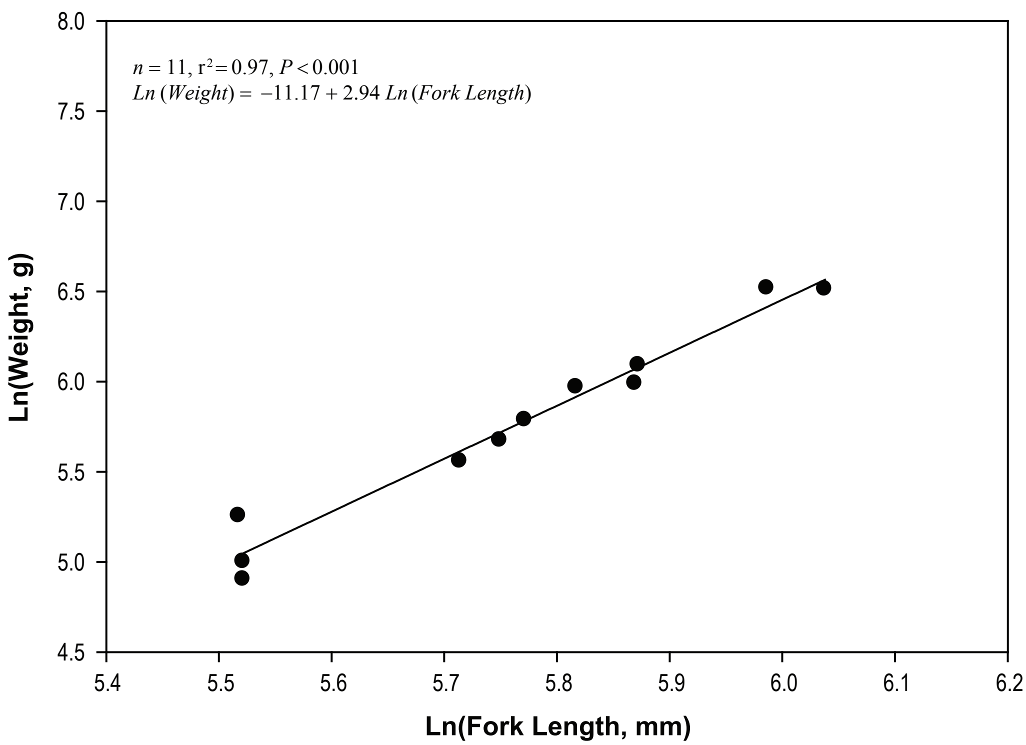
Figures 3.2-14 to 3.2-20 show weight-length regressions for all species for which more than six individuals were sampled from a lake. The weight-length regression of Arctic char sampled from Little Roberts Lake was highly significant ($P<0.001$) and explained 97% of the variation in ln(weight). A weight-length regression for Arctic char from Reference Lake B was not conducted due to a low sample size ($n = 3$). With the exception of Reference Lake B, all lake trout weight-length regressions were highly significant ($P<0.001$) and explained between 79 to 99% of the variation in ln(weight). Weight-length regressions for lake whitefish and cisco were also highly significant ($P<0.001$) and explained between 57 and 96% of the variation in ln(weight).

Fork length and weight were also used to calculate condition values for each fish species per lake. Condition data are presented in Figures 3.2-21 and 3.2-22. Lake whitefish showed the highest condition of the fish species sampled. Lake whitefish mean condition ranged from 1.19 g/mm^3 (Reference A Lake) to 1.53 g/mm^3 (P.O. Lake). Lake trout condition ranged from 0.85 g/mm^3 (Glenn Lake) to 1.12 g/mm^3 (Little Roberts Lake). Cisco condition was similar to lake trout, ranging from 0.87 g/mm^3 (P.O. Lake) to 1.11 g/mm^3 (Ogama Lake). Arctic char had higher condition in Little Roberts Lake (0.99 g/mm^3) than in Reference B Lake (0.84 g/mm^3). In general, condition was similar between watersheds; however, condition of lake whitefish was slightly higher in the Doris Watershed.

Table 3.2-10. Age Summary for Fish Sampled from Lakes, Hope Bay Belt Project, 2009

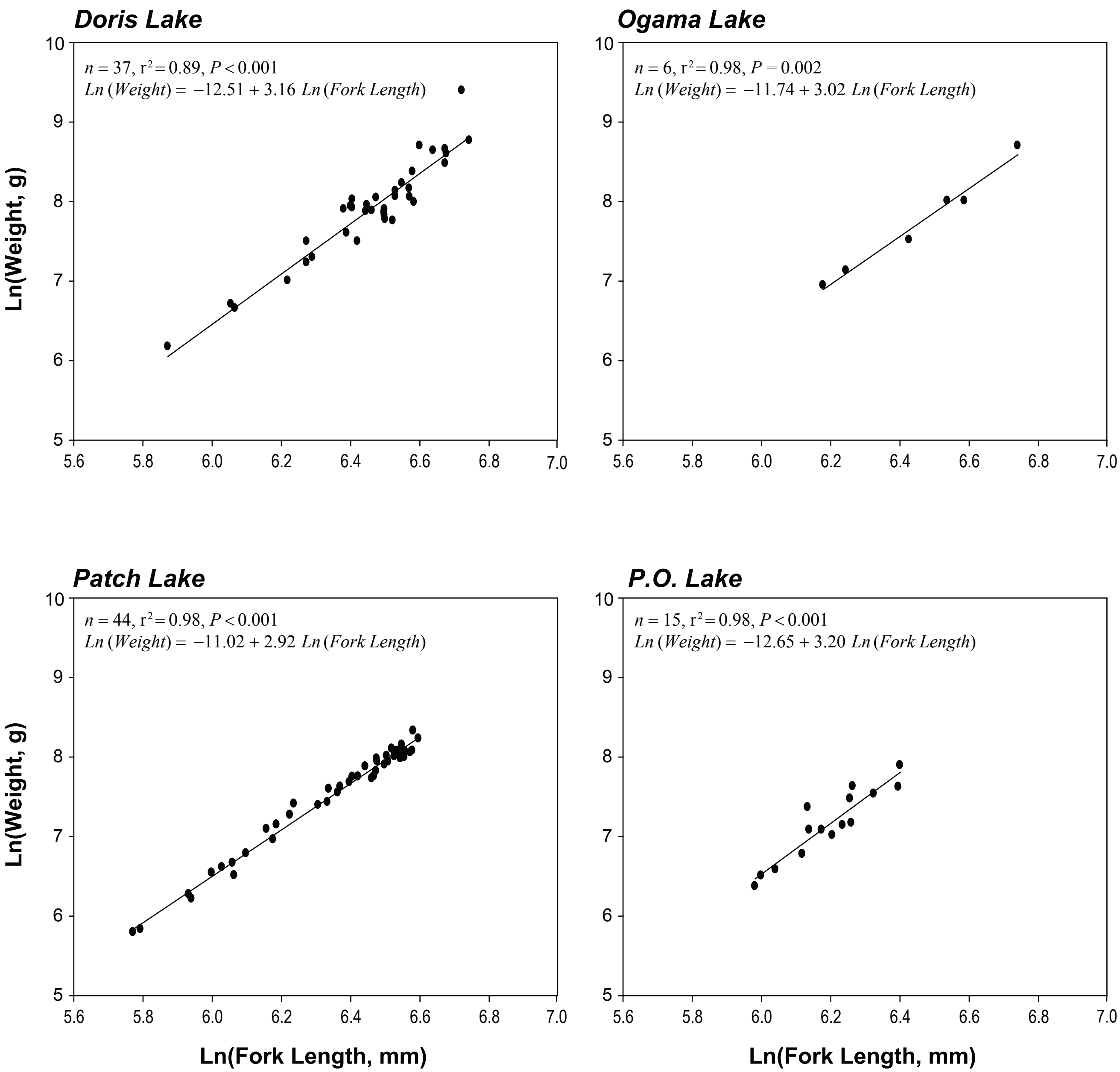
Lake	Watershed	Species	Age (Years)				
			n	Mean	SE	Min	Max
Doris	Doris	LKTR	50	19	1.0	8	35
		ARCH	-	-	-	-	-
		LKWH	89	15	0.8	5	39
		LCIS	3	12	2.5	9	17
Ogama	Doris	LKTR	6	16	2.5	12	25
		ARCH	-	-	-	-	-
		LKWH	-	-	-	-	-
		LCIS	-	-	-	-	-
P.O.	Doris	LKTR	15	11	0.6	6	15
		ARCH	-	-	-	-	-
		LKWH	2	25	9.0	16	34
		LCIS	-	-	-	-	-
Patch	Doris	LKTR	43	17	0.7	7	27
		ARCH	-	-	-	-	-
		LKWH	38	13	0.6	7	23
		LCIS	1	11	-	11	11
Little Roberts	Doris/ Roberts	LKTR	10	16	1.7	9	25
		ARCH	11	5	0.2	3	6
		LKWH	1	14	-	14	14
		LCIS	-	-	-	-	-
Glenn	Windy	LKTR	16	20	1.4	12	29
		ARCH	-	-	-	-	-
		LKWH	-	-	-	-	-
		LCIS	-	-	-	-	-
Windy	Windy	LKTR	18	17	1.3	9	28
		ARCH	-	-	-	-	-
		LKWH	-	-	-	-	-
		LCIS	1	9	-	9	9
Reference A	Reference A	LKTR	17	18	1.5	10	29
		ARCH	-	-	-	-	-
		LKWH	1	17	-	17	17
		LCIS	-	-	-	-	-
Reference B	Reference B	LKTR	21	21	1.4	12	35
		ARCH	4	13	2.4	6	16
		LKWH	-	-	-	-	-
		LCIS	-	-	-	-	-

Notes:
Fish Species Codes: ARCH = Arctic char, LKTR = lake trout, LKWH = lake whitefish, LCIS = cisco, NSSB = ninespine stickleback
n = number, SE = standard error, min = minimum, max = maximum



Weight-Length Regressions for Arctic Char Sampled from Little Roberts Lake, Hope Bay Belt Project, 2009

Figure 3.2-14



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Weight-Length Regressions for Lake Trout Sampled from Lakes in the Doris Watershed, Hope Bay Belt Project, 2009

Figure 3.2-15

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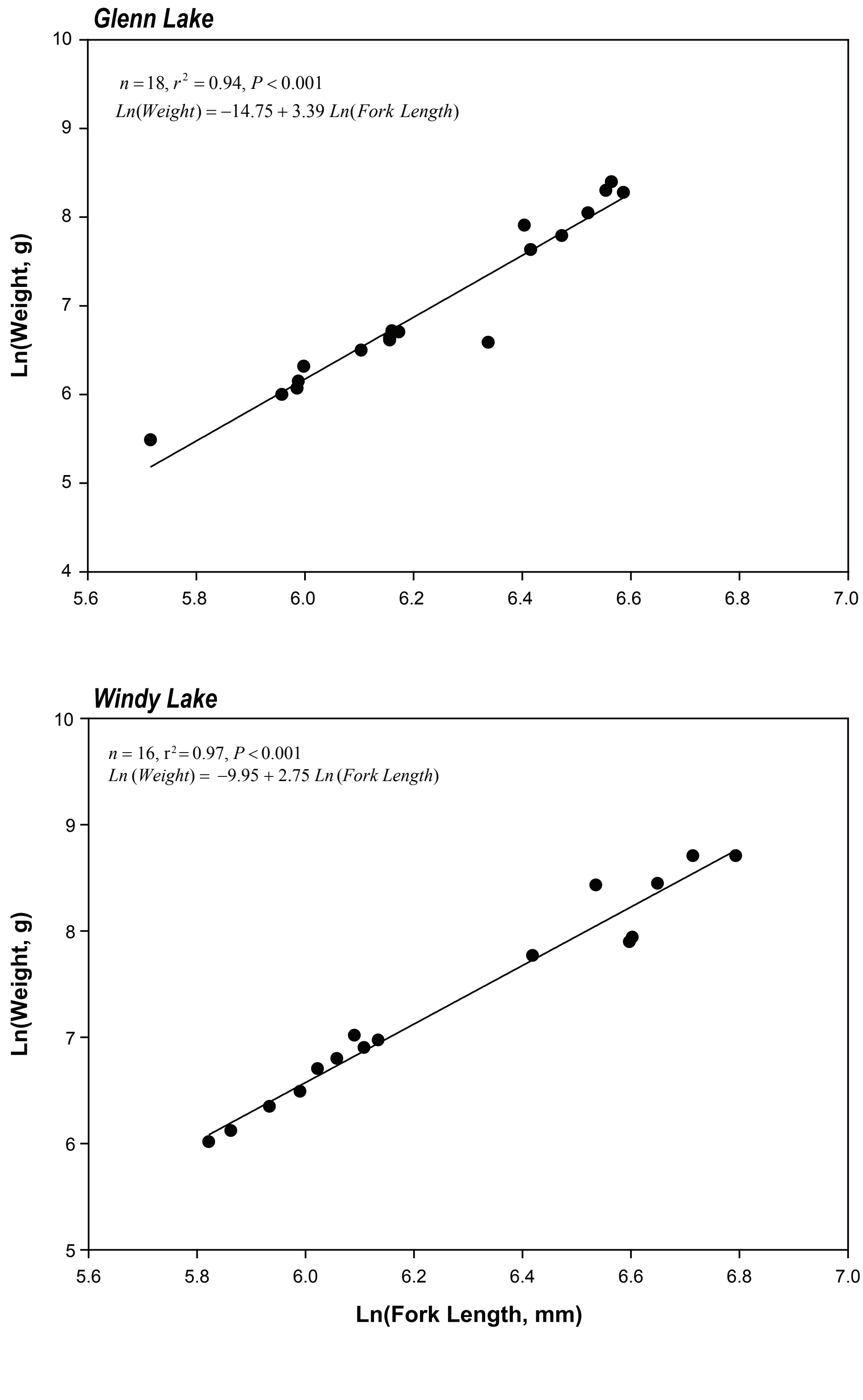

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Weight-Length Regressions for Lake Trout Sampled from Lakes in the Windy Watershed, Hope Bay Belt Project, 2009

Figure 3.2-16

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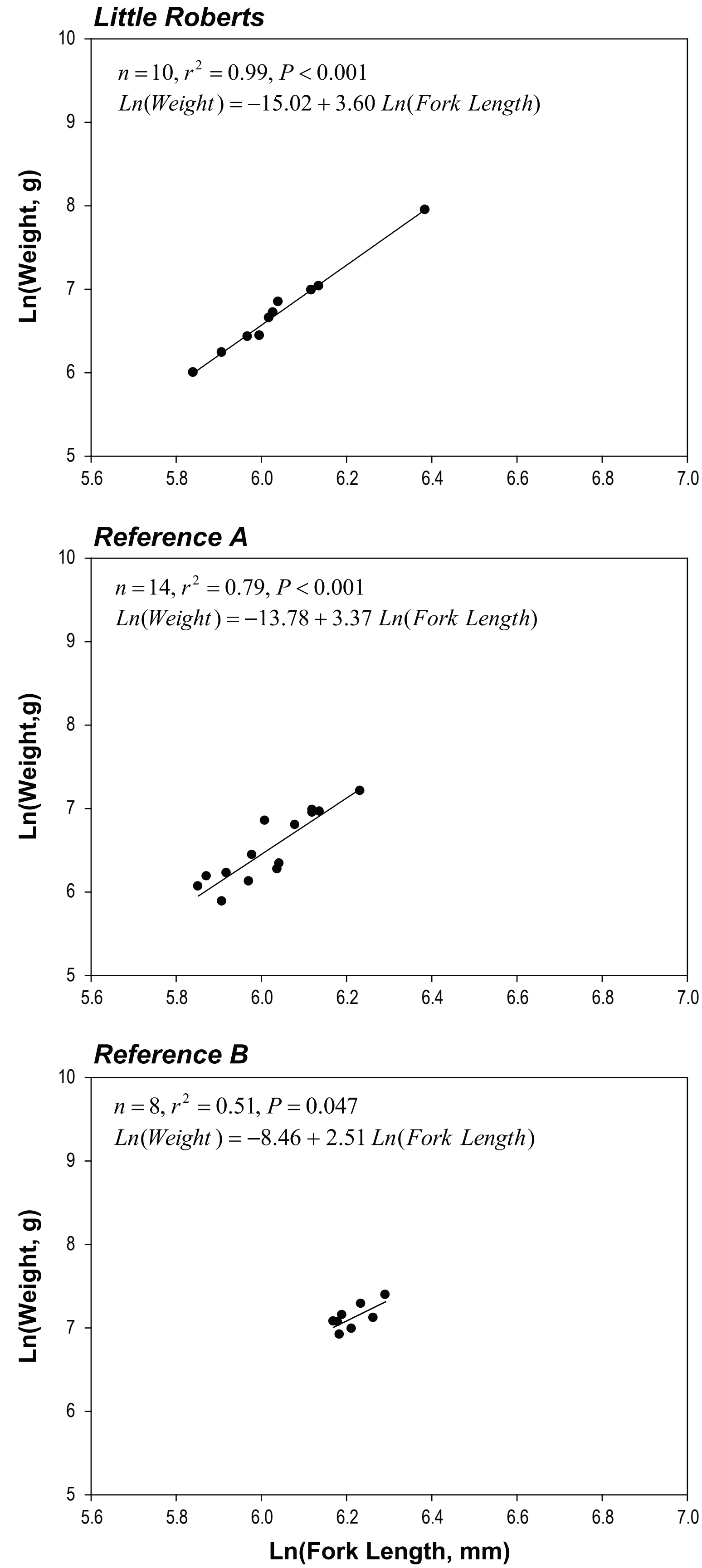

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Weight-Length Regressions for Lake Trout Sampled from Little Roberts Lake and Reference Lakes, Hope Bay Belt Project, 2009

Figure 3.2-17

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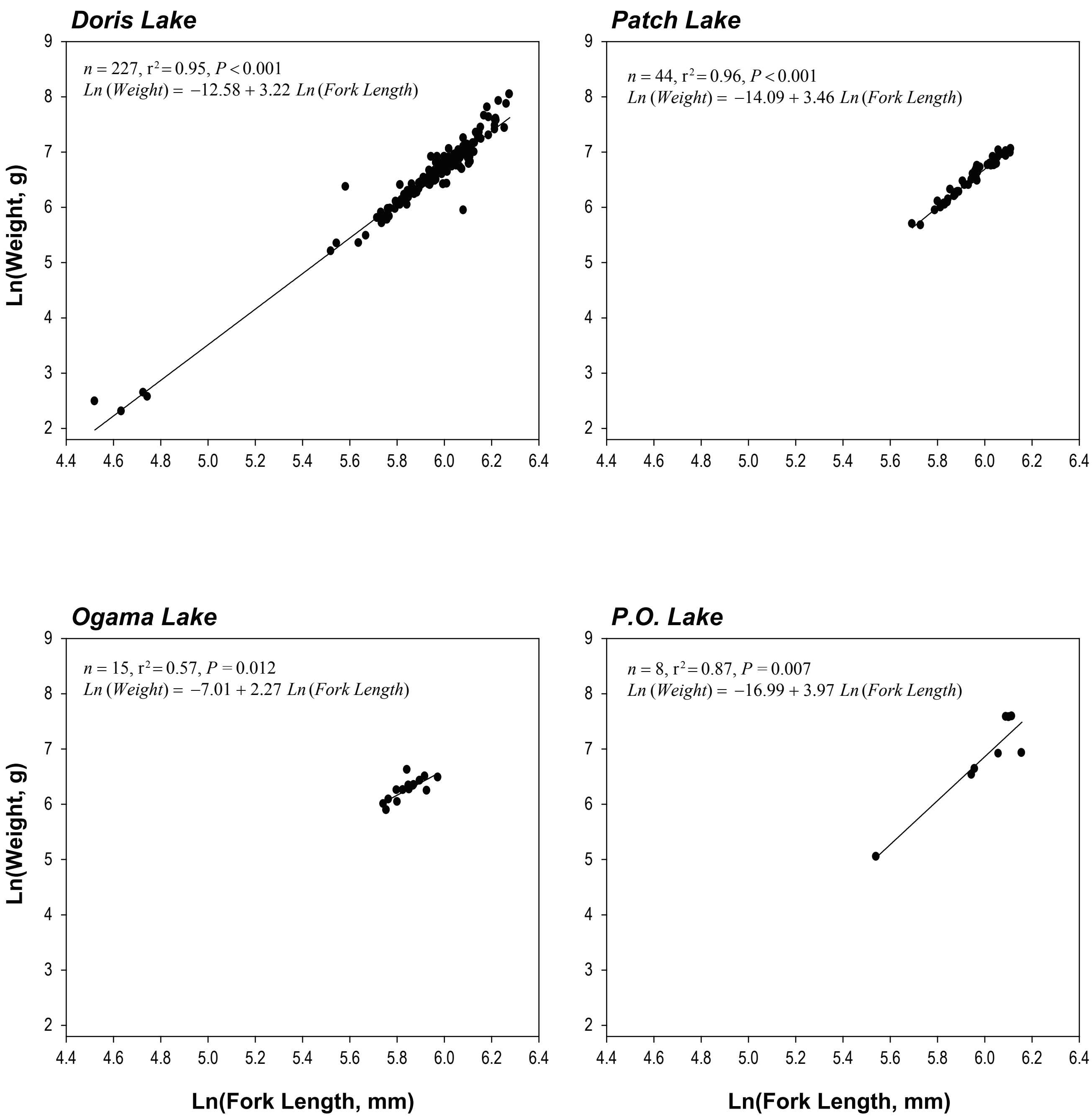

Figure 3.2-18

Weight-Length Regressions for Lake Whitefish Sampled from Lakes in the Doris Watershed, Hope Bay Belt Project, 2009

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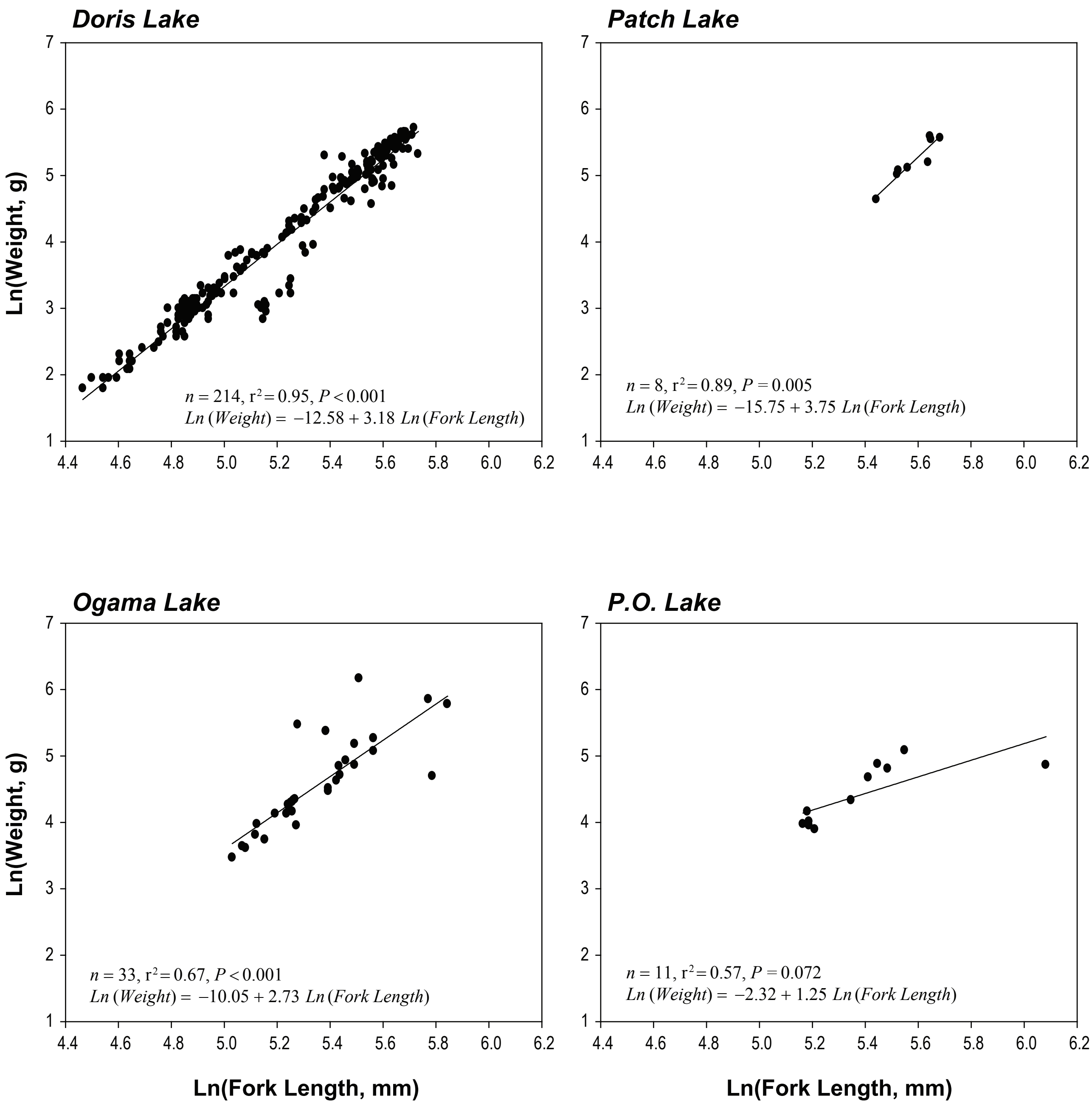

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Weight-Length Regressions for Cisco Sampled from Lakes in the Doris Watershed, Hope Bay Belt Ptoject, 2009

Figure 3.2-19

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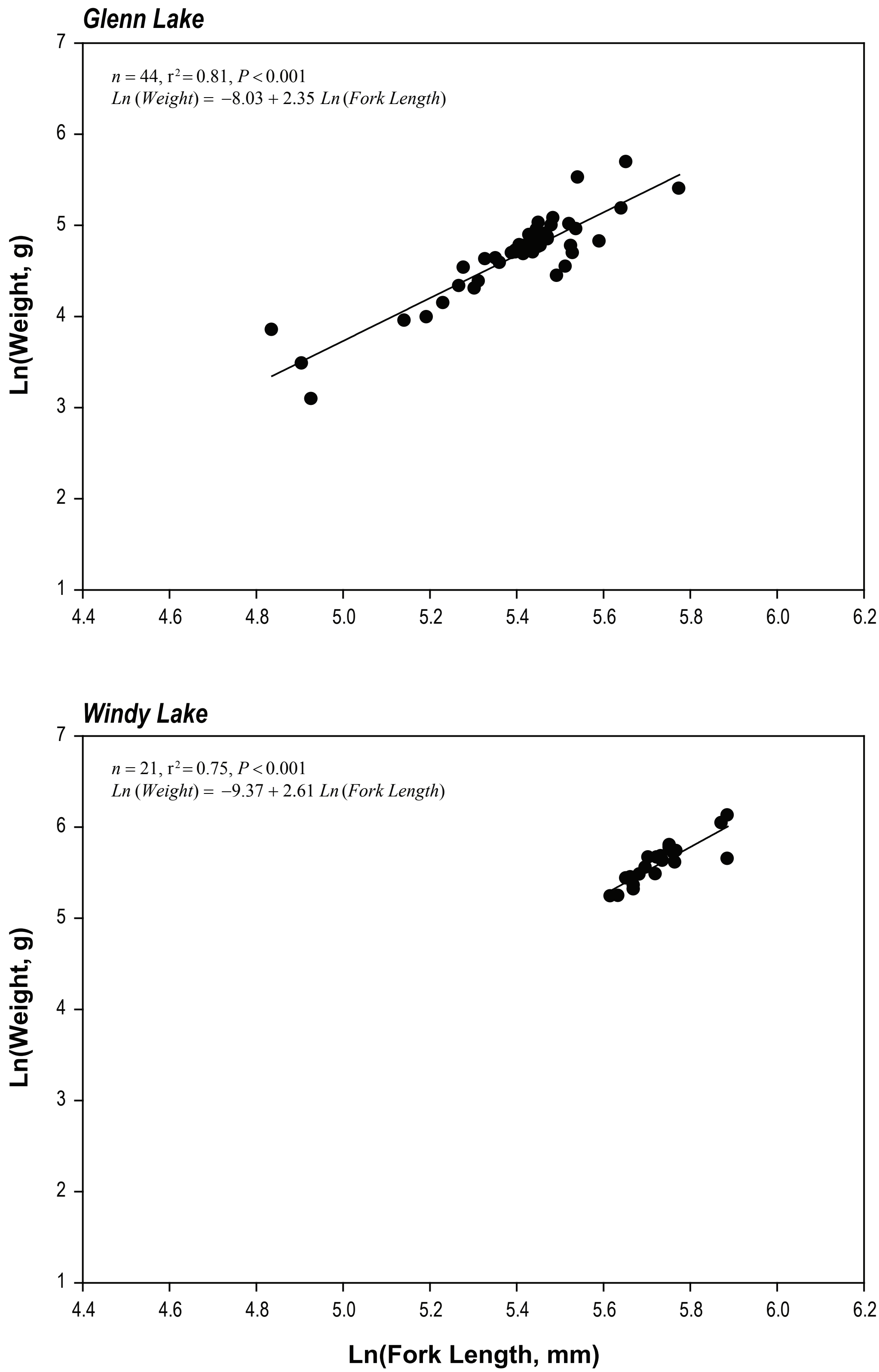

Weight-Length Regressions for Cisco Sampled from Lakes in the Windy Watershed, Hope Bay Belt Project, 2009

Figure 3.2-20

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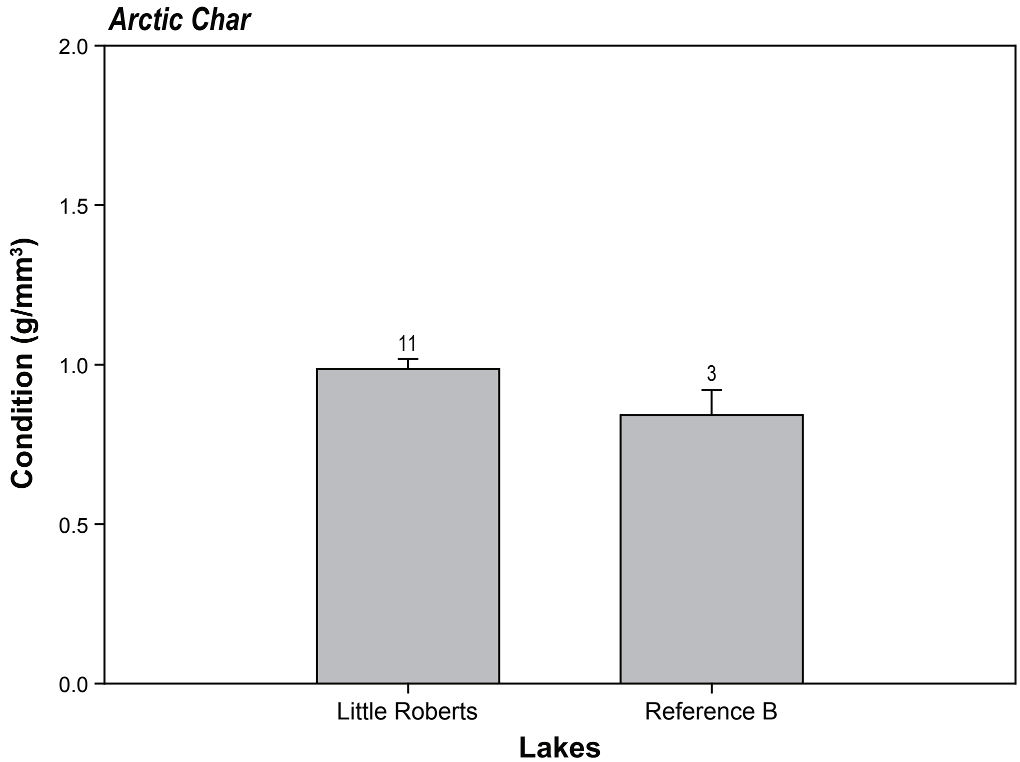
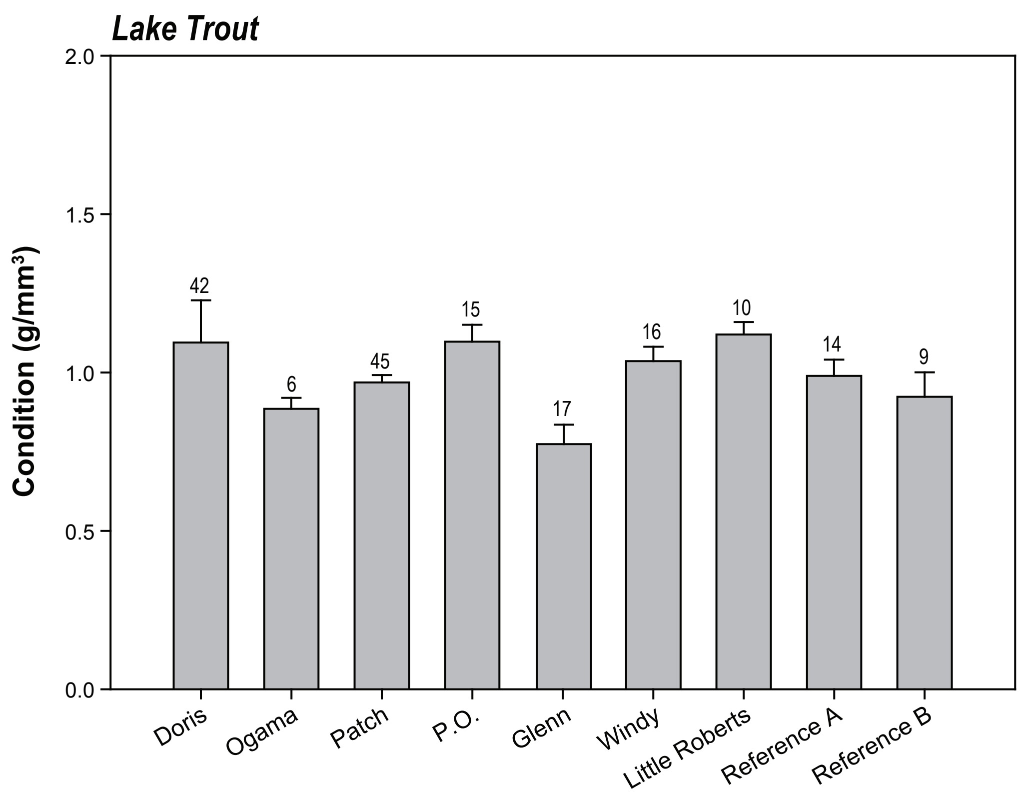
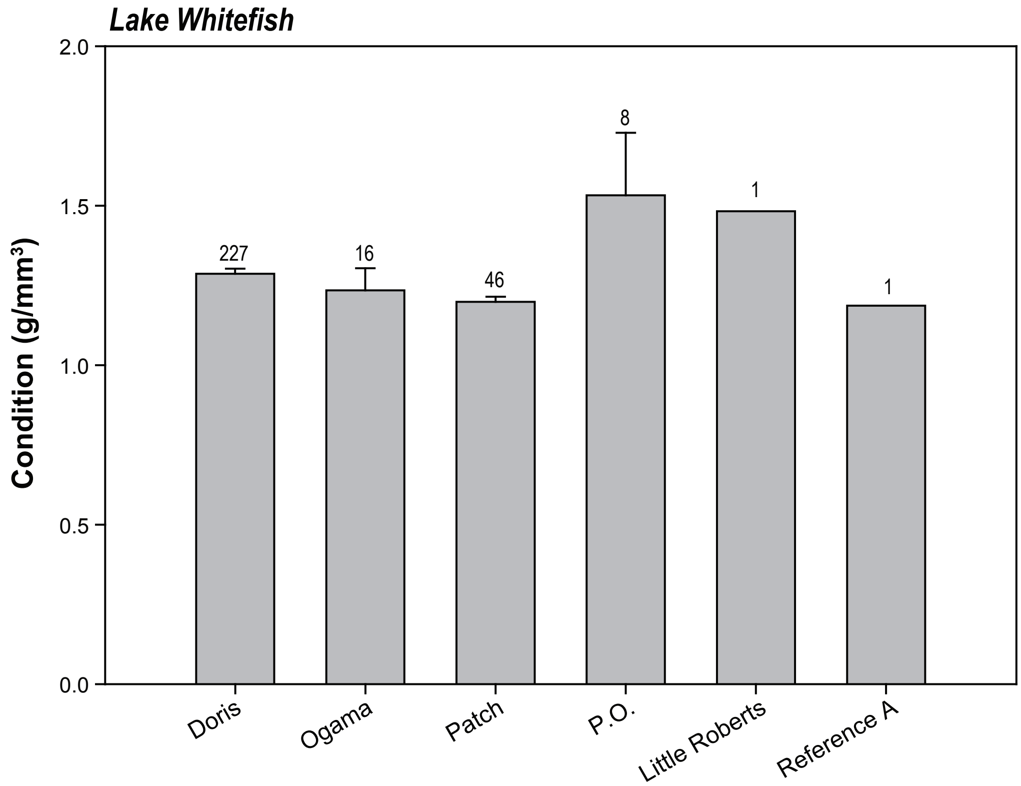


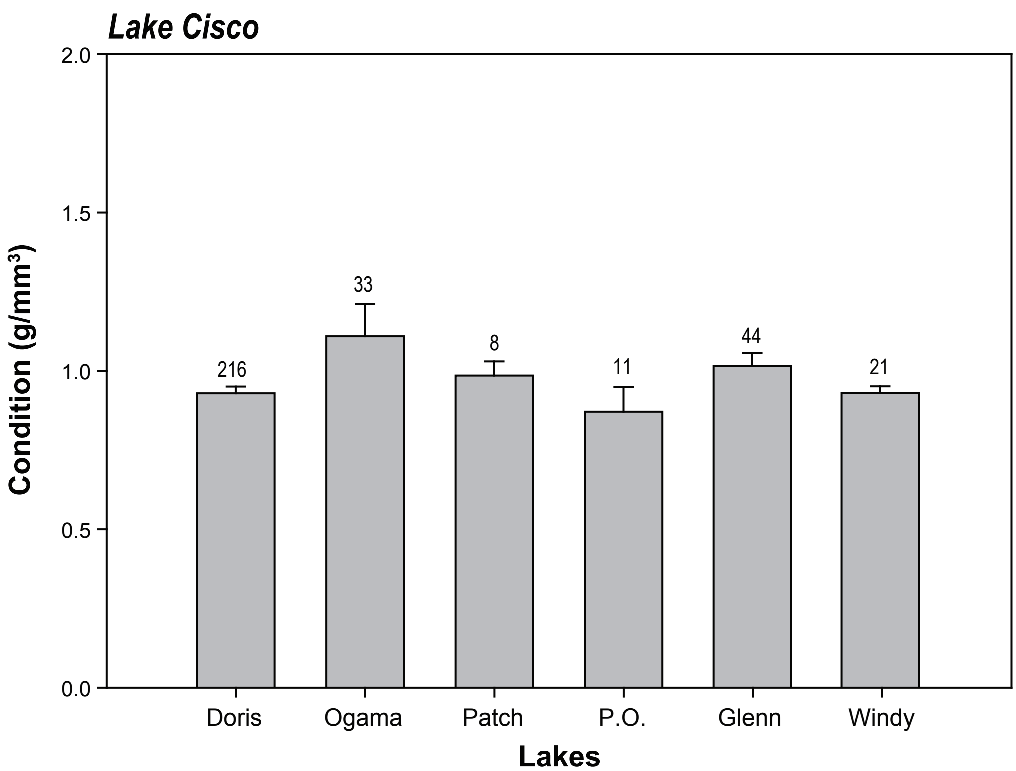


Note: Error bars represent one standard error of the mean.
Numbers represent sample size.

Figure 3.2-21

Mean Condition of Arctic Char and Lake Trout Sampled from Lakes, Hope Bay Belt Project, 2009





Note: Error bars represent one standard error of the mean.
Numbers represent sample size.

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Mean Condition of Lake Whitefish and Cisco Sampled from Lakes, Hope Bay Belt Project, 2009

Figure 3.2-22

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Figures 3.2-23 to 3.2-27 show age-frequency distributions for each fish species, and Figures 3.2-28 to 3.2-32 show von Bertalanffy growth models. Lake trout captured in the project area ranged in age from 6 to 35 years. The dominant age class within most lakes was 10 to 14 years and 15 to 19 years. Glenn Lake had the oldest mean age. The von Bertalanffy growth models explained between 59 and 95% of the variation in length-at-age for lake trout sampled from their respective lakes. Growth coefficients varied from 0.013 $year^{-1}$ (Windy Lake) to 0.159 $year^{-1}$ (P.O. Lake). Lake whitefish ranged in ages from 5 to 39 years within the Project area.

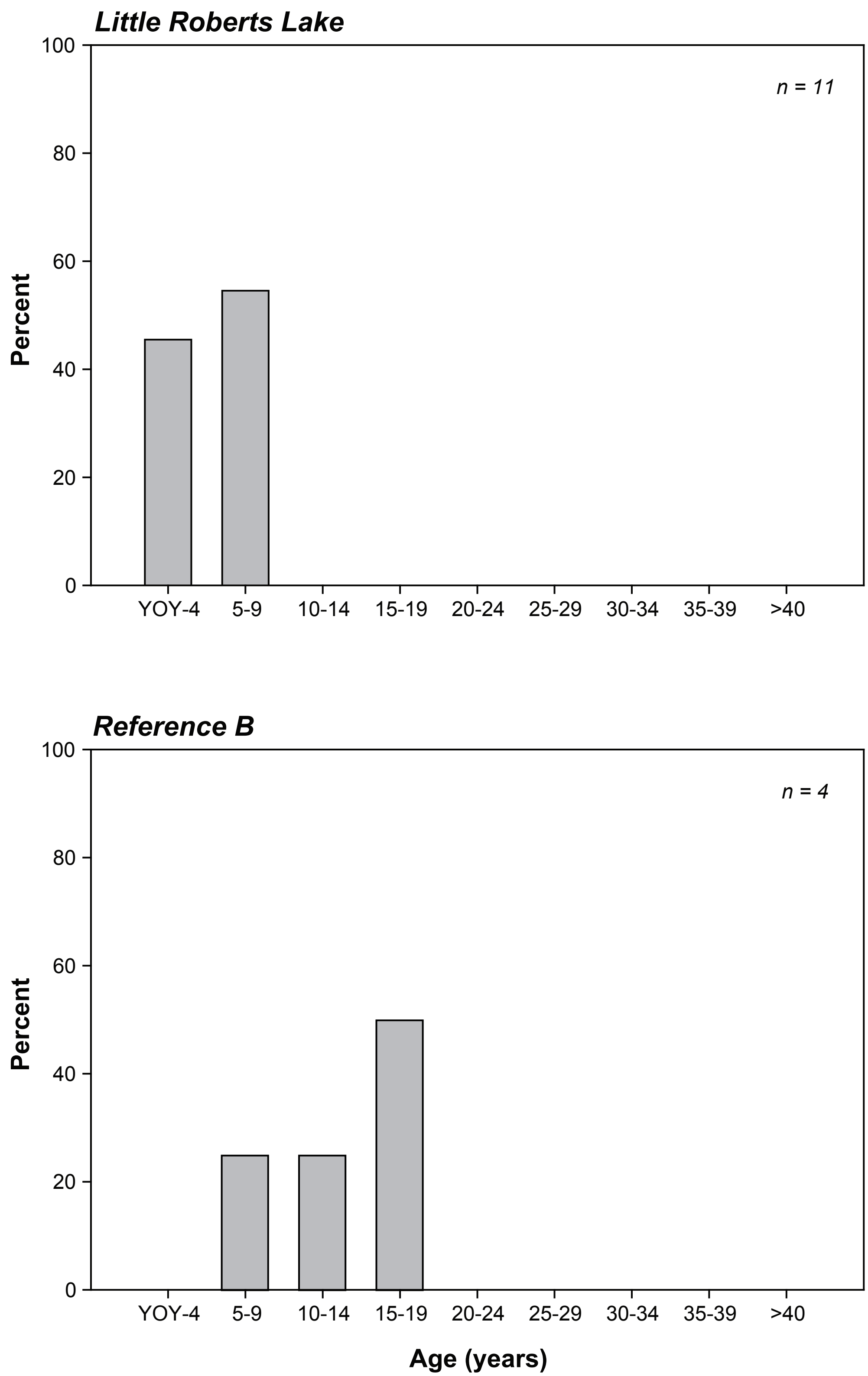
Doris Lake had the widest range of ages. The dominant age class for lake whitefish was 10 to 14 years. The von Bertalanffy growth models explained 73 to 85% of the variation in length-at-age for lake whitefish sampled from Doris and Patch lakes. Growth coefficients varied from 0.153 $year^{-1}$ (Doris Lake) to 0.187 $year^{-1}$ (Patch Lake). The sample sizes at P.O. Lake (n = 4) and Little Roberts Lake (n = 1) were too small for modelling. Arctic char captured in Little Roberts Lake were between ages of 0 and 6 years. In Reference Lake B, Arctic char ages ranged between 6 to 16 years, with a dominant age class of 15 to 19. The von Bertalanffy growth models explained 88 to 98% of the variation in length-at-age for Arctic char. Growth coefficients varied from 0.145 $year^{-1}$ (Little Roberts Lake) to 0.168 $year^{-1}$ (Reference B Lake).

3.2.1.4 Diet

Taxonomic analysis of stomach contents was conducted on a total of 49 preserved lake trout stomachs: 10 from Reference A, Reference B, P.O. and Windy lakes, and nine from Little Roberts Lake. An additional four lake whitefish stomachs were sampled from P.O. Lake and analyzed for diet composition. Full taxonomic results are presented in Appendix 3.2-4 (by number) and Appendix 3.2-5 (by wet weight). Diet composition was analyzed and presented by number (Figure 3.2-33) and by weight (Figure 3.2-34). It is important to note that some differences in the diet composition between numbers and weight are caused by the higher average weight of larger organisms (e.g., fish) versus smaller organisms (e.g., chironomids).

Taxonomic analysis found prey items from both marine and freshwater environments. There are three hypotheses why marine prey were found in the stomachs of fish sampled from freshwater environments – in order of decreasing likelihood:

- Populations of large and typically ‘marine’ invertebrates, such as isopods (Plate 3.2-5) and amphipods, are present in both marine and freshwater environments. The presence of isopods and amphipods was confirmed by studies of the benthic communities in lakes of the Project area (Rescan 2010) and supported by some published literature (Percy 1983). This suggests that some species of isopods and amphipods with marine ancestry have adapted to freshwater environments in lakes along the coast of the Arctic Ocean, perhaps as a result of being trapped in lakes by the uplifting of land after the weight of the glaciers disappeared approximately 10,000 years ago.
- Fish fed at sea and then migrated into freshwater lakes. This suggests that these fish made brief excursions to brackish water environments immediately before capture. Such excursions are not uncommon for lake trout in the Project area (Golder 2007, 2008; H. Swanson, Canadian Rivers Institute, pers. comm.). Excursions to and from freshwater and marine environments could only take place if there were no barriers to fish migrations in the outlet stream (e.g., Roberts Outflow and Glenn Outflow).
- Marine invertebrates were dispersed by wind inland into freshwater lakes. This is the least likely possibility, particularly when isopods and amphipods are known to exist in the lakes.



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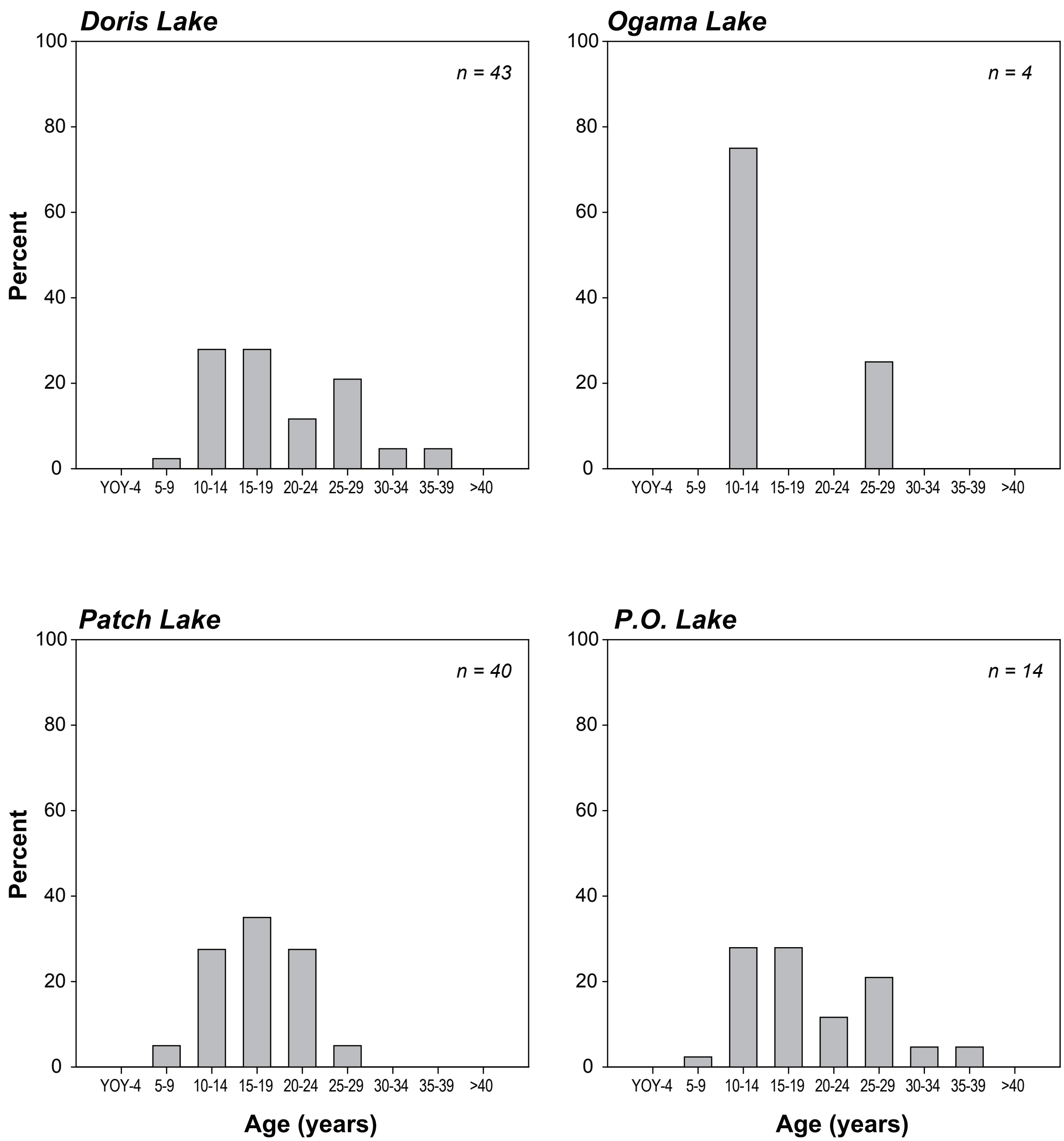
Age-Frequency Distributions for Arctic Char Sampled from Lakes, Hope Bay Belt Project, 2009

Figure 3.2-23

Rescan™ Engineers & Scientists

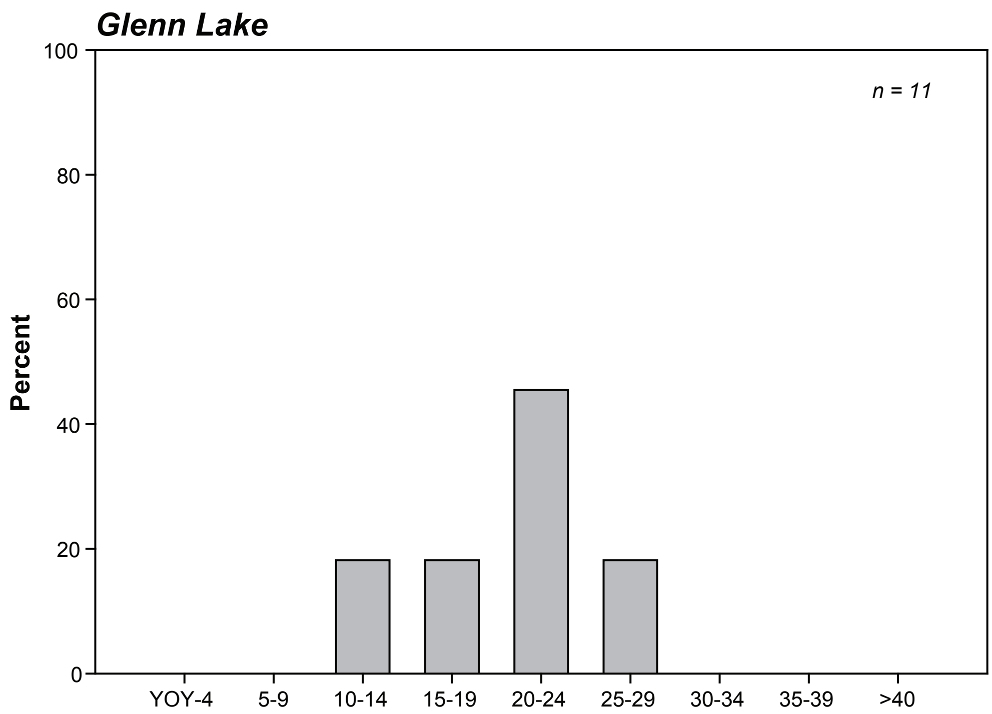


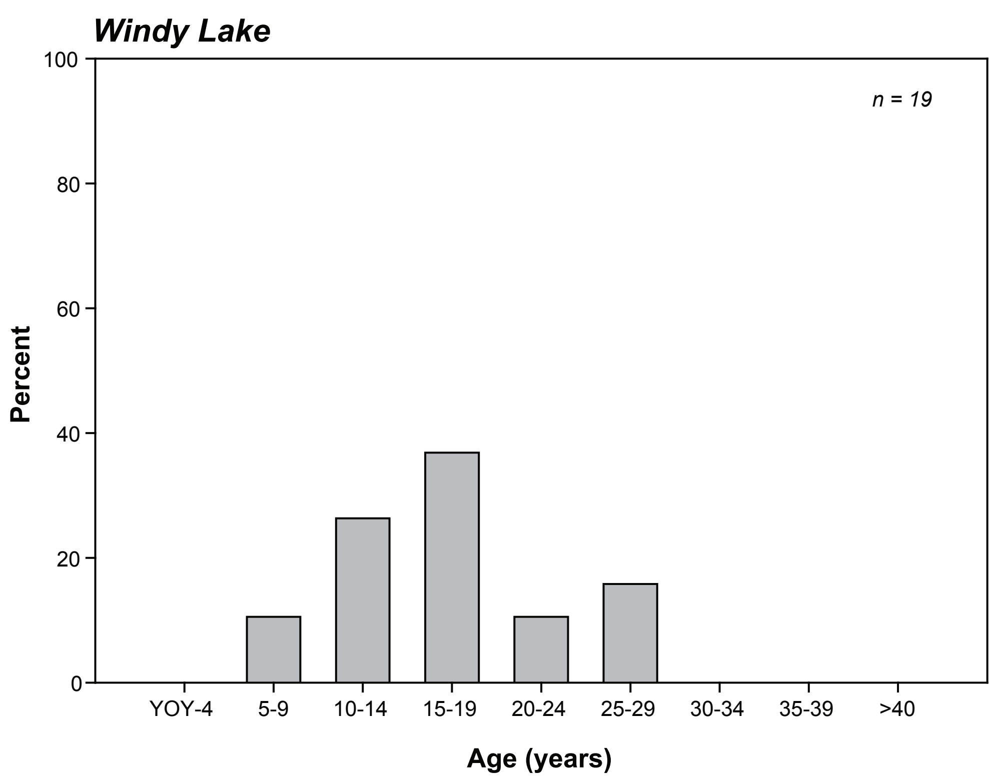
Age-Frequency Distributions for Lake Trout Sampled from Lakes in the Doris Watershed, Hope Bay Belt Project, 2009

Figure3.2-24

NEWMONT The Gold Company

Rescan Engineers & Scientists





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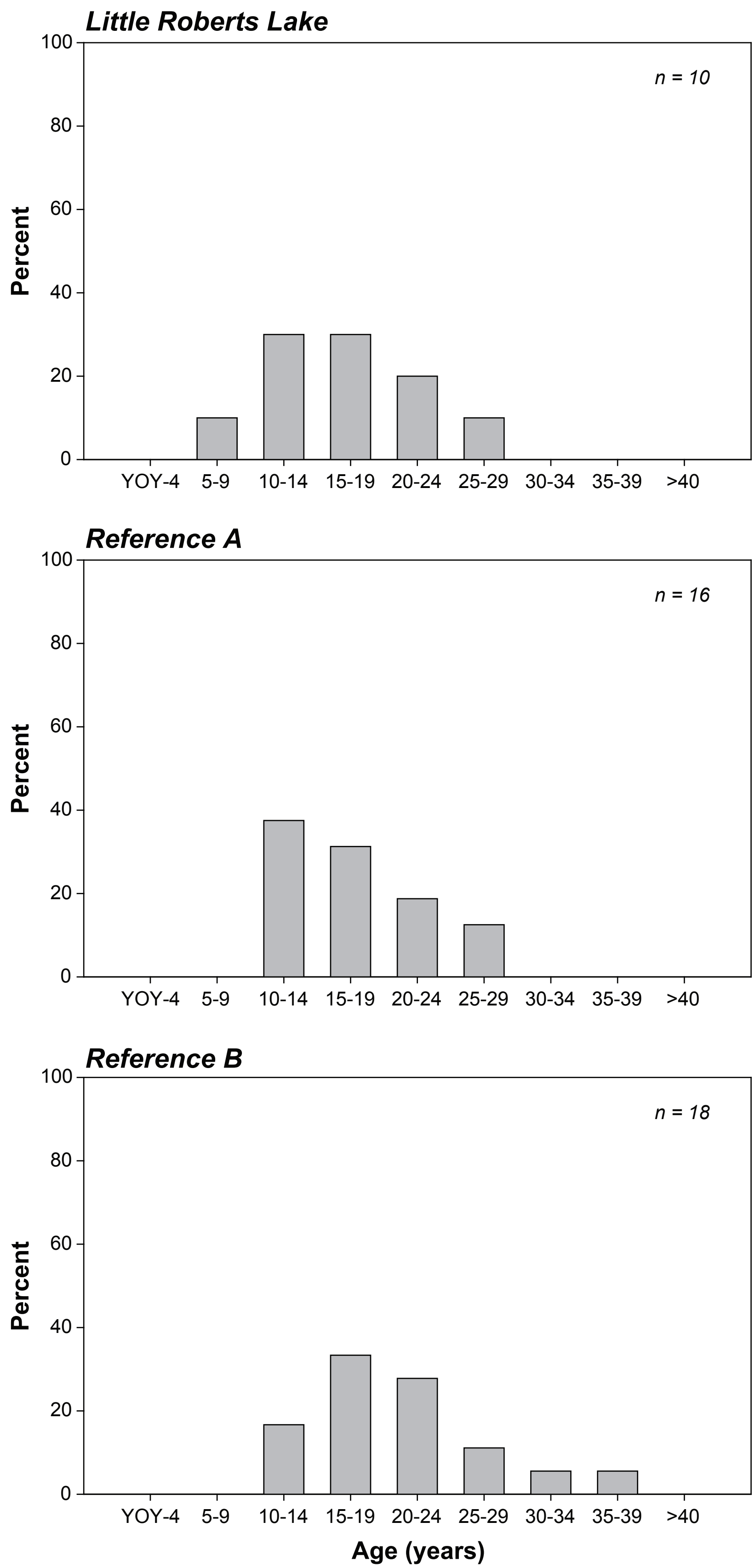
Age-Frequency Distributions for Lake Trout Sampled from Lakes in the Windy Watershed, Hope Bay Belt Project, 2009

Figure 3.2-25

Rescan
Engineers & Scientists



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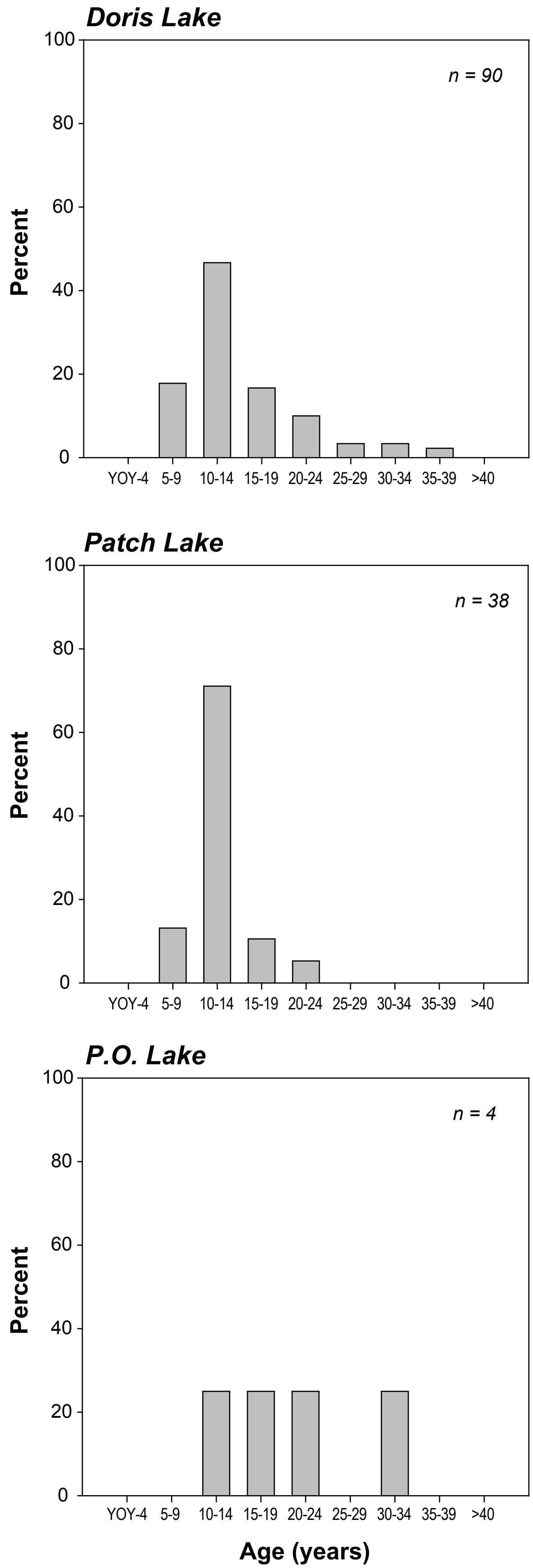
Age-Frequency Distributions for Lake Trout Sampled from Little Roberts Lake and Reference Lakes, Hope Bay Belt Project, 2009

Figure 3.2-26

Rescan Engineers & Scientists

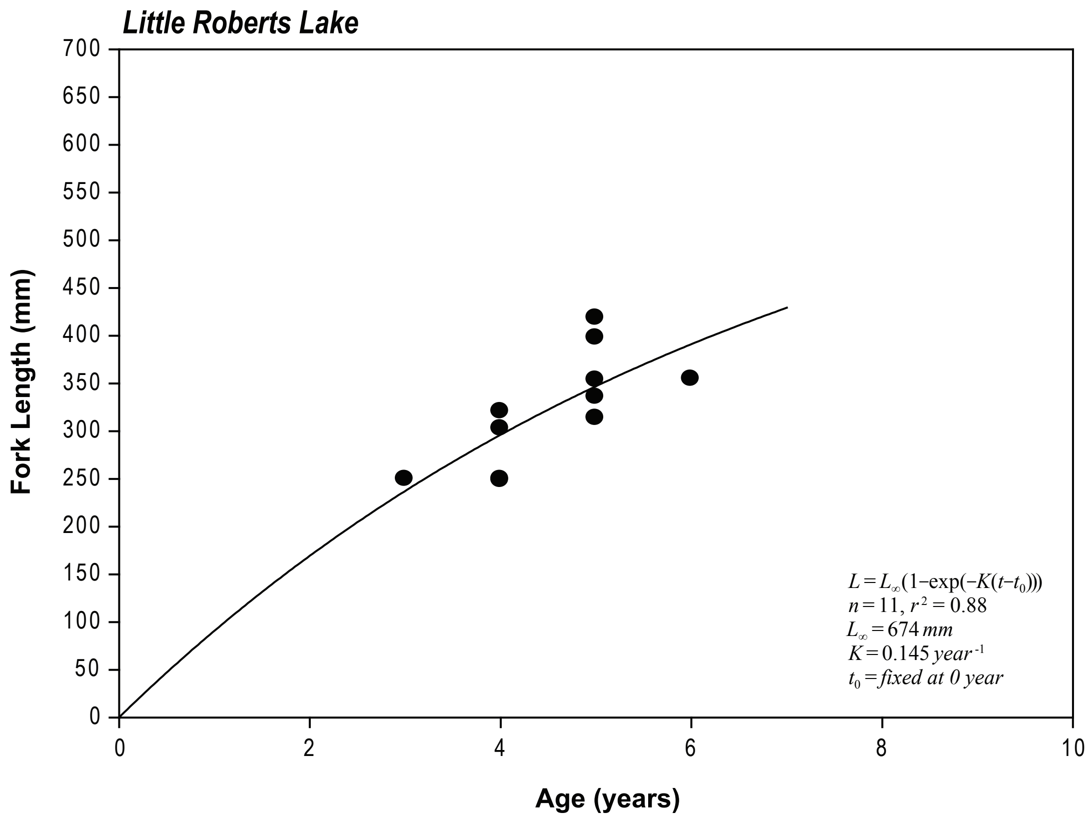


NEWMONT The Gold Company

Age-Frequency Distributions for Lake Whitefish Sampled from Lakes, Hope Bay Belt Project, 2009

Figure 3.2-27

Rescan Engineers & Scientists



NEWMONT™ The Gold Company

von Bertalanffy Growth Models for Arctic Char Sampled from Little Roberts Lake, Hope Bay Belt Project, 2009

Figure 3.2-28

Rescan™ Engineers & Scientists

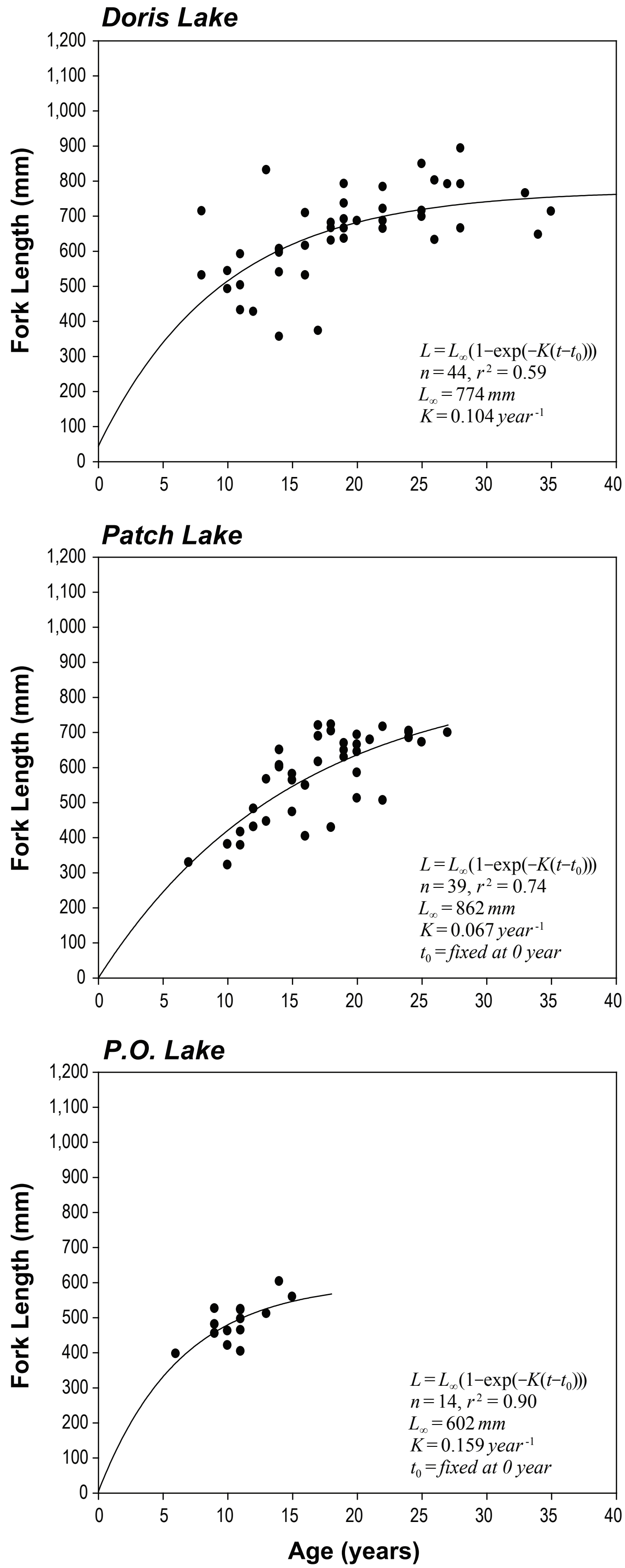
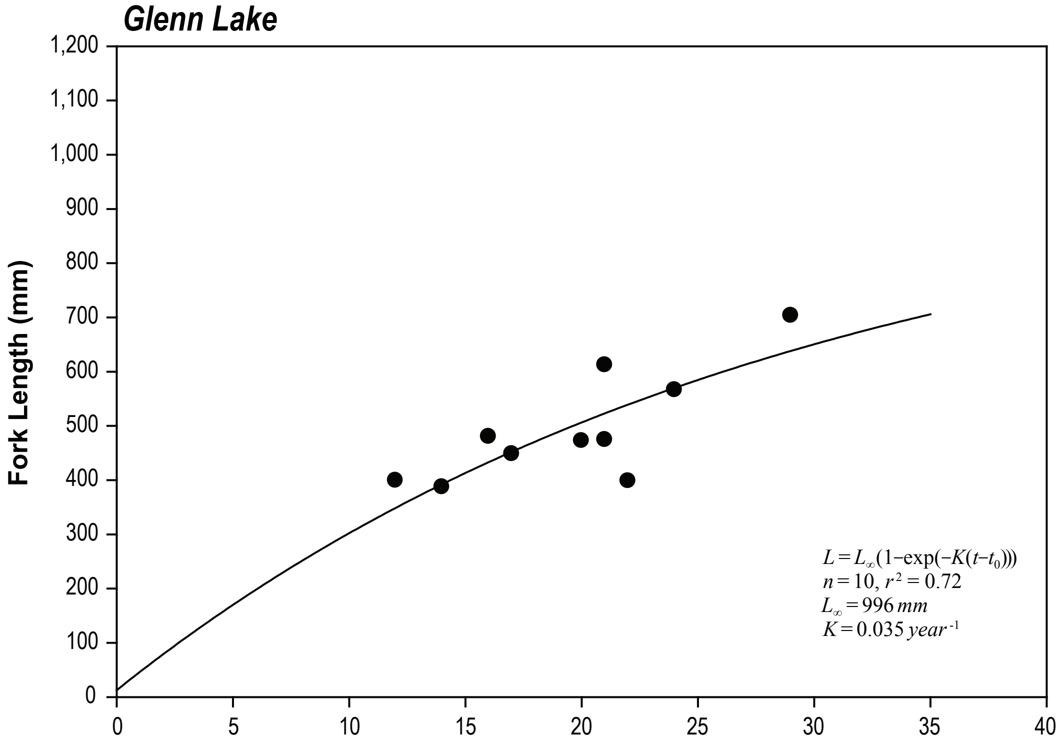
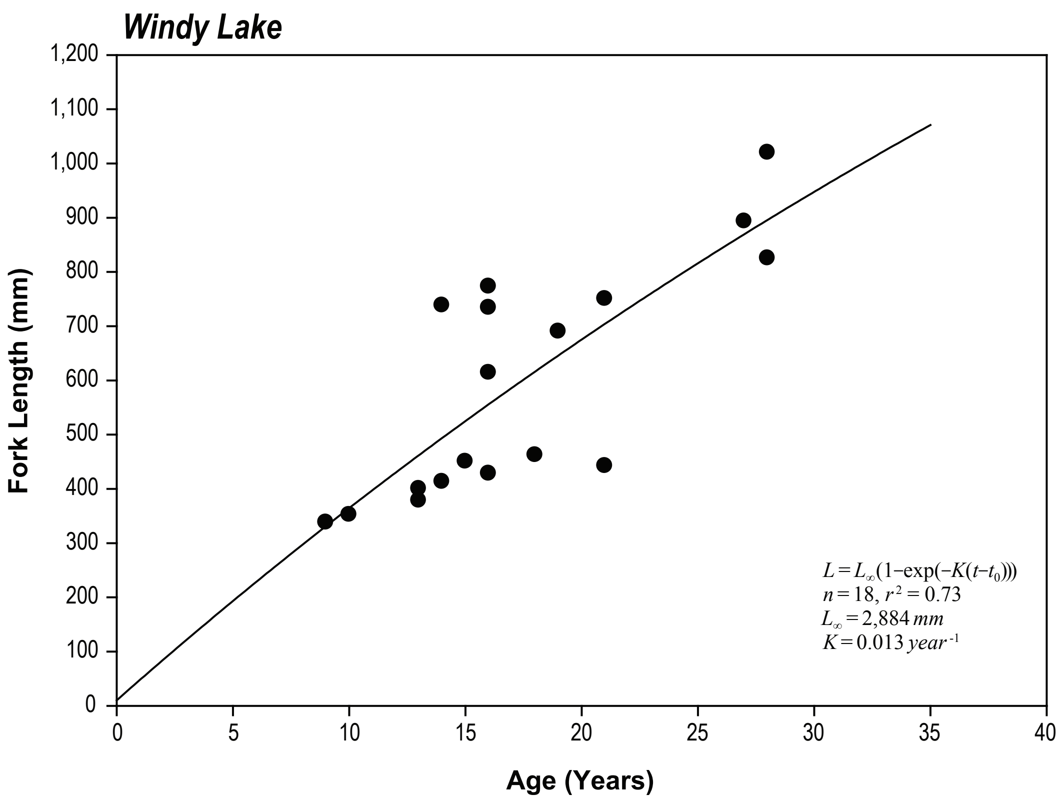


Figure 3.2-29

von Bertalanffy Growth Models for Lake Trout Sampled from Lakes in the Doris Watershed, Hope Bay Belt Project, 2009





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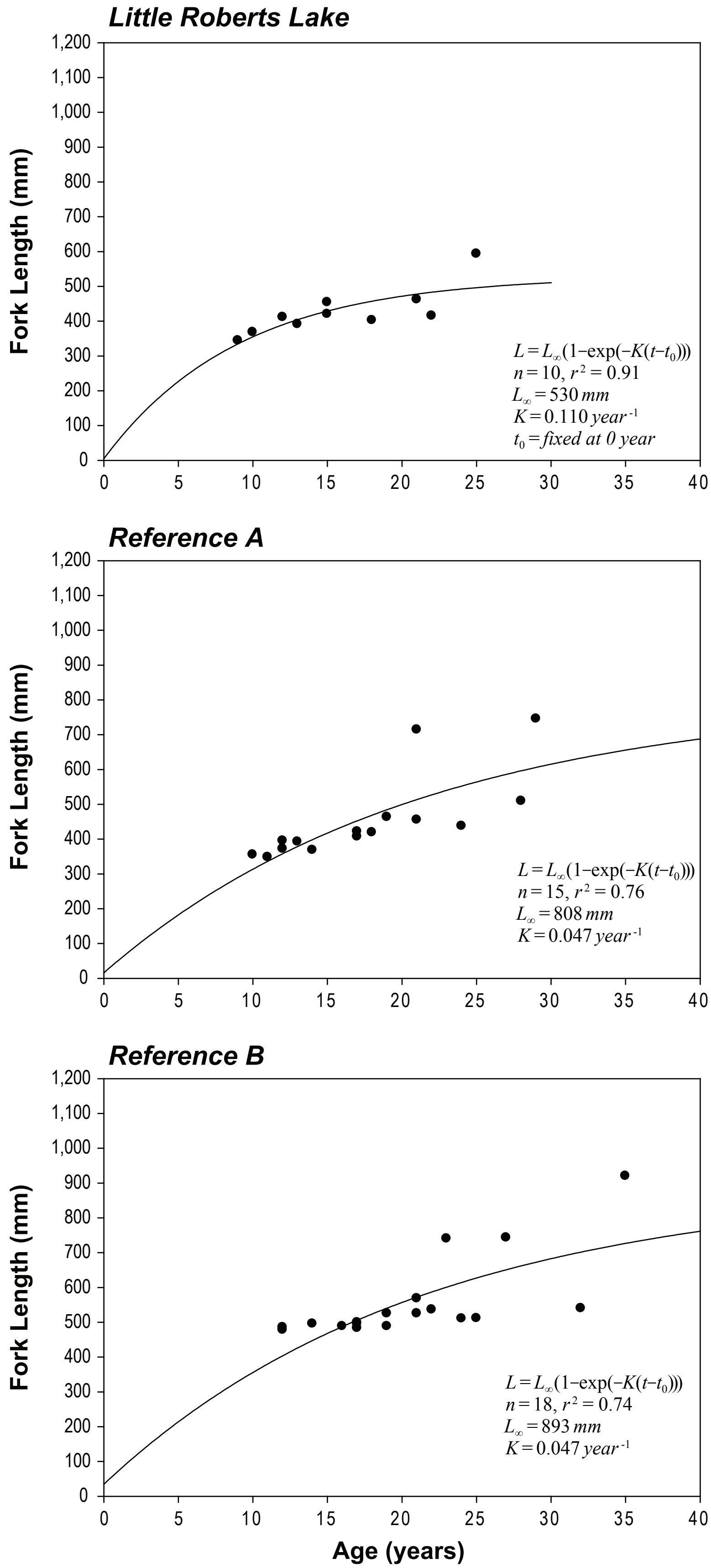
von Bertalanffy Growth Models for Lake Trout Sampled from Lakes in the Windy Watershed, Hope Bay Belt Project, 2009

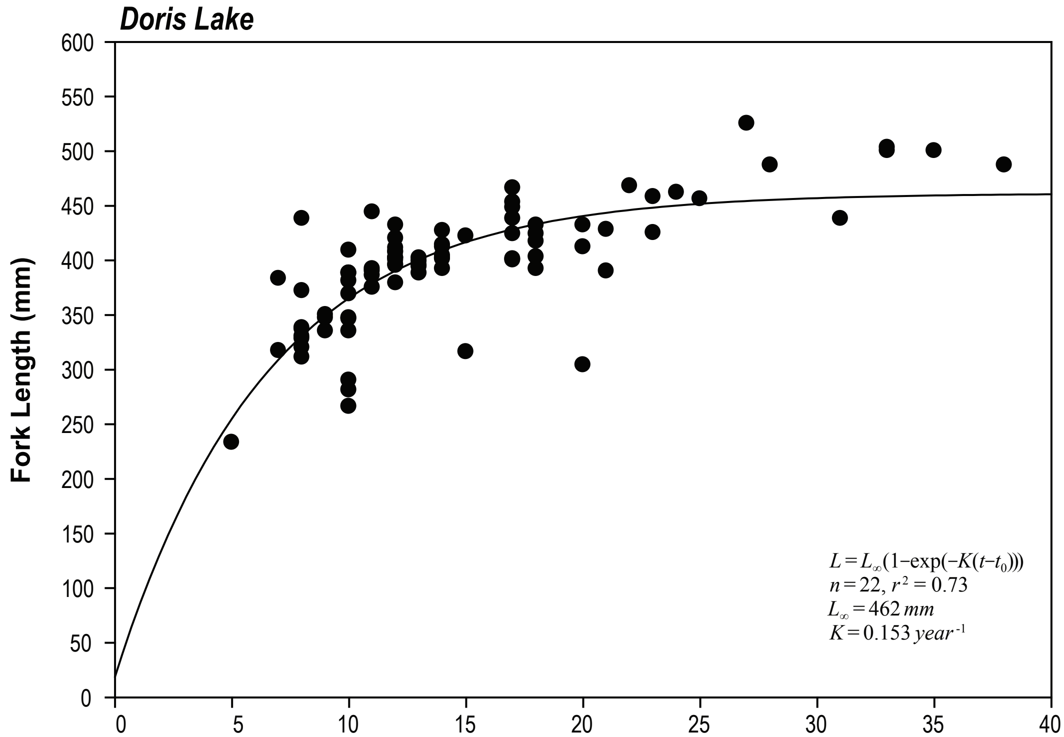
Figure 3.2-30

Rescan Engineers & Scientists



von Bertalanffy Growth Models for Lake Trout Sampled from Little Roberts Lake and Lakes in the Reference Watersheds, Hope Bay Belt Project, 2009

Figure 3.2-31



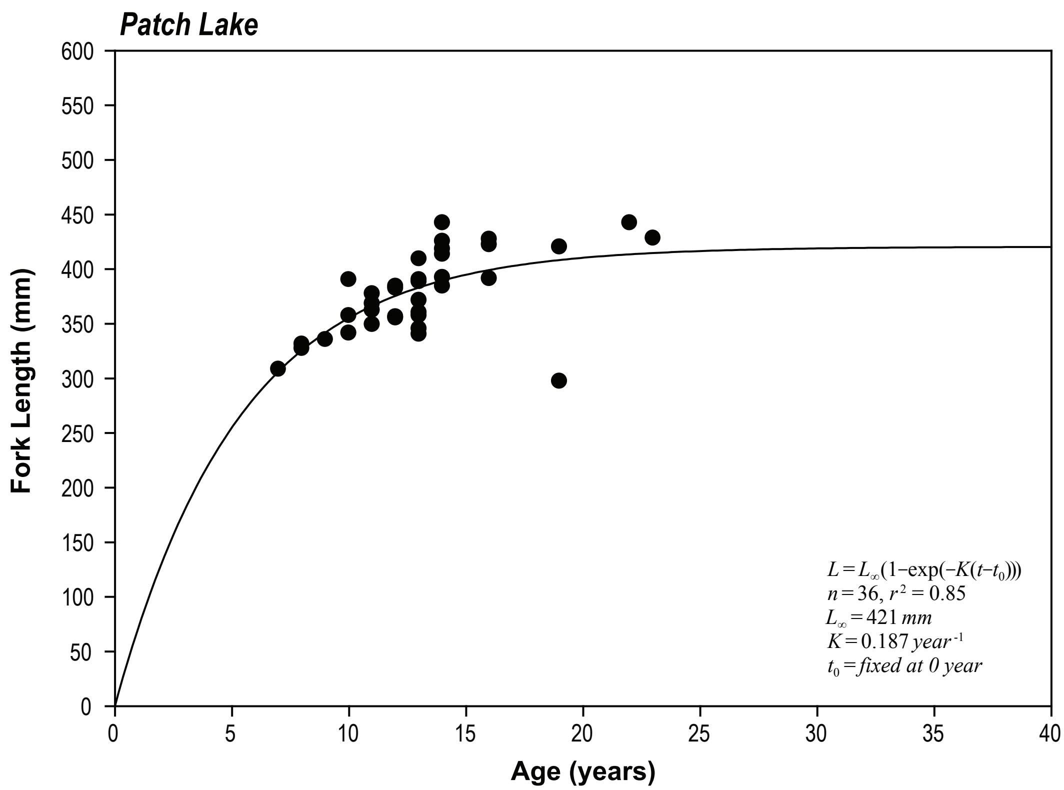


Figure 3.2-32

von Bertalanffy Growth Models for Lake Whitefish Sampled from Lakes in the Doris Watershed, Hope Bay Belt Project, 2009

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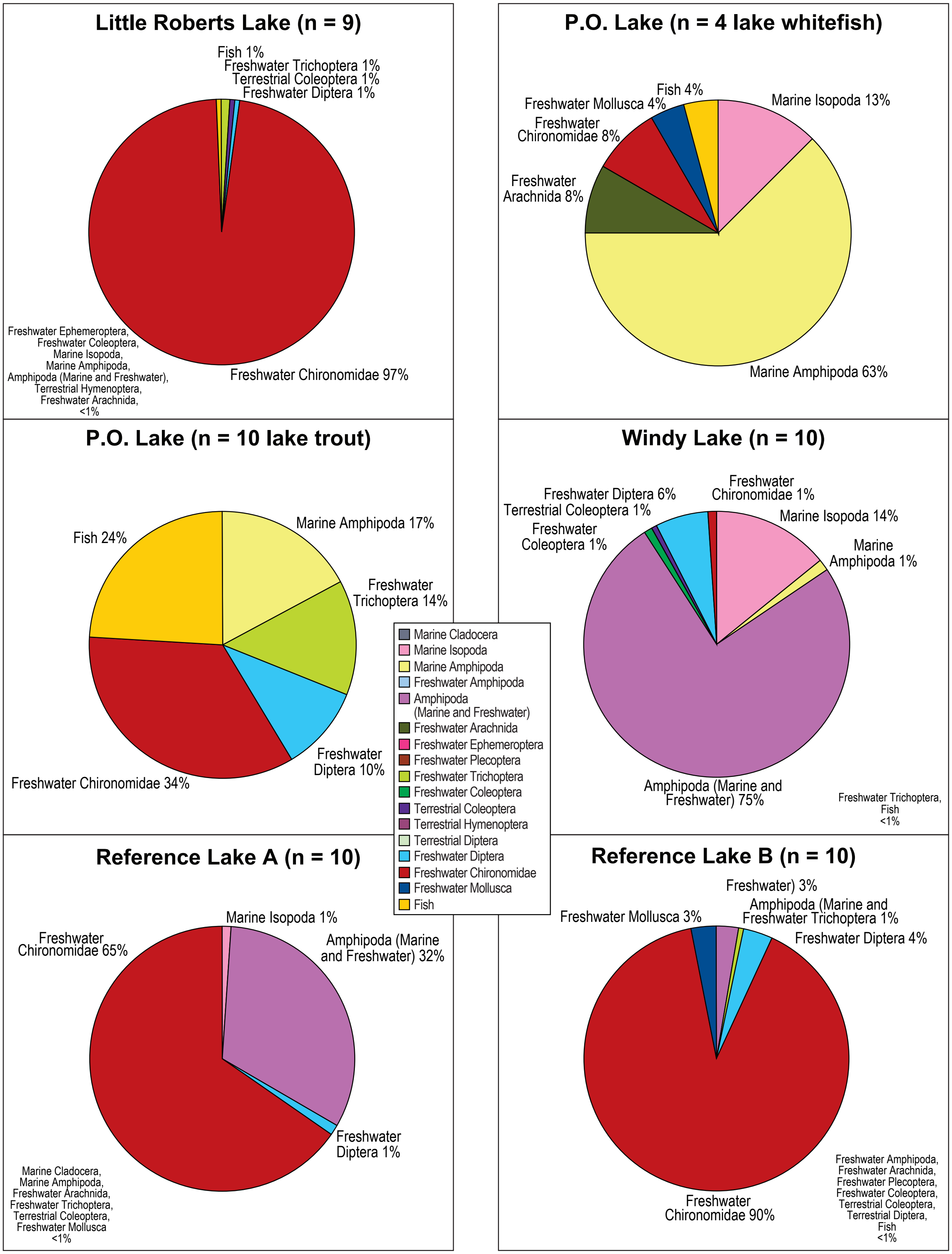

Mean Taxonomic Composition of Lake Trout and Lake Whitefish Stomach Contents by Number, Hope Bay Belt Project, 2009

Figure 3.2-33

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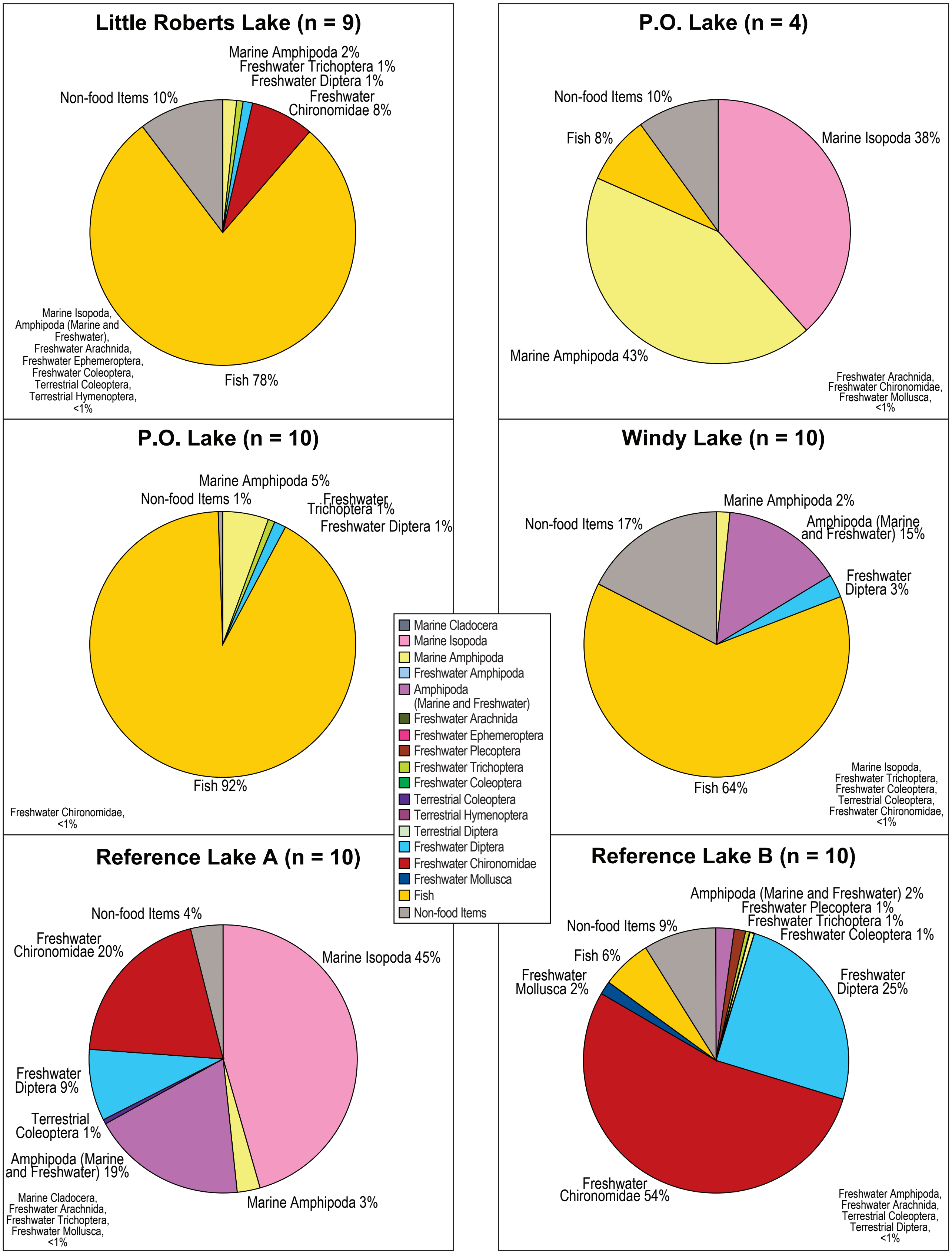

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Mean Taxonomic Composition of Lake Trout and Lake Whitefish Stomach Contents by Wet Weight, Hope Bay Belt Project, 2009

Figure 3.2-34

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Plate 3.2-5. 'Marine' isopod captured by fish community assessment gear from several freshwater lakes, Hope Bay Belt Project, 2009.

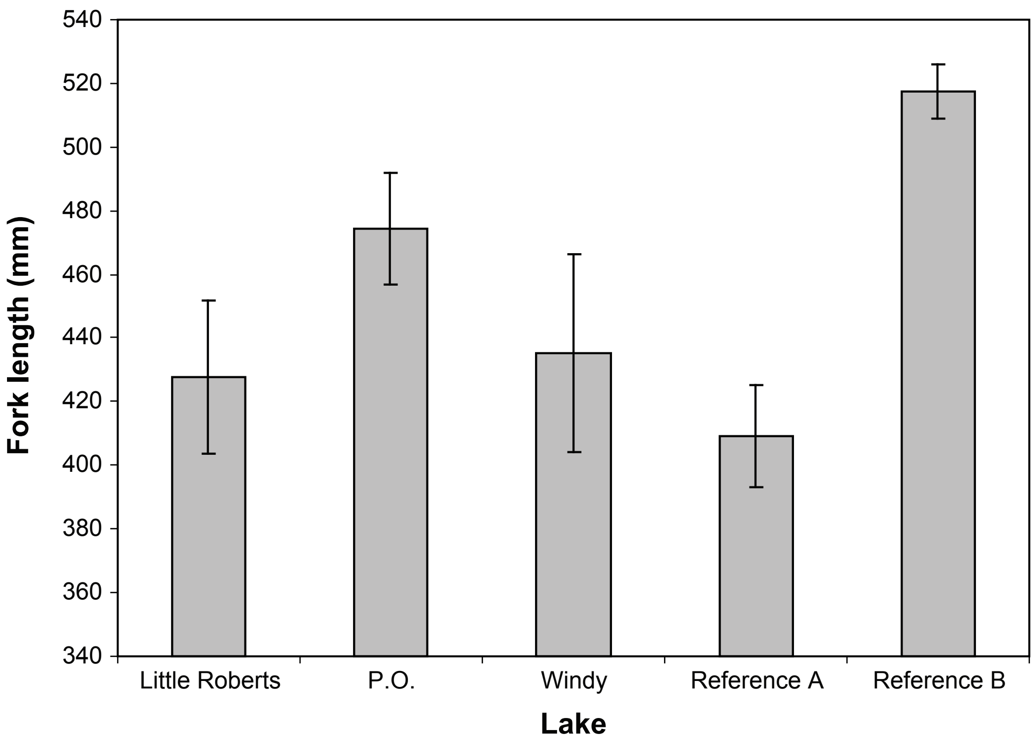
By number, the diet of lake trout sampled from Project area lakes were comprised predominantly of freshwater chironomids. Freshwater and marine amphipods were also present in relatively high percentages, especially in the diet of lake trout sampled from P.O. and Windy lakes. The diet of lake trout sampled from P.O. Lake had the widest variety of food items (by number). Lake whitefish stomach contents sampled from P.O. Lake was comprised predominantly of 'marine' amphipods.

When examined by weight, lake trout sampled from Little Roberts, P.O. and Windy lakes showed relatively high proportion of fish in their diet. Unidentified juvenile fish made up 62% of 'fish' in lake trout diets, followed by fish bones (17%), juvenile salmonids (15%) and ninespine stickleback (7%). In contrast, the diet of lake trout sampled from Reference Lake A was predominately 'marine' isopods, followed by substantial proportions of chironomids, amphipods and dipterans. Chironomidae and Diptera formed the main dietary components of lake trout sampled from Reference Lake B. Other non-food items, such as pebbles and plant materials, comprised 1 to 17% of lake trout stomach samples. The diet of lake whitefish sampled from P.O. Lake was split between "marine"-origin amphipods and isopods. Ninespine stickleback were also found in lake whitefish stomachs. All non-food items were plant materials.

3.2.1.5 Tissue Metals Concentrations

Appendix 3.2-6 shows the metal concentrations measured in each sample of muscle and liver collected from fish in the Project area in 2009. Appendix 3.2-6 also displays the fork lengths of the lake trout. Lengths, not weights, are the conventional measure of body size for tissue metals analysis.

Since the concentrations of some metals that bind permanently to protein (e.g., mercury) are typically positively correlated with fish body size, the first step in analysis was to conduct a one-way ANOVA of fork length on lake to test for significant differences in mean body size among lakes (Figure 3.2-35). Only those lake trout used for tissue metal analyses were included. The ANOVA did not show a significant ($F_{4,44}$ = 4.372, P>0.05) difference in mean fork length of lake trout among lakes.



Note: Error bars represent one standard error of the mean.

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Mean Length of Lake Trout Sampled for Metals from Five Lakes, Hope Bay Belt Project, 2009

Figure 3.2-35

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The second step in analysis was to exclude those metals for which 90% of concentrations were below the metal-specific MDL. Because the analysis combined muscle and liver samples, at least in the PCA, the 90% rule was applied to the combined muscle and liver samples. The following six metals were excluded: antimony, beryllium, bismuth, lithium, nickel and tin. This meant the inclusion of five metals (cadmium, cobalt, thallium, uranium, and vanadium) for which 90% of the concentrations in muscle tissue were below the MDL. However, since liver tissue is enriched in those metals, they had to be included in the analysis.

Tables 3.2-11 and 3.2-12 show the mean concentrations of the remaining metals for muscle and liver tissue, respectively, for each of the five lakes. To calculate the means, concentrations below metal-specific MDL were replaced by one-half of the MDL.

Two-way ANOVAs of ln-transformed metal concentrations on lake and tissue type showed that all 19 metals showed some significant variability with either lakes or tissues or the interaction of lakes and tissues (Table 3.2-13). Four basic patterns of variability were observed:

- 15 metals (aluminum, arsenic, cadmium, calcium, chromium, cobalt, copper, magnesium, manganese, molybdenum, selenium, strontium, thallium, uranium and vanadium) had concentrations that varied significantly among lakes, between tissues and with the interaction of lakes and tissues. This result represented a combination of environmental differences in metal concentrations, a difference in uptake and storage between tissues and interactions of location and tissue type.
- 2 metals (barium and zinc) had concentrations that varied between the two types of tissues, but not among lakes or with the interaction of lakes and tissues. This result represented different degrees of metal uptake and storage by the two types of tissue that was not affected by environmental influences.
- 1 metal (lead) had concentrations that varied among lakes and between tissues, but not with the interaction of lakes and tissues. This result represented a combination of environmental differences in metal concentrations plus a difference in uptake and storage between tissues, but no interaction of lake and tissue type.
- 1 metal (mercury) had concentrations that varied among lakes, but not between tissue types or with the interaction of lakes and tissues. This result represented environmental differences in metal concentrations that were not influenced by tissue type.

To interpret this complex data set, factor analysis was required. A total of 20 ln-transformed variables were entered into PCA: fork length and the 19 tissue metal concentrations for both liver and muscle tissue. The program extracted five components. However, a scree plot (not shown here) showed that only the first component was important in interpreting the major trends of the data. It accounted for 48.4% of the explained variance, whereas each of the other four components only accounted for between 12.9 and 6.8% of the explained variance.

To further reduce the data set, the seven variables that were not significantly correlated with the first component (mercury, arsenic, strontium, fork length, chromium, lead, and barium) were removed from the data set and PCA was run a second time. Only one component was extracted on the second run, accounting for 78.8% of the explained variance (Table 3.2-14). PC1 was positively correlated with eleven metals (copper, zinc, cobalt, thallium, manganese, cadmium, molybdenum, selenium, uranium, vanadium and aluminum) and negatively correlated with two metals (magnesium and calcium). Figure 3.2-36 shows how mean PC1 scores varied among lakes and between tissue types.

Table 3.2-11. Mean Concentrations of Metals in Lake Trout Liver Tissue, Hope Bay Belt Project, 2009

		Detection	Little Roberts Lake (n = 9)				P.O. Lake (n = 10)				Windy Lake (n = 10)				Reference Lake A (n = 10)				Reference Lake B (n = 10)			
Variable	**Units**	**Limit**	**Mean**	**SE**	**Min**	**Max**	**Mean**	**SE**	**Min**	**Max**	**Mean**	**SE**	**Min**	**Max**	**Mean**	**SE**	**Min**	**Max**	**Mean**	**SE**	**Min**	**Max**
Fork Length	mm	n/a	428	24	344	593	474	18	396	558	435	31	338	690	409	16	348	509	517	9	483	568
Moisture	%	0.1	75.6	0.7	73.2	79.4	74.6	1.3	67.8	80.0	74.1	2.6	70.6	78.6	76.4	0.5	73.7	78.7	76.8	0.8	73.3	80.3
Aluminum (Al)	mg/kg WW	4	10.3	1.9	4.4	19.2	4.4	0.7	1.0	7.3	9.3	2.6	6.1	13.9	13.1	2.5	7.1	32.3	13.6	2.4	5.7	25.7
Arsenic (As)	mg/kg WW	0.02	0.318	0.226	0.036	2.110	0.098	0.019	0.040	0.200	0.476	0.206	0.165	0.826	0.245	0.041	0.047	0.443	0.053	0.007	0.028	0.109
Barium (Ba)	mg/kg WW	0.02	0.024	0.005	0.010	0.048	0.013	0.003	0.005	0.029	0.020	0.018	0.010	0.059	0.020	0.006	0.010	0.066	0.025	0.013	0.010	0.138
Cadmium (Cd)	mg/kg WW	0.01	0.0391	0.0071	0.0160	0.0731	0.0145	0.0018	0.0050	0.0229	0.0202	0.0068	0.0100	0.0320	0.0715	0.0180	0.0230	0.2140	0.2042	0.0298	0.0720	0.4090
Calcium (Ca)	mg/kg WW	4	82.8	10.0	51.8	145.0	77.7	6.6	53.9	112.0	46.1	8.5	34.8	62.4	60.9	3.3	47.0	77.1	64.8	3.8	49.6	86.3
Chromium (Cr)	mg/kg WW	0.2	<0.20	0	<0.20	0.16	<0.20	0	<0.20	<0.20	<0.20	0	<0.20	<0.20	<0.20	0	<0.20	<0.20	<0.20	0	<0.20	<0.20
Cobalt (Co)	mg/kg WW	0.04	0.067	0.014	0.020	0.162	0.093	0.007	0.047	0.125	0.066	0.018	0.041	0.103	0.136	0.019	0.065	0.245	0.130	0.027	0.057	0.348
Copper (Cu)	mg/kg WW	0.02	14.0	2.6	3.5	28.2	11.3	0.9	7.4	15.1	25.4	6.7	19.0	36.9	16.6	1.3	10.3	24.9	19.4	2.9	3.7	30.5
Lead (Pb)	mg/kg WW	0.04	<0.040	0	<0.040	<0.040	0.035	0.008	0.010	0.090	<0.040	0	<0.040	<0.040	0.035	0.007	0.020	0.082	0.034	0.007	0.020	0.081
Magnesium (Mg)	mg/kg WW	2	216	7	184	256	179	11	159	282	209	26	170	268	203	5	184	236	214	12	177	282
Manganese (Mn)	mg/kg WW	0.02	2.11	0.13	1.60	2.79	1.70	0.10	1.47	2.53	1.56	0.43	1.14	2.64	1.83	0.06	1.53	2.12	2.14	0.16	1.52	3.14
Mercury (Hg)	mg/kg WW	0.003	0.1992	0.0289	0.0934	0.3680	0.2045	0.0188	0.0820	0.2900	0.0194	0.0135	0.0072	0.0464	0.1462	0.0431	0.0443	0.4900	0.2224	0.0406	0.0767	0.4420
Molybdenum (Mo)	mg/kg WW	0.02	0.144	0.015	0.056	0.212	0.129	0.012	0.106	0.222	0.120	0.031	0.058	0.178	0.170	0.010	0.138	0.231	0.281	0.097	0.101	1.140
Selenium (Se)	mg/kg WW	0.4	1.44	0.22	0.86	2.98	1.26	0.16	1.05	2.56	3.34	1.85	1.17	8.12	2.29	0.19	1.36	3.60	2.71	0.32	1.64	5.03
Strontium (Sr)	mg/kg WW	0.02	0.144	0.025	0.083	0.328	0.175	0.016	0.094	0.246	0.073	0.019	0.052	0.102	0.109	0.015	0.056	0.211	0.090	0.008	0.055	0.125
Thallium (Tl)	mg/kg WW	0.02	0.069	0.007	0.043	0.103	0.034	0.012	0.029	0.146	0.098	0.035	0.046	0.140	0.126	0.016	0.051	0.211	0.141	0.014	0.062	0.218
Uranium (U)	mg/kg WW	0.004	<0.0040	0	<0.0040	<0.0040	<0.0040	0	<0.0040	<0.0040	<0.0040	0	<0.0040	<0.0040	0.0032	0.0007	0.0020	0.0073	0.0103	0.0023	0.0034	0.0285
Vanadium (V)	mg/kg WW	0.2	<0.20	0	<0.20	<0.20	<0.20	0	<0.20	<0.20	<0.20	0	<0.20	<0.20	0.16	0.03	0.10	0.34	0.13	0.03	0.05	0.33
Zinc (Zn)	mg/kg WW	0.2	37.57	2.80	24.90	53.00	37.05	1.92	29.10	48.30	39.19	4.08	30.80	43.70	40.01	1.17	34.10	45.60	37.73	1.95	25.70	44.50

n = number of samples, SE = standard error of the mean, min = minimum, max = maximum, WW = wet weight

Table 3.2-12. Mean Concentrations of Metals in Lake Trout Muscle Tissue, Hope Bay Belt Project, 2009

Variable	Units	Detection Limit	Little Roberts Lake (n = 9)				P.O. Lake (n = 10)				Windy Lake (n = 10)				Reference Lake A (n = 10)				Reference Lake B (n = 10)			
			Mean	SE	Min	Max	Mean	SE	Min	Max	Mean	SE	Min	Max	Mean	SE	Min	Max	Mean	SE	Min	Max
Fork Length	mm	n/a	428	24	344	593	474	18	396	558	435	31	338	690	409	16	348	509	517	9	483	568
Moisture	%	0.1	76.8	0.6	74.5	79.9	77.4	0.6	72.7	79.2	76.3	0.4	74.4	78.7	80.2	0.3	78.8	81.7	78.9	0.2	78.2	79.8
Aluminum (Al)	mg/kg WW	2	3.8	1.3	2.1	13.1	2.7	1.4	1.0	14.9	2.5	0.2	1.0	4.0	1.6	0.5	1.0	5.7	1.8	0.2	1.0	2.8
Arsenic (As)	mg/kg WW	0.01	0.135	0.099	0.025	0.928	0.032	0.003	0.018	0.054	0.132	0.015	0.088	0.249	0.070	0.006	0.038	0.098	0.054	0.007	0.041	0.112
Barium (Ba)	mg/kg WW	0.01	0.063	0.025	0.012	0.214	0.034	0.014	0.005	0.158	0.056	0.022	0.023	0.262	0.021	0.002	0.011	0.030	0.028	0.002	0.020	0.040
Calcium (Ca)	mg/kg WW	2	373.4	100.5	111.0	1080.0	125.8	14.5	85.1	207.0	211.2	28.1	119.0	400.0	148.7	18.5	75.0	254.0	117.7	13.2	79.6	211.0
Chromium (Cr)	mg/kg WW	0.1	<0.10	0	<0.10	<0.10	0.10	0.03	0.05	0.35	<0.10	0	<0.10	0.14	<0.10	0	<0.10	<0.10	0.13	0.01	0.10	0.18
Copper (Cu)	mg/kg WW	0.01	0.3	0.0	0.2	0.3	0.3	0.0	0.3	0.3	0.3	0.0	0.2	0.4	0.2	0.0	0.1	0.3	0.3	0.0	0.2	0.3
Lead (Pb)	mg/kg WW	0.02	0.023	0.010	0.010	0.104	0.059	0.015	0.031	0.115	0.013	0.002	0.010	0.025	0.041	0.010	0.010	0.108	0.014	0.003	0.010	0.033
Magnesium (Mg)	mg/kg WW	1	312	7	284	337	309	4	284	320	314	3	298	329	299	4	284	323	258	3	245	274
Manganese (Mn)	mg/kg WW	0.01	0.21	0.03	0.13	0.41	0.19	0.02	0.13	0.37	0.14	0.01	0.09	0.16	0.14	0.00	0.12	0.17	0.12	0.01	0.09	0.17
Mercury (Hg)	mg/kg WW	0.003	0.0964	0.0114	0.0481	0.1470	0.1519	0.0098	0.1300	0.2350	0.0192	0.0034	0.0049	0.0425	0.1475	0.0271	0.0697	0.3410	0.1738	0.0260	0.1070	0.3610
Molybdenum (Mo)	mg/kg WW	0.01	0.010	0.004	0.005	0.044	0.039	0.005	0.012	0.050	<0.010	0	<0.010	0.011	<0.010	0	<0.010	<0.010	<0.010	0	<0.010	<0.010
Selenium (Se)	mg/kg WW	0.2	0.17	0.05	0.10	0.56	0.29	0.01	0.22	0.34	0.58	0.02	0.45	0.64	0.34	0.01	0.26	0.39	0.48	0.01	0.43	0.53
Strontium (Sr)	mg/kg WW	0.01	0.573	0.171	0.098	1.730	0.142	0.022	0.068	0.241	0.227	0.036	0.102	0.456	0.167	0.031	0.034	0.333	0.110	0.019	0.059	0.241
Zinc (Zn)	mg/kg WW	0.1	4.16	0.18	3.38	4.78	3.97	0.10	3.53	4.42	4.39	0.18	3.65	5.52	3.35	0.08	2.93	3.73	3.70	0.14	3.16	4.54

n = number of samples, SE = standard error of the mean, min = minimum, max = maximum, WW = wet weight

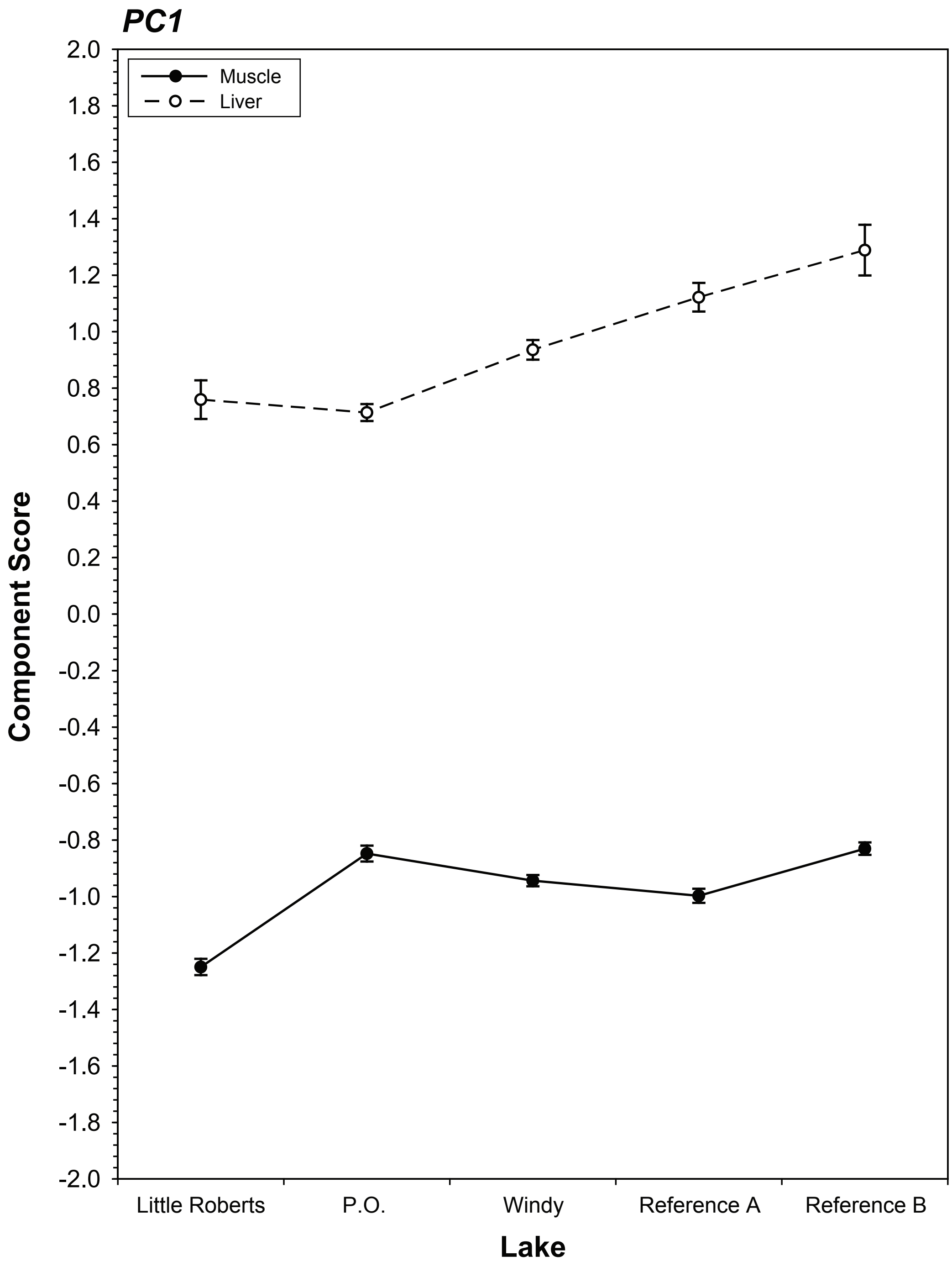
Table 3.2-13. Analysis of Variance of Lake Trout Tissue Metal Concentrations, Hope Bay Belt Project, 2009

Metal	Source of Variance	df	F-ratio	P	Notes	Metal	Source of variance	df	F-ratio	P	Notes
Aluminum	Lakes	4	6.333	<0.001	***	Manganese	Lakes	4	7.527	<0.001	***
	Tissues	1	116.606	<0.001	***		Tissues	1	3375.351	<0.001	***
	Lakes x Tissues	4	5.692	<0.001	***		Lakes x Tissues	4	5.538	0.001	**
	Error	88					Error	88			
Arsenic	Lakes	4	17.553	<0.001	***	Mercury	Lakes	4	73.416	<0.001	***
	Tissues	1	40.897	<0.001	***		Tissues	1	3.045	0.084	NS
	Lakes x Tissues	4	3.237	0.016	*		Lakes x Tissues	4	1.845	0.127	NS
	Error	88					Error	88			
Barium	Lakes	4	1.390	0.244	NS	Molybdenum	Lakes	4	19.052	<0.001	***
	Tissues	1	10.706	0.002	*		Tissues	1	1202.908	<0.001	***
	Lakes x Tissues	4	0.745	0.564	NS		Lakes x Tissues	4	21.488	<0.001	***
	Error	88					Error	88			
Cadmium	Lakes	4	38.248	<0.001	***	Selenium	Lakes	4	36.973	<0.001	***
	Tissues	1	1408.231	<0.001	***		Tissues	1	796.344	<0.001	***
	Lakes x Tissues	4	38.248	<0.001	***		Lakes x Tissues	4	3.548	0.01	*
	Error	88					Error	88			
Calcium	Lakes	4	7.481	<0.001	***	Strontium	Lakes	4	7.783	<0.001	***
	Tissues	1	153.654	<0.001	***		Tissues	1	19.299	<0.001	***
	Lakes x Tissues	4	7.292	<0.001	***		Lakes x Tissues	4	5.925	<0.001	***
	Error	88					Error	88			
Chromium	Lakes	4	10.321	<0.001	***	Thallium	Lakes	4	11.029	<0.001	***
	Tissues	1	53.370	<0.001	***		Tissues	1	927.931	<0.001	***
	Lakes x Tissues	4	11.419	<0.001	***		Lakes x Tissues	4	3.306	0.014	*
	Error	88					Error	88			
Cobalt	Lakes	4	5.449	0.001	**	Uranium	Lakes	4	18.799	<0.001	***
	Tissues	1	1101.071	<0.001	***		Tissues	1	277.433	<0.001	***
	Lakes x Tissues	4	5.449	0.001	**		Lakes x Tissues	4	18.799	<0.001	***
	Error	88					Error	88			
Copper	Lakes	4	5.701	<0.001	***	Vanadium	Lakes	4	90.608	<0.001	***
	Tissues	1	3429.729	<0.001	***		Tissues	1	584.409	<0.001	***
	Lakes x Tissues	4	4.404	0.003	**		Lakes x Tissues	4	63.477	<0.001	***
	Error	88					Error	88			
Lead	Lakes	4	3.647	0.009	**	Zinc	Lakes	4	2.450	0.052	NS
	Tissues	1	8.465	0.006	**		Tissues	1	6775.395	<0.001	***
	Lakes x Tissues	4	1.518	0.204	NS		Lakes x Tissues	4	3.951	3.951	NS
	Error	88					Error	88			
Magnesium	Lakes	4	3.744	0.007	**						
	Tissues	1	363.756	<0.001	***						
	Lakes x Tissues	4	6.286	<0.001	***						
	Error	88									

Metal concentrations were In-transformed.

Degrees of freedom: lakes = 3, tissues = 1, lakes x tissues = 3, error = 66.

*Notes: NS = not significant, *P = 0.05 to 0.01, **P = 0.01 to 0.001, ***P<0.001.*



Note: Error bars represent one standard error of the mean.

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Mean Principle Component Scores for Lake Trout Tissue Metals Concentrations from Five Lakes, Hope Bay Belt Project, 2009

Figure 3.2-36

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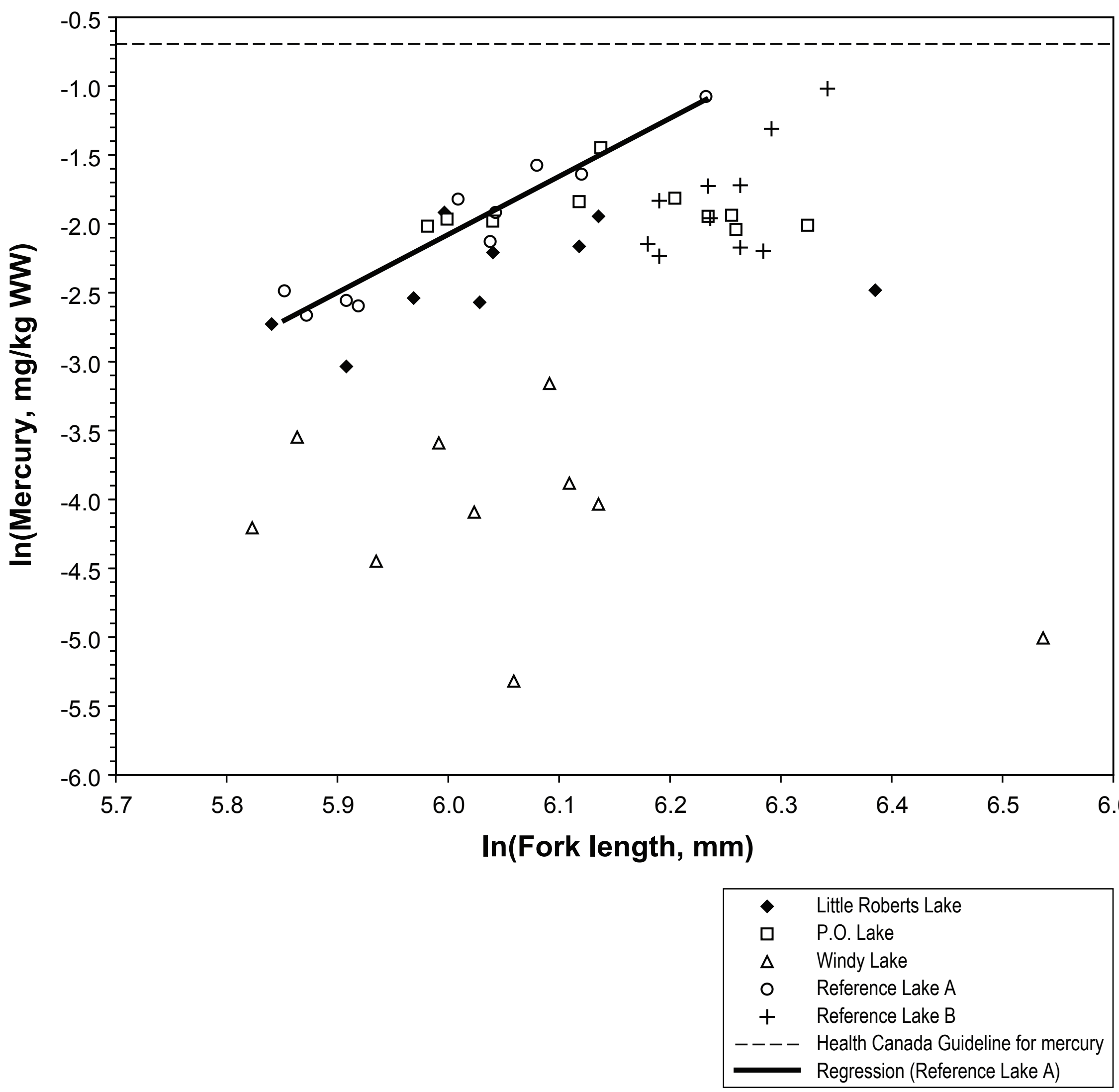
Table 3.2-14 Loadings of Metals on Principle Components

Metal	PC1
Variance explained (%)	78.8
ln(Copper)	0.976
ln(Zinc)	0.973
ln(Cobalt)	0.963
ln(Thallium)	0.95
ln(Manganese)	0.949
ln(Cadmium)	0.93
ln(Molybdenum)	0.916
ln(Selenium)	0.909
ln(Magnesium)	-0.847
ln(Uranium)	0.829
ln(Calcium)	-0.767
ln(Vanadium)	0.745
ln(Aluminum)	0.737

To interpret the PC1 plot, a two-way ANOVA of PC1 scores on lake and tissue type was conducted. It showed that mean PC1 scores were highly significantly different among lakes ($F_{4,88}$ = 28.864, P<0.001), between tissues ($F_{1,88}$ = 4609.336, P<0.001) and with the interaction of lake and tissue ($F_{4,88}$ = 13.511, P<0.001). The significant differences between PC1 scores for liver and muscle tissues was expected because the liver is the principal organ responsible for detoxification. As such, liver tissues tend to be enriched with metals relative to muscle tissues.

Finally, factor analysis did not show any correlations between fork length and metal concentrations, even for mercury which commonly varies directly with fish body size and age. To confirm this relationship, ln-transformed data of mercury concentration in muscle tissue was plotted on ln-transformed data of lake trout fork length for each lake (Figure 3.2-37). Regression analysis showed that mercury was significantly (n = 10, r^2 = 0.92, P<0.001) related to fork length for lake trout sampled from Reference Lake A only. Lake trout muscle samples from remaining lakes showed a non-significant relationship (r^2 ranged from 0 to 0.4, P ranged from 0.924 to 0.33) between mercury and fork length (non-significant relationship are not shown in Figure 3.2-36). This result suggests that, at present, mercury is not accumulating in the tissues of lake trout sampled from lakes studied in the Project area, with the exception of Reference Lake A.

Mercury is a toxic metal with no known biological function (Eisler 1987). The Health Canada guideline for maximum allowable concentration of total mercury in fish muscle tissue is 0.5 mg/kg WW (CCME 1999; Health Canada 2001). All lake trout samples, both muscle and liver, were below the Health Canada guideline. The highest concentration of mercury observed in lake trout muscle tissue came from Reference Lake B (sample number 8 collected on August 5), which had a mercury concentration of 0.361 mg/kg WW, which was well below the Health Canada guideline.



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Plot of Mercury Concentrations on Fork Length of Lake Trout Sampled for Metals from Five Lakes, Hope Bay Belt Project, 2009

Figure 3.2-37

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3.2.2 River, Stream and Pond Fish Community

3.2.2.1 Community and CPUE

Biological data for fish sampled from streams and one pond in the Project area are presented in Appendix 3.2-7. A total of 145 fish were collected from 13 stream locations, four river locations and two pond locations (Table 3.2-15). The total number of fish collected per site ranged from 0 to 23 (Ref A O/F). A total of eight different fish species were identified utilizing stream habitat. Ninespine stickleback was the predominant fish species found, followed by lake trout and slimy sculpin (Plate 3.2-6). These three fish species constituted 88% of all stream resident fish captured. Arctic grayling, Arctic char, cisco, lake whitefish and starry flounder (*Platichthys stellatus*) constituted the remaining 12% of fish captured from stream sites. Fish were not captured by electrofishing along the shorelines of the two pond sites.

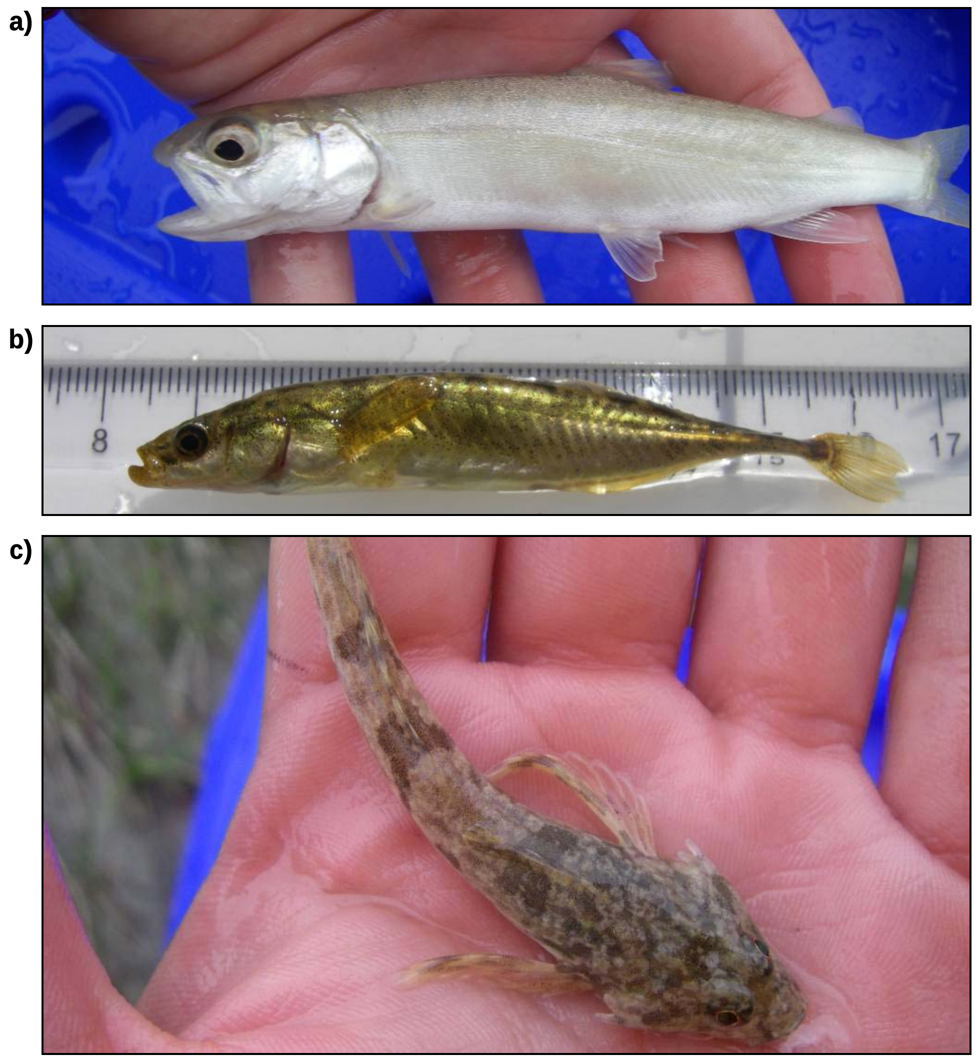

Plate 3.2-6. Juvenile lake trout (a), ninespine stickleback (b) and slimy sculpin (c) captured from streams, Hope Bay Belt Project, 2009.

Table 3.2-15. Fish Species and Numbers Captured from Rivers and Streams, Hope Bay Belt Project, 2009

Site ID	Watershed	Date	Sampling Method	Number of Fish by Species								Total
				ARCH	ARGR	LCIS	LKTR	LKWH	NSSB	SLSC	STFL	
Streams												
Doris O/F1	Doris	29-Jul-09	EF	0	0	0	6	0	0	0	0	**6**
Doris O/F3	Doris	28-Jul-09	EF	0	0	0	0	0	0	0	0	**0**
P.O. O/F2	Doris	26-Aug-09	EF	0	0	0	0	0	0	0	0	**0**
P.O. O/F2	Doris	27-Aug-09	EF	0	0	0	0	0	15	0	0	**15**
Ogama O/F1	Doris	29-Jul-09	EF	0	0	3	1	1	0	0	0	**5**
Ogama O/F3	Doris	29-Jul-09	EF	0	0	0	0	0	0	0	0	**0**
Glenn O/F2	Windy	31-Jul-09	EF	0	0	0	2	0	7	8	1	**18**
Windy O/F1	Windy	28-Jul-09	EF	0	0	0	2	0	0	0	0	**2**
Roberts I/F1	Roberts	6-Aug-09	EF	0	0	0	0	0	12	0	0	**12**
Roberts I/F2	Roberts	6-Aug-09	EF	0	0	0	0	0	8	0	0	**8**
Roberts Bay I/F1	Roberts Bay	1-Aug-09	EF	0	0	0	0	0	12	0	0	**12**
Stream E09	Roberts	25-Aug-09	EF	5	0	0	2	0	0	0	0	**7**
Ref A O/F	Reference	28-Jul-09	EF	0	0	1	13	0	0	9	0	**23**
Ref B O/F	Reference	25-Jul-09	EF	2	3	0	0	0	0	0	0	**5**
Rivers												
Koignuk D/S	Koignuk	5-Aug-09	EF	0	0	0	0	0	0	7	0	**7**
Koignuk D/S	Koignuk	4-Aug-09	MT	0	0	0	0	0	0	0	0	**0**
Koignuk M/S	Koignuk	5-Aug-09	MT	0	0	0	0	0	8	1	0	**9**
Koignuk M/S	Koignuk	5-Aug-09	GN	0	0	0	0	0	8	0	0	**8**
Koignuk M/S	Koignuk	6-Aug-09	GN	0	0	0	1	0	0	0	0	**1**
Koignuk M/S2	Koignuk	30-Aug-09	GN	0	0	0	0	0	0	0	0	**0**
Koignuk U/S	Koignuk	29-Aug-09	GN	0	0	0	7	7	0	0	0	**7**
Pond(s)												
Pond 1	Doris	30-Aug-09	EF	0	0	0	0	0	0	0	0	**0**
Pond 2	Roberts	15-Aug-09	EF	0	0	0	0	0	0	0	0	**0**
Total				**7**	**3**	**4**	**27**	**8**	**70**	**25**	**1**	**145**

EF = electrofishing, MT = minnow trap

Fish Species Codes: ARCH = Arctic char, ARGR = Arctic grayling, LCIS = cisco, LKTR = lake trout, LKWH = lake whitefish, NSSB = ninespine stickleback, SLSC = slimy sculpin, STFL = starry flounder

CPUE was calculated for each sampling site and each sampling method (e.g., electrofishing, minnow trapping and gillnetting). Electrofishing CPUE for stream sites is summarized in Table 3.2-16. Of the nine sites where fish were caught the total CPUE ranged from 0.02 fish/100 s at Windy O/F1 to 0.23 fish/100 s at Ref A O/F.

Minnow traps were set at two different sites on the Koignuk River (Table 3.2-17). Nine fish (one slimy sculpin and eight ninespine stickleback) were captured at Koignuk M/S, while no fish were caught at Koignuk D/S. Gillnets were also set at three separate locations on the Koignuk River (Table 3.2-18). Twenty six RISC standard gillnets were set for a total of 25 hours of effort. Mean total CPUE ranged from 0 to 1.26 fish/100 m^2 of net/hour.

3.2.2.2 Length, Weight, and Condition

Table 3.2-19 summarizes fork length, weight and condition data for fish sampled from rivers and streams. A total of 53 ninespine stickleback were sampled at six different sites. Ninespine stickleback length ranged from 29 to 75 mm, with a mean of 50 mm. Eighteen lake trout were sampled from six different stream sites. Lake trout length ranged from 72 to 753 mm, with a mean of 319 mm. A total of eight slimy sculpin were measured for fork length at four different sites. Fork length ranged from 43 to 109 mm, with a mean of 63 mm. A relatively small number of lake whitefish, Arctic grayling, cisco and Arctic char were sampled from streams. The fork length of lake whitefish ranged from 414 to 545 mm. Arctic char were measured at Stream EO9 ranged from 97 to 140 mm. Arctic grayling sampled at Ref B O/F ranged from 175 to 198 mm. Cisco sampled from Ogama O/F1 ranged from 61 to 304 mm.

Arctic char, lake trout, lake whitefish, ninespine stickleback and slimy sculpin were measured for total body weight. The mean weight of ninespine stickleback was 1.16 g and ranged from 0.4 to 2.5 g. Lake trout weight ranged from 41.7 to 5,066 g, while lake whitefish weighed at site Koignuk U/S ranged from 166 to 2,320 g. Five slimy sculpin were measured for body weight from two different locations on the Koignuk River, and ranged in weight from 1 to 5 g. Three Arctic char weighed from Stream EO9 ranged from 11.0 to 30.9 g.

Condition factor was calculated for fish where both fork length and total body weight were recorded. Mean condition of ninespine stickleback collected from three different sites (Roberts I/F1, Roberts I/F2 and P.O. O/F2,) ranged from 0.60 to 0.97 g/mm^3. Mean condition of lake trout and Arctic char (Stream EO9) was 1.02 and 1.08 g/mm^3, respectively. Lake whitefish collected from the Koignuk River had a mean condition of 1.28 g/mm^3. Mean condition of slimy sculpin was 1.37 g/mm^3 at Koignuk D/S.

Table 3.2-16. Electrofishing Effort, Catch and CPUE for Streams, Hope Bay Belt Project, 2009

Site	Watershed	Total Electrofishing Effort (s)	Number of Fish									CPUE (fish/100 s)								
			ARCH	ARGR	LCIS	LKTR	LKWH	NSSB	SLSC	STFL	Total	ARCH	ARGR	LCIS	LKTR	LKWH	NSSB	SLSC	STFL	Total
Streams																				
Doris O/F1	Doris	640	0	0	0	6	0	0	0	0	6	0.00	0.00	0.00	0.94	0.00	0.00	0.00	0.00	**0.94**
Doris O/F3	Doris	1,902	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
P.O. O/F2	Doris	193	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
P.O. O/F2	Doris	549	0	0	0	0	0	15	0	0	15	0.00	0.00	0.00	0.00	0.00	2.73	0.00	0.00	**2.73**
Ogama O/F1	Doris	2,915	0	0	3	1	1	0	0	0	5	0.00	0.00	0.10	0.03	0.03	0.00	0.00	0.00	**0.17**
Ogama O/F3	Doris	530	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
Glenn O/F2	Windy	2,524	0	0	0	2	0	7	8	1	18	0.00	0.00	0.00	0.08	0.00	0.28	0.32	0.04	**0.71**
Windy O/F1	Windy	1,452	0	0	0	2	0	0	0	0	2	0.00	0.00	0.00	0.14	0.00	0.00	0.00	0.00	**0.14**
Roberts I/F1	Roberts	893	0	0	0	0	0	12	0	0	12	0.00	0.00	0.00	0.00	0.00	1.34	0.00	0.00	**1.34**
Roberts I/F2	Roberts	300	0	0	0	0	0	8	0	0	8	0.00	0.00	0.00	0.00	0.00	2.67	0.00	0.00	**2.67**
Roberts Bay I/F1	Roberts Bay	4,455	0	0	0	0	0	12	0	0	12	0.00	0.00	0.00	0.00	0.00	0.27	0.00	0.00	**0.27**
Stream E09	Roberts	774	5	0	0	2	0	0	0	0	7	0.65	0.00	0.00	0.26	0.00	0.00	0.00	0.00	**0.90**
Ref A O/F	Reference	1,946	0	0	1	13	0	0	9	0	23	0.00	0.00	0.05	0.67	0.00	0.00	0.46	0.00	**1.18**
Ref B O/F	Reference	4,292	2	3	0	0	0	0	0	0	5	0.05	0.07	0.00	0.00	0.00	0.00	0.00	0.00	**0.12**
River(s)																				
Koignuk D/S	Koignuk	3,563	0	0	0	0	0	0	7	0	7	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	**0.20**
Pond(s)																				
Pond 1	Doris	649	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
Pond 2	Roberts	1,837	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
Total		**27,577**	**7**	**3**	**4**	**26**	**1**	**54**	**24**	**1**	**120**									

Species code: ARCH = Arctic char, ARGR = Arctic grayling, LCIS = cisco, LKTR = lake trout, LKWH = lake whitefish, NSSB = ninespine stickleback, SLSC = slimy sculpin, STFL = starry flounder

Table 3.2-17. Minnow Trap Effort, Catch and CPUE for Rivers, Hope Bay Belt Project, 2009

Site ID	Watershed	Number of Traps Set	Total Effort (h)	NSSB	SLSC	Total Catch	Mean Total CPUE
River(s)							
Koignuk M/S	Koignuk	10	240.0	8	1	9	0.9
Koignuk D/S	Koignuk	9	180.8	0	0	0	0.0
Total		**19**	**420.8**	**8**	**1**	**9**	

Notes:
Fish Species Codes: NSSB = ninespine stickleback, SLSC = slimy sculpin
CPUE = number of fish/24 h

Table 3.2-18. Gillnet Effort, Catch and CPUE for Rivers, Hope Bay Belt Project, 2009

Site ID	Watershed	Number of Nets Set	Total Effort (h)	Catch (Number of Fish)			Total Catch	Mean Total CPUE	SE
				LKTR	LKWH	NSSB			
River(s)									
Koignuk U/S	Koignuk	4	4	7	7	0	14	1.26	0.49
Koignuk M/S	Koignuk	17	15.8	1	0	8	9	0.27	0.20
Koignuk M/S2	Koignuk	5	5.5	0	0	0	0	0.00	0.00
Total		**26**	**25.3**	**8**	**7**	**8**	**23**		

Notes:
Fish Species Codes: NSSB = ninespine stickleback, SLSC = slimy sculpin
CPUE = number of fish/24
SE = standard error

Table 3.2-19. Summary of Mean Length, Weight and Condition Data for Fish Sampled from Streams and Rivers, Hope Bay Belt Project, 2009

				Length (mm)				Weight (g)				Condition (g/mm^3)			
Site	Watershed	Species	Method	n	Range	Mean	SE	n	Range	Mean	SE	n	Range	Mean	SE
Streams															
P.O. Outflow	Doris	NSSB	EF	11	36 - 65	48	3	11	0.7 - 1.9	1.0	0.1	11	0.69 - 1.58	0.97	0.09
Ogama Outflow	Doris	LKWH	EF	1	414	414	0	–	–	–	–	–	–	–	–
		LCIS	EF	2	61 - 304	183	122	–	–	–	–	–	–	–	–
Glenn Outlfow	Windy	LKTR	EF	1	199	199	0	–	–	–	–	–	–	–	–
		NSSB	EF	5	42 - 49	45	1	–	–	–	–	–	–	–	–
		SLSC	EF	1	58	58	0	–	–	–	–	–	–	–	–
		STFL	EF	1	202	202	0	–	–	–	–	–	–	–	–
Windy Outflow	Windy	LKTR	EF	2	461 - 506	484	23	–	–	–	–	–	–	–	–
Roberts I/F1	Roberts	NSSB	EF	11	44 - 75	60	3	11	0.4 - 2.5	1.5	0.2	11	0.42 - 0.96	0.66	0.05
Roberts I/F2	Roberts	NSSB	EF	6	45 - 68	54	3	6	0.5 - 1.9	1.0	0.2	6	0.54 - 0.64	0.59	0.02
Roberts Bay I/F1	Roberts Bay	NSSB	EF	12	41 - 57	49	1	–	–	–	–	–	–	–	–
Stream E09	Roberts	LKTR	EF	2	168 - 217	193	25	2	41.7 - 93.0	67.4	25.7	2	0.88 - 0.91	0.89	0.02
		ARCH	EF	3	97 - 140	120	13	3	11.0 - 30.9	19.6	5.9	3	0.91 - 1.21	1.08	0.09
Ref A O/F	Reference	LKTR	EF	7	72 - 362	172	44	–	–	–	–	–	–	–	–
		SLSC	EF	2	50 -109	80	30	–	–	–	–	–	–	–	–
Ref B O/F	Reference	ARGR	EF	3	175 - 198	184	7	–	–	–	–	–	–	–	–
Rivers															
Koignuk D/S	Koignuk	SLSC	EF	4	43 - 61	51	4	4	1.0 - 3.0	1.8	0.5	4	0.75 - 2.52	1.37	0.40
Koignuk M/S	Koignuk	LKTR	GN	1	753	753	0	1	4600	4600.0	0.0	1	1.08	1.08	0.00
		NSSB	MT	8	29 - 61	44	4	–	–	–	–	–	–	–	–
		SLSC	MT	1	82	82	0	1	5	5.0	0.0	1	0.91	0.91	
Koignuk U/S	Koignuk	LKTR	GN	5	295 - 812	494	88	5	273 - 5066	1675.2	865.0	5	0.95 - 1.19	1.04	0.04
		LKWH	GN	6	422 - 545	465	18	6	166 - 2320	1312.7	283.4	6	0.17 - 1.62	1.28	0.22

Species code: ARCH = Arctic char, ARGR = Arctic grayling, LCIS = lake cisco, LKTR = lake trout, LKWH = lake whitefish, NSSB = ninespine stickleback, SLSC = slimy sculpin, STFL = starry flounder.

n = sample size; SE = standard error

Dashes (-) indicate data not available.

4. Summary of Historic Freshwater Fish and Fish Habitat Information

4. Summary of Historic Freshwater Fish and Fish Habitat Information

4.1 INTRODUCTION

Fish and fish habitat studies were conducted nearly every year in the Hope Bay area from 1995 to 2009; however, studies were not conducted in the Project area in 1999 or 2001. In this chapter, a total of 14 reports (Klohn-Crippen 1995; Rescan 1997, 1998, 1999a, 1999b, 2001; RL&L 2003a, 2003b; Golder 2005, 2006, 2007, 2008a, 2008b, 2009) that contained information on freshwater fish and fish habitat were reviewed.

Variables were selected based on the consistency of data collection methods between the study years and by the robustness of the data (i.e., if the data was collected by methods that would facilitate comparison with 2009 data and/or if the variable can be compared through time to detect trends). Data for each selected variable were then extracted from historical documents and synthesized into tables for each sampling location (i.e., lake or stream site). Figure 4.1-1 and Table 4.1-1 show lake and stream sites used to compare historical and present fish community data. Each lake and stream site is discussed below.

The purpose of this historical review is to summarize past data and compile historical baseline fish community data into one report.

Table 4.1-1. Historical Sampling of Freshwater Fish Habitat and Fish Community, Hope Bay Belt Project, 1995 to 2009

Water Body or Site	Environment	Watershed	Sampling Years
Doris Lake	Lake	Doris	1995 to 1997, 1999, 2003, 2005, 2009
Patch Lake	Lake	Doris	1995 to 1999, 2006, 2009
P.O. Lake	Lake	Doris	2006, 2007, 2009
Ogama Lake	Lake	Doris	1996, 2006, 2007, 2009
Little Roberts Lake	Lake	Doris/Roberts	2000, 2002, 2003, 2009
Glenn Lake	Lake	Windy	2006, 2007, 2009
Windy Lake	Lake	Windy	1996, 1997, 1999, 2008, 2009
Koignuk River	River	Koignuk	1998, 2006 to 2009
Doris Outflow	Stream	Doris	1996, 1997, 2003, 2005, 2009
P.O. Outflow	Stream	Doris	2006, 2007, 2009
Ogama Outflow	Stream	Doris	1995, 1997, 2005 to 2007, 2009
Glenn Outflow	Stream	Windy	1997, 2000, 2003, 2009
Windy Outflow	Stream	Windy	1997, 2003, 2009

4.2 LAKES

4.2.1 Doris Lake

The fish community of Doris Lake consists of lake trout, lake whitefish, cisco and ninespine stickleback. Data on the large-bodied fish species were collected in six years: 1995, 1996, 1997, 1999, 2003, 2005 and 2009. Data on the small-bodied fish species (i.e., ninespine stickleback) were collected in 2003, 2005 and 2009. CPUE statistics were variable among years due to the various gillnet mesh sizes used in each study. However, all studies showed that cisco was the most abundant species. The rank order of mean fork length was consistent for all species and over all study years. The range in mean fork length for each species was, in order of decreasing mean length: lake trout (460 to 699 mm); lake whitefish (260 to 446 mm); cisco (89 to 276 mm); and ninespine stickleback (29 to 55 mm). Mean condition for all species was very consistent between sampling years. The range in mean condition for each species was: lake trout (0.96 to 1.07 g/mm^3); lake whitefish (1.28 to 1.36 g/mm^3); and cisco (0.93 to 1.09 g/mm^3). Condition for ninespine stickleback was reported only in 2009 as 1.20 g/mm^3. Metal concentrations in the muscle, liver and kidney of 1 lake trout and 3 lake whitefish were collected in 1995. Samples of muscle and liver were collected from 22 lake trout and 29 lake whitefish in 1997 and 1998. Data for all fish community variables remained relatively consistent from 1995 to 2009.

4.2.2 Patch Lake

Fish community studies were conducted at Patch Lake from 1995 to 1999 and from 2006 to 2009. Based on these studies, the fish community is composed of lake trout, lake whitefish, cisco and ninespine stickleback. CPUE for each fish species was highly variable between years due to various gillnet mesh sizes used for each study. The abundance of the three large-bodied species were relatively similar, regardless of gillnet mesh size. Mean fork length for lake trout and lake whitefish ranged from 433 to 702 mm and 372 to 475 mm, respectively. Cisco fork length showed consistency between studies, ranging from 225 to 267 mm. Lake whitefish showed the highest mean condition with values ranging from 1.20 to 1.33 g/mm^3 among studies. Ranges in mean condition for lake trout and cisco were considerably lower, ranging from 0.94 to 1.03 g/mm^3 and 0.77 to 1.09 g/mm^3, respectively. Stomach contents were sampled from lake trout and lake whitefish in 2008. The diet of lake trout was predominantly fish, while the predominant diet of lake whitefish was isopods, gammarids and chironomids. Samples of muscle, liver and kidney were taken from one lake trout in 1995 for metals analysis. Muscle and liver were again sampled from 25 lake trout and 26 lake whitefish in 1997 and 1998 for metals analysis.

4.2.3 P.O. Lake

Fish community studies were conducted on P.O. Lake in 2006, 2007 and 2009. Lake trout, lake whitefish, cisco and ninespine stickleback were captured in all studies. Relative abundance of fish species varied among years. In 2006 and 2007 the predominant species captured was lake whitefish, while the cisco were the predominant species in 2009. Mean length of all species was consistent among study years. The range in mean fork length for each species was: lake trout (494 to 597 mm); lake whitefish (365 to 408 mm); and cisco (209 to 227 mm). Mean fork length of ninespine stickleback was 47 mm. Mean condition of lake whitefish in P.O.Lake was high relative to other lakes in the Project area, with means ranging from 1.36 to 1.53 g/mm^3. Lake trout displayed lower condition, with means ranging from 0.84 to 1.10 g/mm^3. The diet of lake trout and lake whitefish were studied in 2009. The predominant food items for lake trout were chironomids and fish, while amphipods were the main diet of lake whitefish. Muscle and liver tissues were sampled from 10 lake trout and 4 lake whitefish in 2009 for the evaluation of baseline metals concentrations.

4.2.4 Ogama Lake

Fish community studies were conducted at Ogama Lake in 1996, 2006, 2007 and 2009. The fish community was consistent with other lakes in the Doris Watershed, and included lake trout, lake whitefish, cisco and ninespine stickleback. Cisco was the most abundant large-bodies species in the catch. Lake trout were the largest species captured with mean fork lengths ranging from 291 to 646 mm, while ninespine stickleback were the smallest with a mean fork length of 58 mm. Lake trout displayed relatively low condition with means ranging from 0.89 to 0.93 g/mm^3 among study years. Lake whitefish had the highest mean condition, ranging from 1.24 to 1.29 g/mm^3. Diet and tissue metal concentration data were not reported for Ogama Lake.

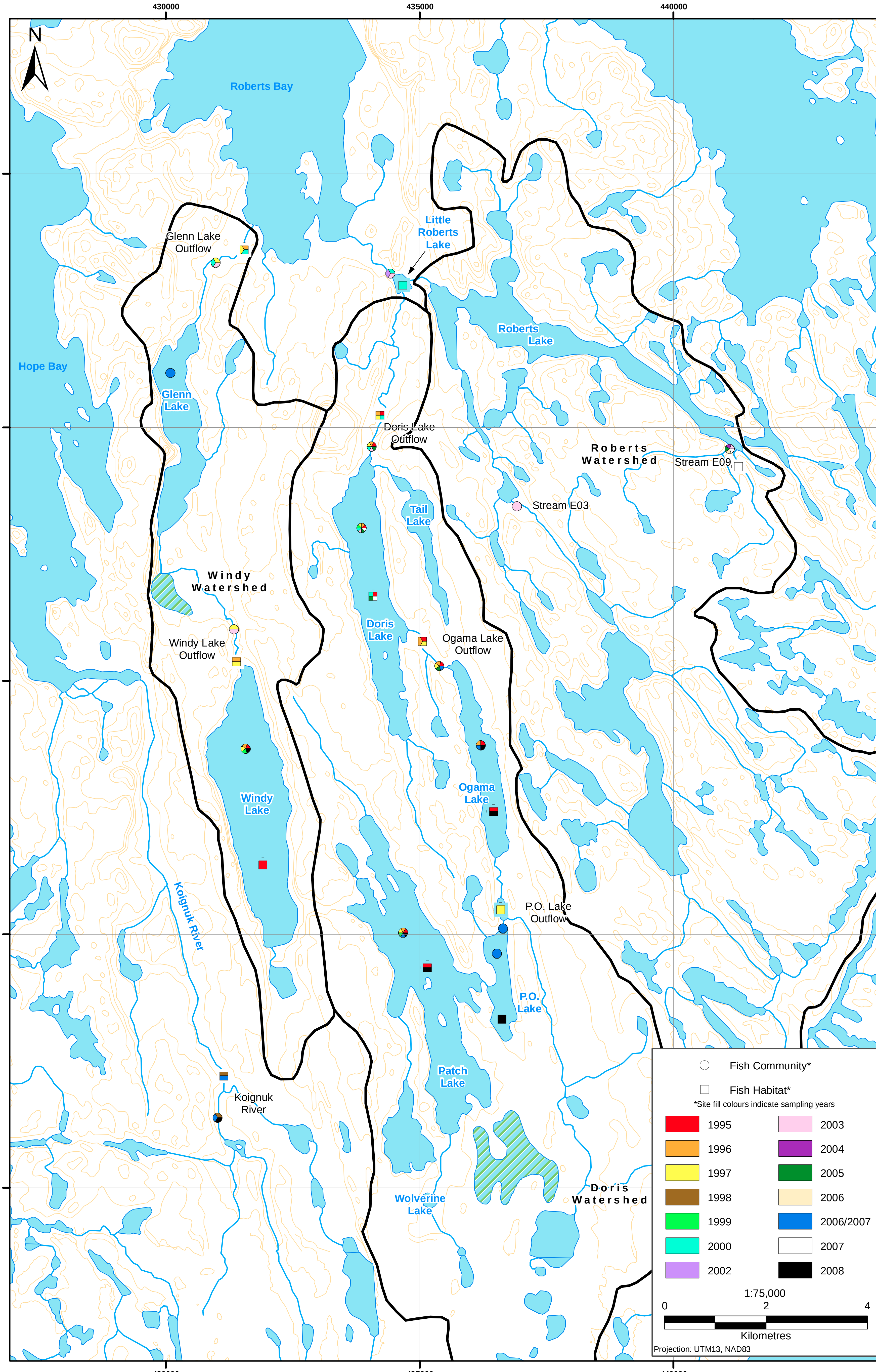

Figure 4.1-1

Historical Sampling of Freshwater Fish Habitat and Fish Community, Hope Bay Belt Project, 1995 to 2008

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4.2.5 Little Roberts Lake

Fish community and fish habitat studies of Little Roberts Lake took place in 2000, 2002, 2003 and 2009. The fish community consisted of Arctic char, lake trout, lake whitefish and cisco. Broad whitefish (*Coregonus nasus*) and least cisco (*Coregonus sardinella*) were reported in 2000, and least cisco were also reported in 2002 and 2003. Reports of broad whitefish and least cisco may have been the result of improper species identification. Gillnet catches were highest for Arctic char relative to other species in nearly all studies. Lake trout and lake whitefish showed similar relative abundance. Mean fork lengths of Arctic char ranged from 136 to 698 mm. Lake trout and cisco mean fork lengths were consistent between study years, ranging from 276 to 426 mm and 135 to 199 mm, respectively. Lake whitefish mean fork length ranged from 187 to 428 mm. Mean condition for Arctic char ranged from 0.99 to 1.40 g/mm^3. Condition of lake trout ranged from 0.95 to 1.30 g/mm^3. Condition of lake whitefish was highest among fish species and ranged from 1.48 to 1.9 g/mm^3. Condition of cisco ranged from 0.85 to 1.20 g/mm^3. Maximum condition for all species were reported in the 2000 study. Studies of fish diet were conducted in 2000, 2002 and 2009. This study found that the dominant diets of Arctic char, lake trout and cisco consisted of tadpole shrimp, chironomids and fish, and amphipods and ants, respectively. Muscle and liver samples for metals analysis were collected in 2009 only.

4.2.6 Glenn Lake

Studies of the Glenn Lake fish habitat and fish community were conducted in 2006, 2007 and 2009. The fish community was composed of Arctic char, lake trout, lake whitefish and cisco. Arctic char were not captured during the 2009 study. Lake trout have also been documented to migrate to and from Glenn Lake and Roberts Bay via the Glenn Lake outflow. Cisco showed the highest relative abundance in gillnet catches. Lake trout were the largest species captured, with mean fork lengths ranging from 439 to 527 mm. The mean fork length of Arctic char was 223 mm, representing the smallest species captured by gillnets in 2006 and 2007. Condition for each species were relatively high throughout the study periods. Lake whitefish displayed the highest mean condition at 1.45 g/mm^3, while lake trout showed the lowest mean condition at 0.85 g/mm^3. Tissue metals samples have not been collected from fish species in Glenn Lake.

4.2.7 Windy Lake

Fish habitat and fish community studies were conducted on Windy Lake in 1996, 1997, 1999, 2008 and 2009. The fish community consists of lake trout, lake whitefish, cisco and ninespine stickleback. Gillnet CPUE show that cisco were captured in the highest relative abundance in most studies. Compared to lake trout sampled from other lakes in the Project area, lake trout sampled from Windy Lake show relatively large mean fork length. Mean fork length for lake trout from Windy Lake ranged from 434 to 594 mm. Cisco were also relatively large with mean fork lengths ranging from 291 to 344 mm. The mean condition of lake trout and cisco ranged from 1.04 to 1.12 g/mm^3, and from 0.93 to 1.11 g/mm^3, respectively. Stomach contents of lake trout and cisco were examined in 2008 and 2009. They found that the diet of lake trout was predominately gammarids, ampipods and fish, while the diet of cisco was predominantly mysids. Muscle and liver tissues were collected from lake trout in 1999 and 2009. Levels of mercury remained similar for each tissue between sampling events.

4.3 STREAMS

4.3.1 Koignuk River

The fish communities and fish habitat of the Koignuk River were studied in 1998, 2006, 2007, 2008 and 2009. A total of seven fish species were captured in freshwater sections of the river. These species included Arctic char, Arctic grayling, burbot (*Lota lota*), lake trout, lake whitefish, ninespine stickleback and slimy sculpin. The fish community of the Koignuk River is the most diverse in the

Project area. In addition to these freshwater species, three species of fish that tend to prefer marine or estuary environments were captured in brackish water at the outflow of the Koignuk, including Arctic flounder (*Liopsetta glacialis*), sculpin (*Myoxocephalus* sp.) and Greenland cod (*Gadus ogac*). CPUE and relative abundance of fish species was highly variable between years and gear type (i.e., electrofishing, gillnets, minnow traps). Due to the various gear used to capture fish from the Koignuk River and their associated size selectivity, the mean fork lengths of each fish species varied considerable between study years. The largest fish were generally captured by gillnets, with lake trout, Arctic char, lake whitefish and Arctic grayling representing the largest species. Small-bodied species such as ninespine stickleback and slimy sculpin, and juveniles of large-bodied species were predominantly captured by electrofishing and minnow trapping gear. Condition for Arctic char, lake trout and lake whitefish were generally lower than for those species captured in lakes within the Project area. This was most obvious for lake whitefish where the mean condition ranged from 1.16 to 1.28 g/mm^3. Additional data for the fish community such as age, diet and tissue metals concentrations were sporadically reported through the study period.

4.3.2 Doris Outflow

Fish habitat and the fish community in the outflow stream from Doris Lake were studied over five field seasons. Studies took place in 1996, 1997, 2003, 2005 and 2009. This stream was studied from the outlet of Doris Lake down to its inlet at Little Roberts Lake. The fish community along the entirety of Doris Outflow consists of Arctic char, lake trout, lake whitefish, cisco and ninespine stickleback. A waterfall is located within this section of stream, which restricts Arctic char habitat use to the lower reaches of Doris Outflow. Adult and juvenile lake trout, lake whitefish and cisco were captured at the Doris Lake outlet in multiple years. Lake trout mean fork length ranged from 83 to 485 mm. Lake whitefish mean fork length ranged from 78 to 493 mm. Cisco mean fork length ranged from 165 to 245 mm. Arctic char mean fork length ranged from 170 to 223 mm demonstrating that the lower reaches of Doris Creek and its tributaries are mainly used by juvenile Arctic char as rearing habitat. The mean fork length of ninespine stickleback ranged from 38 to 55 mm over the study period. The condition of Arctic char and lake trout were reported in the 2003 and 2005 studies. The mean condition of Arctic char was 1.27 g/mm^3, while the mean condition of lake trout ranged from 1.07 to 1.27 g/mm^3. Sampling of fish for diet and tissue metals concentrations has not been conducted at the Doris Outflow.

4.3.3 P.O. Outflow

Fish community and fish habitat studies were conducted in 2006, 2007 and 2009. Ninespine stickleback were the only fish species captured using electrofishing and beach seining gear. The mean fork length of fish captured ranged from 36 to 48 mm, while the mean condition was 0.97 g/mm^3 reported in 2009. No other fish community variables were assessed at the P.O. Outflow.

4.3.4 Ogama Outflow

Ogama Outflow was studied for fish habitat and fish community in 1995, 1997, 2005, 2006, 2007 and 2009. The fish community was represented by four species: lake trout, lake whitefish, cisco and ninespine stickleback. Lake trout were the largest species captured, with mean fork lengths ranging from 389 to 535 mm. Ninespine stickle back were the smallest fish captured with mean fork lengths ranging from 43 to 56 mm. Lake whitefish displayed the highest mean condition at 1.56 g/mm^3, while lake trout had the lowest mean condition at 1.08 g/mm^3. Additional fish community variables such as diet and tissue metals were not examined in past studies.

4.3.5 Glenn Outflow

Glenn Outflow was studied in 1997, 2000, 2003 and 2009. The fish community was represented by Arctic char, lake trout, ninespine stickleback, slimy sculpin and starry flounder. Only one starry flounder was captured in 2009, while remaining species were captured in all study years. Adult and juvenile Arctic char and lake trout were captured from the Glenn Outflow. Mean fork lengths for Arctic char ranged from 205 to 820 mm, while mean fork lengths for lake trout ranged from 142 to 390 mm. Mean fork lengths of ninespine stickleback and slimy sculpin were 45 mm and 58 mm, respectively. Condition for Arctic char and lake trout were calculated in the 2003 study. Mean condition of Arctic char and lake trout were 1.17 g/mm^3 and 1.01 g/mm^3, respectively. Fish diet and tissue metals were not sampled from the Glenn Outflow in previous years.

4.3.6 Stream E09

Stream E09 was also previously assessed for the purposes of collecting baseline fish habitat and fish community data for future fish habitat compensation planning. Fish community assessments were conducted in 2003, 2004, 2005, 2007 and 2009 using electrofishing gear. The community consisted of Arctic char, lake trout and ninespine stickleback, with Arctic char as the most frequently captured species. All Arctic char and lake trout captured were juveniles, indicating that they used this stream as rearing habitat. Arctic char mean fork lengths ranged from 93 to 120 mm, while mean fork lengths of lake trout ranged from 99 to 193 mm. The mean fork length for ninespine stickleback was 33 mm in 2007. Mean condition of Arctic char and lake trout ranged from 0.98 to 1.08 g/mm^3 and from 0.90 to 1.20 g/mm^3, respectively. The mean age of Arctic char and lake trout captured in 2009 were 2.3 and 4.5 years, respectively. No additional fish community data was collected from Stream E09.

4.3.7 Roberts I/F1 (formerly Stream E03)

The fish community and fish habitat at Stream E03 was assessed in previous studies for the purpose of future fish habitat compensation planning. The fish community at this site consisted of Arctic char, lake trout, lake whitefish, cisco and ninespine stickleback. Adult lake trout, lake whitefish and cisco were captured. Lake trout had the largest mean fork length at 410 mm, while cisco were the smallest with a mean fork length of 206 mm. Arctic char were captured as juveniles with a mean fork length of 125 mm. Ninespine stickleback mean fork lengths ranged from 19 to 60 mm. Mean condition was relatively low for all species relative to other stream sites. Ninespine stickleback and Arctic char showed the lowest mean condition at 0.66 g/mm^3 and 0.77 g/mm^3, respectively. Lake trout and lake whitefish had the highest mean condition at 1.03 g/mm^3 and 1.12 g/mm^3, respectively. Fish in Stream E03 were not sampled for diet or tissue metals samples.

5. Summary

5. Summary

5.1 FISH HABITAT

Lakes were the predominant form of fish habitat in the Project area and supplied the greatest amount of perennial fish habitat. Lake habitat was evaluated using hydroacoustics and visual observation. Hydroacoustic methods were useful in assessing substrate in deepwater basins of lakes or for the assessment of substrate in very turbid lakes with low visibility (e.g., Doris Lake). Visual observations were used to assess fish habitat in the littoral zone of relatively clear lakes. Fines (e.g., silt clay or mud) were found to be the predominant substrate type in lakes in the Project area. Fine substrates were especially dominant at lakes in relatively close proximity to the ocean and for turbid lakes (e.g., Glenn and Doris lakes). Gillnet and hydroacoustic assessments conducted at Doris and Patch lakes showed concentrations of fish associated with deepwater habitat over substrates of mud or fines.

Large rivers in the Project area, such as the Koignuk and Angimajuq rivers, also supplied perennial habitat for fish. Substrate of the Koignuk River was predominantly fines, while the substrate of the Angimajuq site was predominately boulder and cobble. Many streams in the Project area were found to be ephemeral and supplied poor habitat. Outflow streams from lake sources were relatively larger and permanent (e.g., Glenn Outflow, Doris Outflow). These streams supplied relatively high quality habitat, especially for small-bodied fish species such as ninespine stickleback. Juvenile lake trout and Arctic char were also observed utilizing these large streams for rearing habitat. Ponds assessed in the Project area were non-fish-bearing and rated as poor habitat quality.

5.2 FISH COMMUNITY

The fish community of nine lakes, one river, 13 streams sites and two ponds were assessed in 2009. Large-bodied fish communities in lakes were assessed using RISC standard monofilament gillnets and with hydroacoustic gear at Doris and Patch lakes. Large river sites were assessed with a combination of RISC standard monofilament gillnets, minnow traps and electrofishing gear. The fish community of stream sites was primarily assessed using backpack electrofishing gear. A total of 224 gillnets sets were conducted, with 198 (173 RISC standard gillnets, 25 ¾" gillnets) sets in lakes and 26 sets at Koignuk River sites. Thus, approximately 200 hours of gillnetting effort were exerted on lakes and 25 hours of gillnetting effort on the Koignuk River. Minnow traps and electrofishing gear were used to assess the small-bodied fish community. A total of 142 minnow traps were deployed with 123 set in lakes and 19 set in at Koignuk River sites. Minnow traps were not set at stream sites due to shallow water or fast flow. This resulted in a total of 3,359 hours of minnow trapping effort conducted in the Project area. Minnow trapping effort was distributed as: 2,938 hours in lakes and 421 hours at Koignuk River sites. Electrofishing was primarily used in streams, ponds and along the shores of large river sites. A total of 27,577 seconds of electrofishing effort was exerted, with 23,365 seconds in streams, 3,563 seconds at Koignuk River sites and 2,486 seconds at pond sites.

This fishing effort resulted in the capture and sampling of 1,084 fish from water bodies in the Project area. Of this total, 989 were captured from lakes, 70 fish from streams and 25 fish from the Koignuk River. Fish communities of the Project area displayed very low species richness. A total of seven species were identified in the freshwater environment, including Arctic char, Arctic grayling, cisco, lake trout, lake whitefish, ninespine stickleback and slimy sculpin. Cisco, lake whitefish and lake trout represented the majority of fish captured. One starry flounder was captured from Glenn Outflow near the ocean estuary.

Hydroacoustic gear was used to estimate fish absolute abundance in Doris and Patch lakes. The total number of fish in Doris Lake was estimated at 55,806 with the 95% confidence limits ranging from 41,982 to 69,629. Gillnet and hydroacoustic assessment data showed that lake trout and cisco relative abundance and density increase with depth, while lake whitefish relative abundance was highest in shallow locations (0 to 5 m). The total number of fish in Patch Lake was estimated at 33,619 with 95% confidence limits ranging from 17,499 to 49,740. Hydroacoustic data showed that fish abundance increased with depth, particularly in the northwest portion of Patch Lake.

Aging analyses were conducted for Arctic char, lake trout, lake whitefish and cisco. The mean ages of lake trout ranged from 11 years to 21 years, while Arctic char ranged from 5 to 13 years. The eldest fish sampled was a 39 year old lake whitefish captured from Doris Lake.

Taxonomic analysis of stomach contents was conducted on a total of 49 lake trout and four lake whitefish stomachs. These analyses found prey items derived from both marine and freshwater sources. Fish and chironomids represented the main food items found in lake trout and lake whitefish stomachs. 'Marine' and freshwater isopods and amphipods were also found in relatively high abundance.

Lake trout muscle and liver tissue samples were analysed for total metal concentrations from Little Roberts, P.O., Windy and Reference A and B lakes. Mercury concentrations for all lake trout samples, both muscle and liver, were below the Health Canada guideline. The highest concentration of mercury observed in lake trout muscle tissue came from Reference Lake B, which had a mercury concentration of 0.361 mg/kg WW.

Historical information on fish and fish habitat from 1995 to 2007 was summarized and compared to the 2009 baseline information, and assist in Project planning, permitting and future environmental monitoring.

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Appendix 2.1-1

Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheet used to Assess Fish Habitat, Hope Bay Belt Project, 2009

Appendix 2.1-1. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheet Used to Assess Fish Habitat, Hope Bay Belt Project, 2009

Station ID: Survey Distance (m):	Survey Date (d/m/y): Survey Crew: Time:	Coordinates: 0m	Coordinates:
Temperature (^{o}C): ________ Channel Velocity (m/s): ________ Current Flow Conditions: ________ Discharge estimate (m^3/s): ________	Transparency: ________ Conductivity (µS/cm): ________ pH: ________	Comments: Weather:	

Hab Unit No.	Hab Type	Dist. fr start (m)	Length (m)	Slope (%)	Depth (m) Mean	Depth (m) Bank-full	Width (m) Mean	Width (m) Bank-full	Bed Material Sand (%)	Bed Material Gravel (%)	Bed Material Cobble (%)	Bed Material Boulder (%)	Bed Material Bedrock (%)	Pool Info Type	Pool Info Depth (m) Max	Pool Info Depth (m) Crest	Fish Passage Barriers Type	Fish Passage Barriers T/P
1																		
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		
11																		
12																		
13																		
14																		
15																		
16																		
17																		
18																		
19																		
20																		

Flow Conditions: H = High flow, M = Medium flow, L = Low flow
Habitat Unit: Under bankfull conditions: 0 - 2.5 m = > 1 m^2, 2.5 - 5 m = > 2 m^2, 5 - 10 m = > 4 m^2, 10 -15 m = > 6 m^2, 15 -20 = > 8 m^2, > 20 m = > 10 m^2
Hab Type: P = pool, G = glide, R = riffle, C = cascade, O = other
Dist. fr start: distance from beginning of the survey to the beginning of the habitat unit being surveyed
Pool Type: S = scour, D = dammed, U = unknown
Substrate: Sand (silt, clay, fine organic< 2 mm), Gravel (2 - 64 mm), Cobble (64 - 256 mm), Boulders (256 - 4000 mm), Bedrock (>4000 mm)
Fish Passage Barriers: IF = Impassible waterfall
BF = Boulder Field, passage through the boulder arrangement is not possible for fish
D = dry channel, no stream flow
NC = no distinct channel, water drains over land
N = no barrier to fish passage through the habitat unit
T/P: T = temporary, portion of open water season
P = Permanent, all year round

Overall Rating

Spawning: ________ **Rearing:** ______ **Adult Feeding:** ________ **Over-wintering:** _____ **Migration:** ________

Appendix 2.1-1. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheet Used to Assess Fish Habitat, Hope Bay Belt Project, 2009

Station ID:
Survey Date:
Survey Crew:
Survey Distance (m):

Hab Unit No.	Banks of Channel				Instream Cover							Riparian Cover (%)			Photos (Role #) (Photo #)
	L Bank Height (m)	R Bank Height (m)	L Bank Stab	R Bank Stab	Pool %	Boulder %	Instream Veg %	Overhang Veg %	Undercut Bank %	LWD %	SWD %	Canopy	LB	RB	
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															

Comments:

Banks of Channel (Stability): H = highly stable, S = stable, U = unstable

Appendix 2.2-1

Set Times, Retrieval Times and Locations for Gillnets, Hope Bay Belt Project, 2009

Engineers and Scientists

Appendix 2.2-1. Set Times, Retrieval Times and Locations for Gillnets, Hope Bay Belt Project, 2009

			Set		Retrieval		UTM 1		UTM 2		# of Fish
Water Body	Watershed	Set #	Time	Date	Time	Date	Easting	Northing	Easting	Northing	per Species
Doris Lake	Doris	1	9:00	7-Aug	9:38	7-Aug	433861	7559379	433768	7558778	2 LKWH, 7 LCIS
Doris Lake	Doris	2	9:20	7-Aug	9:59	7-Aug	433889	7558787	433974	7558721	3 LKWH, 16 LCIS
Doris Lake	Doris	3	10:05	7-Aug	10:40	7-Aug	433569	7558684	433674	7558520	3 LKTR, 5LKWH, 13 LCIS
Doris Lake	Doris	4	9:05	9-Aug	9:35	9-Aug	433626	7558612	433774	7558628	2 LKTR, 2 LKWH, 14 LCIS
Doris Lake	Doris	5	9:26	9-Aug	10:45	9-Aug	433818	7558673	433949	7558651	4 LKWH, 23 LCIS
Doris Lake	Doris	6	13:40	9-Aug	14:20	9-Aug	433567	7558505	433633	7558555	1 LKTR, 4 LKWH, 12 LCIS
Doris Lake	Doris	7	15:05	9-Aug	16:00	9-Aug	433335	7558281	433402	7558368	
Doris Lake	Doris	8	11:40	15-Aug	12:20	15-Aug	433448	7558075	433531	7558186	2 LKWH, 7 LCIS
Doris Lake	Doris	9	12:35	15-Aug	13:30	15-Aug	433591	7557810	433570	7557950	no catch
Doris Lake	Doris	10	13:40	15-Aug	14:45	15-Aug	433650	7557591	433710	7557680	
Doris Lake	Doris	11	14:55	15-Aug	15:45	15-Aug	433750	7557700	433880	7557770	
Doris Lake	Doris	12	15:50	15-Aug	16:55	15-Aug	434110	7557653	434196	7557750	
Doris Lake	Doris	13	9:50	16-Aug	10:30	16-Aug	433788	7557338	433888	7557409	1 LKTR, 7 LKWH, 10 LCIS
Doris Lake	Doris	14	10:50	16-Aug	11:35	16-Aug	433793	7557018	433789	7557132	4 LKWH, 6 LCIS
Doris Lake	Doris	15	12:55	16-Aug	13:40	16-Aug	433566	7557758	433676	7557790	2 LKTR, 7 LKWH, 5 LCIS
Doris Lake	Doris	16	13:55	16-Aug	15:00	16-Aug	433786	7557909	433846	7558030	1 LKTR, 8 LKWH, 14 LCIS
Doris Lake	Doris	17	15:30	16-Aug	16:10	16-Aug	434089	7558385	433990	7558451	2 LKWH, 7 LCIS
Doris Lake	Doris	18	16:25	16-Aug	17:00	16-Aug	433906	7558827	434008	7558897	1 LKTR, 8 LKWH, 5 LCIS
Doris Lake	Doris	19	9:20	17-Aug	10:00	17-Aug	433886	7559199	434001	7559199	5 LKWH, 12 LCIS
Doris Lake	Doris	20	10:35	17-Aug	11:15	17-Aug	433915	7558910	433987	7558970	2 LKTR, 5 LKWH, 5 LCIS
Doris Lake	Doris	21	11:35	17-Aug	12:20	17-Aug	434081	7558585	433980	7558522	2 LKTR, 4 LKWH, 16 LCIS
Doris Lake	Doris	22	13:10	17-Aug	13:55	17-Aug	434034	7558252	434139	7558232	1 LKTR, 5 LKWH, 24 LCIS
Doris Lake	Doris	23	14:25	17-Aug	15:00	17-Aug	434266	7557600	434155	7557607	2 LKTR, 3 LKWH, 18 LCIS
Doris Lake	Doris	24	15:50	17-Aug	16:40	17-Aug	435805	7557512	433934	7557564	4 LKTR, 8 LKWH, 15 LCIS
Doris Lake	Doris	25	9:15	18-Aug	9:55	18-Aug	434012	7558865	433970	7558759	
Doris Lake	Doris	26	10:00	18-Aug	10:45	18-Aug	433858	7559002	433767	7558909	
Doris Lake	Doris	27	12:00	18-Aug	12:50	18-Aug	433977	7559171	433857	7559061	
Doris Lake	Doris	28	14:30	18-Aug	15:51	18-Aug	434058	7558342	434041	7558232	
Doris Lake	Doris	29	15:30	18-Aug	16:15	18-Aug	433945	7558138	433815	7558064	
Doris Lake	Doris	30	16:40	18-Aug	17:40	18-Aug	433748	7558778	433660	7558894	
Doris Lake	Doris	31	9:25	18-Aug	9:55	18-Aug	434019	7559025	434043	7559096	no catch
Doris Lake	Doris	32	10:00	18-Aug	10:59	18-Aug	433971	7559163	434010	7559277	no catch
Doris Lake	Doris	33	10:25	18-Aug	12:15	18-Aug	434036	7558743	434086	7558794	1 LKWH
Doris Lake	Doris	34	12:10	18-Aug	13:35	18-Aug	433879	7558542	433956	7558638	no catch
Doris Lake	Doris	35	12:40	18-Aug	13:45	18-Aug	433736	7558741	433784	7558784	1 LKTR, 5 LCIS
Doris Lake	Doris	36	14:30	18-Aug	15:57	18-Aug	433651	7558510	433568	7558475	6 LCIS
Doris Lake	Doris	37	15:00	18-Aug	16:17	18-Aug	434114	7558472	434009	7558322	no catch
Doris Lake	Doris	38	16:10	18-Aug	17:02	18-Aug	433411	7558362	433720	7558322	no catch
Doris Lake	Doris	39	16:44	18-Aug	17:47	18-Aug	433939	7558323	433986	7558449	no catch
Doris Lake	Doris	40	8:50	19-Aug	9:40	19-Aug	433892	7557640	433763	7557600	14 LKWH, 16 LCIS
Doris Lake	Doris	41	12:20	19-Aug	13:05	19-Aug	433864	7557898	433844	7557786	1 LKTR, 3 LKWH, 16 LCIS
Doris Lake	Doris	42	13:40	19-Aug	14:26	19-Aug	433886	7557053	433899	7557177	2 LKTR, 7 LKWH, 32 LCIS
Doris Lake	Doris	43	15:00	19-Aug	16:00	19-Aug	433814	7557009	433692	7556935	2 LKTR, 2 LKWH, 16 LCIS
Doris Lake	Doris	44	16:25	19-Aug	17:10	19-Aug	433916	7556514	433775	7556459	1 LKWH, 15 LCIS
Doris Lake	Doris	45	8:30	19-Aug	9:15	19-Aug	433489	7558263	433475	7558106	no catch
Doris Lake	Doris	46	9:30	19-Aug	10:15	19-Aug	433718	7557744	433654	7557630	no catch
Doris Lake	Doris	47	9:30	19-Aug	10:30	19-Aug	433659	7557469	433716	7557431	no catch

Species code: ARCH = Arctic char, LCIS = cisco; LKTR = lake trout; LKWH = lake whitefish
Net Type: F = RISC standard floating, S = RISC standard sinking, 3/4 = 3-panel 3/4 inch sinking

Appendix 2.2-1. Set Times, Retrieval Times and Locations for Gillnets, Hope Bay Belt Project, 2009

			Set		Retrieval		UTM 1		UTM 2		# of Fish
Water Body	Watershed	Set #	Time	Date	Time	Date	Easting	Northing	Easting	Northing	per Species
Doris Lake	Doris	48	10:20	19-Aug	11:45	19-Aug	433825	7557354	433835	7557293	no catch
Doris Lake	Doris	49	10:35	19-Aug	11:55	19-Aug	433796	7557612	433821	7557557	no catch
Doris Lake	Doris	50	11:50	19-Aug	13:15	19-Aug	434278	7557542	434256	7557426	no catch
Doris Lake	Doris	51	12:00	19-Aug	14:25	19-Aug	433823	7557561	433376	7558289	no catch
Doris Lake	Doris	52	13:20	19-Aug	14:35	19-Aug	434219	7557933	434238	7557822	no catch
Doris Lake	Doris	53	14:30	19-Aug	16:00	19-Aug	434538	7558083	433518	7558006	no catch
Doris Lake	Doris	54	14:45	19-Aug	16:10	19-Aug	434435	7556488	434356	7556408	no catch
Doris Lake	Doris	55	16:05	19-Aug	17:15	19-Aug	434358	7556982	434361	7556909	no catch
Doris Lake	Doris	56	16:20	19-Aug	17:20	19-Aug	434202	7556598	434137	7556525	no catch
Doris Lake	Doris	57	8:45	20-Aug	10:55	20-Aug	434363	7555277	434356	7555204	
Doris Lake	Doris	58	8:55	20-Aug	9:35	20-Aug	434265	7555372	434207	7553264	
Doris Lake	Doris	59	11:50	20-Aug	12:35	20-Aug	434010	7555759	434071	7555637	
Doris Lake	Doris	60	11:55	20-Aug	14:15	20-Aug	434223	7554734	434239	7554661	
Doris Lake	Doris	61	12:50	20-Aug	15:35	20-Aug	434427	7555361	434505	7555279	
Doris Lake	Doris	62	13:55	20-Aug	14:40	20-Aug	434441	7554888	434464	7554758	
Doris Lake	Doris	63	14:20	20-Aug	17:15	20-Aug	434669	7554497	434677	7554436	
Doris Lake	Doris	64	15:00	20-Aug	15:45	20-Aug	434475	7554131	434587	7554116	
Doris Lake	Doris	65	16:00	20-Aug	16:55	20-Aug	434220	7554656	434332	7554613	
Doris Lake	Doris	66	11:30	21-Aug	12:30	21-Aug	434573	7555911	434508	7555979	1 LKTR, 4 LCIS
Doris Lake	Doris	67	12:40	21-Aug	13:45	21-Aug	434471	7555196	434411	7555281	3 LKTR, 5 LKWH, 1 LCIS
Doris Lake	Doris	68	13:00	21-Aug	16:45	21-Aug	434631	7556027	434671	7556082	no catch
Doris Lake	Doris	69	14:15	21-Aug	15:00	21-Aug	434288	7555924	434269	7556031	6 LKWH, 16 LCIS
Doris Lake	Doris	70	14:30	21-Aug	17:45	21-Aug	434076	7555915	434070	7555976	2 LCIS
Doris Lake	Doris	71	17:20	21-Aug	18:15	21-Aug	434297	7556208	434225	7556321	2 LKTR, 12 LKWH, 23 LCIS
Ogama Lake	Doris	1	12:07	30-Jul-09	13:14	30-Jul-09	436011	7554491	436032	7554380	1 LKTR, 7 LCIS
Ogama Lake	Doris	2	13:19	30-Jul-09	14:29	30-Jul-09	436122	7553827	436106	7553950	2 LKTR, 6 LKWH, 2 LCIS
Ogama Lake	Doris	3	13:46	30-Jul-09	15:25	30-Jul-09	436007	7554263	435918	7554215	1 LKWH, 3 LCIS
Ogama Lake	Doris	4	14:37	30-Jul-09	15:45	30-Jul-09	436203	7553879	436138	7553804	2 LKTR, 13 LKWH, 8 LCIS
Ogama Lake	Doris	5	12:45	31-Jul-09	13:45	31-Jul-09	435946	7554586	435902	7554678	1 LKTR
Ogama Lake	Doris	6	13:50	31-Jul-09	14:50	31-Jul-09	436018	7554476	435913	7554480	1 LKTR, 3 LCIS
Ogama Lake	Doris	7	15:05	31-Jul-09	16:09	31-Jul-09	436285	7553697	436388	7553748	1 LCIS
Ogama Lake	Doris	8	13:14	1-Aug-09	14:37	1-Aug-09	435969	7554174	436087	7554209	5 LCIS
Ogama Lake	Doris	9	13:46	1-Aug-09	15:02	1-Aug-09	435914	7554602	436026	7554633	11 LKWH, 14 LCIS
Ogama Lake	Doris	10	14:55	1-Aug-09	16:30	1-Aug-09	436040	7554091	435932	7554032	11 LCIS
Ogama Lake	Doris	11	15:30	1-Aug-09	17:15	1-Aug-09	436105	7553807	435989	7553737	11 LKWH, 11 LCIS
PO Lake	Doris	1	12:36	23-Jul-09	13:21	23-Jul-09	436475	7548772	436414	7548588	1 LKTR, 2 LKWH
PO Lake	Doris	2	14:20	23-Jul-09	15:13	23-Jul-09	436692	7548596	436817	7548618	1 LKTR, 1 LKWH
PO Lake	Doris	3	15:32	23-Jul-09	16:25	23-Jul-09	436670	7548287	436763	7548251	1 LKWH
PO Lake	Doris	4	10:18	23-Jul-09	11:22	23-Jul-09	436770	7548950	436593	7548979	1 LKTR, 1 LKWH
PO Lake	Doris	5	11:17	23-Jul-09	13:07	23-Jul-09	436616	7548346	436505	7548307	1 LKTR, 1 LKWH
PO Lake	Doris	6	12:18	23-Jul-09	13:23	23-Jul-09	436658	7548537	436551	7548485	3 LCIS
PO Lake	Doris	7	13:30	23-Jul-09	15:32	23-Jul-09	436695	7548130	436598	7548094	1 LKTR
PO Lake	Doris	8	14:13	23-Jul-09	16:02	23-Jul-09	436743	7548425	436830	7548344	1 LKTR, 3 LKWH, 6 LCIS
PO Lake	Doris	9	16:03	23-Jul-09	17:01	23-Jul-09	436519	7548870	436390	7548862	1 LKTR, 25 LCIS
PO Lake	Doris	10	14:25	27-Jul-09	16:15	27-Jul-09	436463	7548791	436373	7548846	3 LKTR, 36 LCIS
PO Lake	Doris	11	15:15	27-Jul-09	17:34	27-Jul-09	436531	7548640	436438	7548721	No catch
PO Lake	Doris	12	16:48	27-Jul-09	18:14	27-Jul-09	436564	7548130	436499	7548915	1 LKTR, 1 LKWH

Species code: ARCH = Arctic char, LCIS = cisco; LKTR = lake trout; LKWH = lake whitefish
Net Type: F = RISC standard floating, S = RISC standard sinking, 3/4 = 3-panel 3/4 inch sinking

Appendix 2.2-1. Set Times, Retrieval Times and Locations for Gillnets, Hope Bay Belt Project, 2009

			Set		Retrieval		UTM 1		UTM 2		# of Fish
Water Body	Watershed	Set #	Time	Date	Time	Date	Easting	Northing	Easting	Northing	per Species
PO Lake	Doris	13	10:00	27-Aug-09	10:50	27-Aug-09	436452	7548758	436394	7548854	1 LKTR
PO Lake	Doris	14	11:15	27-Aug-09	12:10	27-Aug-09	436540	7548776	436488	7548874	2 LKTR, 2 LKWH, 1 LCIS
PO Lake	Doris	15	12:25	27-Aug-09	13:15	27-Aug-09	436511	7548828	436385	7548822	2 LKTR
Patch Lake	Doris	1	10:15	23-Aug	11:10	23-Aug	434368	7551877	434149	7551859	1 LKTR
Patch Lake	Doris	2	10:55	23-Aug	12:00	23-Aug	434117	7551556	434209	7551648	2 LKTR
Patch Lake	Doris	3	11:15	23-Aug	12:20	23-Aug	434101	7551556	434091	7551356	1 LKTR
Patch Lake	Doris	4	12:20	23-Aug	14:15	23-Aug	434365	7551123	434405	7551275	No catch
Patch Lake	Doris	5	12:35	23-Aug	13:50	23-Aug	434241	7551000	434254	7551134	4 LKTR
Patch Lake	Doris	6	13:55	23-Aug	15:00	23-Aug	434869	7550827	434800	7550873	1 LKTR
Patch Lake	Doris	7	14:30	23-Aug	15:35	23-Aug	434180	7550484	434083	7550534	No catch
Patch Lake	Doris	8	15:20	23-Aug	16:25	23-Aug	433911	7550476	434830	7330454	No catch
Patch Lake	Doris	9	16:10	23-Aug	17:05	23-Aug	433999	7550867	433881	7550903	No catch
Patch Lake	Doris	10	16:35	23-Aug	17:50	23-Aug	433946	7550193	433947	7550303	No catch
Patch Lake	Doris	11	10:05	24-Aug	11:15	24-Aug	434492	7549331	434530	7549446	17 LKWH, 1 LCIS
Patch Lake	Doris	12	10:15	24-Aug	12:40	24-Aug	434814	7548945	434798	7549093	No catch
Patch Lake	Doris	13	12:30	24-Aug	13:20	24-Aug	434792	7549101	434623	7549085	2 LKTR
Patch Lake	Doris	14	12:45	24-Aug	14:25	24-Aug	434983	7549495	434932	7549446	No catch
Patch Lake	Doris	15	13:45	24-Aug	14:40	24-Aug	434673	7549291	434660	7549414	6 LKTR, 2 LCIS
Patch Lake	Doris	16	14:30	24-Aug	15:45	24-Aug	435424	7549875	435310	7549885	No catch
Patch Lake	Doris	17	15:40	24-Aug	16:30	24-Aug	434485	7549829	434572	7549854	4 LKTR, 9 LKWH, 3 LCIS
Patch Lake	Doris	18	15:55	24-Aug	17:30	24-Aug	435197	7549137	435189	7549274	1 LKTR
Patch Lake	Doris	19	9:00	25-Aug	10:20	25-Aug	435676	7548815	435686	7548942	No catch
Patch Lake	Doris	20	9:05	25-Aug	10:05	25-Aug	435414	7548765	435381	7548876	No catch
Patch Lake	Doris	21	10:15	25-Aug	11:35	25-Aug	435437	7548406	435543	7548457	3 LKWH
Patch Lake	Doris	22	10:30	25-Aug	13:15	25-Aug	435189	7548748	435090	7548685	No catch
Patch Lake	Doris	23	11:45	25-Aug	13:35	25-Aug	435520	7549065	435447	7548976	No catch
Patch Lake	Doris	24	13:10	25-Aug	15:20	25-Aug	435424	7548126	435298	7548135	1 LKTR
Patch Lake	Doris	25	13:45	25-Aug	14:45	25-Aug	435952	7548942	435893	7549039	No catch
Patch Lake	Doris	26	15:10	25-Aug	16:05	25-Aug	435554	7547887	435670	7547936	No catch
Patch Lake	Doris	27	15:25	25-Aug	16:50	25-Aug	435207	7547581	435331	7547718	No catch
Patch Lake	Doris	28	12:25	26-Aug	13:27	26-Aug	435572	7546969	435578	7547098	1 LKTR
Patch Lake	Doris	29	12:50	26-Aug	13:59	26-Aug	435764	7547723	435837	7547735	No catch
Patch Lake	Doris	30	13:55	26-Aug	14:50	26-Aug	436211	7546995	436316	7547056	No catch
Patch Lake	Doris	31	14:20	26-Aug	15:30	26-Aug	435326	7548541	435329	7548458	No catch
Patch Lake	Doris	32	15:10	26-Aug	16:35	26-Aug	435869	7547025	435953	7546901	No catch
Patch Lake	Doris	33	15:50	26-Aug	17:05	26-Aug	435534	7546396	435581	7546331	No catch
Patch Lake	Doris	34	16:55	26-Aug	17:45	26-Aug	435647	7547497	435606	7547392	1 LKTR, 1 LKWH
Patch Lake	Doris	35	17:20	26-Aug	18:15	26-Aug	435335	7547120	435264	7547101	No catch
Patch Lake	Doris	36	8:55	27-Aug	9:55	27-Aug	435421	7549549	435487	7549592	1 LKTR
Patch Lake	Doris	37	9:10	27-Aug	10:45	27-Aug	434738	7550239	434832	7550162	No catch
Patch Lake	Doris	38	10:10	27-Aug	11:15	27-Aug	434499	7550526	434560	7550437	No catch
Patch Lake	Doris	39	11:00	27-Aug	12:45	27-Aug	434574	7548983	434618	7548942	No catch
Patch Lake	Doris	40	11:30	27-Aug	12:35	27-Aug	435021	7549174	435108	7549098	No catch
Patch Lake	Doris	41	13:00	27-Aug	14:10	27-Aug	434679	7548896	434476	7548873	4 LKTR
Patch Lake	Doris	42	13:10	27-Aug	15:00	27-Aug	434522	7548942	434575	7548860	No catch
Patch Lake	Doris	43	14:20	27-Aug	15:25	27-Aug	434542	7548526	434446	7548425	1 LKTR
Patch Lake	Doris	44	15:00	27-Aug	16:35	27-Aug	434499	7548753	434973	7548743	No catch

Species code: ARCH = Arctic char, LCIS = cisco; LKTR = lake trout; LKWH = lake whitefish
Net Type: F = RISC standard floating, S = RISC standard sinking, 3/4 = 3-panel 3/4 inch sinking

Appendix 2.2-1. Set Times, Retrieval Times and Locations for Gillnets, Hope Bay Belt Project, 2009

			Set		Retrieval		UTM 1		UTM 2		# of Fish
Water Body	Watershed	Set #	Time	Date	Time	Date	Easting	Northing	Easting	Northing	per Species
Patch Lake	Doris	45	15:38	27-Aug	17:00	27-Aug	434864	7548926	434973	7548966	2 LKTR, 15 LKWH
Patch Lake	Doris	46	16:36	27-Aug	17:35	27-Aug	434663	7549856	434704	7549822	No catch
Little Roberts Lake	Doris/Roberts	1	10:45	28-Jul-09	11:31	28-Jul-09	434585	7562800	434521	7562910	1 ARCH and 1 LKTR escaped
Little Roberts Lake	Doris/Roberts	2	13:40	28-Jul-09	14:20	28-Jul-09	434588	7562842	434520	7562939	1 ARCH, 1 LKTR
Little Roberts Lake	Doris/Roberts	3	14:50	28-Jul-09	15:47	28-Jul-09	434631	7562859	434746	7562815	1 ARCH
Little Roberts Lake	Doris/Roberts	4	15:53	28-Jul-09	16:47	28-Jul-09	434611	7562715	434552	7562807	2 ARCH, 1 LKTR
Little Roberts Lake	Doris/Roberts	5	8:50	29-Jul-09	9:40	29-Jul-09	434573	7562841	434499	7562930	2 ARCH, 1 LKTR
Little Roberts Lake	Doris/Roberts	6	10:10	29-Jul-09	11:15	29-Jul-09	434623	7562871	434604	7562960	1 ARCH, 2 LKTR
Glenn Lake	Windy	1	13:40	31-Jul-09	14:38	31-Jul-09	431435	7563360	430506	7559290	No catch
Glenn Lake	Windy	2	14:07	31-Jul-09	15:30	31-Jul-09	429958	7560484	429943	7560398	No catch
Glenn Lake	Windy	3	15:02	31-Jul-09	18:00	31-Jul-09	430557	7559305	429950	7560931	3 LCIS
Glenn Lake	Windy	4	12:51	2-Aug-09	14:00	2-Aug-09	430573	7561614	430625	7561679	2 LKTR, 3LCIS
Glenn Lake	Windy	5	13:05	2-Aug-09	14:40	2-Aug-09	430411	7560659	430403	7560744	No catch
Glenn Lake	Windy	6	14:50	2-Aug-09	15:40	2-Aug-09	430453	7560276	430528	7560308	1 LKTR, 1 LCIS
Glenn Lake	Windy	7	15:19	2-Aug-09	16:25	2-Aug-09	430044	7561441	430043	7561361	No catch
Glenn Lake	Windy	8	15:53	2-Aug-09	17:00	2-Aug-09	430045	7561325	430559	7559842	6 LKTR
Glenn Lake	Windy	9	16:30	2-Aug-09	17:25	2-Aug-09	430286	7561645	430372	7561570	5 LCIS
Glenn Lake	Windy	10	9:20	3-Aug-09	10:24	3-Aug-09	430346	7560403	430472	7560434	4 LCIS
Glenn Lake	Windy	11	9:45	3-Aug-09	11:30	3-Aug-09	429970	7561204	429845	7561220	3 LKTR, 3 LCIS
Glenn Lake	Windy	12	10:40	3-Aug-09	12:08	3-Aug-09	430376	7559713	430279	7559669	2 LCIS
Glenn Lake	Windy	13	12:25	3-Aug-09	13:21	3-Aug-09	430379	7559254	430520	7559093	2 LKTR, 4 LCIS
Glenn Lake	Windy	14	12:45	3-Aug-09	14:00	3-Aug-09	429974	7558605	430083	7558585	2 LCIS
Glenn Lake	Windy	15	13:55	3-Aug-09	15:00	3-Aug-09	430503	7560319	430409	7560272	2 LKTR, 2 LCIS
Glenn Lake	Windy	16	14:30	3-Aug-09	15:40	3-Aug-09	429756	7561086	429805	7560969	1 LKTR, 2 LCIS
Glenn Lake	Windy	17	15:24	3-Aug-09	16:20	3-Aug-09	429907	7561318	429982	7561279	2 LCIS
Glenn Lake	Windy	18	8:45	3-Aug-09	9:30	3-Aug-09	430421	7559631	430338	7559628	1 LKTR, 2 LCIS
Glenn Lake	Windy	19	9:00	3-Aug-09	10:00	3-Aug-09	429853	7561229	429909	7561158	5 LCIS
Glenn Lake	Windy	20	9:45	3-Aug-09	10:37	3-Aug-09	430181	7559738	430097	7559718	1 LCIS
Glenn Lake	Windy	21	10:30	4-Aug-09	11:30	4-Aug-09	430256	7561488	430319	7561430	1 LKTR, 2 LCIS
Glenn Lake	Windy	22	11:00	4-Aug-09	12:02	4-Aug-09	430363	7561829	430477	7561790	1 LKTR, 2 LCIS
Windy Lake	Windy	1	8:50	28-Jul-09	9:50	28-Jul-09	432542	7550532	432582	7550441	1 LKTR, 1 LCIS
Windy Lake	Windy	2	9:30	28-Jul-09	10:40	28-Jul-09	432404	7550788	432381	7550628	No catch
Windy Lake	Windy	3	10:00	28-Jul-09	11:00	28-Jul-09	432388	7550484	432455	7550404	1 LCIS
Windy Lake	Windy	4	10:45	28-Jul-09	12:45	28-Jul-09	432532	7550376	432576	7550286	No catch
Windy Lake	Windy	5	11:15	28-Jul-09	13:15	28-Jul-09	431928	7550132	432011	7550071	2 LKTR, 11 LCIS
Windy Lake	Windy	6	12:50	28-Jul-09	14:50	28-Jul-09	432494	7549869	432439	7549931	5 LKTR, 7 LCIS
Windy Lake	Windy	7	13:30	28-Jul-09	16:00	28-Jul-09	431962	7549898	432062	7549890	3 LKTR, 16 LCIS
Windy Lake	Windy	8	15:00	28-Jul-09	16:50	28-Jul-09	431993	7549765	432097	7549731	1 LKTR
Windy Lake	Windy	9	14:10	29-Jul-09	15:30	29-Jul-09	431390	7551647	431457	7551554	12 LCIS
Windy Lake	Windy	10	14:40	29-Jul-09	16:40	29-Jul-09	431511	7551232	431569	7551135	2 LCIS
Windy Lake	Windy	11	16:55	29-Jul-09	17:50	29-Jul-09	431625	7550896	431586	7550978	2 LKTR, 10 LCIS
Reference Lake A	Reference A	1	12:22	21-Jul-09	13:23	21-Jul-09	448438	7559732	448552	7559777	No catch
Reference Lake A	Reference A	2	13:15	21-Jul-09	14:17	21-Jul-09	448740	7560034	448615	7559985	4 LKTR
Reference Lake A	Reference A	3	14:07	21-Jul-09	15:11	21-Jul-09	448710	7559638	448584	7559648	No catch
Reference Lake A	Reference A	4	15:08	21-Jul-09	16:10	21-Jul-09	448750	7559415	448622	7559450	3 LKTR
Reference Lake A	Reference A	5	15:31	21-Jul-09	17:08	21-Jul-09	448792	7559575	448760	7559455	No catch
Reference Lake A	Reference A	6	9:29	22-Jul-09	10:35	22-Jul-09	448972	7558230	449076	7558216	6 LKTR

Species code: ARCH = Arctic char, LCIS = cisco; LKTR = lake trout; LKWH = lake whitefish
Net Type: F = RISC standard floating, S = RISC standard sinking, 3/4 = 3-panel 3/4 inch sinking

Appendix 2.2-1. Set Times, Retrieval Times and Locations for Gillnets, Hope Bay Belt Project, 2009

			Set		Retrieval		UTM 1		UTM 2		# of Fish
Water Body	Watershed	Set #	Time	Date	Time	Date	Easting	Northing	Easting	Northing	per Species
Reference Lake A	Reference A	7	10:10	22-Jul-09	11:50	22-Jul-09	449525	7557801	449425	7557902	1 LKTR
Reference Lake A	Reference A	8	11:40	22-Jul-09	12:45	22-Jul-09	449292	7557868	449338	7557777	4 LKTR, 1 LKWH
Reference Lake A	Reference A	9	12:35	22-Jul-09	13:50	22-Jul-09	449009	7557619	448982	7557727	No catch
Reference Lake B	Reference B	1	15:20	23-Jul-09	16:30	23-Jul-09	424819	7532746	424769	7532664	3 LKTR
Reference Lake B	Reference B	2	15:45	23-Jul-09	15:10	23-Jul-09	424565	7532691	424528	7532583	3 ARCH, 6 LKTR
Reference Lake B	Reference B	3	10:30	26-Jul-09	11:30	26-Jul-09	423831	7530946	423927	7530932	6 LKTR
Reference Lake B	Reference B	4	11:05	26-Jul-09	12:30	26-Jul-09	423762	7531172	423878	7531101	No catch
Reference Lake B	Reference B	5	12:15	26-Jul-09	12:45	26-Jul-09	424117	7531186	424207	7531352	4 LKTR
Reference Lake B	Reference B	6	13:25	26-Jul-09	15:20	26-Jul-09	425849	7534811	425968	7534660	1 ARCH, 7 LKTR
Reference Lake B	Reference B	7	15:10	26-Jul-09	17:00	26-Jul-09	425896	7534926	426003	7534902	No catch
Koignuk River (north)	Koignuk	1	12:35	29-Aug	13:21	29-Aug	433263	7527897	433280	7527994	1 LKTR, 1 LKWH
Koignuk River (north)	Koignuk	2	13:35	29-Aug	14:33	29-Aug	433480	7527776	433378	7527794	1 LKTR, 4 LKWH
Koignuk River (north)	Koignuk	3	14:50	29-Aug	15:50	29-Aug	433429	7527323	433507	7527398	1 LKWH
Koignuk River (north)	Koignuk	4	16:05	29-Aug	17:21	29-Aug	433658	7526833	433689	7526938	5 LKTR, LKWH
Koignuk River (middle)	Koignuk	1	10:15	30-Aug	11:00	30-Aug	433745	7537391	433759	7537479	No catch
Koignuk River (middle)	Koignuk	2	11:10	30-Aug	12:25	30-Aug	433770	7537645	433791	7537749	No catch
Koignuk River (middle)	Koignuk	3	12:35	30-Aug	13:40	30-Aug	433702	7537980	433615	7537996	No catch
Koignuk River (middle)	Koignuk	4	13:50	30-Aug	15:00	30-Aug	–	–	433157	7537298	No catch
Koignuk River (middle)	Koignuk	5	15:05	30-Aug	16:20	30-Aug	433796	7537786	433757	7537879	No catch
Koignuk River (south)	Koignuk	1	12:55	5-Aug	13:55	5-Aug	431072	7546784	431079	7546774	No catch
Koignuk River (south)	Koignuk	2	13:05	5-Aug	14:00	5-Aug	431076	7546657	431049	7546705	No catch
Koignuk River (south)	Koignuk	3	14:00	5-Aug	15:05	5-Aug	431042	7546627	431070	7546630	No catch
Koignuk River (south)	Koignuk	4	14:10	5-Aug	15:13	5-Aug	431091	7546483	431043	7546508	No catch
Koignuk River (south)	Koignuk	5	15:10	5-Aug	16:00	5-Aug	431072	7546443	431039	7546446	No catch
Koignuk River (south)	Koignuk	6	15:17	5-Aug	16:05	5-Aug	431037	7546331	431071	7546351	No catch
Koignuk River (south)	Koignuk	7	16:08	5-Aug	16:55	5-Aug	431037	7546281	431015	7546262	No catch
Koignuk River (south)	Koignuk	8	16:10	5-Aug	17:00	5-Aug	431020	7546198	431002	7546143	No catch
Koignuk River (south)	Koignuk	9	9:10	6-Aug	9:52	6-Aug	431022	7546179	431004	7546153	No catch
Koignuk River (south)	Koignuk	10	9:20	6-Aug	10:02	6-Aug	431046	7546163	431023	7546117	1 LKTR
Koignuk River (south)	Koignuk	11	9:55	6-Aug	10:58	6-Aug	431030	7546041	431054	7546068	No catch
Koignuk River (south)	Koignuk	12	10:20	6-Aug	11:25	6-Aug	431091	7545972	431065	7545977	No catch
Koignuk River (south)	Koignuk	13	11:05	6-Aug	11:55	6-Aug	431092	7545935	431081	7545936	No catch
Koignuk River (south)	Koignuk	14	11:10	6-Aug	12:10	6-Aug	431156	7545802	431143	7545805	No catch
Koignuk River (south)	Koignuk	15	12:00	6-Aug	13:10	6-Aug	431293	7545813	431318	7545813	No catch
Koignuk River (south)	Koignuk	16	13:10	6-Aug	14:10	6-Aug	431063	7546791	431077	7546734	No catch
Koignuk River (south)	Koignuk	17	13:15	6-Aug	14:15	6-Aug	431101	7546801	431087	7546822	No catch

Species code: ARCH = Arctic char, LCIS = cisco; LKTR = lake trout; LKWH = lake whitefish
Net Type: F = RISC standard floating, S = RISC standard sinking, 3/4 = 3-panel 3/4 inch sinking

Species code: ARCH = Arctic char, LCIS = cisco; LKTR = lake trout; LKWH = lake whitefish
Net Type: F = RISC standard floating, S = RISC standard sinking, 3/4 = 3-panel 3/4 inch sinking

Appendix 2.2-2

Set Times, Retrieval Times and Locations for Minnow Traps, Hope Bay Belt Project, 2009

Engineers and Scientists

Appendix 2.2-2. Set Times, Retrieval Times, and Locations for Minnow Traps, Hope Bay Belt Project, 2009

			Set		Retrieval		UTM		# of Fish
Water Body	Basin	Set #	Time	Date	Time	Date	Easting	Northing	per Species
Doris Lake	Doris	1	16:00	6-Aug	8:41	7-Aug	433608	7558814	No catch
Doris Lake	Doris	2	16:04	6-Aug	8:43	7-Aug	433649	7558913	No catch
Doris Lake	Doris	3	16:08	6-Aug	8:45	7-Aug	433736	7558972	No catch
Doris Lake	Doris	4	16:12	6-Aug	8:47	7-Aug	433804	7559022	No catch
Doris Lake	Doris	5	16:16	6-Aug	8:49	7-Aug	433830	7559125	No catch
Doris Lake	Doris	6	16:20	6-Aug	8:51	7-Aug	433845	7559177	No catch
Doris Lake	Doris	7	16:24	6-Aug	8:53	7-Aug	433944	7559254	No catch
Doris Lake	Doris	8	16:28	6-Aug	8:55	7-Aug	433952	7559295	No catch
Doris Lake	Doris	9	16:32	6-Aug	8:57	7-Aug	433977	7559339	No catch
Doris Lake	Doris	10	16:36	6-Aug	8:59	7-Aug	434054	7559379	No catch
Doris Lake	Doris	11	9:30	16-Aug	8:45	17-Aug	433337	7558377	No catch
Doris Lake	Doris	12	9:30	16-Aug	8:45	17-Aug	433312	7558343	No catch
Doris Lake	Doris	13	9:35	16-Aug	8:45	17-Aug	433313	7558308	No catch
Doris Lake	Doris	14	9:36	16-Aug	8:45	17-Aug	433323	7558202	No catch
Doris Lake	Doris	15	9:38	16-Aug	8:45	17-Aug	433359	7558092	No catch
Doris Lake	Doris	16	9:40	16-Aug	8:45	17-Aug	433397	7557987	No catch
Doris Lake	Doris	17	9:42	16-Aug	8:50	17-Aug	433441	7557908	No catch
Doris Lake	Doris	18	9:43	16-Aug	8:50	17-Aug	433535	7557783	No catch
Doris Lake	Doris	19	9:05	17-Aug	8:45	18-Aug	434142	7558678	No catch
Doris Lake	Doris	20	9:06	17-Aug	8:45	18-Aug	434121	7558796	No catch
Doris Lake	Doris	21	9:07	17-Aug	8:45	18-Aug	434053	7558900	No catch
Doris Lake	Doris	22	9:07	17-Aug	8:45	18-Aug	434062	7558983	No catch
Doris Lake	Doris	23	9:09	17-Aug	8:45	18-Aug	434112	7559142	No catch
Doris Lake	Doris	24	9:10	17-Aug	8:45	18-Aug	434060	7559194	No catch
Doris Lake	Doris	25	9:12	17-Aug	8:50	18-Aug	434010	7559258	No catch
Doris Lake	Doris	26	9:13	17-Aug	8:50	18-Aug	433979	7559314	No catch
Doris Lake	Doris	27	8:45	18-Aug	8:50	19-Aug	434184	7558308	No catch
Doris Lake	Doris	28	8:45	18-Aug	8:50	19-Aug	434225	7558216	No catch
Doris Lake	Doris	29	8:47	18-Aug	8:45	19-Aug	434223	7558012	No catch
Doris Lake	Doris	30	8:50	18-Aug	8:45	19-Aug	434263	7557780	No catch
Doris Lake	Doris	31	8:51	18-Aug	8:45	19-Aug	434292	7557635	No catch
Doris Lake	Doris	32	8:58	18-Aug	8:50	19-Aug	434062	7559381	No catch
Doris Lake	Doris	33	8:59	18-Aug	8:50	19-Aug	434040	7559381	No catch
Doris Lake	Doris	34	9:00	18-Aug	8:55	19-Aug	433996	7558865	No catch
Doris Lake	Doris	35	9:05	19-Aug	8:05	20-Aug	434107	7559150	No catch
Doris Lake	Doris	36	9:05	19-Aug	8:06	20-Aug	434073	7559178	No catch
Doris Lake	Doris	37	9:06	19-Aug	8:06	20-Aug	434017	7559221	No catch
Doris Lake	Doris	38	9:07	19-Aug	8:07	20-Aug	434010	7559254	No catch
Doris Lake	Doris	39	9:07	19-Aug	8:09	20-Aug	434024	7559282	No catch
Doris Lake	Doris	40	9:08	19-Aug	8:10	20-Aug	433983	7559310	1 NSSB
Doris Lake	Doris	41	9:09	19-Aug	8:11	20-Aug	433948	7559273	No catch
Doris Lake	Doris	42	9:10	19-Aug	8:12	20-Aug	433919	7559260	No catch
Doris Lake	Doris	43	8:30	20-Aug	8:30	21-Aug	434685	7555911	No catch
Doris Lake	Doris	44	8:30	20-Aug	8:30	21-Aug	434719	7555862	No catch
Doris Lake	Doris	45	8:35	20-Aug	8:35	21-Aug	434744	7555909	No catch
Doris Lake	Doris	46	8:35	20-Aug	8:35	21-Aug	434770	7555929	No catch
Doris Lake	Doris	47	8:35	20-Aug	8:35	21-Aug	434748	7555973	No catch
Doris Lake	Doris	48	8:35	20-Aug	8:35	21-Aug	434724	7556029	No catch
Ogama Lake	Doris	3	11:18	30-Jul-09	14:30	31-Jul-09	436526	7553625	No catch
Ogama Lake	Doris	4	11:20	30-Jul-09	14:30	31-Jul-09	436551	7553302	No catch
Ogama Lake	Doris	5	11:25	30-Jul-09	14:30	31-Jul-09	436684	7552001	No catch
Ogama Lake	Doris	6	11:31	30-Jul-09	14:40	31-Jul-09	436491	7551446	No catch
Ogama Lake	Doris	7	11:43	30-Jul-09	14:25	31-Jul-09	435709	7555023	No catch
Ogama Lake	Doris	8	11:50	30-Jul-09	14:30	31-Jul-09	435577	7555203	No catch
Ogama Lake	Doris	9	11:54	30-Jul-09	14:34	31-Jul-09	436063	7554671	No catch

Fish Species Codes: ARCH = Arctic char;
NSSB = ninespine stickleback;
SLSC = slimy sculpin

Appendix 2.2-2. Set Times, Retrieval Times, and Locations for Minnow Traps, Hope Bay Belt Project, 2009

			Set		Retrieval		UTM		# of Fish
Water Body	**Basin**	**Set #**	**Time**	**Date**	**Time**	**Date**	**Easting**	**Northing**	**per Species**
P.O. Lake	Doris	1	11:51	23-Jul-09	14:43	24-Jul-09	436435	7549924	17 NSSB
P.O. Lake	Doris	2	11:57	23-Jul-09	14:40	24-Jul-09	436662	7550141	53 NSSB
P.O. Lake	Doris	3	12:00	23-Jul-09	14:37	24-Jul-09	436709	7549731	No catch
P.O. Lake	Doris	4	12:03	23-Jul-09	14:25	24-Jul-09	436772	7549349	20 NSSB
P.O. Lake	Doris	5	12:07	23-Jul-09	14:19	24-Jul-09	436837	7548641	38 NSSB
P.O. Lake	Doris	6	12:12	23-Jul-09	13:57	24-Jul-09	436751	7547843	3 NSSB
P.O. Lake	Doris	7	12:17	23-Jul-09	13:49	24-Jul-09	436527	7548071	41 NSSB
P.O. Lake	Doris	8	12:19	23-Jul-09	10:56	24-Jul-09	436396	7548258	22 NNSB
P.O. Lake	Doris	9	12:21	23-Jul-09	10:52	24-Jul-09	436470	7548447	3 NSSB
P.O. Lake	Doris	10	12:25	23-Jul-09	10:25	24-Jul-09	436362	7548880	34 NSSB
Little Roberts Lake	Doris/Roberts	1	10:55	28-Jul-09	10:39	28-Jul-09	434543	7562969	No catch
Little Roberts Lake	Doris/Roberts	2	11:00	28-Jul-09	10:40	28-Jul-09	434627	7562984	1 NSSB
Little Roberts Lake	Doris/Roberts	3	11:02	28-Jul-09	10:45	28-Jul-09	434770	7562864	No catch
Little Roberts Lake	Doris/Roberts	4	11:05	28-Jul-09	11:00	28-Jul-09	434798	7562842	No catch
Little Roberts Lake	Doris/Roberts	5	11:07	28-Jul-09	11:00	28-Jul-09	434808	7562697	No catch
Little Roberts Lake	Doris/Roberts	6	11:09	28-Jul-09	11:00	28-Jul-09	434646	7562677	No catch
Little Roberts Lake	Doris/Roberts	7	11:10	28-Jul-09	11:00	28-Jul-09	434564	7562656	No catch
Little Roberts Lake	Doris/Roberts	8	11:11	28-Jul-09	11:00	28-Jul-09	434538	7562755	2 NSSB
Little Roberts Lake	Doris/Roberts	9	11:14	28-Jul-09	11:00	28-Jul-09	434452	7562972	No catch
Glenn Lake	Windy	1	14:00	31-Jul-09	14:00	1-Aug-09	430661	7558808	No catch
Glenn Lake	Windy	2	14:00	31-Jul-09	14:00	1-Aug-09	430554	7558768	No catch
Glenn Lake	Windy	3	14:00	31-Jul-09	14:00	1-Aug-09	430372	7558522	No catch
Glenn Lake	Windy	4	14:00	31-Jul-09	14:00	1-Aug-09	430019	7557889	No catch
Glenn Lake	Windy	5	14:00	31-Jul-09	14:00	1-Aug-09	429916	7557846	No catch
Glenn Lake	Windy	6	14:00	31-Jul-09	14:00	1-Aug-09	429866	7558344	No catch
Glenn Lake	Windy	7	14:00	31-Jul-09	14:00	1-Aug-09	429966	7558770	No catch
Glenn Lake	Windy	8	14:00	31-Jul-09	14:00	1-Aug-09	430325	7559366	1 SLSC
Glenn Lake	Windy	9	14:00	31-Jul-09	14:00	1-Aug-09	430227	7559639	No catch
Glenn Lake	Windy	10	14:20	31-Jul-09	14:20	1-Aug-09	430227	7559639	No catch
Windy Lake	Windy	1	17:05	27-Jul-09	17:05	28-Jul-09	432597	7550480	1 NSSB
Windy Lake	Windy	2	17:05	27-Jul-09	17:05	28-Jul-09	432627	7550146	No catch
Windy Lake	Windy	3	17:05	27-Jul-09	17:05	28-Jul-09	432529	7549857	No catch
Windy Lake	Windy	4	17:05	27-Jul-09	17:05	28-Jul-09	432174	7549668	No catch
Windy Lake	Windy	5	17:05	27-Jul-09	17:05	28-Jul-09	431983	7549754	No catch
Windy Lake	Windy	6	17:05	27-Jul-09	17:05	28-Jul-09	431953	7549831	No catch
Windy Lake	Windy	7	17:05	27-Jul-09	17:05	28-Jul-09	431802	7550249	No catch
Windy Lake	Windy	8	17:05	27-Jul-09	17:05	28-Jul-09	431711	7550406	No catch
Windy Lake	Windy	9	17:05	27-Jul-09	17:05	28-Jul-09	431608	7550616	No catch
Windy Lake	Windy	10	17:35	27-Jul-09	17:35	28-Jul-09	431582	7550842	No catch
Reference Lake A	Reference A	1	8:20	22-Jul-09	10:45	23-Jul-09	448849	7559586	No catch
Reference Lake A	Reference A	2	8:30	22-Jul-09	10:50	23-Jul-09	449185	7558461	No catch
Reference Lake A	Reference A	3	8:35	22-Jul-09	11:30	23-Jul-09	449383	7558195	No catch
Reference Lake A	Reference A	4	8:45	22-Jul-09	11:30	23-Jul-09	449646	7557716	7 NSSB
Reference Lake A	Reference A	5	8:50	22-Jul-09	11:30	23-Jul-09	449742	7557493	No catch
Reference Lake A	Reference A	6	9:00	22-Jul-09	11:30	23-Jul-09	448742	7557200	No catch
Reference Lake A	Reference A	7	9:05	22-Jul-09	11:30	23-Jul-09	449771	7557847	No catch
Reference Lake A	Reference A	12	9:30	22-Jul-09	10:35	23-Jul-09	449084	7558272	No catch
Reference Lake A	Reference A	13	9:35	22-Jul-09	10:35	23-Jul-09	449048	7558370	No catch
Reference Lake A	Reference A	14	9:40	22-Jul-09	10:35	23-Jul-09	448851	7558613	No catch
Reference Lake A	Reference A	15	9:42	22-Jul-09	10:35	23-Jul-09	448729	7558732	No catch
Reference Lake B	Reference B	1	16:00	23-Jul-09	17:30	24-Jul-09	424888	7532751	1 SLSC, 1 NSSB
Reference Lake B	Reference B	2	16:05	23-Jul-09	17:30	24-Jul-09	424868	7533150	1 ARCH, 1 SLSC
Reference Lake B	Reference B	3	16:10	23-Jul-09	17:30	24-Jul-09	424633	7534096	37 NSSB
Reference Lake B	Reference B	4	16:12	23-Jul-09	17:30	24-Jul-09	425849	7534193	8 NSSB
Reference Lake B	Reference B	5	16:15	23-Jul-09	17:30	24-Jul-09	425850	7534733	1 NSSB

Fish Species Codes: ARCH = Arctic char;
NSSB = ninespine stickleback;
SLSC = slimy sculpin

Appendix 2.2-2. Set Times, Retrieval Times, and Locations for Minnow Traps, Hope Bay Belt Project, 2009

			Set		Retrieval		UTM		# of Fish
Water Body	Basin	Set #	Time	Date	Time	Date	Easting	Northing	per Species
Reference Lake B	Reference B	6	16:20	23-Jul-09	17:30	24-Jul-09	425824	7534913	7 NSSB
Reference Lake B	Reference B	7	16:23	23-Jul-09	17:30	24-Jul-09	424909	7535155	19 NSSB
Reference Lake B	Reference B	8	16:25	23-Jul-09	17:30	24-Jul-09	426058	7534767	No catch
Reference Lake B	Reference B	9	16:25	23-Jul-09	17:30	24-Jul-09	423937	7530570	No catch
Reference Lake B	Reference B	10	16:25	23-Jul-09	17:30	24-Jul-09	423839	7530590	No catch
Koignuk River (north)	Koignuk	1	14:05	4-Aug	10:00	5-Aug	429658	7554677	No catch
Koignuk River (north)	Koignuk	2	14:06	4-Aug	10:05	5-Aug	429644	7554666	No catch
Koignuk River (north)	Koignuk	3	14:07	4-Aug	10:10	5-Aug	429648	7554688	No catch
Koignuk River (north)	Koignuk	4	14:09	4-Aug	10:15	5-Aug	429646	7554730	No catch
Koignuk River (north)	Koignuk	5	14:10	4-Aug	10:20	5-Aug	429642	7554758	No catch
Koignuk River (north)	Koignuk	6	14:13	4-Aug	10:22	5-Aug	429569	7554732	No catch
Koignuk River (north)	Koignuk	7	14:15	4-Aug	10:24	5-Aug	429622	7554834	No catch
Koignuk River (north)	Koignuk	8	14:19	4-Aug	10:27	5-Aug	429628	7554839	No catch
Koignuk River (north)	Koignuk	9	14:21	4-Aug	10:30	5-Aug	429591	7554775	No catch
Koignuk River (south)	Koignuk	1	13:30	5-Aug	13:30	6-Aug	431025	7546666	No catch
Koignuk River (south)	Koignuk	2	13:30	5-Aug	13:30	6-Aug	431022	7546678	7 NSSB
Koignuk River (south)	Koignuk	3	13:30	5-Aug	13:30	6-Aug	431024	7546698	No catch
Koignuk River (south)	Koignuk	4	13:30	5-Aug	13:30	6-Aug	431029	7546724	1 NSSB
Koignuk River (south)	Koignuk	5	13:30	5-Aug	13:30	6-Aug	431043	7546773	No catch
Koignuk River (south)	Koignuk	6	13:30	5-Aug	13:30	6-Aug	431065	7546810	No catch
Koignuk River (south)	Koignuk	7	13:30	5-Aug	13:30	6-Aug	431147	7546815	No catch
Koignuk River (south)	Koignuk	8	13:30	5-Aug	13:30	6-Aug	431169	7546822	No catch
Koignuk River (south)	Koignuk	9	13:30	5-Aug	13:30	6-Aug	431111	7546784	1 SLSC
Koignuk River (south)	Koignuk	10	13:30	5-Aug	13:30	6-Aug	431082	7546699	No catch

Fish Species Codes: ARCH = Arctic char; NSSB = ninespine stickleback; SLSC = slimy sculpin

Fish Species Codes: ARCH = Arctic char;
NSSB = ninespine stickleback;
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Appendix 2.2-3

Quality Control Tests of Fish Tissue Metal Concentrations, Hope Bay Belt Project, 2009

Engineers and Scientists

Appendix 2.2-3. Quality Control Tests of Fish Tissue Metal Concentrations, Hope Bay Belt Project, 2009

Matrix	QC Type	Analyte	QC Spl. No.	Reference	Result	Target	Units	%	Limits	Qualifier
Tissue	CRM	Arsenic (As)-Total	WG1002057-6	VA-NRC-TORT2	23.2	21.6	mg/kg wwt	108	83-108	RM-H
Tissue	CRM	Cadmium (Cd)-Total	WG1002057-6	VA-NRC-TORT2	29.7	26.7	mg/kg wwt	111	91-122	
Tissue	CRM	Copper (Cu)-Total	WG1002057-6	VA-NRC-TORT2	102	106	mg/kg wwt	97	80-108	
Tissue	CRM	Lead (Pb)-Total	WG1002057-6	VA-NRC-TORT2	0.287	0.350	mg/kg wwt	82	67-141	
Tissue	CRM	Manganese (Mn)-Total	WG1002057-6	VA-NRC-TORT2	13.6	13.6	mg/kg wwt	100	81-110	
Tissue	CRM	Mercury (Hg)-Total	WG1002057-6	VA-NRC-TORT2	0.250	0.270	mg/kg wwt	93	85-115	
Tissue	CRM	Molybdenum (Mo)-Total	WG1002057-6	VA-NRC-TORT2	1.09	0.950	mg/kg wwt	115	87-115	RM-H
Tissue	CRM	Nickel (Ni)-Total	WG1002057-6	VA-NRC-TORT2	2.46	2.50	mg/kg wwt	98	75-109	
Tissue	CRM	Selenium (Se)-Total	WG1002057-6	VA-NRC-TORT2	6.84	5.63	mg/kg wwt	122	96-124	
Tissue	CRM	Strontium (Sr)-Total	WG1002057-6	VA-NRC-TORT2	44.3	45.2	mg/kg wwt	98	77-111	
Tissue	CRM	Vanadium (V)-Total	WG1002057-6	VA-NRC-TORT2	1.92	1.64	mg/kg wwt	117	90-125	
Tissue	CRM	Zinc (Zn)-Total	WG1002057-6	VA-NRC-TORT2	194	180	mg/kg wwt	108	84-118	
Tissue	CRM	Arsenic (As)-Total	WG1002514-4	VA-NRC-TORT2	22.6	21.6	mg/kg wwt	105	83-108	
Tissue	CRM	Cadmium (Cd)-Total	WG1002514-4	VA-NRC-TORT2	28.4	26.7	mg/kg wwt	106	91-122	
Tissue	CRM	Copper (Cu)-Total	WG1002514-4	VA-NRC-TORT2	98.5	106	mg/kg wwt	93	80-108	
Tissue	CRM	Lead (Pb)-Total	WG1002514-4	VA-NRC-TORT2	0.291	0.350	mg/kg wwt	83	67-141	
Tissue	CRM	Manganese (Mn)-Total	WG1002514-4	VA-NRC-TORT2	13.2	13.6	mg/kg wwt	97	81-110	
Tissue	CRM	Mercury (Hg)-Total	WG1002514-4	VA-NRC-TORT2	0.263	0.270	mg/kg wwt	97	85-115	
Tissue	CRM	Molybdenum (Mo)-Total	WG1002514-4	VA-NRC-TORT2	1.08	0.950	mg/kg wwt	114	87-115	
Tissue	CRM	Nickel (Ni)-Total	WG1002514-4	VA-NRC-TORT2	2.31	2.50	mg/kg wwt	92	75-109	
Tissue	CRM	Selenium (Se)-Total	WG1002514-4	VA-NRC-TORT2	6.86	5.63	mg/kg wwt	122	96-124	
Tissue	CRM	Strontium (Sr)-Total	WG1002514-4	VA-NRC-TORT2	41.7	45.2	mg/kg wwt	92	77-111	
Tissue	CRM	Vanadium (V)-Total	WG1002514-4	VA-NRC-TORT2	1.99	1.64	mg/kg wwt	121	90-125	
Tissue	CRM	Zinc (Zn)-Total	WG1002514-4	VA-NRC-TORT2	192	180	mg/kg wwt	107	84-118	
Tissue	CRM	Arsenic (As)-Total	WG1002890-5	VA-NRC-TORT2	24.3	21.6	mg/kg wwt	112	83-108	RM-H
Tissue	CRM	Cadmium (Cd)-Total	WG1002890-5	VA-NRC-TORT2	30.8	26.7	mg/kg wwt	115	91-122	
Tissue	CRM	Copper (Cu)-Total	WG1002890-5	VA-NRC-TORT2	105	106	mg/kg wwt	99	80-108	
Tissue	CRM	Manganese (Mn)-Total	WG1002890-5	VA-NRC-TORT2	13.9	13.6	mg/kg wwt	102	81-110	
Tissue	CRM	Mercury (Hg)-Total	WG1002890-5	VA-NRC-TORT2	0.265	0.270	mg/kg wwt	98	85-115	
Tissue	CRM	Molybdenum (Mo)-Total	WG1002890-5	VA-NRC-TORT2	1.12	0.950	mg/kg wwt	118	87-115	RM-H
Tissue	CRM	Nickel (Ni)-Total	WG1002890-5	VA-NRC-TORT2	2.45	2.50	mg/kg wwt	98	75-109	
Tissue	CRM	Selenium (Se)-Total	WG1002890-5	VA-NRC-TORT2	6.93	5.63	mg/kg wwt	123	96-124	
Tissue	CRM	Strontium (Sr)-Total	WG1002890-5	VA-NRC-TORT2	43.4	45.2	mg/kg wwt	96	77-111	
Tissue	CRM	Vanadium (V)-Total	WG1002890-5	VA-NRC-TORT2	1.94	1.64	mg/kg wwt	118	90-125	

Qualifier Description

MB	*Method Blank*
CRM	*Comparison with Reference Material*
RM-H	*Reference Material recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.*
MB-LOR	*Method Blank exceeds ALS data quality objective (DQO). LORs adjusted for samples with positive hits below 5 times blank level.*

Appendix 2.2-3. Quality Control Tests of Fish Tissue Metal Concentrations, Hope Bay Belt Project, 2009

Matrix	QC Type	Analyte	QC Spl. No.	Reference	Result	Target	Units	%	Limits	Qualifier
Tissue	CRM	Zinc (Zn)-Total	WG1002890-5	VA-NRC-TORT2	203	180	mg/kg wwt	113	84-118	
Tissue	MB	Aluminum (Al)-Total	WG1002057-1		<2.0	<2	mg/kg wwt	-	2	
Tissue	MB	Antimony (Sb)-Total	WG1002057-1		<0.010	<0.01	mg/kg wwt	-	0.01	
Tissue	MB	Arsenic (As)-Total	WG1002057-1		<0.010	<0.01	mg/kg wwt	-	0.01	
Tissue	MB	Barium (Ba)-Total	WG1002057-1		<0.010	<0.01	mg/kg wwt	-	0.01	
Tissue	MB	Beryllium (Be)-Total	WG1002057-1		<0.10	<0.1	mg/kg wwt	-	0.1	
Tissue	MB	Bismuth (Bi)-Total	WG1002057-1		<0.030	<0.03	mg/kg wwt	-	0.03	
Tissue	MB	Cadmium (Cd)-Total	WG1002057-1		<0.0050	<0.005	mg/kg wwt	-	0.005	
Tissue	MB	Calcium (Ca)-Total	WG1002057-1		<2.0	<2	mg/kg wwt	-	2	
Tissue	MB	Chromium (Cr)-Total	WG1002057-1		<0.10	<0.1	mg/kg wwt	-	0.1	
Tissue	MB	Cobalt (Co)-Total	WG1002057-1		<0.020	<0.02	mg/kg wwt	-	0.02	
Tissue	MB	Copper (Cu)-Total	WG1002057-1		<0.010	<0.01	mg/kg wwt	-	0.01	
Tissue	MB	Lead (Pb)-Total	WG1002057-1		<0.020	<0.02	mg/kg wwt	-	0.02	
Tissue	MB	Lithium (Li)-Total	WG1002057-1		<0.10	<0.1	mg/kg wwt	-	0.1	
Tissue	MB	Magnesium (Mg)-Total	WG1002057-1		<1.0	<1	mg/kg wwt	-	1	
Tissue	MB	Manganese (Mn)-Total	WG1002057-1		0.012	<0.01	mg/kg wwt	-	0.01	MB-LOR
Tissue	MB	Mercury (Hg)-Total	WG1002057-1		<0.0010	<0.001	mg/kg wwt	-	0.001	
Tissue	MB	Molybdenum (Mo)-Total	WG1002057-1		<0.010	<0.01	mg/kg wwt	-	0.01	
Tissue	MB	Nickel (Ni)-Total	WG1002057-1		<0.10	<0.1	mg/kg wwt	-	0.1	
Tissue	MB	Selenium (Se)-Total	WG1002057-1		<0.20	<0.2	mg/kg wwt	-	0.2	
Tissue	MB	Strontium (Sr)-Total	WG1002057-1		<0.010	<0.01	mg/kg wwt	-	0.01	
Tissue	MB	Thallium (Tl)-Total	WG1002057-1		<0.010	<0.01	mg/kg wwt	-	0.01	
Tissue	MB	Tin (Sn)-Total	WG1002057-1		<0.050	<0.05	mg/kg wwt	-	0.05	
Tissue	MB	Uranium (U)-Total	WG1002057-1		<0.0020	<0.002	mg/kg wwt	-	0.002	
Tissue	MB	Vanadium (V)-Total	WG1002057-1		<0.10	<0.1	mg/kg wwt	-	0.1	
Tissue	MB	Zinc (Zn)-Total	WG1002057-1		<0.10	<0.1	mg/kg wwt	-	0.1	
Tissue	MB	Aluminum (Al)-Total	WG1002057-2		<2.0	<2	mg/kg wwt	-	2	
Tissue	MB	Antimony (Sb)-Total	WG1002057-2		<0.010	<0.01	mg/kg wwt	-	0.01	
Tissue	MB	Arsenic (As)-Total	WG1002057-2		<0.010	<0.01	mg/kg wwt	-	0.01	
Tissue	MB	Barium (Ba)-Total	WG1002057-2		<0.010	<0.01	mg/kg wwt	-	0.01	
Tissue	MB	Beryllium (Be)-Total	WG1002057-2		<0.10	<0.1	mg/kg wwt	-	0.1	
Tissue	MB	Bismuth (Bi)-Total	WG1002057-2		<0.030	<0.03	mg/kg wwt	-	0.03	
Tissue	MB	Cadmium (Cd)-Total	WG1002057-2		<0.0050	<0.005	mg/kg wwt	-	0.005	
Tissue	MB	Calcium (Ca)-Total	WG1002057-2		<2.0	<2	mg/kg wwt	-	2	

Qualifier Description
MB *Method Blank*
CRM *Comparison with Reference Material*
RM-H *Reference Material recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.*
MB-LOR *Method Blank exceeds ALS data quality objective (DQO). LORs adjusted for samples with positive hits below 5 times blank level.*

Appendix 2.2-3. Quality Control Tests of Fish Tissue Metal Concentrations, Hope Bay Belt Project, 2009

Matrix	QC Type	Analyte	QC Spl. No.	Reference	Result	Target	Units	%	Limits	Qualifier
Tissue	MB	Chromium (Cr)-Total	WG1002057-2		<0.10	<0.1	mg/kg wwt	-	0.1	
Tissue	MB	Cobalt (Co)-Total	WG1002057-2		<0.020	<0.02	mg/kg wwt	-	0.02	
Tissue	MB	Copper (Cu)-Total	WG1002057-2		0.074	<0.01	mg/kg wwt	-	0.01	MB-LOR
Tissue	MB	Lead (Pb)-Total	WG1002057-2		<0.020	<0.02	mg/kg wwt	-	0.02	
Tissue	MB	Lithium (Li)-Total	WG1002057-2		<0.10	<0.1	mg/kg wwt	-	0.1	
Tissue	MB	Magnesium (Mg)-Total	WG1002057-2		<1.0	<1	mg/kg wwt	-	1	
Tissue	MB	Manganese (Mn)-Total	WG1002057-2		0.011	<0.01	mg/kg wwt	-	0.01	MB-LOR
Tissue	MB	Mercury (Hg)-Total	WG1002057-2		<0.0010	<0.001	mg/kg wwt	-	0.001	
Tissue	MB	Molybdenum (Mo)-Total	WG1002057-2		<0.010	<0.01	mg/kg wwt	-	0.01	
Tissue	MB	Nickel (Ni)-Total	WG1002057-2		<0.10	<0.1	mg/kg wwt	-	0.1	
Tissue	MB	Tin (Sn)-Total	WG1002057-2		<0.050	<0.05	mg/kg wwt	-	0.05	
Tissue	MB	Uranium (U)-Total	WG1002057-2		<0.0020	<0.002	mg/kg wwt	-	0.002	
Tissue	MB	Vanadium (V)-Total	WG1002057-2		<0.10	<0.1	mg/kg wwt	-	0.1	
Tissue	MB	Zinc (Zn)-Total	WG1002057-2		<0.10	<0.1	mg/kg wwt	-	0.1	
Tissue	MB	Aluminum (Al)-Total	WG1002514-1		<2.0	<2	mg/kg wwt	-	2	
Tissue	MB	Antimony (Sb)-Total	WG1002514-1		<0.010	<0.01	mg/kg wwt	-	0.01	
Tissue	MB	Arsenic (As)-Total	WG1002514-1		<0.010	<0.01	mg/kg wwt	-	0.01	
Tissue	MB	Barium (Ba)-Total	WG1002514-1		<0.010	<0.01	mg/kg wwt	-	0.01	
Tissue	MB	Beryllium (Be)-Total	WG1002514-1		<0.10	<0.1	mg/kg wwt	-	0.1	
Tissue	MB	Bismuth (Bi)-Total	WG1002514-1		<0.030	<0.03	mg/kg wwt	-	0.03	
Tissue	MB	Cadmium (Cd)-Total	WG1002514-1		<0.0050	<0.005	mg/kg wwt	-	0.005	
Tissue	MB	Calcium (Ca)-Total	WG1002514-1		<2.0	<2	mg/kg wwt	-	2	
Tissue	MB	Chromium (Cr)-Total	WG1002514-1		<0.10	<0.1	mg/kg wwt	-	0.1	
Tissue	MB	Cobalt (Co)-Total	WG1002514-1		<0.020	<0.02	mg/kg wwt	-	0.02	
Tissue	MB	Copper (Cu)-Total	WG1002514-1		<0.010	<0.01	mg/kg wwt	-	0.01	
Tissue	MB	Lead (Pb)-Total	WG1002514-1		<0.020	<0.02	mg/kg wwt	-	0.02	
Tissue	MB	Lithium (Li)-Total	WG1002514-1		<0.10	<0.1	mg/kg wwt	-	0.1	
Tissue	MB	Magnesium (Mg)-Total	WG1002514-1		<1.0	<1	mg/kg wwt	-	1	
Tissue	MB	Manganese (Mn)-Total	WG1002514-1		<0.010	<0.01	mg/kg wwt	-	0.01	
Tissue	MB	Molybdenum (Mo)-Total	WG1002514-1		<0.010	<0.01	mg/kg wwt	-	0.01	
Tissue	MB	Nickel (Ni)-Total	WG1002514-1		<0.10	<0.1	mg/kg wwt	-	0.1	
Tissue	MB	Selenium (Se)-Total	WG1002514-1		<0.20	<0.2	mg/kg wwt	-	0.2	
Tissue	MB	Strontium (Sr)-Total	WG1002514-1		<0.010	<0.01	mg/kg wwt	-	0.01	
Tissue	MB	Thallium (Tl)-Total	WG1002514-1		<0.010	<0.01	mg/kg wwt	-	0.01	

Qualifier Description

MB *Method Blank*
CRM *Comparison with Reference Material*
RM-H *Reference Material recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.*
MB-LOR *Method Blank exceeds ALS data quality objective (DQO). LORs adjusted for samples with positive hits below 5 times blank level.*

Appendix 2.2-3. Quality Control Tests of Fish Tissue Metal Concentrations, Hope Bay Belt Project, 2009

Matrix	QC Type	Analyte	QC Spl. No.	Reference	Result	Target	Units	%	Limits	Qualifier
Tissue	MB	Tin (Sn)-Total	WG1002514-1		<0.050	<0.05	mg/kg wwt	-	0.05	
Tissue	MB	Uranium (U)-Total	WG1002514-1		<0.0020	<0.002	mg/kg wwt	-	0.002	
Tissue	MB	Vanadium (V)-Total	WG1002514-1		<0.10	<0.1	mg/kg wwt	-	0.1	
Tissue	MB	Zinc (Zn)-Total	WG1002514-1		<0.10	<0.1	mg/kg wwt	-	0.1	
Tissue	MB	Aluminum (Al)-Total	WG1002514-2		<2.0	<2	mg/kg wwt	-	2	
Tissue	MB	Antimony (Sb)-Total	WG1002514-2		<0.010	<0.01	mg/kg wwt	-	0.01	
Tissue	MB	Arsenic (As)-Total	WG1002514-2		<0.010	<0.01	mg/kg wwt	-	0.01	
Tissue	MB	Barium (Ba)-Total	WG1002514-2		<0.010	<0.01	mg/kg wwt	-	0.01	
Tissue	MB	Beryllium (Be)-Total	WG1002514-2		<0.10	<0.1	mg/kg wwt	-	0.1	
Tissue	MB	Bismuth (Bi)-Total	WG1002514-2		<0.030	<0.03	mg/kg wwt	-	0.03	
Tissue	MB	Cadmium (Cd)-Total	WG1002514-2		<0.0050	<0.005	mg/kg wwt	-	0.005	
Tissue	MB	Calcium (Ca)-Total	WG1002514-2		<2.0	<2	mg/kg wwt	-	2	
Tissue	MB	Chromium (Cr)-Total	WG1002514-2		<0.10	<0.1	mg/kg wwt	-	0.1	
Tissue	MB	Cobalt (Co)-Total	WG1002514-2		<0.020	<0.02	mg/kg wwt	-	0.02	
Tissue	MB	Copper (Cu)-Total	WG1002514-2		<0.010	<0.01	mg/kg wwt	-	0.01	
Tissue	MB	Lead (Pb)-Total	WG1002514-2		<0.020	<0.02	mg/kg wwt	-	0.02	
Tissue	MB	Lithium (Li)-Total	WG1002514-2		<0.10	<0.1	mg/kg wwt	-	0.1	
Tissue	MB	Magnesium (Mg)-Total	WG1002514-2		<1.0	<1	mg/kg wwt	-	1	
Tissue	MB	Manganese (Mn)-Total	WG1002514-2		<0.010	<0.01	mg/kg wwt	-	0.01	
Tissue	MB	Molybdenum (Mo)-Total	WG1002514-2		<0.010	<0.01	mg/kg wwt	-	0.01	
Tissue	MB	Nickel (Ni)-Total	WG1002514-2		<0.10	<0.1	mg/kg wwt	-	0.1	
Tissue	MB	Selenium (Se)-Total	WG1002514-2		<0.20	<0.2	mg/kg wwt	-	0.2	
Tissue	MB	Strontium (Sr)-Total	WG1002514-2		<0.010	<0.01	mg/kg wwt	-	0.01	
Tissue	MB	Thallium (Tl)-Total	WG1002514-2		<0.010	<0.01	mg/kg wwt	-	0.01	
Tissue	MB	Tin (Sn)-Total	WG1002514-2		<0.050	<0.05	mg/kg wwt	-	0.05	
Tissue	MB	Uranium (U)-Total	WG1002514-2		<0.0020	<0.002	mg/kg wwt	-	0.002	
Tissue	MB	Vanadium (V)-Total	WG1002514-2		<0.10	<0.1	mg/kg wwt	-	0.1	
Tissue	MB	Zinc (Zn)-Total	WG1002514-2		<0.10	<0.1	mg/kg wwt	-	0.1	
Tissue	MB	Aluminum (Al)-Total	WG1002890-1		<2.0	<2	mg/kg wwt	-	2	
Tissue	MB	Antimony (Sb)-Total	WG1002890-1		<0.010	<0.01	mg/kg wwt	-	0.01	
Tissue	MB	Arsenic (As)-Total	WG1002890-1		<0.010	<0.01	mg/kg wwt	-	0.01	
Tissue	MB	Barium (Ba)-Total	WG1002890-1		<0.010	<0.01	mg/kg wwt	-	0.01	
Tissue	MB	Beryllium (Be)-Total	WG1002890-1		<0.10	<0.1	mg/kg wwt	-	0.1	
Tissue	MB	Bismuth (Bi)-Total	WG1002890-1		<0.030	<0.03	mg/kg wwt	-	0.03	

Qualifier Description

MB *Method Blank*
CRM *Comparison with Reference Material*
RM-H *Reference Material recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.*
MB-LOR *Method Blank exceeds ALS data quality objective (DQO). LORs adjusted for samples with positive hits below 5 times blank level.*

Appendix 2.2-3. Quality Control Tests of Fish Tissue Metal Concentrations, Hope Bay Belt Project, 2009

Matrix	QC Type	Analyte	QC Spl. No.	Reference	Result	Target	Units	%	Limits	Qualifier
Tissue	MB	Cadmium (Cd)-Total	WG1002890-1		<0.0050	<0.005	mg/kg wwt	-	0.005	
Tissue	MB	Calcium (Ca)-Total	WG1002890-1		<2.0	<2	mg/kg wwt	-	2	
Tissue	MB	Chromium (Cr)-Total	WG1002890-1		<0.10	<0.1	mg/kg wwt	-	0.1	
Tissue	MB	Cobalt (Co)-Total	WG1002890-1		<0.020	<0.02	mg/kg wwt	-	0.02	
Tissue	MB	Copper (Cu)-Total	WG1002890-1		<0.010	<0.01	mg/kg wwt	-	0.01	
Tissue	MB	Lead (Pb)-Total	WG1002890-1		<0.020	<0.02	mg/kg wwt	-	0.02	
Tissue	MB	Lithium (Li)-Total	WG1002890-1		<0.10	<0.1	mg/kg wwt	-	0.1	
Tissue	MB	Magnesium (Mg)-Total	WG1002890-1		<1.0	<1	mg/kg wwt	-	1	
Tissue	MB	Manganese (Mn)-Total	WG1002890-1		<0.010	<0.01	mg/kg wwt	-	0.01	
Tissue	MB	Mercury (Hg)-Total	WG1002890-1		<0.0010	<0.001	mg/kg wwt	-	0.001	
Tissue	MB	Molybdenum (Mo)-Total	WG1002890-1		<0.010	<0.01	mg/kg wwt	-	0.01	
Tissue	MB	Nickel (Ni)-Total	WG1002890-1		<0.10	<0.1	mg/kg wwt	-	0.1	
Tissue	MB	Selenium (Se)-Total	WG1002890-1		<0.20	<0.2	mg/kg wwt	-	0.2	
Tissue	MB	Strontium (Sr)-Total	WG1002890-1		<0.010	<0.01	mg/kg wwt	-	0.01	
Tissue	MB	Thallium (Tl)-Total	WG1002890-1		<0.010	<0.01	mg/kg wwt	-	0.01	
Tissue	MB	Tin (Sn)-Total	WG1002890-1		<0.050	<0.05	mg/kg wwt	-	0.05	
Tissue	MB	Uranium (U)-Total	WG1002890-1		<0.0020	<0.002	mg/kg wwt	-	0.002	
Tissue	MB	Vanadium (V)-Total	WG1002890-1		<0.10	<0.1	mg/kg wwt	-	0.1	
Tissue	MB	Zinc (Zn)-Total	WG1002890-1		<0.10	<0.1	mg/kg wwt	-	0.1	
Tissue	MB	Aluminum (Al)-Total	WG1002890-2		<2.0	<2	mg/kg wwt	-	2	
Tissue	MB	Antimony (Sb)-Total	WG1002890-2		<0.010	<0.01	mg/kg wwt	-	0.01	
Tissue	MB	Arsenic (As)-Total	WG1002890-2		<0.010	<0.01	mg/kg wwt	-	0.01	
Tissue	MB	Barium (Ba)-Total	WG1002890-2		<0.010	<0.01	mg/kg wwt	-	0.01	
Tissue	MB	Beryllium (Be)-Total	WG1002890-2		<0.10	<0.1	mg/kg wwt	-	0.1	
Tissue	MB	Bismuth (Bi)-Total	WG1002890-2		<0.030	<0.03	mg/kg wwt	-	0.03	
Tissue	MB	Cadmium (Cd)-Total	WG1002890-2		<0.0050	<0.005	mg/kg wwt	-	0.005	
Tissue	MB	Calcium (Ca)-Total	WG1002890-2		<2.0	<2	mg/kg wwt	-	2	
Tissue	MB	Chromium (Cr)-Total	WG1002890-2		<0.10	<0.1	mg/kg wwt	-	0.1	
Tissue	MB	Cobalt (Co)-Total	WG1002890-2		<0.020	<0.02	mg/kg wwt	-	0.02	
Tissue	MB	Copper (Cu)-Total	WG1002890-2		<0.010	<0.01	mg/kg wwt	-	0.01	
Tissue	MB	Lead (Pb)-Total	WG1002890-2		<0.020	<0.02	mg/kg wwt	-	0.02	
Tissue	MB	Lithium (Li)-Total	WG1002890-2		<0.10	<0.1	mg/kg wwt	-	0.1	
Tissue	MB	Magnesium (Mg)-Total	WG1002890-2		<1.0	<1	mg/kg wwt	-	1	
Tissue	MB	Manganese (Mn)-Total	WG1002890-2		<0.010	<0.01	mg/kg wwt	-	0.01	

Qualifier Description

MB *Method Blank*

CRM *Comparison with Reference Material*

RM-H *Reference Material recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.*

MB-LOR *Method Blank exceeds ALS data quality objective (DQO). LORs adjusted for samples with positive hits below 5 times blank level.*

Appendix 2.2-3. Quality Control Tests of Fish Tissue Metal Concentrations, Hope Bay Belt Project, 2009

Matrix	QC Type	Analyte	QC Spl. No.	Reference	Result	Target	Units	%	Limits	Qualifier
Tissue	MB	Mercury (Hg)-Total	WG1002890-2		<0.0010	<0.001	mg/kg wwt	-	0.001	
Tissue	MB	Molybdenum (Mo)-Total	WG1002890-2		<0.010	<0.01	mg/kg wwt	-	0.01	
Tissue	MB	Nickel (Ni)-Total	WG1002890-2		<0.10	<0.1	mg/kg wwt	-	0.1	
Tissue	MB	Selenium (Se)-Total	WG1002890-2		<0.20	<0.2	mg/kg wwt	-	0.2	
Tissue	MB	Strontium (Sr)-Total	WG1002890-2		<0.010	<0.01	mg/kg wwt	-	0.01	
Tissue	MB	Thallium (Tl)-Total	WG1002890-2		<0.010	<0.01	mg/kg wwt	-	0.01	
Tissue	MB	Tin (Sn)-Total	WG1002890-2		<0.050	<0.05	mg/kg wwt	-	0.05	
Tissue	MB	Uranium (U)-Total	WG1002890-2		<0.0020	<0.002	mg/kg wwt	-	0.002	
Tissue	MB	Vanadium (V)-Total	WG1002890-2		<0.10	<0.1	mg/kg wwt	-	0.1	
Tissue	MB	Zinc (Zn)-Total	WG1002890-2		<0.10	<0.1	mg/kg wwt	-	0.1	

Qualifier ***Description***

MB *Method Blank*

CRM *Comparison with Reference Material*

RM-H *Reference Material recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.*

MB-LOR *Method Blank exceeds ALS data quality objective (DQO). LORs adjusted for samples with positive hits below 5 times blank level.*

Qualifier Description

MB *Method Blank*

CRM *Comparison with Reference Material*

RM-H *Reference Material recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.*

MB-LOR *Method Blank exceeds ALS data quality objective (DQO). LORs adjusted for samples with positive hits below 5 times blank level.*

Appendix 2.2-4

Fish Tissue Replicate Metals Concentrations, Hope Bay Belt Project, 2009

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Appendix 2.2-4. Fish Tissue Replicate Metals Concentrations, Hope Bay Belt Project, 2009

Sample ID	Matrix	ALS ID	Analyte	Replicate 1	Replicate 2	Units	RPD	RPD Limit	Diff	Diff Limit	Qualifier
Physical Tests											
L806060-11	Tissue	WG1002012-1	% Moisture	80.2	80.3	%	0.062	30	-	-	-
Metals											
L806060-11	Tissue	WG1002057-3	Aluminum (Al)-Total	2.2	<2.0	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-11	Tissue	WG1002057-3	Antimony (Sb)-Total	<0.010	<0.010	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-11	Tissue	WG1002057-3	Arsenic (As)-Total	0.053	0.055	mg/kg wwt	-	-	0.002	0.04	J
L806060-11	Tissue	WG1002057-3	Barium (Ba)-Total	0.027	0.036	mg/kg wwt	-	-	0.009	0.04	J
L806060-11	Tissue	WG1002057-3	Beryllium (Be)-Total	<0.10	<0.10	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-11	Tissue	WG1002057-3	Bismuth (Bi)-Total	<0.030	<0.030	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-11	Tissue	WG1002057-3	Cadmium (Cd)-Total	<0.0050	<0.0050	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-11	Tissue	WG1002057-3	Calcium (Ca)-Total	254	194	mg/kg wwt	27	45	-	-	-
L806060-11	Tissue	WG1002057-3	Chromium (Cr)-Total	<0.10	<0.10	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-11	Tissue	WG1002057-3	Cobalt (Co)-Total	<0.020	<0.020	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-11	Tissue	WG1002057-3	Copper (Cu)-Total	0.244	0.256	mg/kg wwt	4.6	45	-	-	-
L806060-11	Tissue	WG1002057-3	Lead (Pb)-Total	0.084	0.088	mg/kg wwt	-	-	0.003	0.08	J
L806060-11	Tissue	WG1002057-3	Lithium (Li)-Total	<0.10	<0.10	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-11	Tissue	WG1002057-3	Magnesium (Mg)-Total	290	286	mg/kg wwt	1.2	45	-	-	-
L806060-11	Tissue	WG1002057-3	Manganese (Mn)-Total	0.172	0.161	mg/kg wwt	6.7	45	-	-	-
L806060-11	Tissue	WG1002057-3	Mercury (Hg)-Total	0.0746	0.0769	mg/kg wwt	3.1	45	-	-	-
L806060-11	Tissue	WG1002057-3	Molybdenum (Mo)-Total	<0.010	<0.010	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-11	Tissue	WG1002057-3	Nickel (Ni)-Total	<0.10	<0.10	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-11	Tissue	WG1002057-3	Selenium (Se)-Total	0.34	0.32	mg/kg wwt	-	-	0.02	0.8	J
L806060-11	Tissue	WG1002057-3	Strontium (Sr)-Total	0.333	0.234	mg/kg wwt	35	45	-	-	-
L806060-11	Tissue	WG1002057-3	Thallium (Tl)-Total	<0.010	<0.010	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-11	Tissue	WG1002057-3	Tin (Sn)-Total	<0.050	<0.050	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-11	Tissue	WG1002057-3	Uranium (U)-Total	<0.0020	<0.0020	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-11	Tissue	WG1002057-3	Vanadium (V)-Total	<0.10	<0.10	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-11	Tissue	WG1002057-3	Zinc (Zn)-Total	3.27	3.18	mg/kg wwt	3.1	45	-	-	-
Physical Tests											
L806060-13	Tissue	WG1002012-2	% Moisture	78.8	78.9	%	0.17	30	-	-	-
Metals											
L806060-13	Tissue	WG1002057-4	Aluminum (Al)-Total	<2.0	<2.0	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-13	Tissue	WG1002057-4	Antimony (Sb)-Total	<0.010	<0.010	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-13	Tissue	WG1002057-4	Arsenic (As)-Total	0.071	0.072	mg/kg wwt	-	-	0.002	0.04	J
L806060-13	Tissue	WG1002057-4	Barium (Ba)-Total	0.022	0.011	mg/kg wwt	-	-	0.011	0.04	J
L806060-13	Tissue	WG1002057-4	Beryllium (Be)-Total	<0.10	<0.10	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-13	Tissue	WG1002057-4	Bismuth (Bi)-Total	<0.030	<0.030	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-13	Tissue	WG1002057-4	Cadmium (Cd)-Total	<0.0050	<0.0050	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-13	Tissue	WG1002057-4	Calcium (Ca)-Total	219	107	mg/kg wwt	68	45	-	-	DUP-H
L806060-13	Tissue	WG1002057-4	Chromium (Cr)-Total	<0.10	<0.10	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-13	Tissue	WG1002057-4	Cobalt (Co)-Total	<0.020	<0.020	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-13	Tissue	WG1002057-4	Copper (Cu)-Total	0.291	0.304	mg/kg wwt	4.4	45	-	-	-
L806060-13	Tissue	WG1002057-4	Lead (Pb)-Total	0.043	0.046	mg/kg wwt	-	-	0.002	0.08	J
L806060-13	Tissue	WG1002057-4	Lithium (Li)-Total	<0.10	<0.10	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-13	Tissue	WG1002057-4	Magnesium (Mg)-Total	303	294	mg/kg wwt	3.1	45	-	-	-
L806060-13	Tissue	WG1002057-4	Manganese (Mn)-Total	0.139	0.130	mg/kg wwt	6.9	45	-	-	-
L806060-13	Tissue	WG1002057-4	Mercury (Hg)-Total	0.162	0.150	mg/kg wwt	7.7	45	-	-	-
L806060-13	Tissue	WG1002057-4	Molybdenum (Mo)-Total	<0.010	<0.010	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-13	Tissue	WG1002057-4	Nickel (Ni)-Total	<0.10	<0.10	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-13	Tissue	WG1002057-4	Selenium (Se)-Total	0.36	0.35	mg/kg wwt	-	-	0.01	0.8	J
L806060-13	Tissue	WG1002057-4	Strontium (Sr)-Total	0.238	0.080	mg/kg wwt	0.158	.04	-	-	DUP-H
L806060-13	Tissue	WG1002057-4	Thallium (Tl)-Total	<0.010	<0.010	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-13	Tissue	WG1002057-4	Tin (Sn)-Total	<0.050	<0.050	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-13	Tissue	WG1002057-4	Uranium (U)-Total	<0.0020	<0.0020	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-13	Tissue	WG1002057-4	Vanadium (V)-Total	<0.10	<0.10	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-13	Tissue	WG1002057-4	Zinc (Zn)-Total	3.47	3.38	mg/kg wwt	2.7	45	-	-	-

Qualifier Description

DUP-H	*Duplicate results outside ALS DQO, due to sample heterogeneity.*
J	*Duplicate results and limits are expressed in terms of absolute difference.*
RPD-NA	*Relative Percent Difference Not Available due to result(s) being less than detection limit.*

Appendix 2.2-4. Fish Tissue Replicate Metals Concentrations, Hope Bay Belt Project, 2009

Sample ID	Matrix	ALS ID	Analyte	Replicate 1	Replicate 2	Units	RPD	RPD Limit	Diff	Diff Limit	Qualifier
Physical Tests											
L806060-27	Tissue	WG1002012-3	% Moisture	77.2	77.3	%	0.17	30	-	-	-
Metals											
L806060-27	Tissue	WG1002057-5	Aluminum (Al)-Total	8.9	8.8	mg/kg wwt	-	-	0.1	16	J
L806060-27	Tissue	WG1002057-5	Antimony (Sb)-Total	<0.020	<0.020	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-27	Tissue	WG1002057-5	Arsenic (As)-Total	0.046	0.046	mg/kg wwt	-	-	0.001	0.08	J
L806060-27	Tissue	WG1002057-5	Barium (Ba)-Total	<0.020	<0.020	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-27	Tissue	WG1002057-5	Beryllium (Be)-Total	<0.20	<0.20	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-27	Tissue	WG1002057-5	Bismuth (Bi)-Total	<0.060	<0.060	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-27	Tissue	WG1002057-5	Cadmium (Cd)-Total	0.150	0.144	mg/kg wwt	3.9	45	-	-	-
L806060-27	Tissue	WG1002057-5	Calcium (Ca)-Total	68.7	67.1	mg/kg wwt	2.4	45	-	-	-
L806060-27	Tissue	WG1002057-5	Chromium (Cr)-Total	<0.20	<0.20	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-27	Tissue	WG1002057-5	Cobalt (Co)-Total	0.057	0.050	mg/kg wwt	-	-	0.006	0.16	J
L806060-27	Tissue	WG1002057-5	Copper (Cu)-Total	3.70	3.56	mg/kg wwt	3.8	45	-	-	-
L806060-27	Tissue	WG1002057-5	Lead (Pb)-Total	<0.040	<0.040	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-27	Tissue	WG1002057-5	Lithium (Li)-Total	<0.20	<0.20	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-27	Tissue	WG1002057-5	Magnesium (Mg)-Total	272	266	mg/kg wwt	2.2	45	-	-	-
L806060-27	Tissue	WG1002057-5	Manganese (Mn)-Total	3.14	3.03	mg/kg wwt	3.6	45	-	-	-
L806060-27	Tissue	WG1002057-5	Mercury (Hg)-Total	0.150	0.151	mg/kg wwt	0.47	45	-	-	-
L806060-27	Tissue	WG1002057-5	Molybdenum (Mo)-Total	0.101	0.103	mg/kg wwt	-	-	0.002	0.08	J
L806060-27	Tissue	WG1002057-5	Nickel (Ni)-Total	<0.20	<0.20	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-27	Tissue	WG1002057-5	Selenium (Se)-Total	1.64	1.58	mg/kg wwt	-	-	0.05	1.6	J
L806060-27	Tissue	WG1002057-5	Strontium (Sr)-Total	0.071	0.067	mg/kg wwt	-	-	0.003	0.08	J
L806060-27	Tissue	WG1002057-5	Thallium (Tl)-Total	0.218	0.212	mg/kg wwt	3.1	45	-	-	-
L806060-27	Tissue	WG1002057-5	Tin (Sn)-Total	<0.10	<0.10	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-27	Tissue	WG1002057-5	Uranium (U)-Total	0.0053	0.0053	mg/kg wwt	-	-	0.0001	0.016	J
L806060-27	Tissue	WG1002057-5	Vanadium (V)-Total	<0.20	<0.20	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-27	Tissue	WG1002057-5	Zinc (Zn)-Total	25.7	25.1	mg/kg wwt	2.0	45	-	-	-
Physical Tests											
L806060-48	Tissue	WG1002887-1	% Moisture	76.5	76.3	%	0.28	30	-	-	-
Metals											
L806060-48	Tissue	WG1002890-3	Aluminum (Al)-Total	6.1	7.0	mg/kg wwt	-	-	0.9	16	J
L806060-48	Tissue	WG1002890-3	Antimony (Sb)-Total	<0.020	<0.020	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-48	Tissue	WG1002890-3	Arsenic (As)-Total	0.165	0.174	mg/kg wwt	-	-	0.009	0.08	J
L806060-48	Tissue	WG1002890-3	Barium (Ba)-Total	<0.020	0.023	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-48	Tissue	WG1002890-3	Beryllium (Be)-Total	<0.20	<0.20	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-48	Tissue	WG1002890-3	Bismuth (Bi)-Total	<0.060	<0.060	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-48	Tissue	WG1002890-3	Cadmium (Cd)-Total	0.013	0.014	mg/kg wwt	-	-	0.001	0.04	J
L806060-48	Tissue	WG1002890-3	Calcium (Ca)-Total	62.4	65.1	mg/kg wwt	4.1	45	-	-	-
L806060-48	Tissue	WG1002890-3	Chromium (Cr)-Total	<0.20	<0.20	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-48	Tissue	WG1002890-3	Cobalt (Co)-Total	0.062	0.063	mg/kg wwt	-	-	0.001	0.16	J
L806060-48	Tissue	WG1002890-3	Copper (Cu)-Total	19.0	19.9	mg/kg wwt	4.5	45	-	-	-
L806060-48	Tissue	WG1002890-3	Lead (Pb)-Total	<0.040	<0.040	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-48	Tissue	WG1002890-3	Lithium (Li)-Total	<0.20	<0.20	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-48	Tissue	WG1002890-3	Magnesium (Mg)-Total	268	272	mg/kg wwt	1.7	45	-	-	-
L806060-48	Tissue	WG1002890-3	Manganese (Mn)-Total	2.64	2.70	mg/kg wwt	2.2	45	-	-	-
L806060-48	Tissue	WG1002890-3	Mercury (Hg)-Total	0.0401	0.0403	mg/kg wwt	0.45	45	-	-	-
L806060-48	Tissue	WG1002890-3	Molybdenum (Mo)-Total	0.058	0.062	mg/kg wwt	-	-	0.004	0.08	J
L806060-48	Tissue	WG1002890-3	Nickel (Ni)-Total	<0.20	<0.20	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-48	Tissue	WG1002890-3	Selenium (Se)-Total	1.17	1.23	mg/kg wwt	-	-	0.06	1.6	J
L806060-48	Tissue	WG1002890-3	Strontium (Sr)-Total	0.066	0.072	mg/kg wwt	-	-	0.006	0.08	J
L806060-48	Tissue	WG1002890-3	Thallium (Tl)-Total	0.100	0.103	mg/kg wwt	-	-	0.003	0.08	J
L806060-48	Tissue	WG1002890-3	Tin (Sn)-Total	<0.10	<0.10	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-48	Tissue	WG1002890-3	Uranium (U)-Total	<0.0040	<0.0040	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-48	Tissue	WG1002890-3	Vanadium (V)-Total	<0.20	<0.20	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-48	Tissue	WG1002890-3	Zinc (Zn)-Total	34.2	35.1	mg/kg wwt	2.6	45	-	-	-

Qualifier Description

DUP-H	*Duplicate results outside ALS DQO, due to sample heterogeneity.*
J	*Duplicate results and limits are expressed in terms of absolute difference.*
RPD-NA	*Relative Percent Difference Not Available due to result(s) being less than detection limit.*

Appendix 2.2-4. Fish Tissue Replicate Metals Concentrations, Hope Bay Belt Project, 2009

Sample ID	Matrix	ALS ID	Analyte	Replicate 1	Replicate 2	Units	RPD	RPD Limit	Diff	Diff Limit	Qualifier
Physical Tests											
L806060-58	Tissue	WG1002887-2	% Moisture	75.5	75.9	%	0.53	30	-	-	-
Metals											
L806060-58	Tissue	WG1002890-4	Aluminum (Al)-Total	2.4	2.2	mg/kg wwt	-	-	0.2	8	J
L806060-58	Tissue	WG1002890-4	Antimony (Sb)-Total	<0.010	<0.010	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-58	Tissue	WG1002890-4	Arsenic (As)-Total	0.249	0.230	mg/kg wwt	7.8	45	-	-	-
L806060-58	Tissue	WG1002890-4	Barium (Ba)-Total	0.025	0.024	mg/kg wwt	-	-	0.001	0.04	J
L806060-58	Tissue	WG1002890-4	Beryllium (Be)-Total	<0.10	<0.10	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-58	Tissue	WG1002890-4	Bismuth (Bi)-Total	<0.030	<0.030	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-58	Tissue	WG1002890-4	Cadmium (Cd)-Total	<0.0050	<0.0050	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-58	Tissue	WG1002890-4	Calcium (Ca)-Total	150	138	mg/kg wwt	8.3	45	-	-	-
L806060-58	Tissue	WG1002890-4	Chromium (Cr)-Total	<0.10	<0.10	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-58	Tissue	WG1002890-4	Cobalt (Co)-Total	<0.020	<0.020	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-58	Tissue	WG1002890-4	Copper (Cu)-Total	0.366	0.355	mg/kg wwt	3.0	45	-	-	-
L806060-58	Tissue	WG1002890-4	Lead (Pb)-Total	<0.020	<0.020	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-58	Tissue	WG1002890-4	Lithium (Li)-Total	<0.10	<0.10	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-58	Tissue	WG1002890-4	Magnesium (Mg)-Total	314	306	mg/kg wwt	2.8	45	-	-	-
L806060-58	Tissue	WG1002890-4	Manganese (Mn)-Total	0.093	0.093	mg/kg wwt	-	-	0.000	0.04	J
L806060-58	Tissue	WG1002890-4	Mercury (Hg)-Total	0.0425	0.0453	mg/kg wwt	6.3	45	-	-	-
L806060-58	Tissue	WG1002890-4	Molybdenum (Mo)-Total	<0.010	<0.010	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-58	Tissue	WG1002890-4	Nickel (Ni)-Total	<0.10	<0.10	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-58	Tissue	WG1002890-4	Selenium (Se)-Total	0.63	0.58	mg/kg wwt	-	-	0.05	0.8	J
L806060-58	Tissue	WG1002890-4	Strontium (Sr)-Total	0.111	0.098	mg/kg wwt	-	-	0.013	0.04	J
L806060-58	Tissue	WG1002890-4	Thallium (Tl)-Total	0.010	0.010	mg/kg wwt	-	-	0.000	0.04	J
L806060-58	Tissue	WG1002890-4	Tin (Sn)-Total	<0.050	<0.050	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-58	Tissue	WG1002890-4	Uranium (U)-Total	<0.0020	<0.0020	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-58	Tissue	WG1002890-4	Vanadium (V)-Total	<0.10	<0.10	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-58	Tissue	WG1002890-4	Zinc (Zn)-Total	4.46	4.23	mg/kg wwt	5.4	45	-	-	-
Physical Tests											
L806060-61	Tissue	WG1002868-1	% Moisture	75.2	75.1	%	0.14	30	-	-	-
Metals											
L806060-61	Tissue	WG1002514-3	Aluminum (Al)-Total	4.4	5.1	mg/kg wwt	-	-	0.8	8	J
L806060-61	Tissue	WG1002514-3	Antimony (Sb)-Total	<0.010	<0.010	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-61	Tissue	WG1002514-3	Arsenic (As)-Total	2.11	2.03	mg/kg wwt	3.9	45	-	-	-
L806060-61	Tissue	WG1002514-3	Barium (Ba)-Total	0.048	0.082	mg/kg wwt	-	-	0.034	0.04	J
L806060-61	Tissue	WG1002514-3	Beryllium (Be)-Total	<0.10	<0.10	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-61	Tissue	WG1002514-3	Bismuth (Bi)-Total	<0.030	<0.030	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-61	Tissue	WG1002514-3	Cadmium (Cd)-Total	0.0731	0.0721	mg/kg wwt	1.4	45	-	-	-
L806060-61	Tissue	WG1002514-3	Calcium (Ca)-Total	115	114	mg/kg wwt	1.4	45	-	-	-
L806060-61	Tissue	WG1002514-3	Chromium (Cr)-Total	0.16	0.15	mg/kg wwt	-	-	0.01	0.4	J
L806060-61	Tissue	WG1002514-3	Cobalt (Co)-Total	0.028	0.028	mg/kg wwt	-	-	0.000	0.08	J
L806060-61	Tissue	WG1002514-3	Copper (Cu)-Total	8.85	8.66	mg/kg wwt	2.2	45	-	-	-
L806060-61	Tissue	WG1002514-3	Lead (Pb)-Total	<0.020	<0.020	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-61	Tissue	WG1002514-3	Lithium (Li)-Total	<0.10	<0.10	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-61	Tissue	WG1002514-3	Magnesium (Mg)-Total	184	180	mg/kg wwt	2.0	45	-	-	-
L806060-61	Tissue	WG1002514-3	Manganese (Mn)-Total	1.70	1.66	mg/kg wwt	2.0	45	-	-	-
L806060-61	Tissue	WG1002514-3	Mercury (Hg)-Total	0.0934	0.0970	mg/kg wwt	3.8	45	-	-	-
L806060-61	Tissue	WG1002514-3	Molybdenum (Mo)-Total	0.056	0.052	mg/kg wwt	-	-	0.003	0.04	J
L806060-61	Tissue	WG1002514-3	Nickel (Ni)-Total	<0.10	<0.10	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-61	Tissue	WG1002514-3	Selenium (Se)-Total	2.98	2.84	mg/kg wwt	4.9	45	-	-	-
L806060-61	Tissue	WG1002514-3	Strontium (Sr)-Total	0.328	0.323	mg/kg wwt	1.5	45	-	-	-
L806060-61	Tissue	WG1002514-3	Thallium (Tl)-Total	<0.010	<0.010	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-61	Tissue	WG1002514-3	Tin (Sn)-Total	<0.050	<0.050	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-61	Tissue	WG1002514-3	Uranium (U)-Total	<0.0020	<0.0020	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-61	Tissue	WG1002514-3	Vanadium (V)-Total	<0.10	<0.10	mg/kg wwt	N/A	45	-	-	RPD-NA
L806060-61	Tissue	WG1002514-3	Zinc (Zn)-Total	24.9	24.5	mg/kg wwt	1.7	45	-	-	-

Qualifier	*Description*
DUP-H	*Duplicate results outside ALS DQO, due to sample heterogeneity.*
J	*Duplicate results and limits are expressed in terms of absolute difference.*
RPD-NA	*Relative Percent Difference Not Available due to result(s) being less than detection limit.*

Qualifier Description

DUP-H *Duplicate results outside ALS DQO, due to sample heterogeneity.*

J *Duplicate results and limits are expressed in terms of absolute difference.*

RPD-NA *Relative Percent Difference Not Available due to result(s) being less than detection limit.*

Appendix 3.1-1

Substrate Data Collected from Hydroacoustic Surveys of Doris Lake, Hope Bay Belt Project, 2009

Engineers and Scientists

Appendix 3.1-1. Substrate Data Collected from Hydroacoustic Surveys of Doris Lake,Hope Bay Belt Project, 2009

Longitude	Latitude	Bottom Type	Category	Depth	#Ping	Date
-106.5742283	68.0931217	3	gravel, cobble, boulder	1.35	11	8/24/2009
-106.5741833	68.0931233	3	gravel, cobble, boulder	1.42	31	8/24/2009
-106.5741117	68.0931317	3	gravel, cobble, boulder	1.41	51	8/24/2009
-106.57401	68.0931467	3	gravel, cobble, boulder	1.67	71	8/24/2009
-106.5739	68.0931633	3	gravel, cobble, boulder	1.72	91	8/24/2009
-106.57379	68.0931817	3	gravel, cobble, boulder	1.77	111	8/24/2009
-106.573735	68.0931917	3	gravel, cobble, boulder	1.81	131	8/24/2009
-106.5736283	68.09321	3	gravel, cobble, boulder	1.89	151	8/24/2009
-106.5735167	68.093225	3	gravel, cobble, boulder	1.96	171	8/24/2009
-106.5733933	68.093235	3	gravel, cobble, boulder	2.01	191	8/24/2009
-106.5732567	68.0932417	3	gravel, cobble, boulder	2.08	211	8/24/2009
-106.573115	68.0932467	3	gravel, cobble, boulder	2.14	231	8/24/2009
-106.572975	68.0932517	3	gravel, cobble, boulder	2.19	251	8/24/2009
-106.5728283	68.0932567	3	gravel, cobble, boulder	2.2	271	8/24/2009
-106.5726783	68.093255	3	gravel, cobble, boulder	2.22	291	8/24/2009
-106.5725317	68.093255	3	gravel, cobble, boulder	2.26	311	8/24/2009
-106.5723833	68.0932567	3	gravel, cobble, boulder	2.33	331	8/24/2009
-106.57231	68.0932583	3	gravel, cobble, boulder	2.36	351	8/24/2009
-106.572165	68.0932567	3	gravel, cobble, boulder	2.38	371	8/24/2009
-106.5720183	68.0932517	3	gravel, cobble, boulder	2.38	391	8/24/2009
-106.5718717	68.0932467	2	mud	2.36	411	8/24/2009
-106.5717283	68.09324	3	gravel, cobble, boulder	2.22	431	8/24/2009
-106.5715833	68.093235	3	gravel, cobble, boulder	2.14	451	8/24/2009
-106.5714333	68.0932283	3	gravel, cobble, boulder	2.17	471	8/24/2009
-106.5712867	68.093225	3	gravel, cobble, boulder	2.27	491	8/24/2009
-106.5711417	68.09322	3	gravel, cobble, boulder	2.31	511	8/24/2009
-106.570995	68.093215	2	mud	2.33	531	8/24/2009
-106.5708467	68.09321	2	mud	2.31	551	8/24/2009
-106.5707733	68.0932083	3	gravel, cobble, boulder	2.29	571	8/24/2009
-106.5706267	68.0932067	3	gravel, cobble, boulder	2.29	591	8/24/2009
-106.5704783	68.0932067	2	mud	2.24	611	8/24/2009
-106.5703283	68.093205	2	mud	2.22	631	8/24/2009
-106.5701783	68.093205	2	mud	2.19	651	8/24/2009
-106.57003	68.0932033	2	mud	2.17	671	8/24/2009
-106.5698817	68.0932017	2	mud	2.15	691	8/24/2009
-106.5697333	68.0932	2	mud	2.14	711	8/24/2009
-106.569585	68.0931983	2	mud	2.1	731	8/24/2009
-106.56951	68.0931967	2	mud	2.08	751	8/24/2009
-106.5693633	68.093195	2	mud	2.08	771	8/24/2009
-106.569215	68.09319	2	mud	2.05	791	8/24/2009
-106.5690683	68.0931833	2	mud	2.03	811	8/24/2009
-106.56892	68.0931817	2	mud	2	831	8/24/2009
-106.5687733	68.0931817	2	mud	2	851	8/24/2009
-106.5686983	68.0931833	2	mud	1.98	871	8/24/2009
-106.56855	68.093185	2	mud	1.94	891	8/24/2009
-106.5684033	68.0931883	1	very soft fines	1.93	911	8/24/2009
-106.5682567	68.0931933	2	mud	1.89	931	8/24/2009
-106.56811	68.0931983	2	mud	1.82	951	8/24/2009
-106.5679633	68.0932033	3	gravel, cobble, boulder	1.79	971	8/24/2009
-106.5678217	68.0932067	3	gravel, cobble, boulder	1.79	991	8/24/2009
-106.5676867	68.09321	2	mud	1.81	1011	8/24/2009
-106.5676217	68.0932117	2	mud	1.87	1031	8/24/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately
5 m long transect segment (20 pings)
Bottom Type Codes: 1 = very soft fines, 2 = mud,
3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-1. Substrate Data Collected from Hydroacoustic Surveys of Doris Lake,Hope Bay Belt Project, 2009

Longitude	Latitude	Bottom Type	Category	Depth	#Ping	Date
-106.5674933	68.0932133	2	mud	1.94	1051	8/24/2009
-106.56737	68.0932133	1	very soft fines	2.05	1071	8/24/2009
-106.5672517	68.0932133	1	very soft fines	2.08	1091	8/24/2009
-106.5671333	68.09321	1	very soft fines	2.07	1111	8/24/2009
-106.5670183	68.0932083	1	very soft fines	1.93	1131	8/24/2009
-106.5669633	68.0932067	1	very soft fines	1.84	1151	8/24/2009
-106.5668733	68.0932017	3	gravel, cobble, boulder	1.41	1171	8/24/2009
-106.5680783	68.09623	3	gravel, cobble, boulder	1.94	11	8/24/2009
-106.5682217	68.0962183	3	gravel, cobble, boulder	2.14	31	8/24/2009
-106.5683767	68.09621	1	very soft fines	2.24	51	8/24/2009
-106.56853	68.096205	1	very soft fines	2.27	71	8/24/2009
-106.5686083	68.0962033	1	very soft fines	2.31	91	8/24/2009
-106.5687633	68.0962017	1	very soft fines	2.34	111	8/24/2009
-106.5689183	68.0962	1	very soft fines	2.27	131	8/24/2009
-106.5690733	68.0961983	3	gravel, cobble, boulder	1.79	151	8/24/2009
-106.5692283	68.0961933	2	mud	2	171	8/24/2009
-106.569385	68.0961883	1	very soft fines	2.26	191	8/24/2009
-106.5695417	68.096185	2	mud	2.19	211	8/24/2009
-106.5696967	68.09618	2	mud	2.14	231	8/24/2009
-106.569775	68.0961783	2	mud	2.15	251	8/24/2009
-106.5699283	68.0961733	3	gravel, cobble, boulder	2.2	271	8/24/2009
-106.5700817	68.09617	3	gravel, cobble, boulder	2.2	291	8/24/2009
-106.570235	68.0961667	2	mud	2.26	311	8/24/2009
-106.5703867	68.0961617	2	mud	2.26	331	8/24/2009
-106.57054	68.096155	2	mud	2.34	351	8/24/2009
-106.570695	68.09615	2	mud	2.36	371	8/24/2009
-106.570775	68.0961483	2	mud	2.43	391	8/24/2009
-106.5709317	68.096145	1	very soft fines	2.46	411	8/24/2009
-106.5710883	68.0961433	2	mud	2.55	431	8/24/2009
-106.5712433	68.0961433	2	mud	2.66	451	8/24/2009
-106.5713983	68.0961433	1	very soft fines	2.64	471	8/24/2009
-106.5715533	68.09614	2	mud	2.78	491	8/24/2009
-106.57163	68.096135	1	very soft fines	2.81	511	8/24/2009
-106.571785	68.09613	2	mud	2.88	531	8/24/2009
-106.5719433	68.0961267	1	very soft fines	2.95	551	8/24/2009
-106.5720983	68.096125	1	very soft fines	2.95	571	8/24/2009
-106.572255	68.096125	1	very soft fines	3	591	8/24/2009
-106.5724117	68.096125	1	very soft fines	3.02	611	8/24/2009
-106.5724883	68.0961233	1	very soft fines	3.04	631	8/24/2009
-106.57264	68.0961233	1	very soft fines	3.04	651	8/24/2009
-106.572795	68.096125	1	very soft fines	3.06	671	8/24/2009
-106.57295	68.0961283	1	very soft fines	3.07	691	8/24/2009
-106.573105	68.09613	1	very soft fines	3.09	711	8/24/2009
-106.5732617	68.0961317	1	very soft fines	3.09	731	8/24/2009
-106.5733417	68.0961317	1	very soft fines	3.09	751	8/24/2009
-106.5734967	68.096135	1	very soft fines	3.11	771	8/24/2009
-106.5736517	68.0961383	1	very soft fines	3.12	791	8/24/2009
-106.5738067	68.0961417	1	very soft fines	3.12	811	8/24/2009
-106.5739617	68.0961433	1	very soft fines	3.14	831	8/24/2009
-106.5741183	68.096145	1	very soft fines	3.11	851	8/24/2009
-106.5741967	68.096145	1	very soft fines	3.12	871	8/24/2009
-106.5743533	68.0961467	1	very soft fines	3.11	891	8/24/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately
5 m long transect segment (20 pings)
Bottom Type Codes: 1 = very soft fines, 2 = mud,
3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-1. Substrate Data Collected from Hydroacoustic Surveys of Doris Lake,Hope Bay Belt Project, 2009

Longitude	Latitude	Bottom Type	Category	Depth	#Ping	Date
-106.57451	68.0961483	1	very soft fines	3.09	911	8/24/2009
-106.5746667	68.0961467	1	very soft fines	3.09	931	8/24/2009
-106.5748217	68.096145	1	very soft fines	3.09	951	8/24/2009
-106.5749783	68.0961433	1	very soft fines	3.07	971	8/24/2009
-106.5751333	68.0961433	1	very soft fines	3.06	991	8/24/2009
-106.5752117	68.0961417	1	very soft fines	3.06	1011	8/24/2009
-106.5753683	68.09614	1	very soft fines	3.04	1031	8/24/2009
-106.5755217	68.0961367	1	very soft fines	3.02	1051	8/24/2009
-106.5756783	68.0961367	1	very soft fines	3.02	1071	8/24/2009
-106.5758333	68.0961367	1	very soft fines	3	1091	8/24/2009
-106.57599	68.0961333	1	very soft fines	3	1111	8/24/2009
-106.5761467	68.0961283	2	mud	3	1131	8/24/2009
-106.576225	68.096125	1	very soft fines	3	1151	8/24/2009
-106.5763817	68.0961167	2	mud	3	1171	8/24/2009
-106.57654	68.0961083	1	very soft fines	2.99	1191	8/24/2009
-106.5767	68.0960983	1	very soft fines	2.97	1211	8/24/2009
-106.5768583	68.09609	2	mud	2.93	1231	8/24/2009
-106.577015	68.0960817	2	mud	2.92	1251	8/24/2009
-106.5771717	68.0960733	2	mud	2.83	1271	8/24/2009
-106.5772483	68.09607	2	mud	2.76	1291	8/24/2009
-106.5774017	68.09606	2	mud	2.64	1311	8/24/2009
-106.5775517	68.0960517	3	gravel, cobble, boulder	2.5	1331	8/24/2009
-106.57769	68.0960433	3	gravel, cobble, boulder	2.27	1351	8/24/2009
-106.5778133	68.0960333	3	gravel, cobble, boulder	2.15	1371	8/24/2009
-106.5779367	68.0960233	3	gravel, cobble, boulder	2.08	1391	8/24/2009
-106.5780033	68.09601	3	gravel, cobble, boulder	2.08	1411	8/24/2009
-106.58175	68.0996817	3	gravel, cobble, boulder	1.87	11	8/24/2009
-106.581695	68.0996883	3	gravel, cobble, boulder	1.68	31	8/24/2009
-106.5815967	68.0997017	3	gravel, cobble, boulder	1.94	51	8/24/2009
-106.581465	68.0997167	3	gravel, cobble, boulder	2.12	71	8/24/2009
-106.5813083	68.09973	2	mud	2.6	91	8/24/2009
-106.5811583	68.0997433	1	very soft fines	2.95	111	8/24/2009
-106.5810133	68.09976	2	mud	2.95	131	8/24/2009
-106.5808633	68.0997733	1	very soft fines	3	151	8/24/2009
-106.5807117	68.0997833	1	very soft fines	3.02	171	8/24/2009
-106.5806333	68.0997867	1	very soft fines	3.02	191	8/24/2009
-106.5804783	68.0997917	1	very soft fines	3.07	211	8/24/2009
-106.5803217	68.0997967	1	very soft fines	3.14	231	8/24/2009
-106.5801667	68.0998017	1	very soft fines	3.19	251	8/24/2009
-106.5800117	68.099805	2	mud	3.28	271	8/24/2009
-106.5798567	68.09981	1	very soft fines	3.4	291	8/24/2009
-106.57978	68.0998133	1	very soft fines	3.49	311	8/24/2009
-106.5796267	68.09982	1	very soft fines	3.63	331	8/24/2009
-106.5794733	68.0998233	1	very soft fines	3.75	351	8/24/2009
-106.5793167	68.0998283	1	very soft fines	3.78	371	8/24/2009
-106.5791633	68.0998317	1	very soft fines	3.85	391	8/24/2009
-106.5790083	68.099835	1	very soft fines	3.87	411	8/24/2009
-106.5788533	68.09984	2	mud	3.75	431	8/24/2009
-106.5787767	68.0998433	1	very soft fines	3.77	451	8/24/2009
-106.5786217	68.0998517	1	very soft fines	3.77	471	8/24/2009
-106.5784633	68.0998567	1	very soft fines	3.77	491	8/24/2009
-106.5783083	68.0998633	1	very soft fines	3.73	511	8/24/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately
5 m long transect segment (20 pings)
Bottom Type Codes: 1 = very soft fines, 2 = mud,
3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-1. Substrate Data Collected from Hydroacoustic Surveys of Doris Lake,Hope Bay Belt Project, 2009

Longitude	Latitude	Bottom Type	Category	Depth	#Ping	Date
-106.5781533	68.0998733	1	very soft fines	3.68	531	8/24/2009
-106.5779967	68.09988	1	very soft fines	3.61	551	8/24/2009
-106.5778417	68.0998867	1	very soft fines	3.58	571	8/24/2009
-106.577765	68.09989	1	very soft fines	3.54	591	8/24/2009
-106.57761	68.0998983	1	very soft fines	3.51	611	8/24/2009
-106.5774533	68.0999067	1	very soft fines	3.45	631	8/24/2009
-106.5772983	68.099915	1	very soft fines	3.44	651	8/24/2009
-106.577145	68.0999217	1	very soft fines	3.4	671	8/24/2009
-106.5769917	68.0999267	2	mud	3.39	691	8/24/2009
-106.5768383	68.0999333	1	very soft fines	3.37	711	8/24/2009
-106.57676	68.0999367	1	very soft fines	3.3	731	8/24/2009
-106.576605	68.0999433	1	very soft fines	3.3	751	8/24/2009
-106.5764517	68.0999483	1	very soft fines	3.23	771	8/24/2009
-106.576295	68.099955	2	mud	3.16	791	8/24/2009
-106.57614	68.0999633	1	very soft fines	3.07	811	8/24/2009
-106.5759867	68.09997	1	very soft fines	2.97	831	8/24/2009
-106.57591	68.0999733	2	mud	2.85	851	8/24/2009
-106.5757567	68.0999783	2	mud	2.78	871	8/24/2009
-106.5755983	68.0999817	3	gravel, cobble, boulder	2.71	891	8/24/2009
-106.5754433	68.0999833	2	mud	2.67	911	8/24/2009
-106.57529	68.0999867	3	gravel, cobble, boulder	2.53	931	8/24/2009
-106.5751333	68.09999	2	mud	2.48	951	8/24/2009
-106.5749783	68.0999917	2	mud	2.43	971	8/24/2009
-106.5748233	68.099995	2	mud	2.36	991	8/24/2009
-106.5746667	68.1000017	2	mud	2.38	1011	8/24/2009
-106.5745083	68.1000067	2	mud	2.4	1031	8/24/2009
-106.5743483	68.1000133	3	gravel, cobble, boulder	2.41	1051	8/24/2009
-106.5742717	68.1000183	3	gravel, cobble, boulder	2.5	1071	8/24/2009
-106.5741133	68.1000267	3	gravel, cobble, boulder	2.53	1091	8/24/2009
-106.573955	68.1000317	1	very soft fines	2.59	1111	8/24/2009
-106.5737967	68.1000367	2	mud	2.4	1131	8/24/2009
-106.573635	68.1000383	3	gravel, cobble, boulder	2.22	1151	8/24/2009
-106.5734767	68.1000417	3	gravel, cobble, boulder	2.1	1171	8/24/2009
-106.573325	68.10005	3	gravel, cobble, boulder	2.07	1191	8/24/2009
-106.5731733	68.1000567	3	gravel, cobble, boulder	2.03	1211	8/24/2009
-106.5730233	68.1000617	3	gravel, cobble, boulder	1.89	1231	8/24/2009
-106.57287	68.1000683	3	gravel, cobble, boulder	1.86	1251	8/24/2009
-106.5727183	68.1000767	3	gravel, cobble, boulder	1.75	1271	8/24/2009
-106.5725667	68.1000833	3	gravel, cobble, boulder	1.79	1291	8/24/2009
-106.5724917	68.1000867	3	gravel, cobble, boulder	1.81	1311	8/24/2009
-106.57234	68.100095	3	gravel, cobble, boulder	2	1331	8/24/2009
-106.57219	68.100105	3	gravel, cobble, boulder	2.17	1351	8/24/2009
-106.57204	68.1001083	3	gravel, cobble, boulder	2.24	1371	8/24/2009
-106.5718867	68.10011	3	gravel, cobble, boulder	2.24	1391	8/24/2009
-106.57173	68.1001117	3	gravel, cobble, boulder	2.27	1411	8/24/2009
-106.5715717	68.1001133	3	gravel, cobble, boulder	2.4	1431	8/24/2009
-106.571415	68.1001183	2	mud	2.52	1451	8/24/2009
-106.5712583	68.1001217	3	gravel, cobble, boulder	2.41	1471	8/24/2009
-106.5711	68.1001267	3	gravel, cobble, boulder	2.4	1491	8/24/2009
-106.5709417	68.10013	3	gravel, cobble, boulder	2.38	1511	8/24/2009
-106.5708633	68.1001333	3	gravel, cobble, boulder	2.36	1531	8/24/2009
-106.57071	68.1001433	3	gravel, cobble, boulder	2.36	1551	8/24/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately
5 m long transect segment (20 pings)
Bottom Type Codes: 1 = very soft fines, 2 = mud,
3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-1. Substrate Data Collected from Hydroacoustic Surveys of Doris Lake,Hope Bay Belt Project, 2009

Longitude	Latitude	Bottom Type	Category	Depth	#Ping	Date
-106.570555	68.100155	–	–	2.69	1571	8/24/2009
-106.5704	68.1001667	2	mud	2.97	1591	8/24/2009
-106.5702483	68.1001783	2	mud	3.07	1611	8/24/2009
-106.5701017	68.1001883	2	mud	3.09	1631	8/24/2009
-106.5699633	68.1001983	2	mud	3.11	1651	8/24/2009
-106.56983	68.1002083	2	mud	2.97	1671	8/24/2009
-106.5696983	68.1002167	2	mud	2.67	1691	8/24/2009
-106.5696383	68.1002217	1	very soft fines	1.87	1711	8/24/2009
-106.5695233	68.100225	2	mud	1.72	1731	8/24/2009
-106.5694217	68.1002233	1	very soft fines	1.56	1751	8/24/2009
-106.5693533	68.1002133	3	gravel, cobble, boulder	1.23	1771	8/24/2009
-106.5693283	68.100195	3	gravel, cobble, boulder	1.3	1791	8/24/2009
-106.572275	68.1037517	3	gravel, cobble, boulder	1.46	11	8/24/2009
-106.5723733	68.1037233	3	gravel, cobble, boulder	1.82	31	8/24/2009
-106.5724283	68.103705	3	gravel, cobble, boulder	1.74	51	8/24/2009
-106.57255	68.1036683	3	gravel, cobble, boulder	1.79	71	8/24/2009
-106.5726717	68.10364	3	gravel, cobble, boulder	1.93	91	8/24/2009
-106.572805	68.1036183	3	gravel, cobble, boulder	2.07	111	8/24/2009
-106.5729383	68.1035983	3	gravel, cobble, boulder	2.07	131	8/24/2009
-106.573075	68.1035783	3	gravel, cobble, boulder	2.08	151	8/24/2009
-106.5732167	68.10356	3	gravel, cobble, boulder	2.1	171	8/24/2009
-106.5733617	68.1035433	3	gravel, cobble, boulder	2.12	191	8/24/2009
-106.5735083	68.10353	3	gravel, cobble, boulder	2.12	211	8/24/2009
-106.573655	68.103515	3	gravel, cobble, boulder	2.14	231	8/24/2009
-106.5737983	68.1035	3	gravel, cobble, boulder	2.14	251	8/24/2009
-106.5739433	68.1034833	3	gravel, cobble, boulder	2.12	271	8/24/2009
-106.5740917	68.10347	3	gravel, cobble, boulder	2.14	291	8/24/2009
-106.57424	68.1034583	3	gravel, cobble, boulder	2.19	311	8/24/2009
-106.57439	68.1034483	3	gravel, cobble, boulder	2.19	331	8/24/2009
-106.574465	68.1034433	3	gravel, cobble, boulder	2.19	351	8/24/2009
-106.574615	68.1034317	3	gravel, cobble, boulder	2.2	371	8/24/2009
-106.5747633	68.10342	3	gravel, cobble, boulder	2.2	391	8/24/2009
-106.5749183	68.1034083	3	gravel, cobble, boulder	2.2	411	8/24/2009
-106.57507	68.1033983	3	gravel, cobble, boulder	2.19	431	8/24/2009
-106.57522	68.10339	3	gravel, cobble, boulder	2.14	451	8/24/2009
-106.575375	68.1033817	3	gravel, cobble, boulder	2.08	471	8/24/2009
-106.5755283	68.1033767	3	gravel, cobble, boulder	2.01	491	8/24/2009
-106.5756817	68.1033717	3	gravel, cobble, boulder	2.12	511	8/24/2009
-106.575835	68.103365	3	gravel, cobble, boulder	2.14	531	8/24/2009
-106.5759883	68.1033633	3	gravel, cobble, boulder	2.2	551	8/24/2009
-106.5761433	68.1033583	3	gravel, cobble, boulder	2.27	571	8/24/2009
-106.5762967	68.1033483	3	gravel, cobble, boulder	2.4	591	8/24/2009
-106.5763733	68.1033433	2	mud	2.6	611	8/24/2009
-106.5765283	68.1033333	1	very soft fines	2.67	631	8/24/2009
-106.5766867	68.10333	1	very soft fines	2.62	651	8/24/2009
-106.576845	68.1033317	2	mud	2.41	671	8/24/2009
-106.5770017	68.103335	2	mud	2.24	691	8/24/2009
-106.5771583	68.1033367	2	mud	2.17	711	8/24/2009
-106.5773133	68.1033367	2	mud	2.07	731	8/24/2009
-106.5773917	68.1033383	3	gravel, cobble, boulder	2.03	751	8/24/2009
-106.5775517	68.1033383	2	mud	2.05	771	8/24/2009
-106.5777083	68.1033417	2	mud	2.05	791	8/24/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately 5 m long transect segment (20 pings)
Bottom Type Codes: 1 = very soft fines, 2 = mud, 3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-1. Substrate Data Collected from Hydroacoustic Surveys of Doris Lake,Hope Bay Belt Project, 2009

Longitude	Latitude	Bottom Type	Category	Depth	#Ping	Date
-106.577865	68.10335	2	mud	2.15	811	8/24/2009
-106.5780217	68.1033567	2	mud	2.26	831	8/24/2009
-106.5781767	68.103365	2	mud	2.36	851	8/24/2009
-106.57833	68.1033717	1	very soft fines	2.46	871	8/24/2009
-106.578485	68.103375	2	mud	2.52	891	8/24/2009
-106.5786367	68.1033767	2	mud	2.79	911	8/24/2009
-106.5787133	68.1033783	2	mud	2.88	931	8/24/2009
-106.5788683	68.1033833	3	gravel, cobble, boulder	3	951	8/24/2009
-106.5790233	68.103385	2	mud	3.09	971	8/24/2009
-106.57918	68.1033867	2	mud	3.19	991	8/24/2009
-106.5793383	68.1033883	2	mud	3.28	1011	8/24/2009
-106.5794967	68.1033867	1	very soft fines	3.37	1031	8/24/2009
-106.5796517	68.1033867	1	very soft fines	3.42	1051	8/24/2009
-106.57973	68.1033883	1	very soft fines	3.44	1071	8/24/2009
-106.5798883	68.1033883	1	very soft fines	3.44	1091	8/24/2009
-106.580045	68.1033883	1	very soft fines	3.44	1111	8/24/2009
-106.5802017	68.10339	1	very soft fines	3.44	1131	8/24/2009
-106.5803583	68.1033917	2	mud	3.45	1151	8/24/2009
-106.580515	68.103395	2	mud	3.47	1171	8/24/2009
-106.5806717	68.1033933	1	very soft fines	3.49	1191	8/24/2009
-106.5807517	68.1033933	1	very soft fines	3.49	1211	8/24/2009
-106.5809083	68.1033917	1	very soft fines	3.54	1231	8/24/2009
-106.581065	68.1033933	1	very soft fines	3.56	1251	8/24/2009
-106.5812217	68.1033933	1	very soft fines	3.61	1271	8/24/2009
-106.58138	68.1033933	1	very soft fines	3.65	1291	8/24/2009
-106.581535	68.103395	2	mud	3.63	1311	8/24/2009
-106.5816917	68.1033933	1	very soft fines	3.75	1331	8/24/2009
-106.5817683	68.1033933	1	very soft fines	3.7	1351	8/24/2009
-106.581925	68.1033917	1	very soft fines	3.87	1371	8/24/2009
-106.58208	68.1033883	1	very soft fines	3.82	1391	8/24/2009
-106.582235	68.103385	1	very soft fines	3.85	1411	8/24/2009
-106.58239	68.103385	1	very soft fines	3.87	1431	8/24/2009
-106.582545	68.103385	1	very soft fines	4.06	1451	8/24/2009
-106.5827	68.1033883	1	very soft fines	4.27	1471	8/24/2009
-106.5828483	68.10339	1	very soft fines	4.18	1491	8/24/2009
-106.5829983	68.1033933	1	very soft fines	3.92	1511	8/24/2009
-106.5830717	68.103395	1	very soft fines	3.8	1531	8/24/2009
-106.5832267	68.1033983	1	very soft fines	3.7	1551	8/24/2009
-106.5833783	68.1034	2	mud	3.26	1571	8/24/2009
-106.5835267	68.1034033	2	mud	2.85	1591	8/24/2009
-106.5836	68.1034033	3	gravel, cobble, boulder	1.42	1611	8/24/2009
-106.5837817	68.1034067	3	gravel, cobble, boulder	1.23	1631	8/24/2009
-106.5838667	68.1034067	3	gravel, cobble, boulder	1.15	1651	8/24/2009
-106.5877117	68.1084317	3	gravel, cobble, boulder	4.83	11	8/24/2009
-106.5875783	68.1084367	1	very soft fines	5.42	31	8/24/2009
-106.5874233	68.108435	1	very soft fines	5.54	51	8/24/2009
-106.5872717	68.108425	1	very soft fines	5.71	71	8/24/2009
-106.5872	68.1084183	1	very soft fines	5.82	91	8/24/2009
-106.5870583	68.1084033	1	very soft fines	5.85	111	8/24/2009
-106.5869117	68.108385	1	very soft fines	6.06	131	8/24/2009
-106.5867617	68.1083717	1	very soft fines	6.18	151	8/24/2009
-106.5866083	68.108365	1	very soft fines	6.61	171	8/24/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately 5 m long transect segment (20 pings)
Bottom Type Codes: 1 = very soft fines, 2 = mud, 3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-1. Substrate Data Collected from Hydroacoustic Surveys of Doris Lake,Hope Bay Belt Project, 2009

Longitude	Latitude	Bottom Type	Category	Depth	#Ping	Date
-106.5864533	68.1083633	1	very soft fines	6.49	191	8/24/2009
-106.5863767	68.1083633	1	very soft fines	6.44	211	8/24/2009
-106.58622	68.108365	1	very soft fines	6.28	231	8/24/2009
-106.58606	68.1083683	1	very soft fines	6.23	251	8/24/2009
-106.5859033	68.108375	1	very soft fines	6.2	271	8/24/2009
-106.58575	68.10838	1	very soft fines	6.15	291	8/24/2009
-106.585595	68.1083883	1	very soft fines	6.11	311	8/24/2009
-106.5855167	68.10839	1	very soft fines	6.13	331	8/24/2009
-106.5853567	68.108395	1	very soft fines	6.13	351	8/24/2009
-106.5851967	68.1083967	1	very soft fines	6.2	371	8/24/2009
-106.585035	68.1084017	1	very soft fines	6.21	391	8/24/2009
-106.5848767	68.1084083	1	very soft fines	6.23	411	8/24/2009
-106.58472	68.1084167	1	very soft fines	6.21	431	8/24/2009
-106.5846417	68.1084183	1	very soft fines	6.2	451	8/24/2009
-106.584485	68.1084217	1	very soft fines	6.09	471	8/24/2009
-106.5843317	68.108425	1	very soft fines	6.08	491	8/24/2009
-106.5841767	68.1084267	1	very soft fines	5.99	511	8/24/2009
-106.5840217	68.10843	1	very soft fines	5.9	531	8/24/2009
-106.5838667	68.1084333	1	very soft fines	5.82	551	8/24/2009
-106.58379	68.1084367	1	very soft fines	5.78	571	8/24/2009
-106.5836333	68.1084433	1	very soft fines	5.75	591	8/24/2009
-106.5834783	68.1084483	1	very soft fines	5.64	611	8/24/2009
-106.5833233	68.1084533	1	very soft fines	5.54	631	8/24/2009
-106.5831683	68.10846	2	mud	5.45	651	8/24/2009
-106.58309	68.1084617	2	mud	5.33	671	8/24/2009
-106.5829333	68.1084667	2	mud	5.31	691	8/24/2009
-106.5827783	68.10847	2	mud	5.24	711	8/24/2009
-106.5826183	68.1084717	2	mud	5.23	731	8/24/2009
-106.5824617	68.10847	1	very soft fines	5.21	751	8/24/2009
-106.582305	68.10847	2	mud	5.16	771	8/24/2009
-106.5822267	68.1084717	2	mud	5.14	791	8/24/2009
-106.5820667	68.1084733	2	mud	5.07	811	8/24/2009
-106.58191	68.1084783	3	gravel, cobble, boulder	4.93	831	8/24/2009
-106.581755	68.1084817	2	mud	4.74	851	8/24/2009
-106.5815983	68.108485	2	mud	4.57	871	8/24/2009
-106.58144	68.1084917	2	mud	4.46	891	8/24/2009
-106.5812817	68.1084967	2	mud	4.39	911	8/24/2009
-106.5812033	68.1085	2	mud	4.27	931	8/24/2009
-106.5810467	68.1085067	3	gravel, cobble, boulder	4.18	951	8/24/2009
-106.5808883	68.108515	3	gravel, cobble, boulder	4.08	971	8/24/2009
-106.5807283	68.1085217	3	gravel, cobble, boulder	3.85	991	8/24/2009
-106.5805683	68.1085267	3	gravel, cobble, boulder	3.71	1011	8/24/2009
-106.5804083	68.10853	3	gravel, cobble, boulder	3.66	1031	8/24/2009
-106.5802483	68.1085317	3	gravel, cobble, boulder	3.66	1051	8/24/2009
-106.58009	68.1085333	3	gravel, cobble, boulder	3.68	1071	8/24/2009
-106.5799283	68.108535	2	mud	3.7	1091	8/24/2009
-106.5797667	68.1085367	2	mud	3.7	1111	8/24/2009
-106.579685	68.1085367	3	gravel, cobble, boulder	3.77	1131	8/24/2009
-106.5795233	68.1085367	2	mud	4.13	1151	8/24/2009
-106.579365	68.108535	1	very soft fines	4.22	1171	8/24/2009
-106.5792067	68.1085367	1	very soft fines	4.88	1191	8/24/2009
-106.57905	68.1085367	1	very soft fines	5.33	1211	8/24/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately
5 m long transect segment (20 pings)
Bottom Type Codes: 1 = very soft fines, 2 = mud,
3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-1. Substrate Data Collected from Hydroacoustic Surveys of Doris Lake,Hope Bay Belt Project, 2009

Longitude	Latitude	Bottom Type	Category	Depth	#Ping	Date
-106.5788917	68.1085367	1	very soft fines	5.68	1231	8/24/2009
-106.5788133	68.1085367	1	very soft fines	6.18	1251	8/24/2009
-106.578655	68.1085367	1	very soft fines	6.46	1271	8/24/2009
-106.5784967	68.1085367	1	very soft fines	6.72	1291	8/24/2009
-106.57834	68.1085367	1	very soft fines	6.87	1311	8/24/2009
-106.5782617	68.1085383	1	very soft fines	7.1	1331	8/24/2009
-106.5781033	68.10854	1	very soft fines	7.29	1351	8/24/2009
-106.577945	68.10854	1	very soft fines	7.46	1371	8/24/2009
-106.57779	68.10854	1	very soft fines	7.64	1391	8/24/2009
-106.5776333	68.1085383	1	very soft fines	7.85	1411	8/24/2009
-106.577555	68.1085383	1	very soft fines	8.02	1431	8/24/2009
-106.5773967	68.1085383	1	very soft fines	8.07	1451	8/24/2009
-106.5772383	68.1085367	1	very soft fines	8.19	1471	8/24/2009
-106.5770767	68.1085333	1	very soft fines	8.26	1491	8/24/2009
-106.576915	68.1085283	1	very soft fines	8.37	1511	8/24/2009
-106.576835	68.108525	1	very soft fines	8.45	1531	8/24/2009
-106.57668	68.1085183	1	very soft fines	8.56	1551	8/24/2009
-106.5765283	68.1085183	1	very soft fines	8.61	1571	8/24/2009
-106.5763767	68.1085167	1	very soft fines	8.75	1591	8/24/2009
-106.576225	68.1085167	1	very soft fines	8.44	1611	8/24/2009
-106.5761483	68.108515	1	very soft fines	8.11	1631	8/24/2009
-106.575995	68.1085133	1	very soft fines	7.71	1651	8/24/2009
-106.57584	68.108515	1	very soft fines	7.52	1671	8/24/2009
-106.5756817	68.1085167	1	very soft fines	7.33	1691	8/24/2009
-106.5755233	68.1085183	1	very soft fines	7.19	1711	8/24/2009
-106.5754417	68.10852	1	very soft fines	7.1	1731	8/24/2009
-106.57529	68.10852	1	very soft fines	7.05	1751	8/24/2009
-106.5751417	68.1085167	1	very soft fines	6.98	1771	8/24/2009
-106.574995	68.1085117	1	very soft fines	6.87	1791	8/24/2009
-106.5748467	68.10851	1	very soft fines	6.79	1811	8/24/2009
-106.5747717	68.10851	1	very soft fines	6.77	1831	8/24/2009
-106.5746233	68.1085083	1	very soft fines	6.72	1851	8/24/2009
-106.574475	68.1085083	1	very soft fines	6.68	1871	8/24/2009
-106.574325	68.1085067	1	very soft fines	6.61	1891	8/24/2009
-106.5741783	68.1085033	1	very soft fines	6.65	1911	8/24/2009
-106.5741033	68.1085017	1	very soft fines	6.74	1931	8/24/2009
-106.57395	68.1085017	1	very soft fines	6.6	1951	8/24/2009
-106.573795	68.1085017	1	very soft fines	6.58	1971	8/24/2009
-106.5736383	68.1084983	1	very soft fines	6.56	1991	8/24/2009
-106.5734817	68.108495	1	very soft fines	6.13	2011	8/24/2009
-106.5734033	68.1084933	1	very soft fines	5.61	2031	8/24/2009
-106.5732533	68.1084917	2	mud	4.55	2051	8/24/2009
-106.573105	68.1084883	2	mud	3.85	2071	8/24/2009
-106.572965	68.1084833	3	gravel, cobble, boulder	2.95	2091	8/24/2009
-106.57285	68.10848	3	gravel, cobble, boulder	2.66	2111	8/24/2009
-106.57274	68.108475	3	gravel, cobble, boulder	2.36	2131	8/24/2009
-106.57264	68.10847	3	gravel, cobble, boulder	1.46	2151	8/24/2009
-106.572595	68.1084667	3	gravel, cobble, boulder	1.49	2171	8/24/2009
-106.5740467	68.1125483	3	gravel, cobble, boulder	3	11	8/24/2009
-106.5741067	68.112535	3	gravel, cobble, boulder	3.92	31	8/24/2009
-106.5742133	68.112525	2	mud	5.05	51	8/24/2009
-106.57434	68.1125133	2	mud	7.57	71	8/24/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately
5 m long transect segment (20 pings)
Bottom Type Codes: 1 = very soft fines, 2 = mud,
3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-1. Substrate Data Collected from Hydroacoustic Surveys of Doris Lake,Hope Bay Belt Project, 2009

Longitude	Latitude	Bottom Type	Category	Depth	#Ping	Date
-106.574475	68.1124983	2	mud	8.78	91	8/24/2009
-106.5746117	68.1124817	1	very soft fines	9.5	111	8/24/2009
-106.5746817	68.1124717	1	very soft fines	10.26	131	8/24/2009
-106.57481	68.1124483	1	very soft fines	10.57	151	8/24/2009
-106.5749317	68.1124217	1	very soft fines	10.99	171	8/24/2009
-106.5750617	68.1123983	1	very soft fines	11.16	191	8/24/2009
-106.5751983	68.1123767	1	very soft fines	11.37	211	8/24/2009
-106.5753333	68.112355	1	very soft fines	11.39	231	8/24/2009
-106.5754	68.1123433	1	very soft fines	11.42	251	8/24/2009
-106.5755367	68.1123183	2	mud	11.49	271	8/24/2009
-106.5756767	68.1122983	1	very soft fines	11.61	291	8/24/2009
-106.57582	68.11228	1	very soft fines	11.79	311	8/24/2009
-106.5759617	68.1122617	1	very soft fines	11.86	331	8/24/2009
-106.576105	68.1122433	2	mud	11.87	351	8/24/2009
-106.5761767	68.1122333	1	very soft fines	11.87	371	8/24/2009
-106.5763183	68.1122117	1	very soft fines	11.72	391	8/24/2009
-106.576465	68.1121917	1	very soft fines	11.77	411	8/24/2009
-106.576615	68.1121767	1	very soft fines	11.67	431	8/24/2009
-106.5767667	68.112165	1	very soft fines	11.65	451	8/24/2009
-106.5768417	68.1121583	2	mud	11.49	471	8/24/2009
-106.5769917	68.1121483	1	very soft fines	11.4	491	8/24/2009
-106.5771417	68.1121367	1	very soft fines	11.28	511	8/24/2009
-106.577295	68.1121267	1	very soft fines	11.25	531	8/24/2009
-106.57745	68.1121133	1	very soft fines	11.09	551	8/24/2009
-106.5775267	68.1121083	1	very soft fines	11.02	571	8/24/2009
-106.5776817	68.1120967	1	very soft fines	10.92	591	8/24/2009
-106.577835	68.112085	1	very soft fines	10.8	611	8/24/2009
-106.5779883	68.1120733	1	very soft fines	10.68	631	8/24/2009
-106.5781433	68.112065	1	very soft fines	10.52	651	8/24/2009
-106.5782967	68.112055	1	very soft fines	10.35	671	8/24/2009
-106.5783733	68.11205	1	very soft fines	10.26	691	8/24/2009
-106.578525	68.11204	2	mud	10.22	711	8/24/2009
-106.5786783	68.1120317	1	very soft fines	10.21	731	8/24/2009
-106.57883	68.1120217	2	mud	10.19	751	8/24/2009
-106.57898	68.11201	1	very soft fines	10.24	771	8/24/2009
-106.579055	68.1120033	1	very soft fines	10.31	791	8/24/2009
-106.5792067	68.1119883	2	mud	10.5	811	8/24/2009
-106.5793617	68.1119767	1	very soft fines	10.62	831	8/24/2009
-106.57951	68.1119617	1	very soft fines	10.99	851	8/24/2009
-106.57966	68.1119467	1	very soft fines	11.39	871	8/24/2009
-106.579735	68.1119367	1	very soft fines	11.72	891	8/24/2009
-106.5798867	68.1119217	1	very soft fines	12.15	911	8/24/2009
-106.5800417	68.1119083	1	very soft fines	12.45	931	8/24/2009
-106.5801983	68.1118983	1	very soft fines	12.79	951	8/24/2009
-106.5803533	68.1118867	1	very soft fines	12.93	971	8/24/2009
-106.58051	68.1118733	1	very soft fines	13.12	991	8/24/2009
-106.5805883	68.1118667	–	–	13.31	1011	8/24/2009
-106.580745	68.111855	1	very soft fines	13.44	1031	8/24/2009
-106.5809083	68.111845	1	very soft fines	13.37	1051	8/24/2009
-106.5810717	68.1118367	1	very soft fines	13.45	1071	8/24/2009
-106.5812333	68.1118283	1	very soft fines	13.23	1091	8/24/2009
-106.581395	68.1118183	1	very soft fines	13.02	1111	8/24/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately
5 m long transect segment (20 pings)
Bottom Type Codes: 1 = very soft fines, 2 = mud,
3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-1. Substrate Data Collected from Hydroacoustic Surveys of Doris Lake,Hope Bay Belt Project, 2009

Longitude	Latitude	Bottom Type	Category	Depth	#Ping	Date
-106.5815583	68.1118083	1	very soft fines	12.85	1131	8/24/2009
-106.5816383	68.1118033	1	very soft fines	12.64	1151	8/24/2009
-106.5818	68.1117967	1	very soft fines	12.52	1171	8/24/2009
-106.5819617	68.11179	1	very soft fines	12.17	1191	8/24/2009
-106.5821267	68.1117833	1	very soft fines	11.96	1211	8/24/2009
-106.58229	68.1117767	1	very soft fines	11.67	1231	8/24/2009
-106.582455	68.1117733	1	very soft fines	11.56	1251	8/24/2009
-106.5826167	68.1117633	1	very soft fines	11.18	1271	8/24/2009
-106.5826917	68.1117567	1	very soft fines	10.81	1291	8/24/2009
-106.5828433	68.11174	1	very soft fines	10.5	1311	8/24/2009
-106.5829967	68.11172	1	very soft fines	10.14	1331	8/24/2009
-106.58315	68.1117017	1	very soft fines	9.65	1351	8/24/2009
-106.5833017	68.1116833	1	very soft fines	9.43	1371	8/24/2009
-106.58346	68.1116683	–	–	9.22	1391	8/24/2009
-106.5836217	68.111655	2	mud	9.15	1411	8/24/2009
-106.5837	68.1116483	–	–	9.15	1431	8/24/2009
-106.5838567	68.11164	1	very soft fines	9.32	1451	8/24/2009
-106.5840167	68.11163	1	very soft fines	9.44	1471	8/24/2009
-106.58417	68.11162	1	very soft fines	9.58	1491	8/24/2009
-106.5843233	68.1116083	1	very soft fines	9.81	1511	8/24/2009
-106.5844767	68.1115967	2	mud	9.96	1531	8/24/2009
-106.58463	68.111585	1	very soft fines	10.05	1551	8/24/2009
-106.584785	68.1115733	1	very soft fines	9.95	1571	8/24/2009
-106.5849417	68.1115583	1	very soft fines	9.84	1591	8/24/2009
-106.5850933	68.1115433	1	very soft fines	9.81	1611	8/24/2009
-106.5851683	68.111535	1	very soft fines	9.76	1631	8/24/2009
-106.5853183	68.1115217	1	very soft fines	9.6	1651	8/24/2009
-106.5854683	68.11151	1	very soft fines	9.53	1671	8/24/2009
-106.58562	68.1114967	1	very soft fines	9.48	1691	8/24/2009
-106.5857667	68.11148	1	very soft fines	9.37	1711	8/24/2009
-106.585915	68.1114617	1	very soft fines	9.36	1731	8/24/2009
-106.58606	68.111445	1	very soft fines	9.24	1751	8/24/2009
-106.5861317	68.1114367	1	very soft fines	8.96	1771	8/24/2009
-106.5862817	68.1114217	1	very soft fines	8.58	1791	8/24/2009
-106.5864283	68.1114067	1	very soft fines	7.93	1811	8/24/2009
-106.5865783	68.11139	1	very soft fines	7.22	1831	8/24/2009
-106.5867333	68.111375	1	very soft fines	6.68	1851	8/24/2009
-106.5868917	68.1113583	1	very soft fines	6.23	1871	8/24/2009
-106.587045	68.11134	2	mud	5.92	1891	8/24/2009
-106.5871217	68.1113317	1	very soft fines	5.78	1911	8/24/2009
-106.5872667	68.11131	2	mud	5.61	1931	8/24/2009
-106.5874117	68.1112883	2	mud	5.64	1951	8/24/2009
-106.587555	68.1112667	1	very soft fines	5.55	1971	8/24/2009
-106.5876983	68.1112483	2	mud	5.55	1991	8/24/2009
-106.5878483	68.1112317	2	mud	5.57	2011	8/24/2009
-106.5880017	68.1112183	1	very soft fines	5.57	2031	8/24/2009
-106.588075	68.1112117	1	very soft fines	5.61	2051	8/24/2009
-106.5882267	68.1112	2	mud	5.62	2071	8/24/2009
-106.588375	68.11119	1	very soft fines	5.66	2091	8/24/2009
-106.5885217	68.11118	2	mud	5.68	2111	8/24/2009
-106.58867	68.1111717	1	very soft fines	5.69	2131	8/24/2009
-106.5887433	68.1111667	1	very soft fines	5.71	2151	8/24/2009

Notes:
Coordinates (long, lat) are NAD83
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Bottom Type Codes: 1 = very soft fines, 2 = mud,
3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-1. Substrate Data Collected from Hydroacoustic Surveys of Doris Lake,Hope Bay Belt Project, 2009

Longitude	Latitude	Bottom Type	Category	Depth	#Ping	Date
-106.5888917	68.11116	1	very soft fines	5.73	2171	8/24/2009
-106.5890383	68.1111533	2	mud	5.71	2191	8/24/2009
-106.5891833	68.11115	2	mud	5.73	2211	8/24/2009
-106.5893283	68.111145	1	very soft fines	5.59	2231	8/24/2009
-106.5894733	68.1111433	2	mud	5.47	2251	8/24/2009
-106.5895433	68.1111417	1	very soft fines	5.24	2271	8/24/2009
-106.589675	68.1111383	1	very soft fines	4.84	2291	8/24/2009
-106.5897783	68.1111333	1	very soft fines	3.85	2311	8/24/2009
-106.5898533	68.1111267	2	mud	3.32	2331	8/24/2009
-106.5898783	68.1111183	2	mud	3.19	2351	8/24/2009
-106.592715	68.11411	3	gravel, cobble, boulder	1.18	11	8/24/2009
-106.59269	68.1140967	3	gravel, cobble, boulder	1.2	31	8/24/2009
-106.5926483	68.1140933	3	gravel, cobble, boulder	1.39	51	8/24/2009
-106.5925817	68.1140983	3	gravel, cobble, boulder	1.58	71	8/24/2009
-106.59247	68.1141133	3	gravel, cobble, boulder	2.19	91	8/24/2009
-106.5923267	68.1141317	2	mud	2.43	111	8/24/2009
-106.5921683	68.1141483	2	mud	3.12	131	8/24/2009
-106.5920867	68.114155	2	mud	3.85	151	8/24/2009
-106.5919267	68.114165	1	very soft fines	4.01	171	8/24/2009
-106.59176	68.1141733	1	very soft fines	4.55	191	8/24/2009
-106.591595	68.11418	2	mud	5.17	211	8/24/2009
-106.59145	68.1141883	1	very soft fines	5.36	231	8/24/2009
-106.59138	68.1141933	2	mud	5.59	251	8/24/2009
-106.5912383	68.114205	2	mud	5.8	271	8/24/2009
-106.591095	68.1142167	2	mud	6.08	291	8/24/2009
-106.59095	68.11423	2	mud	6.23	311	8/24/2009
-106.5908033	68.1142417	2	mud	6.41	331	8/24/2009
-106.59066	68.1142517	1	very soft fines	6.6	351	8/24/2009
-106.5905867	68.1142567	2	mud	6.68	371	8/24/2009
-106.5904433	68.1142683	2	mud	6.86	391	8/24/2009
-106.5903017	68.1142817	2	mud	7.08	411	8/24/2009
-106.5901633	68.114295	1	very soft fines	7.19	431	8/24/2009
-106.5900233	68.1143117	2	mud	7.31	451	8/24/2009
-106.5898833	68.1143283	2	mud	7.45	471	8/24/2009
-106.58981	68.1143367	2	mud	7.6	491	8/24/2009
-106.5896633	68.1143517	2	mud	7.72	511	8/24/2009
-106.58952	68.1143667	2	mud	7.93	531	8/24/2009
-106.5893733	68.1143817	–	–	8.05	551	8/24/2009
-106.5892267	68.1143983	2	mud	8.35	571	8/24/2009
-106.5890817	68.1144133	2	mud	8.49	591	8/24/2009
-106.588935	68.114425	2	mud	8.68	611	8/24/2009
-106.58886	68.1144317	2	mud	9.1	631	8/24/2009
-106.5887083	68.1144433	2	mud	9.2	651	8/24/2009
-106.5885567	68.1144567	1	very soft fines	9.55	671	8/24/2009
-106.5884067	68.11447	1	very soft fines	9.81	691	8/24/2009
-106.5882583	68.114485	2	mud	10.05	711	8/24/2009
-106.5881117	68.1144983	2	mud	10.31	731	8/24/2009
-106.5879617	68.11451	2	mud	10.69	751	8/24/2009
-106.5878133	68.1145217	1	very soft fines	10.9	771	8/24/2009
-106.5876633	68.1145333	2	mud	11.08	791	8/24/2009
-106.58759	68.1145383	2	mud	11.2	811	8/24/2009
-106.5874417	68.11455	2	mud	11.46	831	8/24/2009

Notes:
Coordinates (long, lat) are NAD83
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5 m long transect segment (20 pings)
Bottom Type Codes: 1 = very soft fines, 2 = mud,
3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-1. Substrate Data Collected from Hydroacoustic Surveys of Doris Lake,Hope Bay Belt Project, 2009

Longitude	Latitude	Bottom Type	Category	Depth	#Ping	Date
-106.587295	68.1145633	2	mud	11.65	851	8/24/2009
-106.5871467	68.114575	2	mud	11.82	871	8/24/2009
-106.5869983	68.114585	2	mud	11.93	891	8/24/2009
-106.5868483	68.114595	1	very soft fines	12.13	911	8/24/2009
-106.5867	68.114605	1	very soft fines	12.22	931	8/24/2009
-106.5865517	68.1146167	1	very soft fines	12.45	951	8/24/2009
-106.5864017	68.1146317	1	very soft fines	12.59	971	8/24/2009
-106.586255	68.114645	2	mud	12.78	991	8/24/2009
-106.58618	68.1146533	2	mud	12.88	1011	8/24/2009
-106.58603	68.1146617	1	very soft fines	13.02	1031	8/24/2009
-106.5858817	68.11467	1	very soft fines	13.11	1051	8/24/2009
-106.58573	68.1146817	1	very soft fines	13.18	1071	8/24/2009
-106.585575	68.11469	1	very soft fines	13.3	1091	8/24/2009
-106.5854217	68.1146983	1	very soft fines	13.35	1111	8/24/2009
-106.5852683	68.114705	1	very soft fines	13.51	1131	8/24/2009
-106.585115	68.1147133	1	very soft fines	13.66	1151	8/24/2009
-106.5850383	68.1147183	1	very soft fines	13.78	1171	8/24/2009
-106.5848867	68.1147283	1	very soft fines	13.89	1191	8/24/2009
-106.58474	68.1147383	2	mud	13.92	1211	8/24/2009
-106.5845917	68.1147467	1	very soft fines	13.96	1231	8/24/2009
-106.58444	68.1147583	1	very soft fines	14.01	1251	8/24/2009
-106.5842883	68.114765	1	very soft fines	14.04	1271	8/24/2009
-106.5841333	68.1147717	2	mud	14.08	1291	8/24/2009
-106.5840567	68.114775	1	very soft fines	14.15	1311	8/24/2009
-106.5839033	68.114785	1	very soft fines	14.17	1331	8/24/2009
-106.5837533	68.114795	1	very soft fines	14.17	1351	8/24/2009
-106.583605	68.1148067	1	very soft fines	14.18	1371	8/24/2009
-106.5834517	68.1148183	2	mud	14.17	1391	8/24/2009
-106.5832967	68.1148333	1	very soft fines	14.15	1411	8/24/2009
-106.5831433	68.114845	2	mud	14.15	1431	8/24/2009
-106.58299	68.1148517	1	very soft fines	14.15	1451	8/24/2009
-106.5829133	68.1148567	1	very soft fines	14.17	1471	8/24/2009
-106.58276	68.1148633	1	very soft fines	14.18	1491	8/24/2009
-106.5826067	68.1148733	1	very soft fines	14.17	1511	8/24/2009
-106.582455	68.1148817	1	very soft fines	14.18	1531	8/24/2009
-106.5823033	68.1148917	1	very soft fines	14.25	1551	8/24/2009
-106.5821533	68.1149033	1	very soft fines	14.23	1571	8/24/2009
-106.5820033	68.1149167	1	very soft fines	14.25	1591	8/24/2009
-106.5818517	68.1149283	1	very soft fines	14.29	1611	8/24/2009
-106.581775	68.1149317	1	very soft fines	14.3	1631	8/24/2009
-106.5816233	68.11494	1	very soft fines	14.3	1651	8/24/2009
-106.5814733	68.1149483	1	very soft fines	14.3	1671	8/24/2009
-106.5813217	68.1149617	1	very soft fines	14.29	1691	8/24/2009
-106.5811717	68.1149733	1	very soft fines	14.32	1711	8/24/2009
-106.5810183	68.1149867	1	very soft fines	14.34	1731	8/24/2009
-106.5808633	68.114995	1	very soft fines	14.39	1751	8/24/2009
-106.580785	68.115	1	very soft fines	14.3	1771	8/24/2009
-106.5806317	68.11501	1	very soft fines	14.41	1791	8/24/2009
-106.5804767	68.1150167	1	very soft fines	14.44	1811	8/24/2009
-106.5803233	68.1150233	1	very soft fines	14.46	1831	8/24/2009
-106.5801733	68.1150317	1	very soft fines	14.48	1851	8/24/2009
-106.5800233	68.1150383	1	very soft fines	14.48	1871	8/24/2009

Notes:
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5 m long transect segment (20 pings)
Bottom Type Codes: 1 = very soft fines, 2 = mud,
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Dashes (-) = no data collected

Appendix 3.1-1. Substrate Data Collected from Hydroacoustic Surveys of Doris Lake,Hope Bay Belt Project, 2009

Longitude	Latitude	Bottom Type	Category	Depth	#Ping	Date
-106.57987	68.1150467	–	–	14.48	1891	8/24/2009
-106.579795	68.11505	1	very soft fines	14.44	1911	8/24/2009
-106.5796483	68.115055	1	very soft fines	14.44	1931	8/24/2009
-106.5795	68.11506	1	very soft fines	14.43	1951	8/24/2009
-106.5793467	68.1150667	1	very soft fines	14.46	1971	8/24/2009
-106.579195	68.1150733	1	very soft fines	14.49	1991	8/24/2009
-106.5790417	68.1150817	2	mud	14.48	2011	8/24/2009
-106.578965	68.115085	1	very soft fines	14.48	2031	8/24/2009
-106.57881	68.1150917	1	very soft fines	14.48	2051	8/24/2009
-106.5786583	68.1150983	1	very soft fines	14.49	2071	8/24/2009
-106.578505	68.115105	1	very soft fines	14.51	2091	8/24/2009
-106.5783517	68.1151117	1	very soft fines	14.51	2111	8/24/2009
-106.5782	68.1151183	1	very soft fines	14.41	2131	8/24/2009
-106.5780483	68.1151233	1	very soft fines	14.22	2151	8/24/2009
-106.5779717	68.115125	1	very soft fines	13.89	2171	8/24/2009
-106.5778217	68.11513	1	very soft fines	13.59	2191	8/24/2009
-106.57767	68.1151317	1	very soft fines	13	2211	8/24/2009
-106.5775167	68.1151367	1	very soft fines	12.31	2231	8/24/2009
-106.577365	68.115145	1	very soft fines	11.7	2251	8/24/2009
-106.5772133	68.1151533	1	very soft fines	10.03	2271	8/24/2009
-106.5770633	68.11516	1	very soft fines	8.49	2291	8/24/2009
-106.5769167	68.1151617	1	very soft fines	7.67	2311	8/24/2009
-106.5768433	68.1151633	1	very soft fines	5.87	2331	8/24/2009
-106.576695	68.1151633	3	gravel, cobble, boulder	4.36	2351	8/24/2009
-106.5765467	68.11516	3	gravel, cobble, boulder	2.69	2371	8/24/2009
-106.57642	68.1151567	3	gravel, cobble, boulder	1.58	2391	8/24/2009
-106.5763317	68.11515	3	gravel, cobble, boulder	1.23	2411	8/24/2009
-106.576285	68.1151367	3	gravel, cobble, boulder	0.94	2431	8/24/2009
-106.5775467	68.1178783	3	gravel, cobble, boulder	2.55	11	8/24/2009
-106.57767	68.11786	3	gravel, cobble, boulder	3.73	31	8/24/2009
-106.577865	68.117815	3	gravel, cobble, boulder	5.99	60	8/24/2009
-106.5779317	68.1178033	3	gravel, cobble, boulder	7.85	80	8/24/2009
-106.5780667	68.117785	3	gravel, cobble, boulder	9.34	100	8/24/2009
-106.578205	68.1177683	2	mud	10.42	120	8/24/2009
-106.57835	68.1177467	1	very soft fines	12	140	8/24/2009
-106.5784933	68.1177233	1	very soft fines	12.62	160	8/24/2009
-106.5786383	68.1177017	1	very soft fines	13.68	180	8/24/2009
-106.5787833	68.1176883	1	very soft fines	13.94	200	8/24/2009
-106.5788583	68.1176833	2	mud	14.32	220	8/24/2009
-106.5790083	68.11768	1	very soft fines	14.88	240	8/24/2009
-106.57916	68.1176783	1	very soft fines	15.26	260	8/24/2009
-106.57931	68.1176783	1	very soft fines	15.54	280	8/24/2009
-106.5794583	68.1176767	1	very soft fines	15.61	300	8/24/2009
-106.5796067	68.117675	1	very soft fines	15.59	320	8/24/2009
-106.579755	68.1176733	1	very soft fines	15.61	340	8/24/2009
-106.57983	68.1176733	1	very soft fines	15.66	360	8/24/2009
-106.5799767	68.1176733	1	very soft fines	15.76	380	8/24/2009
-106.5801267	68.1176683	1	very soft fines	15.87	400	8/24/2009
-106.5802767	68.1176667	1	very soft fines	15.85	420	8/24/2009
-106.5804267	68.117665	1	very soft fines	15.9	440	8/24/2009
-106.5805767	68.1176617	1	very soft fines	15.94	460	8/24/2009
-106.5806517	68.1176617	1	very soft fines	15.94	480	8/24/2009

Notes:
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Appendix 3.1-1. Substrate Data Collected from Hydroacoustic Surveys of Doris Lake,Hope Bay Belt Project, 2009

Longitude	Latitude	Bottom Type	Category	Depth	#Ping	Date
-106.5808017	68.1176617	1	very soft fines	15.97	500	8/24/2009
-106.5809517	68.1176583	1	very soft fines	15.99	520	8/24/2009
-106.5811017	68.1176567	1	very soft fines	16.04	540	8/24/2009
-106.5812517	68.1176517	1	very soft fines	16.11	560	8/24/2009
-106.5814017	68.11765	1	very soft fines	16.11	580	8/24/2009
-106.5814767	68.11765	1	very soft fines	16.07	600	8/24/2009
-106.5816267	68.1176517	1	very soft fines	16.04	620	8/24/2009
-106.5817767	68.1176567	1	very soft fines	15.97	640	8/24/2009
-106.5819283	68.1176583	1	very soft fines	15.9	660	8/24/2009
-106.58208	68.1176583	1	very soft fines	15.87	680	8/24/2009
-106.58223	68.1176583	1	very soft fines	15.87	700	8/24/2009
-106.5823817	68.1176583	1	very soft fines	15.88	720	8/24/2009
-106.5825333	68.1176583	1	very soft fines	15.9	740	8/24/2009
-106.582685	68.1176583	1	very soft fines	15.9	760	8/24/2009
-106.58276	68.1176567	1	very soft fines	15.94	780	8/24/2009
-106.5829083	68.1176583	1	very soft fines	15.88	800	8/24/2009
-106.5830583	68.11766	1	very soft fines	15.85	820	8/24/2009
-106.5832083	68.1176567	1	very soft fines	15.83	840	8/24/2009
-106.5833567	68.1176483	1	very soft fines	15.83	860	8/24/2009
-106.5835	68.117635	1	very soft fines	15.81	880	8/24/2009
-106.5836433	68.1176183	1	very soft fines	15.8	900	8/24/2009
-106.5837167	68.1176133	1	very soft fines	15.81	920	8/24/2009
-106.5838683	68.1176033	1	very soft fines	15.81	940	8/24/2009
-106.58402	68.1175983	1	very soft fines	15.81	960	8/24/2009
-106.5841733	68.117595	1	very soft fines	15.8	980	8/24/2009
-106.5843283	68.11759	1	very soft fines	15.83	1000	8/24/2009
-106.58448	68.1175867	1	very soft fines	15.85	1020	8/24/2009
-106.5846317	68.1175817	1	very soft fines	15.81	1040	8/24/2009
-106.5847833	68.1175783	1	very soft fines	15.73	1060	8/24/2009
-106.5848583	68.1175767	2	mud	15.81	1080	8/24/2009
-106.5850133	68.11757	1	very soft fines	15.85	1100	8/24/2009
-106.5851667	68.1175617	1	very soft fines	15.76	1120	8/24/2009
-106.5853183	68.1175583	1	very soft fines	15.8	1140	8/24/2009
-106.5854717	68.1175567	1	very soft fines	15.83	1160	8/24/2009
-106.5856233	68.117555	1	very soft fines	15.83	1180	8/24/2009
-106.5857733	68.1175533	1	very soft fines	15.83	1200	8/24/2009
-106.5859267	68.1175467	1	very soft fines	15.76	1220	8/24/2009
-106.5860017	68.117545	1	very soft fines	15.76	1240	8/24/2009
-106.5861533	68.11754	1	very soft fines	15.73	1260	8/24/2009
-106.5863067	68.1175367	1	very soft fines	15.71	1280	8/24/2009
-106.5864583	68.1175283	1	very soft fines	15.69	1300	8/24/2009
-106.5866067	68.1175133	–	–	15.69	1320	8/24/2009
-106.586755	68.1174967	1	very soft fines	15.68	1340	8/24/2009
-106.586905	68.1174833	1	very soft fines	15.64	1360	8/24/2009
-106.5870583	68.117475	1	very soft fines	15.62	1380	8/24/2009
-106.587215	68.11747	1	very soft fines	15.55	1400	8/24/2009
-106.5872933	68.1174683	1	very soft fines	15.55	1420	8/24/2009
-106.5874517	68.1174667	1	very soft fines	15.48	1440	8/24/2009
-106.5876083	68.117465	2	mud	15.43	1460	8/24/2009
-106.587765	68.1174633	2	mud	15.43	1480	8/24/2009
-106.58792	68.1174633	2	mud	15.28	1500	8/24/2009
-106.588075	68.1174583	–	–	15.12	1520	8/24/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately 5 m long transect segment (20 pings)
Bottom Type Codes: 1 = very soft fines, 2 = mud, 3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-1. Substrate Data Collected from Hydroacoustic Surveys of Doris Lake,Hope Bay Belt Project, 2009

Longitude	Latitude	Bottom Type	Category	Depth	#Ping	Date
-106.5882283	68.11745	2	mud	14.84	1540	8/24/2009
-106.5883033	68.1174467	1	very soft fines	14.48	1560	8/24/2009
-106.58846	68.1174417	2	mud	14.15	1580	8/24/2009
-106.5886167	68.1174383	2	mud	13.78	1600	8/24/2009
-106.5887733	68.11744	1	very soft fines	13.37	1620	8/24/2009
-106.5889267	68.1174367	1	very soft fines	12.57	1640	8/24/2009
-106.5890783	68.117435	1	very soft fines	12.12	1660	8/24/2009
-106.5892317	68.117435	1	very soft fines	11.6	1680	8/24/2009
-106.5893867	68.117435	2	mud	10.9	1700	8/24/2009
-106.5895417	68.117435	2	mud	10.36	1720	8/24/2009
-106.58962	68.117435	2	mud	10.03	1740	8/24/2009
-106.5897717	68.1174383	2	mud	9.95	1760	8/24/2009
-106.589925	68.1174383	2	mud	9.83	1780	8/24/2009
-106.5900767	68.1174383	2	mud	9.76	1800	8/24/2009
-106.590225	68.1174333	2	mud	9.65	1820	8/24/2009
-106.5903733	68.11743	2	mud	9.58	1840	8/24/2009
-106.590525	68.117425	2	mud	9.5	1860	8/24/2009
-106.5906783	68.1174217	1	very soft fines	9.34	1880	8/24/2009
-106.5907583	68.1174167	2	mud	9.22	1900	8/24/2009
-106.5909133	68.1174083	2	mud	8.99	1920	8/24/2009
-106.5910717	68.1174	2	mud	8.94	1940	8/24/2009
-106.5912283	68.117395	2	mud	8.75	1960	8/24/2009
-106.5913833	68.1173867	2	mud	8.66	1980	8/24/2009
-106.5915383	68.1173767	2	mud	8.47	2000	8/24/2009
-106.5916933	68.11736	2	mud	8.38	2020	8/24/2009
-106.59185	68.1173417	1	very soft fines	8.28	2040	8/24/2009
-106.5919283	68.1173333	2	mud	8.25	2060	8/24/2009
-106.59209	68.117325	2	mud	8.19	2080	8/24/2009
-106.59225	68.1173167	2	mud	8.07	2100	8/24/2009
-106.592405	68.11731	2	mud	7.86	2120	8/24/2009
-106.5925567	68.1173033	2	mud	7.74	2140	8/24/2009
-106.59271	68.1172983	2	mud	7.52	2160	8/24/2009
-106.5928617	68.1172967	2	mud	7.19	2180	8/24/2009
-106.593015	68.1172967	1	very soft fines	6.89	2200	8/24/2009
-106.5930917	68.1172967	2	mud	6.32	2220	8/24/2009
-106.5932467	68.1172967	1	very soft fines	6.23	2240	8/24/2009
-106.5933983	68.1172967	2	mud	5.47	2260	8/24/2009
-106.5935467	68.1172983	1	very soft fines	4.95	2280	8/24/2009
-106.593695	68.1173	1	very soft fines	4.6	2300	8/24/2009
-106.5938317	68.1173	2	mud	3.59	2320	8/24/2009
-106.5939633	68.1173	2	mud	2.59	2340	8/24/2009
-106.5940917	68.1173	3	gravel, cobble, boulder	2	2360	8/24/2009
-106.5941517	68.1172983	3	gravel, cobble, boulder	2.03	2380	8/24/2009
-106.5942633	68.1172983	1	very soft fines	2.01	2400	8/24/2009
-106.594355	68.1172933	1	very soft fines	1.91	2420	8/24/2009
-106.5938517	68.120565	3	gravel, cobble, boulder	1.86	11	8/24/2009
-106.5937167	68.1205817	3	gravel, cobble, boulder	1.86	31	8/24/2009
-106.5936433	68.12059	2	mud	3.06	51	8/24/2009
-106.5934917	68.1206033	2	mud	4.22	71	8/24/2009
-106.5933367	68.120615	2	mud	4.25	91	8/24/2009
-106.5931817	68.1206267	2	mud	3.65	111	8/24/2009
-106.5930233	68.1206367	3	gravel, cobble, boulder	2.67	131	8/24/2009

Notes:
Coordinates (long, lat) are NAD83
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Bottom Type Codes: 1 = very soft fines, 2 = mud,
3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-1. Substrate Data Collected from Hydroacoustic Surveys of Doris Lake,Hope Bay Belt Project, 2009

Longitude	Latitude	Bottom Type	Category	Depth	#Ping	Date
-106.5928633	68.120645	3	gravel, cobble, boulder	2.5	151	8/24/2009
-106.5927017	68.1206517	3	gravel, cobble, boulder	2.62	171	8/24/2009
-106.59262	68.1206533	3	gravel, cobble, boulder	2.59	181	8/24/2009
-106.5924567	68.1206567	3	gravel, cobble, boulder	2.46	201	8/24/2009
-106.5922967	68.12066	3	gravel, cobble, boulder	3.78	221	8/24/2009
-106.5921367	68.1206633	2	mud	4.2	241	8/24/2009
-106.5920583	68.120665	2	mud	5.03	261	8/24/2009
-106.59182	68.1206717	2	mud	5.52	291	8/24/2009
-106.5916617	68.120675	2	mud	6.04	311	8/24/2009
-106.5915067	68.1206767	2	mud	6.86	331	8/24/2009
-106.5913567	68.12068	2	mud	7.38	351	8/24/2009
-106.5912017	68.1206817	2	mud	7.6	371	8/24/2009
-106.5910433	68.1206817	2	mud	8.21	391	8/24/2009
-106.5909633	68.12068	2	mud	8.47	411	8/24/2009
-106.5908017	68.1206767	2	mud	8.85	431	8/24/2009
-106.5906483	68.1206733	2	mud	9.51	451	8/24/2009
-106.5904967	68.1206667	2	mud	10.24	471	8/24/2009
-106.590345	68.1206583	1	very soft fines	10.8	491	8/24/2009
-106.59019	68.12065	2	mud	11.77	511	8/24/2009
-106.5900367	68.120645	2	mud	12.31	531	8/24/2009
-106.5898817	68.12064	2	mud	12.79	551	8/24/2009
-106.5898017	68.1206383	2	mud	13.42	571	8/24/2009
-106.5896467	68.12064	2	mud	14.06	591	8/24/2009
-106.5894917	68.1206417	2	mud	14.48	611	8/24/2009
-106.5893367	68.1206417	2	mud	14.88	631	8/24/2009
-106.5891817	68.1206417	2	mud	15.45	651	8/24/2009
-106.5890267	68.1206433	2	mud	15.73	671	8/24/2009
-106.588875	68.1206483	2	mud	15.94	691	8/24/2009
-106.5887233	68.1206583	–	–	16.01	711	8/24/2009
-106.588575	68.1206733	2	mud	16.01	731	8/24/2009
-106.5885	68.12068	2	mud	16.06	751	8/24/2009
-106.5883533	68.1206983	2	mud	16.09	771	8/24/2009
-106.588205	68.120715	2	mud	16.18	791	8/24/2009
-106.5880533	68.1207283	2	mud	16.37	811	8/24/2009
-106.5879033	68.1207367	1	very soft fines	16.39	831	8/24/2009
-106.58775	68.120745	1	very soft fines	16.49	851	8/24/2009
-106.5875967	68.1207517	1	very soft fines	16.47	871	8/24/2009
-106.5874433	68.1207567	1	very soft fines	16.49	891	8/24/2009
-106.5873683	68.12076	1	very soft fines	16.46	911	8/24/2009
-106.5872117	68.1207667	1	very soft fines	16.53	931	8/24/2009
-106.5870567	68.12077	1	very soft fines	16.6	951	8/24/2009
-106.5869033	68.120775	1	very soft fines	16.66	971	8/24/2009
-106.5867533	68.1207833	1	very soft fines	16.79	991	8/24/2009
-106.5866033	68.12079	1	very soft fines	16.51	1011	8/24/2009
-106.5864517	68.120795	1	very soft fines	16.93	1031	8/24/2009
-106.5863033	68.1208	1	very soft fines	16.96	1051	8/24/2009
-106.5862267	68.1208033	2	mud	16.93	1071	8/24/2009
-106.5860783	68.1208083	1	very soft fines	16.94	1091	8/24/2009
-106.5859283	68.120815	1	very soft fines	16.87	1111	8/24/2009
-106.5857783	68.1208183	1	very soft fines	16.82	1131	8/24/2009
-106.5856233	68.1208217	1	very soft fines	16.82	1151	8/24/2009
-106.5854717	68.1208217	1	very soft fines	16.86	1171	8/24/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately
5 m long transect segment (20 pings)
Bottom Type Codes: 1 = very soft fines, 2 = mud,
3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-1. Substrate Data Collected from Hydroacoustic Surveys of Doris Lake,Hope Bay Belt Project, 2009

Longitude	Latitude	Bottom Type	Category	Depth	#Ping	Date
-106.58532	68.12082	1	very soft fines	16.84	1191	8/24/2009
-106.58517	68.12082	1	very soft fines	16.66	1211	8/24/2009
-106.5850933	68.1208217	1	very soft fines	16.93	1231	8/24/2009
-106.5849433	68.1208267	1	very soft fines	16.93	1251	8/24/2009
-106.5847933	68.1208333	1	very soft fines	16.91	1271	8/24/2009
-106.5846417	68.1208417	1	very soft fines	16.8	1291	8/24/2009
-106.58449	68.1208483	1	very soft fines	16.84	1311	8/24/2009
-106.584335	68.12085	1	very soft fines	16.84	1331	8/24/2009
-106.5841783	68.12085	1	very soft fines	16.82	1351	8/24/2009
-106.584025	68.1208517	1	very soft fines	16.86	1371	8/24/2009
-106.5839483	68.120855	1	very soft fines	16.86	1391	8/24/2009
-106.5837967	68.1208583	1	very soft fines	16.87	1411	8/24/2009
-106.5836433	68.1208633	1	very soft fines	16.89	1431	8/24/2009
-106.58349	68.1208683	1	very soft fines	16.91	1451	8/24/2009
-106.5833383	68.120875	1	very soft fines	16.93	1471	8/24/2009
-106.5831867	68.12088	1	very soft fines	16.93	1491	8/24/2009
-106.5830333	68.1208833	1	very soft fines	16.93	1511	8/24/2009
-106.5828817	68.1208817	1	very soft fines	16.96	1531	8/24/2009
-106.5828067	68.12088	1	very soft fines	16.96	1551	8/24/2009
-106.5826567	68.1208733	1	very soft fines	16.96	1571	8/24/2009
-106.5825067	68.1208667	1	very soft fines	16.91	1591	8/24/2009
-106.5823567	68.120865	1	very soft fines	16.93	1611	8/24/2009
-106.582205	68.1208617	1	very soft fines	16.87	1631	8/24/2009
-106.5820533	68.1208583	1	very soft fines	16.93	1651	8/24/2009
-106.5819033	68.1208567	1	very soft fines	16.87	1671	8/24/2009
-106.5818267	68.1208567	1	very soft fines	16.93	1691	8/24/2009
-106.5816767	68.1208533	1	very soft fines	17.01	1711	8/24/2009
-106.581525	68.1208533	1	very soft fines	17.01	1731	8/24/2009
-106.5813767	68.1208583	1	very soft fines	16.98	1751	8/24/2009
-106.5812283	68.1208617	1	very soft fines	16.89	1771	8/24/2009
-106.5810833	68.12086	1	very soft fines	16.4	1791	8/24/2009
-106.58094	68.1208583	1	very soft fines	16.77	1811	8/24/2009
-106.5807983	68.1208533	1	very soft fines	16.77	1831	8/24/2009
-106.5806567	68.1208467	1	very soft fines	16.79	1851	8/24/2009
-106.5805133	68.12084	1	very soft fines	16.6	1871	8/24/2009
-106.5804417	68.120835	1	very soft fines	16.66	1891	8/24/2009
-106.5803017	68.120825	1	very soft fines	16.61	1911	8/24/2009
-106.58016	68.1208133	1	very soft fines	16.46	1931	8/24/2009
-106.5800183	68.120805	1	very soft fines	16.07	1951	8/24/2009
-106.579875	68.1207983	1	very soft fines	15.24	1971	8/24/2009
-106.5797333	68.120795	2	mud	13.96	1991	8/24/2009
-106.5796633	68.1207933	3	gravel, cobble, boulder	12.15	2011	8/24/2009
-106.579525	68.1207917	3	gravel, cobble, boulder	9.06	2031	8/24/2009
-106.5793883	68.1207867	3	gravel, cobble, boulder	7.08	2051	8/24/2009
-106.5792633	68.1207817	3	gravel, cobble, boulder	2.74	2071	8/24/2009
-106.57917	68.120775	3	gravel, cobble, boulder	1.86	2091	8/24/2009
-106.580635	68.12389	3	gravel, cobble, boulder	2.99	22	8/24/2009
-106.5807533	68.1238717	3	gravel, cobble, boulder	4.96	42	8/24/2009
-106.5808783	68.1238517	3	gravel, cobble, boulder	8.82	62	8/24/2009
-106.5809433	68.12384	3	gravel, cobble, boulder	11.16	82	8/24/2009
-106.5812117	68.1238017	3	gravel, cobble, boulder	13.85	116	8/24/2009
-106.5812817	68.123795	2	mud	14.72	136	8/24/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately
5 m long transect segment (20 pings)
Bottom Type Codes: 1 = very soft fines, 2 = mud,
3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-1. Substrate Data Collected from Hydroacoustic Surveys of Doris Lake,Hope Bay Belt Project, 2009

Longitude	Latitude	Bottom Type	Category	Depth	#Ping	Date
-106.5814217	68.1237783	2	mud	14.91	156	8/24/2009
-106.581555	68.1237583	2	mud	15.28	176	8/24/2009
-106.5816817	68.1237367	1	very soft fines	15.33	196	8/24/2009
-106.5818133	68.123715	1	very soft fines	15.54	216	8/24/2009
-106.581955	68.1236933	1	very soft fines	15.64	236	8/24/2009
-106.5820967	68.123675	1	very soft fines	15.97	256	8/24/2009
-106.5822383	68.1236633	1	very soft fines	16.21	276	8/24/2009
-106.5823817	68.1236517	1	very soft fines	16.21	296	8/24/2009
-106.5825267	68.12364	1	very soft fines	16.3	316	8/24/2009
-106.5826	68.1236333	1	very soft fines	16.39	336	8/24/2009
-106.582745	68.12362	1	very soft fines	16.44	356	8/24/2009
-106.58289	68.1236083	1	very soft fines	16.47	376	8/24/2009
-106.5830367	68.123595	1	very soft fines	16.54	396	8/24/2009
-106.5831833	68.1235817	1	very soft fines	16.66	416	8/24/2009
-106.58333	68.12357	1	very soft fines	16.73	436	8/24/2009
-106.5834817	68.1235583	1	very soft fines	16.86	456	8/24/2009
-106.583635	68.123545	1	very soft fines	16.86	476	8/24/2009
-106.5837117	68.1235383	2	mud	16.93	496	8/24/2009
-106.58386	68.123525	1	very soft fines	16.77	516	8/24/2009
-106.5840067	68.1235083	1	very soft fines	16.84	536	8/24/2009
-106.584155	68.1234917	1	very soft fines	16.75	556	8/24/2009
-106.5843017	68.1234767	1	very soft fines	16.56	576	8/24/2009
-106.58445	68.1234633	1	very soft fines	16.6	596	8/24/2009
-106.5845967	68.1234517	1	very soft fines	16.6	616	8/24/2009
-106.584745	68.1234417	1	very soft fines	16.56	636	8/24/2009
-106.5848217	68.1234367	1	very soft fines	16.54	656	8/24/2009
-106.5849733	68.12343	1	very soft fines	16.56	676	8/24/2009
-106.5851283	68.1234233	1	very soft fines	16.61	696	8/24/2009
-106.5852817	68.123415	1	very soft fines	16.65	716	8/24/2009
-106.5854317	68.1234033	1	very soft fines	16.66	736	8/24/2009
-106.5855767	68.1233883	1	very soft fines	16.72	756	8/24/2009
-106.5857217	68.12337	1	very soft fines	16.68	776	8/24/2009
-106.585865	68.123355	1	very soft fines	16.61	796	8/24/2009
-106.585935	68.1233467	1	very soft fines	16.56	816	8/24/2009
-106.5860767	68.12333	1	very soft fines	16.44	836	8/24/2009
-106.58622	68.123315	1	very soft fines	16.33	856	8/24/2009
-106.586365	68.1233017	1	very soft fines	16.28	876	8/24/2009
-106.5865083	68.1232917	1	very soft fines	16.2	896	8/24/2009
-106.586655	68.1232833	1	very soft fines	16.13	916	8/24/2009
-106.5868067	68.123275	1	very soft fines	16.07	936	8/24/2009
-106.5869583	68.1232683	1	very soft fines	16.04	956	8/24/2009
-106.5871133	68.1232633	1	very soft fines	15.92	976	8/24/2009
-106.58719	68.12326	2	mud	15.95	996	8/24/2009
-106.587345	68.1232567	1	very soft fines	15.92	1016	8/24/2009
-106.5875	68.1232533	1	very soft fines	15.92	1036	8/24/2009
-106.587655	68.12325	1	very soft fines	15.87	1056	8/24/2009
-106.5878083	68.1232483	1	very soft fines	15.87	1076	8/24/2009
-106.5879617	68.1232433	1	very soft fines	15.81	1096	8/24/2009
-106.5881167	68.1232367	1	very soft fines	15.8	1116	8/24/2009
-106.58827	68.12323	1	very soft fines	15.8	1136	8/24/2009
-106.58842	68.1232267	1	very soft fines	15.81	1156	8/24/2009
-106.5884967	68.123225	1	very soft fines	15.81	1176	8/24/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately
5 m long transect segment (20 pings)
Bottom Type Codes: 1 = very soft fines, 2 = mud,
3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-1. Substrate Data Collected from Hydroacoustic Surveys of Doris Lake,Hope Bay Belt Project, 2009

Longitude	Latitude	Bottom Type	Category	Depth	#Ping	Date
-106.5886533	68.1232217	1	very soft fines	15.83	1196	8/24/2009
-106.58881	68.12322	1	very soft fines	15.8	1216	8/24/2009
-106.5889667	68.12322	1	very soft fines	15.81	1236	8/24/2009
-106.5891233	68.12322	1	very soft fines	15.78	1256	8/24/2009
-106.5892733	68.1232167	1	very soft fines	15.9	1276	8/24/2009
-106.58942	68.1232083	1	very soft fines	16.01	1296	8/24/2009
-106.5895683	68.1231917	1	very soft fines	16.01	1316	8/24/2009
-106.5896417	68.1231833	1	very soft fines	15.94	1336	8/24/2009
-106.5897933	68.12317	1	very soft fines	15.87	1356	8/24/2009
-106.58995	68.1231633	1	very soft fines	15.64	1376	8/24/2009
-106.59011	68.1231567	1	very soft fines	15.5	1396	8/24/2009
-106.5902683	68.1231517	1	very soft fines	15.21	1416	8/24/2009
-106.590425	68.123145	1	very soft fines	15.1	1436	8/24/2009
-106.5905817	68.1231417	1	very soft fines	14.91	1456	8/24/2009
-106.5907383	68.1231383	1	very soft fines	14.62	1476	8/24/2009
-106.5908933	68.1231383	–	–	14.34	1496	8/24/2009
-106.5910467	68.12314	1	very soft fines	13.92	1516	8/24/2009
-106.5911233	68.12314	1	very soft fines	13.38	1536	8/24/2009
-106.591275	68.1231433	1	very soft fines	13.04	1556	8/24/2009
-106.591425	68.1231467	1	very soft fines	11.84	1576	8/24/2009
-106.5915767	68.1231467	1	very soft fines	11.32	1596	8/24/2009
-106.5917267	68.123145	1	very soft fines	10.5	1616	8/24/2009
-106.5918783	68.1231433	2	mud	9.65	1636	8/24/2009
-106.5921033	68.1231367	3	gravel, cobble, boulder	8.61	1669	8/24/2009
-106.592255	68.1231383	3	gravel, cobble, boulder	7.26	1689	8/24/2009
-106.5924083	68.1231383	3	gravel, cobble, boulder	5.69	1709	8/24/2009
-106.59256	68.1231417	3	gravel, cobble, boulder	4.29	1729	8/24/2009
-106.5927117	68.12314	3	gravel, cobble, boulder	3.45	1749	8/24/2009
-106.5927867	68.1231367	3	gravel, cobble, boulder	3.04	1769	8/24/2009
-106.59294	68.12313	3	gravel, cobble, boulder	2.66	1789	8/24/2009
-106.5930917	68.1231233	2	mud	2.43	1809	8/24/2009
-106.5932433	68.123115	2	mud	1.98	1829	8/24/2009
-106.5933967	68.1231083	–	–	1.82	1849	8/24/2009
-106.59355	68.1231017	3	gravel, cobble, boulder	1.86	1869	8/24/2009
-106.5937033	68.1230967	3	gravel, cobble, boulder	2.08	1889	8/24/2009
-106.5938533	68.123095	3	gravel, cobble, boulder	2.4	1909	8/24/2009
-106.5939283	68.123095	2	mud	2.59	1929	8/24/2009
-106.5940817	68.123095	3	gravel, cobble, boulder	2.93	1949	8/24/2009
-106.5942333	68.1230917	2	mud	3.4	1969	8/24/2009
-106.5943833	68.1230883	3	gravel, cobble, boulder	3.56	1989	8/24/2009
-106.594535	68.1230867	2	mud	3.37	2009	8/24/2009
-106.5946883	68.1230867	3	gravel, cobble, boulder	2.45	2029	8/24/2009
-106.5948417	68.1230833	3	gravel, cobble, boulder	1.7	2049	8/24/2009
-106.5949933	68.1230783	3	gravel, cobble, boulder	1.37	2069	8/24/2009
-106.5951217	68.123075	3	gravel, cobble, boulder	1.35	2089	8/24/2009
-106.5951717	68.1230717	3	gravel, cobble, boulder	1.51	2109	8/24/2009
-106.5993317	68.1268933	3	gravel, cobble, boulder	2.9	11	8/24/2009
-106.5992133	68.1268983	3	gravel, cobble, boulder	2.74	31	8/24/2009
-106.5990867	68.1269033	2	mud	2.76	51	8/24/2009
-106.59895	68.1269083	3	gravel, cobble, boulder	2.74	71	8/24/2009
-106.5988117	68.1269117	3	gravel, cobble, boulder	2.69	91	8/24/2009
-106.5987417	68.1269133	2	mud	2.73	111	8/24/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately
5 m long transect segment (20 pings)
Bottom Type Codes: 1 = very soft fines, 2 = mud,
3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-1. Substrate Data Collected from Hydroacoustic Surveys of Doris Lake,Hope Bay Belt Project, 2009

Longitude	Latitude	Bottom Type	Category	Depth	#Ping	Date
-106.5986083	68.1269133	2	mud	2.76	131	8/24/2009
-106.5984683	68.12691	2	mud	2.83	151	8/24/2009
-106.5983267	68.126905	2	mud	2.88	171	8/24/2009
-106.5981833	68.1268967	3	gravel, cobble, boulder	2.99	191	8/24/2009
-106.5980367	68.1268917	2	mud	3.04	211	8/24/2009
-106.5979633	68.12689	2	mud	3.14	231	8/24/2009
-106.5978167	68.1268883	1	very soft fines	3.21	251	8/24/2009
-106.59767	68.12689	2	mud	3.32	271	8/24/2009
-106.5975233	68.1268933	1	very soft fines	3.4	291	8/24/2009
-106.59737	68.1268967	1	very soft fines	3.49	311	8/24/2009
-106.5972233	68.1269	1	very soft fines	3.66	331	8/24/2009
-106.59715	68.1269017	1	very soft fines	3.75	351	8/24/2009
-106.5970033	68.1269017	1	very soft fines	3.87	371	8/24/2009
-106.5968567	68.1269033	1	very soft fines	4.03	391	8/24/2009
-106.5967117	68.126905	1	very soft fines	4.06	411	8/24/2009
-106.596565	68.126905	1	very soft fines	4.2	431	8/24/2009
-106.5964917	68.126905	1	very soft fines	4.43	451	8/24/2009
-106.596345	68.1269067	1	very soft fines	4.57	471	8/24/2009
-106.5961967	68.1269083	2	mud	4.79	491	8/24/2009
-106.59605	68.12691	2	mud	4.95	511	8/24/2009
-106.5959033	68.1269117	2	mud	5.12	531	8/24/2009
-106.595755	68.1269133	2	mud	5.35	551	8/24/2009
-106.5956817	68.1269133	2	mud	5.57	571	8/24/2009
-106.595535	68.1269133	2	mud	5.73	591	8/24/2009
-106.5953867	68.1269117	2	mud	6.08	611	8/24/2009
-106.59524	68.12691	2	mud	6.47	631	8/24/2009
-106.5950933	68.1269067	3	gravel, cobble, boulder	6.68	651	8/24/2009
-106.59495	68.1269017	2	mud	6.79	671	8/24/2009
-106.5948033	68.1268967	2	mud	7.1	691	8/24/2009
-106.5946567	68.12689	2	mud	7.59	711	8/24/2009
-106.5945833	68.126885	2	mud	7.86	731	8/24/2009
-106.5944367	68.1268783	2	mud	8.28	751	8/24/2009
-106.59429	68.1268733	2	mud	8.56	771	8/24/2009
-106.5941433	68.12687	2	mud	8.92	791	8/24/2009
-106.5939967	68.1268683	2	mud	9.27	811	8/24/2009
-106.59385	68.1268667	2	mud	9.7	831	8/24/2009
-106.5937017	68.1268667	2	mud	10.16	851	8/24/2009
-106.593555	68.1268667	1	very soft fines	10.45	871	8/24/2009
-106.5934067	68.126865	2	mud	10.54	891	8/24/2009
-106.5933317	68.1268667	1	very soft fines	10.8	911	8/24/2009
-106.5931833	68.12687	2	mud	10.99	931	8/24/2009
-106.593035	68.1268733	2	mud	11.13	951	8/24/2009
-106.5928867	68.126875	1	very soft fines	11.4	971	8/24/2009
-106.5927383	68.1268767	2	mud	11.68	991	8/24/2009
-106.5925917	68.1268783	1	very soft fines	11.8	1011	8/24/2009
-106.592445	68.1268783	1	very soft fines	12.17	1031	8/24/2009
-106.5922967	68.1268767	2	mud	12.38	1051	8/24/2009
-106.5921483	68.1268733	–	–	12.62	1071	8/24/2009
-106.5920733	68.1268717	1	very soft fines	12.76	1091	8/24/2009
-106.591925	68.1268767	1	very soft fines	12.97	1111	8/24/2009
-106.5917783	68.1268817	1	very soft fines	13.09	1131	8/24/2009
-106.5916317	68.1268883	1	very soft fines	13.31	1151	8/24/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately
5 m long transect segment (20 pings)
Bottom Type Codes: 1 = very soft fines, 2 = mud,
3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-1. Substrate Data Collected from Hydroacoustic Surveys of Doris Lake,Hope Bay Belt Project, 2009

Longitude	Latitude	Bottom Type	Category	Depth	#Ping	Date
-106.5914883	68.1268983	2	mud	13.47	1171	8/24/2009
-106.59134	68.1269067	1	very soft fines	13.64	1191	8/24/2009
-106.5911917	68.1269133	1	very soft fines	13.71	1211	8/24/2009
-106.5910433	68.1269217	1	very soft fines	13.96	1231	8/24/2009
-106.590895	68.12693	1	very soft fines	14.08	1251	8/24/2009
-106.5907433	68.1269367	2	mud	14.23	1271	8/24/2009
-106.5905983	68.1269467	1	very soft fines	14.27	1291	8/24/2009
-106.590525	68.12695	2	mud	14.13	1311	8/24/2009
-106.5903783	68.1269567	2	mud	14.01	1331	8/24/2009
-106.5902317	68.1269633	2	mud	13.99	1351	8/24/2009
-106.5900867	68.12697	1	very soft fines	13.92	1371	8/24/2009
-106.589945	68.1269783	2	mud	13.94	1391	8/24/2009
-106.5898033	68.1269883	1	very soft fines	13.9	1411	8/24/2009
-106.5896583	68.1269933	2	mud	13.94	1431	8/24/2009
-106.5895133	68.127	2	mud	13.96	1451	8/24/2009
-106.5893683	68.1270067	2	mud	14.04	1471	8/24/2009
-106.5892217	68.1270133	1	very soft fines	13.96	1491	8/24/2009
-106.5890733	68.1270183	1	very soft fines	13.78	1511	8/24/2009
-106.5889983	68.12702	1	very soft fines	13.68	1531	8/24/2009
-106.5888517	68.12702	1	very soft fines	13.18	1551	8/24/2009
-106.5887033	68.1270233	1	very soft fines	12.93	1571	8/24/2009
-106.5885533	68.1270283	1	very soft fines	12.62	1591	8/24/2009
-106.588405	68.127035	2	mud	12.2	1611	8/24/2009
-106.5882567	68.1270383	2	mud	12.15	1631	8/24/2009
-106.5881067	68.127045	–	–	12.15	1651	8/24/2009
-106.58796	68.1270533	–	–	12.2	1671	8/24/2009
-106.5878117	68.1270617	2	mud	12.31	1691	8/24/2009
-106.5876633	68.1270683	2	mud	12.5	1711	8/24/2009
-106.587515	68.1270717	1	very soft fines	12.9	1731	8/24/2009
-106.58737	68.127075	1	very soft fines	13.44	1751	8/24/2009
-106.5872967	68.1270783	1	very soft fines	14.17	1771	8/24/2009
-106.5871517	68.1270817	1	very soft fines	15	1791	8/24/2009
-106.5870083	68.12709	2	mud	15.33	1811	8/24/2009
-106.586865	68.1271017	1	very soft fines	15.74	1831	8/24/2009
-106.586725	68.127115	1	very soft fines	16.44	1851	8/24/2009
-106.5865833	68.12713	1	very soft fines	17.06	1871	8/24/2009
-106.5864417	68.12714	1	very soft fines	17.15	1891	8/24/2009
-106.5862967	68.127145	1	very soft fines	17.55	1911	8/24/2009
-106.58615	68.12715	1	very soft fines	18.18	1931	8/24/2009
-106.586075	68.1271533	1	very soft fines	18.31	1951	8/24/2009
-106.58593	68.12716	1	very soft fines	18.44	1971	8/24/2009
-106.5857833	68.127165	1	very soft fines	18.05	1991	8/24/2009
-106.5856383	68.12717	1	very soft fines	17.62	2011	8/24/2009
-106.5854933	68.12718	1	very soft fines	17.31	2031	8/24/2009
-106.5853517	68.1271917	1	very soft fines	16.8	2051	8/24/2009
-106.5852067	68.1272	1	very soft fines	16.53	2071	8/24/2009
-106.585135	68.1272017	1	very soft fines	16.14	2091	8/24/2009
-106.58499	68.1272083	1	very soft fines	15.9	2111	8/24/2009
-106.5848417	68.127215	1	very soft fines	15.62	2131	8/24/2009
-106.5846983	68.127215	1	very soft fines	15.22	2151	8/24/2009
-106.5845533	68.127215	1	very soft fines	14.91	2171	8/24/2009
-106.584405	68.1272167	1	very soft fines	14.23	2191	8/24/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately
5 m long transect segment (20 pings)
Bottom Type Codes: 1 = very soft fines, 2 = mud,
3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-1. Substrate Data Collected from Hydroacoustic Surveys of Doris Lake,Hope Bay Belt Project, 2009

Longitude	Latitude	Bottom Type	Category	Depth	#Ping	Date
-106.58426	68.1272167	1	very soft fines	13.85	2211	8/24/2009
-106.5841117	68.1272167	1	very soft fines	13.38	2231	8/24/2009
-106.5840383	68.1272167	1	very soft fines	12.74	2251	8/24/2009
-106.5838883	68.127215	1	very soft fines	12.34	2271	8/24/2009
-106.5837417	68.12721	1	very soft fines	12.15	2291	8/24/2009
-106.5835917	68.1272067	1	very soft fines	11.7	2311	8/24/2009
-106.58344	68.1272033	1	very soft fines	11.35	2331	8/24/2009
-106.5832917	68.1271983	1	very soft fines	10.87	2351	8/24/2009
-106.583145	68.1271917	1	very soft fines	10.69	2371	8/24/2009
-106.583	68.127185	1	very soft fines	10.36	2391	8/24/2009
-106.582855	68.1271783	1	very soft fines	10.03	2411	8/24/2009
-106.5827833	68.127175	1	very soft fines	9.84	2431	8/24/2009
-106.5826367	68.1271683	1	very soft fines	9.65	2451	8/24/2009
-106.5824933	68.12716	2	mud	9.13	2471	8/24/2009
-106.5823483	68.1271533	3	gravel, cobble, boulder	8.26	2491	8/24/2009
-106.5822083	68.1271483	3	gravel, cobble, boulder	7.76	2511	8/24/2009
-106.5820817	68.127145	3	gravel, cobble, boulder	6.11	2531	8/24/2009
-106.5819733	68.1271383	3	gravel, cobble, boulder	3.8	2551	8/24/2009
-106.5818767	68.1271317	3	gravel, cobble, boulder	1.51	2571	8/24/2009
-106.58401	68.1314883	3	gravel, cobble, boulder	1.53	11	8/24/2009
-106.584115	68.1314817	3	gravel, cobble, boulder	1.96	31	8/24/2009
-106.58424	68.131465	3	gravel, cobble, boulder	2.45	51	8/24/2009
-106.584355	68.1314467	3	gravel, cobble, boulder	3.32	71	8/24/2009
-106.5844133	68.1314383	3	gravel, cobble, boulder	3.58	91	8/24/2009
-106.5845317	68.1314267	3	gravel, cobble, boulder	4.03	111	8/24/2009
-106.584655	68.1314183	2	mud	4.46	131	8/24/2009
-106.5847917	68.1314067	2	mud	4.98	151	8/24/2009
-106.5849267	68.1313917	2	mud	5.23	171	8/24/2009
-106.585065	68.1313833	2	mud	5.97	191	8/24/2009
-106.585135	68.13138	2	mud	6.3	211	8/24/2009
-106.5852733	68.1313717	–	–	6.58	231	8/24/2009
-106.58541	68.131365	2	mud	7.08	251	8/24/2009
-106.58555	68.1313583	2	mud	7.34	271	8/24/2009
-106.5856867	68.131355	2	mud	7.6	291	8/24/2009
-106.585835	68.1313517	2	mud	7.92	311	8/24/2009
-106.5859083	68.13135	2	mud	8.12	331	8/24/2009
-106.5860533	68.1313483	2	mud	8.4	351	8/24/2009
-106.586195	68.1313467	2	mud	8.63	371	8/24/2009
-106.586335	68.1313417	1	very soft fines	8.92	391	8/24/2009
-106.5864767	68.1313333	1	very soft fines	9.22	411	8/24/2009
-106.58662	68.131325	2	mud	9.41	431	8/24/2009
-106.58669	68.1313217	2	mud	9.58	451	8/24/2009
-106.5868283	68.131315	1	very soft fines	9.74	471	8/24/2009
-106.5869667	68.1313117	1	very soft fines	9.77	491	8/24/2009
-106.587105	68.1313083	2	mud	9.81	511	8/24/2009
-106.5872483	68.131305	1	very soft fines	9.76	531	8/24/2009
-106.5873883	68.1313017	2	mud	9.74	551	8/24/2009
-106.5875283	68.1312967	1	very soft fines	9.69	571	8/24/2009
-106.5875983	68.131295	2	mud	9.67	591	8/24/2009
-106.58774	68.13129	2	mud	9.67	611	8/24/2009
-106.58788	68.1312867	1	very soft fines	9.67	631	8/24/2009
-106.58802	68.1312833	2	mud	9.74	651	8/24/2009

Notes:
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Dashes (-) = no data collected

Appendix 3.1-1. Substrate Data Collected from Hydroacoustic Surveys of Doris Lake,Hope Bay Belt Project, 2009

Longitude	Latitude	Bottom Type	Category	Depth	#Ping	Date
-106.58816	68.1312767	2	mud	9.77	671	8/24/2009
-106.5883	68.1312717	2	mud	9.88	691	8/24/2009
-106.58844	68.1312683	2	mud	9.98	711	8/24/2009
-106.5885083	68.1312667	2	mud	10.07	731	8/24/2009
-106.588645	68.131265	2	mud	10.21	751	8/24/2009
-106.588785	68.1312583	2	mud	10.24	771	8/24/2009
-106.5889283	68.1312517	2	mud	10.4	791	8/24/2009
-106.5890717	68.131245	2	mud	10.59	811	8/24/2009
-106.5892117	68.1312383	2	mud	10.68	831	8/24/2009
-106.5893533	68.1312317	1	very soft fines	10.76	851	8/24/2009
-106.5894233	68.13123	1	very soft fines	10.78	871	8/24/2009
-106.589565	68.131225	1	very soft fines	10.78	891	8/24/2009
-106.589705	68.13122	1	very soft fines	10.8	911	8/24/2009
-106.5898433	68.1312167	2	mud	10.87	931	8/24/2009
-106.5899833	68.1312117	2	mud	10.97	951	8/24/2009
-106.5901217	68.13121	2	mud	11.13	971	8/24/2009
-106.5902633	68.1312083	2	mud	11.28	991	8/24/2009
-106.5903317	68.1312067	–	–	11.42	1011	8/24/2009
-106.59047	68.131205	1	very soft fines	11.61	1031	8/24/2009
-106.5906117	68.1312033	–	–	12.22	1051	8/24/2009
-106.5907533	68.1312033	1	very soft fines	12.5	1071	8/24/2009
-106.590895	68.131205	–	–	12.86	1091	8/24/2009
-106.591035	68.1312067	–	–	13.35	1111	8/24/2009
-106.591175	68.1312083	3	gravel, cobble, boulder	13.7	1131	8/24/2009
-106.591245	68.1312067	3	gravel, cobble, boulder	14.11	1151	8/24/2009
-106.59138	68.131205	2	mud	14.29	1171	8/24/2009
-106.591515	68.1312033	2	mud	14.53	1191	8/24/2009
-106.59165	68.1312017	1	very soft fines	14.88	1211	8/24/2009
-106.5917867	68.1312	1	very soft fines	14.77	1231	8/24/2009
-106.591925	68.1312	2	mud	14.49	1251	8/24/2009
-106.5920667	68.1311983	2	mud	14.3	1271	8/24/2009
-106.5921367	68.1311983	2	mud	13.82	1291	8/24/2009
-106.592275	68.1311967	2	mud	13.4	1311	8/24/2009
-106.5924183	68.131195	2	mud	13.02	1331	8/24/2009
-106.59256	68.131195	1	very soft fines	12.71	1351	8/24/2009
-106.5927017	68.13119	1	very soft fines	12.13	1371	8/24/2009
-106.5928417	68.131185	1	very soft fines	11.79	1391	8/24/2009
-106.59298	68.1311817	1	very soft fines	11.27	1411	8/24/2009
-106.5931217	68.13118	1	very soft fines	10.68	1431	8/24/2009
-106.59326	68.1311817	1	very soft fines	9.95	1451	8/24/2009
-106.5933983	68.1311817	1	very soft fines	9.24	1471	8/24/2009
-106.5934683	68.1311817	2	mud	7.85	1491	8/24/2009
-106.5936083	68.1311833	2	mud	7.48	1511	8/24/2009
-106.5937467	68.131185	3	gravel, cobble, boulder	7.01	1531	8/24/2009
-106.5938833	68.1311883	3	gravel, cobble, boulder	7.01	1551	8/24/2009
-106.5940217	68.13119	3	gravel, cobble, boulder	6.18	1571	8/24/2009
-106.59416	68.1311917	2	mud	7.55	1591	8/24/2009
-106.594295	68.1311933	2	mud	7.83	1611	8/24/2009
-106.5944283	68.1311917	1	very soft fines	8.16	1631	8/24/2009
-106.59456	68.1311883	1	very soft fines	8.87	1651	8/24/2009
-106.5946983	68.1311833	2	mud	9.34	1671	8/24/2009
-106.594835	68.1311783	2	mud	9.65	1691	8/24/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately
5 m long transect segment (20 pings)
Bottom Type Codes: 1 = very soft fines, 2 = mud,
3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-1. Substrate Data Collected from Hydroacoustic Surveys of Doris Lake,Hope Bay Belt Project, 2009

Longitude	Latitude	Bottom Type	Category	Depth	#Ping	Date
-106.5949033	68.131175	2	mud	9.91	1711	8/24/2009
-106.5950433	68.13117	2	mud	9.95	1731	8/24/2009
-106.5951817	68.131165	2	mud	10.02	1751	8/24/2009
-106.5953217	68.13116	1	very soft fines	10.02	1771	8/24/2009
-106.5954567	68.1311567	2	mud	9.95	1791	8/24/2009
-106.5955933	68.13115	2	mud	9.91	1811	8/24/2009
-106.595725	68.1311433	2	mud	9.81	1831	8/24/2009
-106.5958583	68.1311333	2	mud	9.72	1851	8/24/2009
-106.595995	68.1311267	2	mud	9.7	1871	8/24/2009
-106.59613	68.131125	–	–	9.65	1891	8/24/2009
-106.5961983	68.1311233	2	mud	9.58	1911	8/24/2009
-106.5963383	68.1311233	2	mud	9.56	1931	8/24/2009
-106.5964783	68.131125	2	mud	9.56	1951	8/24/2009
-106.5966167	68.1311283	2	mud	9.58	1971	8/24/2009
-106.596755	68.1311333	2	mud	9.56	1991	8/24/2009
-106.596895	68.1311383	2	mud	9.5	2011	8/24/2009
-106.5970283	68.1311433	1	very soft fines	9.44	2031	8/24/2009
-106.5971633	68.1311467	1	very soft fines	9.3	2051	8/24/2009
-106.5972983	68.1311467	1	very soft fines	9.17	2071	8/24/2009
-106.5973683	68.1311483	1	very soft fines	9.04	2091	8/24/2009
-106.5975083	68.1311517	1	very soft fines	8.91	2111	8/24/2009
-106.59765	68.131155	2	mud	8.77	2131	8/24/2009
-106.5977917	68.1311583	1	very soft fines	8.56	2151	8/24/2009
-106.5979333	68.1311583	1	very soft fines	8.44	2171	8/24/2009
-106.598075	68.1311533	1	very soft fines	8.04	2191	8/24/2009
-106.598215	68.13115	1	very soft fines	7.85	2211	8/24/2009
-106.598285	68.1311483	1	very soft fines	7.6	2231	8/24/2009
-106.5984267	68.131145	1	very soft fines	7.48	2251	8/24/2009
-106.59857	68.1311433	1	very soft fines	7.22	2271	8/24/2009
-106.5987117	68.1311433	1	very soft fines	6.84	2291	8/24/2009
-106.5988533	68.1311433	1	very soft fines	6.58	2311	8/24/2009
-106.5989933	68.1311417	1	very soft fines	6.39	2331	8/24/2009
-106.5990633	68.1311417	1	very soft fines	6.11	2351	8/24/2009
-106.5992067	68.1311367	1	very soft fines	5.87	2371	8/24/2009
-106.5993517	68.131135	1	very soft fines	5.66	2391	8/24/2009
-106.599495	68.131135	1	very soft fines	5.45	2411	8/24/2009
-106.599635	68.131135	1	very soft fines	5.23	2431	8/24/2009
-106.5997767	68.1311317	1	very soft fines	4.96	2451	8/24/2009
-106.59985	68.13113	1	very soft fines	4.74	2471	8/24/2009
-106.5999917	68.1311267	1	very soft fines	4.46	2491	8/24/2009
-106.600135	68.1311217	1	very soft fines	4.22	2511	8/24/2009
-106.60028	68.1311183	1	very soft fines	4.08	2531	8/24/2009
-106.6004233	68.1311133	1	very soft fines	3.77	2551	8/24/2009
-106.6005617	68.1311067	1	very soft fines	3.49	2571	8/24/2009
-106.6007	68.1310983	1	very soft fines	3.21	2591	8/24/2009
-106.6007717	68.1310933	1	very soft fines	3.11	2611	8/24/2009
-106.6009133	68.131085	1	very soft fines	2.88	2631	8/24/2009
-106.6010567	68.1310733	1	very soft fines	2.73	2651	8/24/2009
-106.6011967	68.1310633	2	mud	2.66	2671	8/24/2009
-106.6013367	68.131055	2	mud	2.53	2691	8/24/2009
-106.601475	68.131045	2	mud	2.48	2711	8/24/2009
-106.6016133	68.1310333	2	mud	2.38	2731	8/24/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately 5 m long transect segment (20 pings)
Bottom Type Codes: 1 = very soft fines, 2 = mud, 3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-1. Substrate Data Collected from Hydroacoustic Surveys of Doris Lake,Hope Bay Belt Project, 2009

Longitude	Latitude	Bottom Type	Category	Depth	#Ping	Date
-106.6017583	68.1310267	3	gravel, cobble, boulder	2.29	2751	8/24/2009
-106.6019033	68.1310183	2	mud	2.29	2771	8/24/2009
-106.601975	68.1310133	2	mud	2.36	2791	8/24/2009
-106.6021183	68.131005	2	mud	2.5	2811	8/24/2009
-106.602255	68.1309967	1	very soft fines	2.67	2831	8/24/2009
-106.6023883	68.1309883	1	very soft fines	3.37	2851	8/24/2009
-106.6025217	68.13098	1	very soft fines	3.54	2871	8/24/2009
-106.602655	68.1309733	1	very soft fines	3.54	2891	8/24/2009
-106.6027217	68.1309717	1	very soft fines	3.47	2911	8/24/2009
-106.602855	68.1309633	1	very soft fines	3.19	2931	8/24/2009
-106.6029917	68.130955	1	very soft fines	2.79	2951	8/24/2009
-106.6031283	68.1309467	1	very soft fines	2.53	2971	8/24/2009
-106.6032633	68.13094	3	gravel, cobble, boulder	2.43	2991	8/24/2009
-106.6034017	68.130935	2	mud	2.52	3011	8/24/2009
-106.6035417	68.13093	2	mud	2.33	3031	8/24/2009
-106.6036817	68.130925	2	mud	2.27	3051	8/24/2009
-106.60382	68.13092	2	mud	2.22	3071	8/24/2009
-106.60395	68.1309133	3	gravel, cobble, boulder	2.1	3091	8/24/2009
-106.60401	68.1309117	2	mud	1.89	3111	8/24/2009
-106.6041117	68.1309067	3	gravel, cobble, boulder	1.6	3131	8/24/2009
-106.604205	68.1309017	3	gravel, cobble, boulder	1.53	3151	8/24/2009
-106.59762	68.1347067	3	gravel, cobble, boulder	3.66	11	8/24/2009
-106.5975783	68.134695	3	gravel, cobble, boulder	4.32	31	8/24/2009
-106.5974917	68.134685	3	gravel, cobble, boulder	4.79	51	8/24/2009
-106.5973717	68.134675	1	very soft fines	6.01	71	8/24/2009
-106.5972267	68.1346633	1	very soft fines	7.46	91	8/24/2009
-106.5970833	68.1346517	1	very soft fines	8.12	111	8/24/2009
-106.596945	68.1346367	1	very soft fines	9.36	131	8/24/2009
-106.5968717	68.1346267	1	very soft fines	9.72	151	8/24/2009
-106.5967317	68.1346017	1	very soft fines	10.28	171	8/24/2009
-106.5965967	68.1345817	1	very soft fines	10.78	191	8/24/2009
-106.5964667	68.134565	1	very soft fines	11.13	211	8/24/2009
-106.59634	68.1345483	1	very soft fines	11.49	231	8/24/2009
-106.5962767	68.1345383	1	very soft fines	11.72	251	8/24/2009
-106.5961467	68.1345217	2	mud	11.72	271	8/24/2009
-106.5960167	68.1345083	3	gravel, cobble, boulder	11.7	291	8/24/2009
-106.5958867	68.1344983	2	mud	11.82	311	8/24/2009
-106.5957567	68.1344867	2	mud	11.91	331	8/24/2009
-106.59569	68.1344833	3	gravel, cobble, boulder	11.98	351	8/24/2009
-106.5955583	68.1344767	2	mud	12.12	371	8/24/2009
-106.5954267	68.1344717	2	mud	12	391	8/24/2009
-106.5952933	68.1344667	1	very soft fines	11.84	411	8/24/2009
-106.5951617	68.1344617	1	very soft fines	11.63	431	8/24/2009
-106.5950283	68.134455	1	very soft fines	11.4	451	8/24/2009
-106.5949633	68.1344517	1	very soft fines	11.28	471	8/24/2009
-106.59483	68.134445	1	very soft fines	11.14	491	8/24/2009
-106.5946983	68.1344383	2	mud	10.99	511	8/24/2009
-106.59457	68.13443	1	very soft fines	10.87	531	8/24/2009
-106.5944417	68.1344217	1	very soft fines	10.75	551	8/24/2009
-106.5943133	68.1344117	2	mud	10.68	571	8/24/2009
-106.5942483	68.1344083	1	very soft fines	10.59	591	8/24/2009
-106.5941183	68.1344017	2	mud	10.5	611	8/24/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately
5 m long transect segment (20 pings)
Bottom Type Codes: 1 = very soft fines, 2 = mud,
3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-1. Substrate Data Collected from Hydroacoustic Surveys of Doris Lake,Hope Bay Belt Project, 2009

Longitude	Latitude	Bottom Type	Category	Depth	#Ping	Date
-106.5939883	68.134395	1	very soft fines	10.48	631	8/24/2009
-106.59386	68.13439	1	very soft fines	10.38	651	8/24/2009
-106.59373	68.1343833	2	mud	10.35	671	8/24/2009
-106.593595	68.1343767	1	very soft fines	10.33	691	8/24/2009
-106.5934633	68.1343717	1	very soft fines	10.28	711	8/24/2009
-106.5933983	68.1343683	1	very soft fines	10.26	731	8/24/2009
-106.5932683	68.134365	1	very soft fines	10.12	751	8/24/2009
-106.59314	68.1343633	1	very soft fines	9.98	771	8/24/2009
-106.5930133	68.13436	2	mud	9.84	791	8/24/2009
-106.5928817	68.134355	1	very soft fines	9.72	811	8/24/2009
-106.5927467	68.1343433	1	very soft fines	9.6	831	8/24/2009
-106.5926167	68.1343317	1	very soft fines	9.53	851	8/24/2009
-106.5925517	68.1343267	1	very soft fines	9.44	871	8/24/2009
-106.5924233	68.1343167	1	very soft fines	9.37	891	8/24/2009
-106.5922983	68.13431	1	very soft fines	9.18	911	8/24/2009
-106.59217	68.1343033	1	very soft fines	8.99	931	8/24/2009
-106.5920383	68.1342967	1	very soft fines	8.92	951	8/24/2009
-106.591905	68.1342933	2	mud	8.68	971	8/24/2009
-106.5918383	68.1342917	2	mud	8.61	991	8/24/2009
-106.591705	68.13429	1	very soft fines	8.52	1011	8/24/2009
-106.591575	68.13429	1	very soft fines	8.44	1031	8/24/2009
-106.5914417	68.1342883	2	mud	8.38	1051	8/24/2009
-106.5913117	68.134285	1	very soft fines	8.33	1071	8/24/2009
-106.5911767	68.1342817	2	mud	8.28	1091	8/24/2009
-106.59111	68.13428	2	mud	8.26	1111	8/24/2009
-106.5909733	68.1342783	2	mud	8.21	1131	8/24/2009
-106.5908417	68.1342767	2	mud	8.16	1151	8/24/2009
-106.5907083	68.1342717	2	mud	8.14	1171	8/24/2009
-106.5905767	68.134265	1	very soft fines	8.04	1191	8/24/2009
-106.5905117	68.1342617	1	very soft fines	7.92	1211	8/24/2009
-106.59038	68.1342583	2	mud	7.86	1231	8/24/2009
-106.590245	68.134255	2	mud	7.71	1251	8/24/2009
-106.5901083	68.1342517	1	very soft fines	7.67	1271	8/24/2009
-106.5899733	68.13425	2	mud	7.59	1291	8/24/2009
-106.5899067	68.1342517	2	mud	7.53	1311	8/24/2009
-106.5897717	68.1342517	2	mud	7.52	1331	8/24/2009
-106.58964	68.1342517	2	mud	7.48	1351	8/24/2009
-106.5895067	68.13425	2	mud	7.43	1371	8/24/2009
-106.5893717	68.1342467	2	mud	7.41	1391	8/24/2009
-106.589305	68.1342467	2	mud	7.38	1411	8/24/2009
-106.5891717	68.1342483	2	mud	7.31	1431	8/24/2009
-106.5890383	68.1342483	2	mud	7.26	1451	8/24/2009
-106.588905	68.13425	2	mud	7.22	1471	8/24/2009
-106.58877	68.13425	2	mud	7.19	1491	8/24/2009
-106.5887033	68.13425	2	mud	7.17	1511	8/24/2009
-106.58857	68.13425	2	mud	7.15	1531	8/24/2009
-106.5884367	68.13425	2	mud	7.15	1551	8/24/2009
-106.588305	68.13425	2	mud	7.13	1571	8/24/2009
-106.58817	68.1342483	2	mud	7.12	1591	8/24/2009
-106.588035	68.134245	2	mud	7.1	1611	8/24/2009
-106.5879033	68.1342383	1	very soft fines	7.01	1631	8/24/2009
-106.5878383	68.134235	2	mud	6.96	1651	8/24/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately
5 m long transect segment (20 pings)
Bottom Type Codes: 1 = very soft fines, 2 = mud,
3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-1. Substrate Data Collected from Hydroacoustic Surveys of Doris Lake,Hope Bay Belt Project, 2009

Longitude	Latitude	Bottom Type	Category	Depth	#Ping	Date
-106.5877067	68.1342267	1	very soft fines	6.86	1671	8/24/2009
-106.5875783	68.1342183	2	mud	6.77	1691	8/24/2009
-106.5874533	68.1342133	1	very soft fines	6.68	1711	8/24/2009
-106.5873283	68.1342067	1	very soft fines	6.61	1731	8/24/2009
-106.5872017	68.1342	1	very soft fines	6.56	1751	8/24/2009
-106.5870733	68.1341917	2	mud	6.53	1771	8/24/2009
-106.5870067	68.1341883	1	very soft fines	6.47	1791	8/24/2009
-106.586875	68.13418	2	mud	6.42	1811	8/24/2009
-106.586745	68.1341733	1	very soft fines	6.39	1831	8/24/2009
-106.5866117	68.1341667	1	very soft fines	6.34	1851	8/24/2009
-106.5864783	68.1341617	1	very soft fines	6.34	1871	8/24/2009
-106.586345	68.1341567	2	mud	6.32	1891	8/24/2009
-106.5862133	68.1341517	2	mud	6.32	1911	8/24/2009
-106.5861483	68.1341483	2	mud	6.34	1931	8/24/2009
-106.5860167	68.1341417	2	mud	6.32	1951	8/24/2009
-106.5858867	68.1341333	2	mud	6.28	1971	8/24/2009
-106.585755	68.134125	2	mud	6.25	1991	8/24/2009
-106.5856217	68.1341167	2	mud	6.09	2011	8/24/2009
-106.58549	68.13411	2	mud	5.78	2031	8/24/2009
-106.585355	68.1341017	2	mud	5.35	2051	8/24/2009
-106.5852233	68.1340917	3	gravel, cobble, boulder	4.96	2071	8/24/2009
-106.5851583	68.134085	3	gravel, cobble, boulder	4.72	2091	8/24/2009
-106.58503	68.1340717	3	gravel, cobble, boulder	3.61	2111	8/24/2009
-106.5849233	68.1340617	3	gravel, cobble, boulder	1.49	2131	8/24/2009
-106.58484	68.1340483	3	gravel, cobble, boulder	1.27	2151	8/24/2009
-106.584795	68.13403	3	gravel, cobble, boulder	1.41	2171	8/24/2009
-106.58479	68.1340067	3	gravel, cobble, boulder	1.6	2191	8/24/2009
-106.5848183	68.1339833	2	mud	1.72	2211	8/24/2009
-106.5857967	68.1381517	3	gravel, cobble, boulder	2.66	11	8/24/2009
-106.5858767	68.13816	3	gravel, cobble, boulder	2.81	31	8/24/2009
-106.5859867	68.13817	3	gravel, cobble, boulder	3.09	51	8/24/2009
-106.5861133	68.1381783	2	mud	3.33	71	8/24/2009
-106.5862483	68.1381867	2	mud	3.47	91	8/24/2009
-106.5863833	68.138195	2	mud	3.65	111	8/24/2009
-106.5864517	68.1382	1	very soft fines	3.94	131	8/24/2009
-106.5865867	68.1382067	2	mud	4.17	151	8/24/2009
-106.5867217	68.1382133	2	mud	4.2	171	8/24/2009
-106.5868517	68.1382217	1	very soft fines	4.24	191	8/24/2009
-106.5869833	68.1382317	1	very soft fines	4.32	211	8/24/2009
-106.587115	68.13824	1	very soft fines	4.27	231	8/24/2009
-106.587245	68.1382483	1	very soft fines	3.96	251	8/24/2009
-106.5873117	68.1382517	1	very soft fines	2.86	271	8/24/2009
-106.5874433	68.1382633	2	mud	2.34	291	8/24/2009
-106.5875733	68.138275	2	mud	2.14	311	8/24/2009
-106.587705	68.138285	3	gravel, cobble, boulder	2.1	331	8/24/2009
-106.5878417	68.13829	2	mud	2.08	351	8/24/2009
-106.587975	68.138295	3	gravel, cobble, boulder	1.98	371	8/24/2009
-106.58811	68.1383017	3	gravel, cobble, boulder	1.89	391	8/24/2009
-106.5882383	68.1383083	3	gravel, cobble, boulder	1.89	411	8/24/2009
-106.58837	68.138315	2	mud	1.89	431	8/24/2009
-106.588435	68.1383183	3	gravel, cobble, boulder	1.89	451	8/24/2009
-106.5885667	68.1383267	3	gravel, cobble, boulder	1.87	471	8/24/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately
5 m long transect segment (20 pings)
Bottom Type Codes: 1 = very soft fines, 2 = mud,
3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-1. Substrate Data Collected from Hydroacoustic Surveys of Doris Lake,Hope Bay Belt Project, 2009

Longitude	Latitude	Bottom Type	Category	Depth	#Ping	Date
-106.5886983	68.1383367	2	mud	1.87	491	8/24/2009
-106.5888333	68.1383417	3	gravel, cobble, boulder	1.7	511	8/24/2009
-106.5889667	68.13835	2	mud	1.82	531	8/24/2009
-106.5891	68.1383583	3	gravel, cobble, boulder	1.84	551	8/24/2009
-106.589235	68.138365	2	mud	1.81	571	8/24/2009
-106.58937	68.1383733	3	gravel, cobble, boulder	1.79	591	8/24/2009
-106.5894367	68.1383767	3	gravel, cobble, boulder	1.81	611	8/24/2009
-106.5895683	68.138385	3	gravel, cobble, boulder	1.87	631	8/24/2009
-106.5897017	68.1383917	2	mud	2.12	651	8/24/2009
-106.589835	68.1383983	2	mud	2.34	671	8/24/2009
-106.5899667	68.138405	2	mud	2.55	691	8/24/2009
-106.5900967	68.1384117	2	mud	2.93	711	8/24/2009
-106.5902283	68.1384167	1	very soft fines	3.77	731	8/24/2009
-106.5903583	68.1384217	1	very soft fines	3.96	751	8/24/2009
-106.5904233	68.1384233	1	very soft fines	4.04	771	8/24/2009
-106.5905517	68.1384283	1	very soft fines	3.98	791	8/24/2009
-106.5906817	68.1384317	1	very soft fines	3.91	811	8/24/2009
-106.5908117	68.1384333	1	very soft fines	3.59	831	8/24/2009
-106.59094	68.1384367	1	very soft fines	2.93	851	8/24/2009
-106.5910683	68.1384367	3	gravel, cobble, boulder	2.53	871	8/24/2009
-106.591195	68.1384383	3	gravel, cobble, boulder	2.41	891	8/24/2009
-106.59132	68.1384417	3	gravel, cobble, boulder	2.12	911	8/24/2009
-106.5913817	68.1384433	3	gravel, cobble, boulder	2	931	8/24/2009
-106.591505	68.138445	3	gravel, cobble, boulder	1.98	951	8/24/2009

Notes:

Coordinates (long, lat) are NAD83

Each data point represents an approximately 5 m long transect segment (20 pings).

Bottom Type Codes: 1 = very soft fines, 2 = mud, 3 = gravel, cobble, boulder

Dashes (-) = no data collected

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately 5 m long transect segment (20 pings)
Bottom Type Codes: 1 = very soft fines, 2 = mud, 3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-2

Substrate Data Collected from Hydroacoustic and Underwater Video Surveys of Patch Lake, Hope Bay Belt Project

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Appendix 3.1-2. Substrate Data Collected from Hydroacoustic and Underwater Video Surveys of Patch Lake, Hope Bay Belt Project, 2009

Longitude	Latitude	Type	Category	Depth	#Ping	Date
-106.5827067	68.07118	3	gravel, cobble, boulder	1.44	11	8/27/2009
-106.5826833	68.0711883	3	gravel, cobble, boulder	1.53	31	8/27/2009
-106.5826317	68.0712067	3	gravel, cobble, boulder	1.58	51	8/27/2009
-106.5825717	68.0712233	2	mud	1.75	71	8/27/2009
-106.5825083	68.0712417	1	very soft fines	1.81	91	8/27/2009
-106.5824433	68.07126	1	very soft fines	1.82	111	8/27/2009
-106.5823733	68.0712783	1	very soft fines	1.86	131	8/27/2009
-106.5822817	68.0712967	1	very soft fines	1.86	151	8/27/2009
-106.5821783	68.0713167	1	very soft fines	1.86	171	8/27/2009
-106.5821267	68.0713283	1	very soft fines	1.89	191	8/27/2009
-106.58202	68.07135	1	very soft fines	1.89	211	8/27/2009
-106.581905	68.071375	1	very soft fines	1.91	231	8/27/2009
-106.581785	68.0713983	1	very soft fines	1.87	251	8/27/2009
-106.5816633	68.0714217	1	very soft fines	1.87	271	8/27/2009
-106.581535	68.0714467	1	very soft fines	1.87	291	8/27/2009
-106.5814083	68.0714717	1	very soft fines	1.86	311	8/27/2009
-106.581345	68.071485	1	very soft fines	1.86	331	8/27/2009
-106.5812167	68.0715117	1	very soft fines	1.84	351	8/27/2009
-106.5810883	68.0715367	1	very soft fines	1.82	371	8/27/2009
-106.58096	68.0715633	2	mud	1.81	391	8/27/2009
-106.5808283	68.07159	1	very soft fines	1.81	411	8/27/2009
-106.5806983	68.0716167	1	very soft fines	1.79	431	8/27/2009
-106.5805683	68.0716467	1	very soft fines	1.86	451	8/27/2009
-106.58044	68.071675	1	very soft fines	1.86	471	8/27/2009
-106.580375	68.07169	1	very soft fines	1.84	491	8/27/2009
-106.5802467	68.0717183	1	very soft fines	1.86	511	8/27/2009
-106.58012	68.0717483	1	very soft fines	1.75	531	8/27/2009
-106.5799917	68.0717783	1	very soft fines	1.84	551	8/27/2009
-106.5798633	68.0718083	1	very soft fines	1.91	571	8/27/2009
-106.5797317	68.0718383	1	very soft fines	1.84	591	8/27/2009
-106.5796	68.0718683	1	very soft fines	1.77	611	8/27/2009
-106.5794717	68.0718967	1	very soft fines	1.87	631	8/27/2009
-106.5793433	68.0719283	1	very soft fines	1.81	651	8/27/2009
-106.5792783	68.0719433	2	mud	1.63	671	8/27/2009
-106.5791467	68.071975	1	very soft fines	1.67	691	8/27/2009
-106.579015	68.072005	1	very soft fines	1.86	711	8/27/2009
-106.578885	68.072035	1	very soft fines	1.84	731	8/27/2009
-106.578755	68.0720667	2	mud	1.7	751	8/27/2009
-106.578625	68.0720967	1	very soft fines	1.87	771	8/27/2009
-106.5784933	68.0721283	1	very soft fines	1.87	791	8/27/2009
-106.5783633	68.0721583	1	very soft fines	1.87	811	8/27/2009
-106.5782317	68.0721883	2	mud	1.79	831	8/27/2009
-106.5781	68.0722167	1	very soft fines	1.81	851	8/27/2009
-106.5779683	68.0722467	1	very soft fines	1.86	871	8/27/2009
-106.5779017	68.07226	1	very soft fines	1.91	891	8/27/2009
-106.57777	68.0722883	2	mud	1.65	911	8/27/2009
-106.57764	68.072315	1	very soft fines	1.87	931	8/27/2009
-106.5775133	68.0723433	1	very soft fines	1.86	951	8/27/2009
-106.57739	68.07237	2	mud	1.91	971	8/27/2009
-106.57727	68.0723983	2	mud	1.91	991	8/27/2009
-106.5771467	68.072425	2	mud	1.91	1011	8/27/2009
-106.5770267	68.0724517	2	mud	1.91	1031	8/27/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately 5 m long transect segment (20 pings).
Bottom Type Codes: 1 = very soft fines, 2 = mud,
3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-2. Substrate Data Collected from Hydroacoustic and Underwater Video Surveys of Patch Lake, Hope Bay Belt Project, 2009

Longitude	Latitude	Type	Category	Depth	#Ping	Date
-106.5769067	68.0724767	2	mud	1.93	1051	8/27/2009
-106.5768017	68.0724983	2	mud	1.91	1071	8/27/2009
-106.5766883	68.07252	2	mud	1.87	1091	8/27/2009
-106.5765717	68.07254	2	mud	1.81	1111	8/27/2009
-106.5765217	68.07255	2	mud	1.79	1131	8/27/2009
-106.5764367	68.0725683	2	mud	1.77	1151	8/27/2009
-106.5763583	68.072585	2	mud	1.7	1171	8/27/2009
-106.5762817	68.0726	3	gravel, cobble, boulder	1.67	1191	8/27/2009
-106.5762067	68.0726133	3	gravel, cobble, boulder	1.54	1211	8/27/2009
-106.57613	68.072625	3	gravel, cobble, boulder	1.42	1231	8/27/2009
-106.5760483	68.0726317	3	gravel, cobble, boulder	1.27	1251	8/27/2009
-106.575985	68.0726333	3	gravel, cobble, boulder	1.09	1271	8/27/2009
-106.5759517	68.0726367	3	gravel, cobble, boulder	1.06	1291	8/27/2009
-106.575955	68.0726417	3	gravel, cobble, boulder	1.02	1311	8/27/2009
-106.5759683	68.0726433	3	gravel, cobble, boulder	1.02	1331	8/27/2009
-106.5733833	68.0682417	3	gravel, cobble, boulder	2.57	11	8/27/2009
-106.5734283	68.068225	3	gravel, cobble, boulder	2.71	31	8/27/2009
-106.5734867	68.0682133	3	gravel, cobble, boulder	2.74	51	8/27/2009
-106.573555	68.0682	2	mud	2.9	71	8/27/2009
-106.5736433	68.068185	3	gravel, cobble, boulder	2.93	91	8/27/2009
-106.57375	68.0681683	2	mud	3.14	111	8/27/2009
-106.5738783	68.0681483	2	mud	3.18	131	8/27/2009
-106.5740267	68.0681283	2	mud	2.99	151	8/27/2009
-106.574185	68.0681067	2	mud	2.93	171	8/27/2009
-106.5743417	68.068085	2	mud	2.43	191	8/27/2009
-106.57442	68.0680733	3	gravel, cobble, boulder	2.12	211	8/27/2009
-106.574575	68.0680483	3	gravel, cobble, boulder	1.93	231	8/27/2009
-106.5747333	68.068025	3	gravel, cobble, boulder	1.87	251	8/27/2009
-106.5748917	68.0680033	2	mud	1.96	271	8/27/2009
-106.57505	68.0679817	2	mud	2.12	291	8/27/2009
-106.5752067	68.06796	2	mud	2.14	311	8/27/2009
-106.575365	68.06794	2	mud	2.15	331	8/27/2009
-106.5755217	68.0679183	2	mud	2.19	351	8/27/2009
-106.57568	68.0678983	2	mud	2.19	371	8/27/2009
-106.5758417	68.0678783	2	mud	2.17	391	8/27/2009
-106.5759217	68.0678683	2	mud	2.22	411	8/27/2009
-106.57608	68.0678467	2	mud	2.2	431	8/27/2009
-106.5762367	68.0678267	2	mud	2.2	451	8/27/2009
-106.576395	68.067805	2	mud	2.2	471	8/27/2009
-106.5765517	68.0677817	2	mud	2.2	491	8/27/2009
-106.57671	68.0677583	2	mud	2.29	511	8/27/2009
-106.576865	68.0677317	2	mud	2.2	531	8/27/2009
-106.5770167	68.0677067	2	mud	2.2	551	8/27/2009
-106.5771683	68.0676817	2	mud	2.22	571	8/27/2009
-106.5772433	68.0676683	2	mud	2.22	591	8/27/2009
-106.5773933	68.06764	2	mud	2.2	611	8/27/2009
-106.577545	68.0676133	1	very soft fines	2.22	631	8/27/2009
-106.5776967	68.0675833	1	very soft fines	2.15	651	8/27/2009
-106.5778433	68.067555	2	mud	2.19	671	8/27/2009
-106.57799	68.067525	1	very soft fines	2.17	691	8/27/2009
-106.578135	68.067495	1	very soft fines	2.12	711	8/27/2009
-106.57828	68.0674633	1	very soft fines	2.07	731	8/27/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately 5 m long transect segment (20 pings).
Bottom Type Codes: 1 = very soft fines, 2 = mud, 3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-2. Substrate Data Collected from Hydroacoustic and Underwater Video Surveys of Patch Lake, Hope Bay Belt Project, 2009

Longitude	Latitude	Type	Category	Depth	#Ping	Date
-106.5783533	68.0674483	1	very soft fines	2	751	8/27/2009
-106.5784967	68.067415	1	very soft fines	1.93	771	8/27/2009
-106.57864	68.0673833	1	very soft fines	1.91	791	8/27/2009
-106.57878	68.0673517	1	very soft fines	1.81	811	8/27/2009
-106.5789217	68.06732	1	very soft fines	1.81	831	8/27/2009
-106.5790633	68.0672867	2	mud	1.75	851	8/27/2009
-106.5792017	68.067255	2	mud	1.7	871	8/27/2009
-106.5793383	68.0672217	3	gravel, cobble, boulder	1.68	891	8/27/2009
-106.5794067	68.067205	3	gravel, cobble, boulder	1.67	911	8/27/2009
-106.5795383	68.06717	3	gravel, cobble, boulder	1.46	931	8/27/2009
-106.5796717	68.0671367	2	mud	1.67	951	8/27/2009
-106.5797783	68.0671067	3	gravel, cobble, boulder	1.56	971	8/27/2009
-106.5798533	68.0670833	3	gravel, cobble, boulder	1.49	991	8/27/2009
-106.5799233	68.0670617	3	gravel, cobble, boulder	1.53	1011	8/27/2009
-106.5799883	68.0670433	2	mud	1.72	1031	8/27/2009
-106.5800517	68.0670233	3	gravel, cobble, boulder	1.7	1051	8/27/2009
-106.580115	68.067005	3	gravel, cobble, boulder	1.77	1071	8/27/2009
-106.5801783	68.0669867	3	gravel, cobble, boulder	1.79	1091	8/27/2009
-106.5802433	68.06697	3	gravel, cobble, boulder	1.84	1111	8/27/2009
-106.5803083	68.0669517	3	gravel, cobble, boulder	2.01	1131	8/27/2009
-106.5803717	68.0669333	3	gravel, cobble, boulder	2.05	1151	8/27/2009
-106.5804017	68.066925	2	mud	2.07	1171	8/27/2009
-106.5804467	68.06691	2	mud	2.05	1191	8/27/2009
-106.58048	68.0669	3	gravel, cobble, boulder	2	1211	8/27/2009
-106.580505	68.06689	3	gravel, cobble, boulder	1.96	1231	8/27/2009
-106.5805317	68.0668783	3	gravel, cobble, boulder	2	1251	8/27/2009
-106.58055	68.06687	3	gravel, cobble, boulder	1.98	1271	8/27/2009
-106.5805633	68.0668633	3	gravel, cobble, boulder	1.96	1291	8/27/2009
-106.5615017	68.0631233	3	gravel, cobble, boulder	1.09	11	8/27/2009
-106.5615233	68.0631	3	gravel, cobble, boulder	1.11	31	8/27/2009
-106.5615667	68.06308	3	gravel, cobble, boulder	1.39	51	8/27/2009
-106.5616267	68.0630667	3	gravel, cobble, boulder	1.65	71	8/27/2009
-106.5616967	68.0630533	3	gravel, cobble, boulder	1.89	91	8/27/2009
-106.5617717	68.0630417	3	gravel, cobble, boulder	2.29	111	8/27/2009
-106.56181	68.0630367	3	gravel, cobble, boulder	2.48	131	8/27/2009
-106.56189	68.0630267	2	mud	2.92	151	8/27/2009
-106.5619817	68.0630167	1	very soft fines	3.02	171	8/27/2009
-106.5621	68.063005	2	mud	3.06	191	8/27/2009
-106.5622317	68.06299	1	very soft fines	3.16	211	8/27/2009
-106.5623683	68.0629733	1	very soft fines	3.26	231	8/27/2009
-106.5625117	68.062955	1	very soft fines	3.32	251	8/27/2009
-106.5625883	68.062945	1	very soft fines	3.4	271	8/27/2009
-106.5627467	68.0629217	1	very soft fines	3.61	291	8/27/2009
-106.56291	68.0628933	1	very soft fines	3.63	311	8/27/2009
-106.5630817	68.0628667	2	mud	3.58	331	8/27/2009
-106.5632567	68.0628433	2	mud	3.73	351	8/27/2009
-106.5634283	68.0628167	1	very soft fines	4.03	371	8/27/2009
-106.563515	68.0628033	2	mud	4.22	391	8/27/2009
-106.5636867	68.0627733	2	mud	4.41	411	8/27/2009
-106.5638617	68.0627467	1	very soft fines	4.57	431	8/27/2009
-106.5640383	68.0627217	2	mud	5.16	451	8/27/2009
-106.5642217	68.0627	1	very soft fines	5.87	471	8/27/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately 5 m long transect segment (20 pings).
Bottom Type Codes: 1 = very soft fines, 2 = mud, 3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-2. Substrate Data Collected from Hydroacoustic and Underwater Video Surveys of Patch Lake, Hope Bay Belt Project, 2009

Longitude	Latitude	Type	Category	Depth	#Ping	Date
-106.564405	68.0626817	1	very soft fines	6.01	491	8/27/2009
-106.5644967	68.0626733	1	very soft fines	6.08	511	8/27/2009
-106.564675	68.062655	1	very soft fines	6.27	531	8/27/2009
-106.5648567	68.062635	1	very soft fines	6.53	551	8/27/2009
-106.5650333	68.0626133	2	mud	6.94	571	8/27/2009
-106.5651217	68.0626017	2	mud	7.19	591	8/27/2009
-106.5652983	68.0625817	2	mud	7.05	611	8/27/2009
-106.5654717	68.06256	1	very soft fines	6.53	631	8/27/2009
-106.56564	68.0625383	1	very soft fines	6.27	651	8/27/2009
-106.5658083	68.062515	1	very soft fines	5.97	671	8/27/2009
-106.565985	68.06249	1	very soft fines	5.82	691	8/27/2009
-106.5661617	68.062465	1	very soft fines	5.23	711	8/27/2009
-106.5662517	68.0624517	3	gravel, cobble, boulder	4.7	731	8/27/2009
-106.5664283	68.0624267	3	gravel, cobble, boulder	4.55	751	8/27/2009
-106.5666067	68.0624017	3	gravel, cobble, boulder	4.36	771	8/27/2009
-106.5667867	68.0623767	3	gravel, cobble, boulder	4.41	791	8/27/2009
-106.566965	68.0623517	1	very soft fines	4.81	811	8/27/2009
-106.5671417	68.0623283	1	very soft fines	5.28	831	8/27/2009
-106.5673183	68.0623033	1	very soft fines	5.45	851	8/27/2009
-106.5674067	68.0622917	1	very soft fines	5.57	871	8/27/2009
-106.5675833	68.0622683	1	very soft fines	5.66	891	8/27/2009
-106.56776	68.0622483	1	very soft fines	5.75	911	8/27/2009
-106.5679383	68.062225	1	very soft fines	5.71	931	8/27/2009
-106.5681183	68.0622017	1	very soft fines	5.69	951	8/27/2009
-106.5682933	68.0621767	1	very soft fines	5.71	971	8/27/2009
-106.5683767	68.062165	1	very soft fines	5.78	991	8/27/2009
-106.5685417	68.0621417	1	very soft fines	5.8	1011	8/27/2009
-106.5687183	68.0621217	1	very soft fines	6.13	1031	8/27/2009
-106.5689033	68.062105	2	mud	6.54	1051	8/27/2009
-106.5690883	68.062085	1	very soft fines	6.56	1071	8/27/2009
-106.5691833	68.0620767	1	very soft fines	6.16	1091	8/27/2009
-106.56937	68.062055	1	very soft fines	5.78	1111	8/27/2009
-106.5695533	68.0620333	1	very soft fines	5.62	1131	8/27/2009
-106.5697367	68.06201	1	very soft fines	5.54	1151	8/27/2009
-106.569915	68.061985	1	very soft fines	5.38	1171	8/27/2009
-106.5700933	68.0619617	1	very soft fines	4.88	1191	8/27/2009
-106.5702733	68.0619383	1	very soft fines	4.63	1211	8/27/2009
-106.570365	68.0619267	1	very soft fines	4.1	1231	8/27/2009
-106.570545	68.0619017	1	very soft fines	3.82	1251	8/27/2009
-106.5707283	68.06188	1	very soft fines	3.42	1271	8/27/2009
-106.5709133	68.0618567	1	very soft fines	3.18	1291	8/27/2009
-106.571095	68.0618317	1	very soft fines	2.95	1311	8/27/2009
-106.5712783	68.0618067	1	very soft fines	2.83	1331	8/27/2009
-106.5714583	68.06178	1	very soft fines	2.73	1351	8/27/2009
-106.5715483	68.0617667	1	very soft fines	2.66	1371	8/27/2009
-106.571725	68.06174	2	mud	2.57	1391	8/27/2009
-106.5719017	68.0617133	2	mud	2.53	1411	8/27/2009
-106.5720767	68.0616867	2	mud	2.46	1431	8/27/2009
-106.5722433	68.06166	2	mud	2.41	1451	8/27/2009
-106.57242	68.0616367	3	gravel, cobble, boulder	2.4	1471	8/27/2009
-106.572595	68.0616183	2	mud	2.38	1491	8/27/2009
-106.5727583	68.0615983	2	mud	2.4	1511	8/27/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately 5 m long transect segment (20 pings).
Bottom Type Codes: 1 = very soft fines, 2 = mud, 3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-2. Substrate Data Collected from Hydroacoustic and Underwater Video Surveys of Patch Lake, Hope Bay Belt Project, 2009

Longitude	Latitude	Type	Category	Depth	#Ping	Date
-106.57284	68.0615883	2	mud	2.34	1531	8/27/2009
-106.573005	68.0615667	2	mud	2.33	1551	8/27/2009
-106.57317	68.0615433	1	very soft fines	2.33	1571	8/27/2009
-106.5733367	68.0615183	2	mud	2.31	1591	8/27/2009
-106.5735067	68.0614933	2	mud	2.31	1611	8/27/2009
-106.5736767	68.0614683	2	mud	2.24	1631	8/27/2009
-106.57384	68.061445	1	very soft fines	2.2	1651	8/27/2009
-106.5739183	68.0614317	1	very soft fines	2.19	1671	8/27/2009
-106.5740667	68.0614067	1	very soft fines	2.15	1691	8/27/2009
-106.57422	68.0613817	2	mud	2.12	1711	8/27/2009
-106.5743733	68.0613633	1	very soft fines	2.1	1731	8/27/2009
-106.57452	68.0613483	1	very soft fines	2.12	1751	8/27/2009
-106.574665	68.0613333	2	mud	2.05	1771	8/27/2009
-106.57474	68.061325	1	very soft fines	1.98	1791	8/27/2009
-106.5748867	68.06131	2	mud	1.93	1811	8/27/2009
-106.57503	68.061295	2	mud	1.89	1831	8/27/2009
-106.57517	68.0612817	2	mud	1.84	1851	8/27/2009
-106.5753017	68.061265	1	very soft fines	1.7	1871	8/27/2009
-106.5754233	68.06125	2	mud	1.67	1891	8/27/2009
-106.5755267	68.0612367	2	mud	1.7	1911	8/27/2009
-106.5756167	68.061225	3	gravel, cobble, boulder	1.67	1931	8/27/2009
-106.5757017	68.061215	3	gravel, cobble, boulder	1.93	1951	8/27/2009
-106.5757467	68.0612083	2	mud	1.91	1971	8/27/2009
-106.57584	68.061195	2	mud	1.89	1991	8/27/2009
-106.5759317	68.0611833	2	mud	1.67	2011	8/27/2009
-106.576015	68.0611717	2	mud	1.54	2031	8/27/2009
-106.5760967	68.0611617	3	gravel, cobble, boulder	1.28	2051	8/27/2009
-106.5783383	68.060195	3	gravel, cobble, boulder	1.77	11	8/27/2009
-106.5784017	68.060205	3	gravel, cobble, boulder	1.98	31	8/27/2009
-106.5784733	68.0602067	3	gravel, cobble, boulder	2.26	51	8/27/2009
-106.5785483	68.0602033	3	gravel, cobble, boulder	2.57	71	8/27/2009
-106.578625	68.0601967	3	gravel, cobble, boulder	2.95	91	8/27/2009
-106.578715	68.060185	3	gravel, cobble, boulder	3.19	111	8/27/2009
-106.5788167	68.06017	3	gravel, cobble, boulder	3.26	131	8/27/2009
-106.5789333	68.0601533	3	gravel, cobble, boulder	3.16	151	8/27/2009
-106.5789933	68.060145	3	gravel, cobble, boulder	2.93	171	8/27/2009
-106.5791217	68.060125	3	gravel, cobble, boulder	2.29	191	8/27/2009
-106.5792483	68.0601033	2	mud	2.26	211	8/27/2009
-106.5793733	68.0600783	2	mud	2.19	231	8/27/2009
-106.5795	68.0600533	2	mud	2.17	251	8/27/2009
-106.579625	68.0600283	2	mud	2.15	271	8/27/2009
-106.57975	68.0600017	2	mud	2.15	291	8/27/2009
-106.579875	68.059975	3	gravel, cobble, boulder	2.14	311	8/27/2009
-106.5800033	68.0599517	3	gravel, cobble, boulder	2.15	331	8/27/2009
-106.5801367	68.0599317	2	mud	2.14	351	8/27/2009
-106.5802033	68.0599217	2	mud	2.14	371	8/27/2009
-106.5803383	68.0599017	2	mud	2.14	391	8/27/2009
-106.58047	68.05988	2	mud	2.14	411	8/27/2009
-106.5806033	68.0598567	2	mud	2.15	431	8/27/2009
-106.580735	68.0598317	2	mud	2.15	451	8/27/2009
-106.5808683	68.0598067	2	mud	2.17	471	8/27/2009
-106.5810033	68.05978	2	mud	2.14	491	8/27/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately 5 m long transect segment (20 pings).
Bottom Type Codes: 1 = very soft fines, 2 = mud, 3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-2. Substrate Data Collected from Hydroacoustic and Underwater Video Surveys of Patch Lake, Hope Bay Belt Project, 2009

Longitude	Latitude	Type	Category	Depth	#Ping	Date
-106.5811383	68.059755	2	mud	2.14	511	8/27/2009
-106.581205	68.05974	3	gravel, cobble, boulder	2.14	531	8/27/2009
-106.581335	68.0597133	2	mud	2.12	551	8/27/2009
-106.581465	68.059685	2	mud	2.15	571	8/27/2009
-106.58159	68.059655	2	mud	2.14	591	8/27/2009
-106.5817183	68.059625	2	mud	2.15	611	8/27/2009
-106.5818467	68.059595	2	mud	2.14	631	8/27/2009
-106.581975	68.0595667	2	mud	2.15	651	8/27/2009
-106.5821067	68.0595367	2	mud	2.17	671	8/27/2009
-106.5821717	68.0595217	2	mud	2.15	691	8/27/2009
-106.5823017	68.0594933	2	mud	2.14	711	8/27/2009
-106.5824283	68.0594633	3	gravel, cobble, boulder	2.17	731	8/27/2009
-106.582555	68.0594333	3	gravel, cobble, boulder	2.29	751	8/27/2009
-106.582685	68.0594033	3	gravel, cobble, boulder	2.29	771	8/27/2009
-106.5828117	68.0593717	3	gravel, cobble, boulder	2.52	791	8/27/2009
-106.5829367	68.05934	3	gravel, cobble, boulder	2.66	811	8/27/2009
-106.5830617	68.0593083	3	gravel, cobble, boulder	2.73	831	8/27/2009
-106.5831867	68.059275	3	gravel, cobble, boulder	2.95	851	8/27/2009
-106.5833067	68.0592433	2	mud	2.88	871	8/27/2009
-106.5834167	68.0592117	3	gravel, cobble, boulder	2.9	891	8/27/2009
-106.583475	68.059195	3	gravel, cobble, boulder	3.02	911	8/27/2009
-106.5835983	68.0591633	3	gravel, cobble, boulder	2.9	931	8/27/2009
-106.583725	68.0591333	3	gravel, cobble, boulder	2.9	951	8/27/2009
-106.5838483	68.0591017	3	gravel, cobble, boulder	2.86	971	8/27/2009
-106.58397	68.0590683	3	gravel, cobble, boulder	2.85	991	8/27/2009
-106.5840917	68.059035	2	mud	2.81	1011	8/27/2009
-106.5842133	68.0590033	3	gravel, cobble, boulder	2.78	1031	8/27/2009
-106.5843367	68.0589717	3	gravel, cobble, boulder	2.69	1051	8/27/2009
-106.5844567	68.05894	3	gravel, cobble, boulder	2.64	1071	8/27/2009
-106.584575	68.05891	3	gravel, cobble, boulder	2.73	1091	8/27/2009
-106.5846967	68.0588783	3	gravel, cobble, boulder	2.62	1111	8/27/2009
-106.5847567	68.0588633	3	gravel, cobble, boulder	2.6	1131	8/27/2009
-106.58488	68.0588317	3	gravel, cobble, boulder	2.55	1151	8/27/2009
-106.5850033	68.0588033	3	gravel, cobble, boulder	2.59	1171	8/27/2009
-106.5851233	68.0587767	3	gravel, cobble, boulder	2.55	1191	8/27/2009
-106.5852417	68.05875	3	gravel, cobble, boulder	2.59	1211	8/27/2009
-106.5853617	68.0587233	3	gravel, cobble, boulder	2.53	1231	8/27/2009
-106.5854783	68.0586983	3	gravel, cobble, boulder	2.5	1251	8/27/2009
-106.5855867	68.058675	3	gravel, cobble, boulder	2.4	1271	8/27/2009
-106.5857017	68.0586517	3	gravel, cobble, boulder	2.4	1291	8/27/2009
-106.5858167	68.0586283	2	mud	2.31	1311	8/27/2009
-106.585915	68.0586067	2	mud	2.05	1331	8/27/2009
-106.5860067	68.05859	3	gravel, cobble, boulder	1.93	1351	8/27/2009
-106.5860883	68.0585733	3	gravel, cobble, boulder	1.79	1371	8/27/2009
-106.5861283	68.058565	3	gravel, cobble, boulder	1.79	1391	8/27/2009
-106.586205	68.05855	3	gravel, cobble, boulder	1.61	1411	8/27/2009
-106.5862817	68.058535	3	gravel, cobble, boulder	1.53	1431	8/27/2009
-106.586355	68.0585217	3	gravel, cobble, boulder	1.61	1451	8/27/2009
-106.586405	68.05851	2	mud	1.58	1471	8/27/2009
-106.586455	68.0584983	3	gravel, cobble, boulder	1.42	1491	8/27/2009
-106.5865033	68.0584883	3	gravel, cobble, boulder	1.37	1511	8/27/2009
-106.586555	68.0584767	3	gravel, cobble, boulder	1.22	1531	8/27/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately 5 m long transect segment (20 pings).
Bottom Type Codes: 1 = very soft fines, 2 = mud, 3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-2. Substrate Data Collected from Hydroacoustic and Underwater Video Surveys of Patch Lake, Hope Bay Belt Project, 2009

Longitude	Latitude	Type	Category	Depth	#Ping	Date
-106.580875	68.0565917	3	gravel, cobble, boulder	1.56	11	8/27/2009
-106.5807617	68.0566117	3	gravel, cobble, boulder	1.79	31	8/27/2009
-106.5807033	68.056625	3	gravel, cobble, boulder	2.05	51	8/27/2009
-106.5805883	68.0566517	2	mud	2.93	71	8/27/2009
-106.5804733	68.0566783	1	very soft fines	3.26	91	8/27/2009
-106.5803367	68.0567083	3	gravel, cobble, boulder	3.75	111	8/27/2009
-106.5801983	68.0567433	2	mud	3.98	131	8/27/2009
-106.5800567	68.0567767	3	gravel, cobble, boulder	4.69	151	8/27/2009
-106.5799133	68.0568083	3	gravel, cobble, boulder	5.14	171	8/27/2009
-106.57977	68.0568383	3	gravel, cobble, boulder	5.55	191	8/27/2009
-106.5796983	68.0568533	2	mud	6.23	211	8/27/2009
-106.5795467	68.0568833	1	very soft fines	6.63	231	8/27/2009
-106.57939	68.0569083	1	very soft fines	7.01	251	8/27/2009
-106.5792317	68.0569317	3	gravel, cobble, boulder	7.39	271	8/27/2009
-106.5790717	68.0569533	3	gravel, cobble, boulder	7.38	291	8/27/2009
-106.57891	68.0569767	1	very soft fines	7.45	311	8/27/2009
-106.57883	68.05699	1	very soft fines	7.46	331	8/27/2009
-106.5786717	68.0570133	1	very soft fines	7.45	351	8/27/2009
-106.5785117	68.0570383	1	very soft fines	7.48	371	8/27/2009
-106.5783533	68.057065	1	very soft fines	7.39	391	8/27/2009
-106.578195	68.0570917	1	very soft fines	7.31	411	8/27/2009
-106.5780367	68.05712	1	very soft fines	7.13	431	8/27/2009
-106.57788	68.0571483	2	mud	6.98	451	8/27/2009
-106.577805	68.057165	1	very soft fines	6.72	471	8/27/2009
-106.577655	68.0571983	2	mud	6.41	491	8/27/2009
-106.5774983	68.0572267			5.59	511	8/27/2009
-106.5773383	68.0572533	3	gravel, cobble, boulder	4.95	531	8/27/2009
-106.5771783	68.0572783	3	gravel, cobble, boulder	4.22	551	8/27/2009
-106.5770133	68.0573033	2	mud	3.78	571	8/27/2009
-106.5768483	68.0573267	1	very soft fines	3.37	591	8/27/2009
-106.5766867	68.0573517	1	very soft fines	3.19	611	8/27/2009
-106.576605	68.057365	2	mud	2.95	631	8/27/2009
-106.5764417	68.05739	2	mud	2.78	651	8/27/2009
-106.5762767	68.0574133	2	mud	2.62	671	8/27/2009
-106.5761117	68.05744	2	mud	2.5	691	8/27/2009
-106.5759483	68.057465	3	gravel, cobble, boulder	2.41	711	8/27/2009
-106.5757783	68.05749	2	mud	2.17	731	8/27/2009
-106.575605	68.0575117	2	mud	2	751	8/27/2009
-106.57544	68.05753	2	mud	1.86	771	8/27/2009
-106.575285	68.05755	3	gravel, cobble, boulder	1.81	791	8/27/2009
-106.5751317	68.05757	3	gravel, cobble, boulder	1.75	811	8/27/2009
-106.5749783	68.05759	3	gravel, cobble, boulder	1.67	831	8/27/2009
-106.574825	68.0576117	3	gravel, cobble, boulder	1.63	851	8/27/2009
-106.5746767	68.0576333	3	gravel, cobble, boulder	1.56	871	8/27/2009
-106.57453	68.05766	2	mud	1.53	891	8/27/2009
-106.574475	68.05767	3	gravel, cobble, boulder	1.53	911	8/27/2009
-106.5743733	68.0576883	3	gravel, cobble, boulder	1.56	931	8/27/2009
-106.5742833	68.0577033	3	gravel, cobble, boulder	1.61	951	8/27/2009
-106.57418	68.0577183	3	gravel, cobble, boulder	1.61	971	8/27/2009
-106.5740633	68.0577367	3	gravel, cobble, boulder	1.54	991	8/27/2009
-106.5739383	68.057755	3	gravel, cobble, boulder	1.53	1011	8/27/2009
-106.57381	68.0577733	3	gravel, cobble, boulder	1.6	1031	8/27/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately 5 m long transect segment (20 pings).
Bottom Type Codes: 1 = very soft fines, 2 = mud, 3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-2. Substrate Data Collected from Hydroacoustic and Underwater Video Surveys of Patch Lake, Hope Bay Belt Project, 2009

Longitude	Latitude	Type	Category	Depth	#Ping	Date
-106.5736783	68.0577933	3	gravel, cobble, boulder	1.7	1051	8/27/2009
-106.57355	68.0578133	3	gravel, cobble, boulder	1.89	1071	8/27/2009
-106.5734183	68.0578333	3	gravel, cobble, boulder	2.03	1091	8/27/2009
-106.57329	68.0578533	3	gravel, cobble, boulder	2.03	1111	8/27/2009
-106.5731583	68.057875	3	gravel, cobble, boulder	2.08	1131	8/27/2009
-106.5730267	68.057895	3	gravel, cobble, boulder	2	1151	8/27/2009
-106.5728917	68.057915	3	gravel, cobble, boulder	1.93	1171	8/27/2009
-106.5727417	68.057935	3	gravel, cobble, boulder	1.84	1191	8/27/2009
-106.5725867	68.0579583	2	mud	1.86	1211	8/27/2009
-106.57243	68.0579817	3	gravel, cobble, boulder	1.84	1231	8/27/2009
-106.572275	68.0580067	3	gravel, cobble, boulder	1.81	1251	8/27/2009
-106.572195	68.05802	3	gravel, cobble, boulder	1.84	1271	8/27/2009
-106.5720333	68.0580467	3	gravel, cobble, boulder	1.86	1291	8/27/2009
-106.5718683	68.0580733	3	gravel, cobble, boulder	1.89	1311	8/27/2009
-106.5717017	68.0581	3	gravel, cobble, boulder	1.96	1331	8/27/2009
-106.5715367	68.0581283	3	gravel, cobble, boulder	2.05	1351	8/27/2009
-106.5713733	68.058155	2	mud	2.15	1371	8/27/2009
-106.57121	68.0581833	3	gravel, cobble, boulder	2.24	1391	8/27/2009
-106.5710467	68.0582117	2	mud	2.31	1411	8/27/2009
-106.5708833	68.0582417	3	gravel, cobble, boulder	2.36	1431	8/27/2009
-106.5707217	68.05827	3	gravel, cobble, boulder	2.46	1451	8/27/2009
-106.5705567	68.0582983	3	gravel, cobble, boulder	2.55	1471	8/27/2009
-106.5703917	68.0583267	2	mud	2.6	1491	8/27/2009
-106.5703083	68.05834	2	mud	2.69	1511	8/27/2009
-106.5701417	68.058365	2	mud	2.76	1531	8/27/2009
-106.5699717	68.05839	1	very soft fines	2.88	1551	8/27/2009
-106.569805	68.058415	1	very soft fines	3.02	1571	8/27/2009
-106.5696367	68.05844	2	mud	3.09	1591	8/27/2009
-106.569465	68.058465	2	mud	3.33	1611	8/27/2009
-106.569295	68.0584917	2	mud	3.42	1631	8/27/2009
-106.569125	68.0585183	3	gravel, cobble, boulder	3.77	1651	8/27/2009
-106.56896	68.0585467	2	mud	4.13	1671	8/27/2009
-106.5688767	68.05856	2	mud	4.22	1691	8/27/2009
-106.56871	68.05859	3	gravel, cobble, boulder	4.15	1711	8/27/2009
-106.5685417	68.0586183	3	gravel, cobble, boulder	4.06	1731	8/27/2009
-106.568375	68.0586483	1	very soft fines	4.15	1751	8/27/2009
-106.56821	68.05868	1	very soft fines	4.1	1771	8/27/2009
-106.5680467	68.05871	2	mud	3.96	1791	8/27/2009
-106.5678833	68.0587417	2	mud	3.98	1811	8/27/2009
-106.5678	68.0587567	1	very soft fines	3.94	1831	8/27/2009
-106.5676367	68.0587867	1	very soft fines	3.92	1851	8/27/2009
-106.5674717	68.0588183	1	very soft fines	3.8	1871	8/27/2009
-106.567305	68.0588467	1	very soft fines	3.77	1891	8/27/2009
-106.56714	68.0588767	1	very soft fines	3.71	1911	8/27/2009
-106.566975	68.0589067	1	very soft fines	3.63	1931	8/27/2009
-106.56681	68.0589383	2	mud	3.61	1951	8/27/2009
-106.5667283	68.0589533	1	very soft fines	3.49	1971	8/27/2009
-106.5665633	68.0589833	2	mud	3.45	1991	8/27/2009
-106.5663983	68.0590133	2	mud	3.33	2011	8/27/2009
-106.5662333	68.0590433	2	mud	3.32	2031	8/27/2009
-106.56607	68.0590733	2	mud	3.25	2051	8/27/2009
-106.565905	68.0591033	2	mud	3.18	2071	8/27/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately 5 m long transect segment (20 pings).
Bottom Type Codes: 1 = very soft fines, 2 = mud, 3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-2. Substrate Data Collected from Hydroacoustic and Underwater Video Surveys of Patch Lake, Hope Bay Belt Project, 2009

Longitude	Latitude	Type	Category	Depth	#Ping	Date
-106.5657417	68.0591333	2	mud	3.12	2091	8/27/2009
-106.5655717	68.0591633	2	mud	3.09	2111	8/27/2009
-106.5654	68.0591883	2	mud	3.09	2131	8/27/2009
-106.565315	68.0592	2	mud	3.04	2151	8/27/2009
-106.5651417	68.0592233	2	mud	3.02	2171	8/27/2009
-106.5649683	68.0592483	2	mud	2.99	2191	8/27/2009
-106.5647917	68.0592717	1	very soft fines	2.95	2211	8/27/2009
-106.5646167	68.0592983	1	very soft fines	2.9	2231	8/27/2009
-106.564445	68.0593217	1	very soft fines	2.85	2251	8/27/2009
-106.5642733	68.059345	1	very soft fines	2.79	2271	8/27/2009
-106.5641033	68.0593683	2	mud	2.76	2291	8/27/2009
-106.5639333	68.05939	2	mud	2.76	2311	8/27/2009
-106.5638483	68.0594017	2	mud	2.74	2331	8/27/2009
-106.5636783	68.0594233	2	mud	2.67	2351	8/27/2009
-106.5635083	68.059445	2	mud	2.67	2371	8/27/2009
-106.5633383	68.0594667	2	mud	2.64	2391	8/27/2009
-106.5631717	68.05949	2	mud	2.64	2411	8/27/2009
-106.5630033	68.0595117	2	mud	2.66	2431	8/27/2009
-106.5628383	68.059535	2	mud	2.69	2451	8/27/2009
-106.5626683	68.0595567	2	mud	2.73	2471	8/27/2009
-106.562585	68.0595683	2	mud	2.73	2491	8/27/2009
-106.5624117	68.05959	2	mud	2.78	2511	8/27/2009
-106.56224	68.05961	2	mud	2.86	2531	8/27/2009
-106.5620683	68.0596317	2	mud	2.9	2551	8/27/2009
-106.5618983	68.0596533	2	mud	2.99	2571	8/27/2009
-106.56173	68.059675	2	mud	3.06	2591	8/27/2009
-106.5615583	68.0596967	1	very soft fines	3.12	2611	8/27/2009
-106.561385	68.0597167	1	very soft fines	3.18	2631	8/27/2009
-106.5612133	68.0597383	1	very soft fines	3.33	2651	8/27/2009
-106.56113	68.05975	1	very soft fines	3.49	2671	8/27/2009
-106.5609633	68.059775	1	very soft fines	3.63	2691	8/27/2009
-106.5607967	68.0598017	1	very soft fines	3.8	2711	8/27/2009
-106.5606367	68.0598283	2	mud	4.01	2731	8/27/2009
-106.5604833	68.059855	2	mud	4.18	2751	8/27/2009
-106.56033	68.0598817	2	mud	4.41	2771	8/27/2009
-106.5602517	68.059895	1	very soft fines	4.58	2791	8/27/2009
-106.5600967	68.0599217	1	very soft fines	4.63	2811	8/27/2009
-106.5599417	68.05995	1	very soft fines	4.63	2831	8/27/2009
-106.5597883	68.05998	1	very soft fines	4.55	2851	8/27/2009
-106.5596333	68.0600083	1	very soft fines	4.36	2871	8/27/2009
-106.55956	68.0600233	1	very soft fines	4.31	2891	8/27/2009
-106.55944	68.0600467	1	very soft fines	4.22	2911	8/27/2009
-106.5593433	68.0600683	2	mud	4.1	2931	8/27/2009
-106.55924	68.060085	2	mud	4.01	2951	8/27/2009
-106.5591383	68.0601033	2	mud	4.01	2971	8/27/2009
-106.5590267	68.0601217	2	mud	3.77	2991	8/27/2009
-106.55892	68.0601383	2	mud	3.68	3011	8/27/2009
-106.5588067	68.0601533	1	very soft fines	3.44	3031	8/27/2009
-106.5587483	68.06016	1	very soft fines	3.18	3051	8/27/2009
-106.558635	68.060175	2	mud	2.36	3071	8/27/2009
-106.5585417	68.0601883	2	mud	2.1	3091	8/27/2009
-106.5584567	68.0602	3	gravel, cobble, boulder	1.74	3111	8/27/2009

Notes:
Coordinates (long, lat) are NAD83
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Bottom Type Codes: 1 = very soft fines, 2 = mud, 3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-2. Substrate Data Collected from Hydroacoustic and Underwater Video Surveys of Patch Lake, Hope Bay Belt Project, 2009

Longitude	Latitude	Type	Category	Depth	#Ping	Date
-106.5583733	68.06021	3	gravel, cobble, boulder	1.54	3131	8/27/2009
-106.5582917	68.06022	3	gravel, cobble, boulder	1.44	3151	8/27/2009
-106.55823	68.0602283	3	gravel, cobble, boulder	1.3	3171	8/27/2009
-106.5581867	68.0602367	3	gravel, cobble, boulder	1.32	3191	8/27/2009
-106.553035	68.057265	3	gravel, cobble, boulder	2.26	11	8/27/2009
-106.5530583	68.05724	3	gravel, cobble, boulder	2.48	31	8/27/2009
-106.5531067	68.0572217	2	mud	2.83	51	8/27/2009
-106.553165	68.0572083	2	mud	3.04	71	8/27/2009
-106.5532317	68.057195	1	very soft fines	3.44	91	8/27/2009
-106.5532667	68.0571883	1	very soft fines	3.78	111	8/27/2009
-106.55336	68.0571717	2	mud	4.08	131	8/27/2009
-106.553505	68.0571483	2	mud	4.43	151	8/27/2009
-106.5536667	68.0571183	1	very soft fines	4.86	171	8/27/2009
-106.5538217	68.057085	1	very soft fines	5.16	191	8/27/2009
-106.5539733	68.05705	2	mud	5.36	211	8/27/2009
-106.5540533	68.0570317	1	very soft fines	5.24	231	8/27/2009
-106.554225	68.0569983	2	mud	4.98	251	8/27/2009
-106.554405	68.0569667	2	mud	4.74	271	8/27/2009
-106.55458	68.056945	2	mud	4.55	291	8/27/2009
-106.5547467	68.0569233	2	mud	4.2	311	8/27/2009
-106.55491	68.0569	2	mud	4.06	331	8/27/2009
-106.5550717	68.0568767	2	mud	3.91	351	8/27/2009
-106.5551517	68.056865	1	very soft fines	3.78	371	8/27/2009
-106.5553083	68.0568383	–	–	3.71	391	8/27/2009
-106.555465	68.0568083	2	mud	3.77	411	8/27/2009
-106.5556183	68.0567783	2	mud	3.77	431	8/27/2009
-106.555775	68.0567483	2	mud	3.84	451	8/27/2009
-106.555935	68.05672	2	mud	3.85	471	8/27/2009
-106.5560967	68.0566883	2	mud	3.84	491	8/27/2009
-106.5562633	68.05666	2	mud	3.92	511	8/27/2009
-106.556345	68.056645	2	mud	3.98	531	8/27/2009
-106.5565083	68.056615	2	mud	4.04	551	8/27/2009
-106.5566717	68.0565833	2	mud	3.98	571	8/27/2009
-106.5568333	68.05655	2	mud	3.91	591	8/27/2009
-106.556995	68.0565183	2	mud	3.85	611	8/27/2009
-106.5571583	68.0564883	2	mud	3.68	631	8/27/2009
-106.55732	68.0564567	1	very soft fines	3.63	651	8/27/2009
-106.5574817	68.0564267	2	mud	3.42	671	8/27/2009
-106.55756	68.0564117	3	gravel, cobble, boulder	3.35	691	8/27/2009
-106.55772	68.05638	2	mud	3.32	711	8/27/2009
-106.55788	68.0563483	2	mud	3.33	731	8/27/2009
-106.558035	68.0563183	2	mud	3.35	751	8/27/2009
-106.5581967	68.056285	3	gravel, cobble, boulder	3.39	771	8/27/2009
-106.5583583	68.0562517	3	gravel, cobble, boulder	3.39	791	8/27/2009
-106.55852	68.05622	2	mud	3.35	811	8/27/2009
-106.5586833	68.05619	2	mud	3.33	831	8/27/2009
-106.558765	68.056175	2	mud	3.26	851	8/27/2009
-106.5589267	68.0561467	2	mud	3.28	871	8/27/2009
-106.5590933	68.0561183	2	mud	3.23	891	8/27/2009
-106.559255	68.05609	2	mud	3.23	911	8/27/2009
-106.5594183	68.0560633	2	mud	3.23	931	8/27/2009
-106.5595817	68.056035	2	mud	3.19	951	8/27/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately 5 m long transect segment (20 pings).
Bottom Type Codes: 1 = very soft fines, 2 = mud, 3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-2. Substrate Data Collected from Hydroacoustic and Underwater Video Surveys of Patch Lake, Hope Bay Belt Project, 2009

Longitude	Latitude	Type	Category	Depth	#Ping	Date
-106.5597417	68.0560083	2	mud	3.18	971	8/27/2009
-106.5599033	68.0559817	2	mud	3.16	991	8/27/2009
-106.5600683	68.055955	2	mud	3.14	1011	8/27/2009
-106.5601517	68.0559417	2	mud	3.16	1031	8/27/2009
-106.5603183	68.0559167	2	mud	3.16	1051	8/27/2009
-106.5604833	68.0558917	3	gravel, cobble, boulder	3.16	1071	8/27/2009
-106.5606483	68.055865	2	mud	3.18	1091	8/27/2009
-106.560815	68.0558383	2	mud	3.25	1111	8/27/2009
-106.5609833	68.0558117	2	mud	3.28	1131	8/27/2009
-106.56115	68.055785	2	mud	3.35	1151	8/27/2009
-106.56132	68.0557583	1	very soft fines	3.56	1171	8/27/2009
-106.5614017	68.055745	2	mud	3.52	1191	8/27/2009
-106.56157	68.0557183	1	very soft fines	3.52	1211	8/27/2009
-106.561735	68.0556917	2	mud	3.56	1231	8/27/2009
-106.5618983	68.0556667	2	mud	3.52	1251	8/27/2009
-106.5620633	68.0556417	1	very soft fines	3.56	1271	8/27/2009
-106.56223	68.055615	1	very soft fines	3.42	1291	8/27/2009
-106.562395	68.05559	1	very soft fines	3.37	1311	8/27/2009
-106.5625583	68.0555633	1	very soft fines	3.16	1331	8/27/2009
-106.56272	68.0555367	2	mud	2.9	1351	8/27/2009
-106.5628017	68.0555217	3	gravel, cobble, boulder	2.78	1371	8/27/2009
-106.562965	68.055495	2	mud	2.69	1391	8/27/2009
-106.5631183	68.0554667	3	gravel, cobble, boulder	2.57	1411	8/27/2009
-106.5632567	68.05544	3	gravel, cobble, boulder	2.53	1431	8/27/2009
-106.56339	68.0554133	3	gravel, cobble, boulder	2.38	1451	8/27/2009
-106.563525	68.0553867	3	gravel, cobble, boulder	2.45	1471	8/27/2009
-106.5636567	68.05536	3	gravel, cobble, boulder	2.67	1491	8/27/2009
-106.5637883	68.055335	3	gravel, cobble, boulder	2.74	1511	8/27/2009
-106.563925	68.05531	2	mud	2.85	1531	8/27/2009
-106.5640667	68.055285	2	mud	2.93	1551	8/27/2009
-106.5642117	68.0552617	2	mud	2.97	1571	8/27/2009
-106.56436	68.0552367	3	gravel, cobble, boulder	3.06	1591	8/27/2009
-106.564435	68.055225	2	mud	3.11	1611	8/27/2009
-106.5645883	68.0552017	1	very soft fines	3.21	1631	8/27/2009
-106.56475	68.0551817	2	mud	3.28	1651	8/27/2009
-106.56492	68.0551617	2	mud	3.32	1671	8/27/2009
-106.5650917	68.0551417	1	very soft fines	3.32	1691	8/27/2009
-106.5651767	68.0551317	1	very soft fines	3.35	1711	8/27/2009
-106.5653483	68.0551117	1	very soft fines	3.35	1731	8/27/2009
-106.5655217	68.0550883	1	very soft fines	3.39	1751	8/27/2009
-106.565695	68.055065	1	very soft fines	3.37	1771	8/27/2009
-106.56587	68.0550417	1	very soft fines	3.37	1791	8/27/2009
-106.565955	68.05503	1	very soft fines	3.33	1811	8/28/2009
-106.566125	68.0550033	1	very soft fines	3.33	1831	8/28/2009
-106.5662983	68.0549783	1	very soft fines	3.3	1851	8/28/2009
-106.5664717	68.0549533	1	very soft fines	3.32	1871	8/28/2009
-106.5666433	68.0549267	1	very soft fines	3.32	1891	8/28/2009
-106.5667283	68.054915	1	very soft fines	3.37	1911	8/28/2009
-106.5668983	68.05489	1	very soft fines	3.56	1931	8/28/2009
-106.567075	68.054865	1	very soft fines	3.94	1951	8/28/2009
-106.56725	68.0548417	1	very soft fines	4.22	1971	8/28/2009
-106.5674217	68.0548167	1	very soft fines	5.43	1991	8/28/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately 5 m long transect segment (20 pings).
Bottom Type Codes: 1 = very soft fines, 2 = mud, 3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-2. Substrate Data Collected from Hydroacoustic and Underwater Video Surveys of Patch Lake, Hope Bay Belt Project, 2009

Longitude	Latitude	Type	Category	Depth	#Ping	Date
-106.5675033	68.054805	1	very soft fines	6.06	2011	8/28/2009
-106.56767	68.05478	1	very soft fines	7.2	2031	8/28/2009
-106.5678367	68.0547567	1	very soft fines	7.9	2051	8/28/2009
-106.5680033	68.054735	2	mud	8.56	2071	8/28/2009
-106.5680867	68.0547233	–	–	8.99	2091	8/28/2009
-106.5682533	68.0547017	–	–	9.51	2111	8/28/2009
-106.56842	68.05468	2	mud	9.6	2131	8/28/2009
-106.5685883	68.0546583	3	gravel, cobble, boulder	9.88	2151	8/28/2009
-106.5687517	68.0546367	2	mud	10.09	2171	8/28/2009
-106.5688317	68.054625	3	gravel, cobble, boulder	10.36	2191	8/28/2009
-106.5689967	68.0546033	3	gravel, cobble, boulder	10.42	2211	8/28/2009
-106.5691633	68.05458	3	gravel, cobble, boulder	10.69	2231	8/28/2009
-106.5693317	68.0545517	2	mud	10.97	2251	8/28/2009
-106.569495	68.0545217	–	–	11.32	2271	8/28/2009
-106.5696533	68.0544917	–	–	11.44	2291	8/28/2009
-106.5698067	68.05446	2	mud	11.67	2311	8/28/2009
-106.56988	68.0544433	2	mud	11.79	2331	8/28/2009
-106.5700283	68.05441	2	mud	11.91	2351	8/28/2009
-106.5701767	68.054375	2	mud	11.8	2371	8/28/2009
-106.570325	68.05434	3	gravel, cobble, boulder	11.72	2391	8/28/2009
-106.5704717	68.0543067	2	mud	11.56	2411	8/28/2009
-106.5706267	68.054275	1	very soft fines	11.49	2431	8/28/2009
-106.5707833	68.0542417	2	mud	11.35	2451	8/28/2009
-106.5708617	68.054225	1	very soft fines	11.3	2471	8/28/2009
-106.5710183	68.0541917	2	mud	11.27	2491	8/28/2009
-106.5711767	68.0541567	2	mud	11.16	2511	8/28/2009
-106.571335	68.05412	2	mud	11.04	2531	8/28/2009
-106.5714917	68.0540833	1	very soft fines	10.75	2551	8/28/2009
-106.571645	68.0540467	1	very soft fines	10.52	2571	8/28/2009
-106.5717967	68.05401	1	very soft fines	10.29	2591	8/28/2009
-106.5718733	68.05399	1	very soft fines	10	2611	8/28/2009
-106.5720317	68.0539533	1	very soft fines	9.74	2631	8/28/2009
-106.57219	68.0539167	2	mud	9.53	2651	8/28/2009
-106.5723483	68.05388	1	very soft fines	9.43	2671	8/28/2009
-106.5725067	68.053845	2	mud	9.22	2691	8/28/2009
-106.5725867	68.0538267	1	very soft fines	9.17	2711	8/28/2009
-106.5727483	68.053795	2	mud	8.99	2731	8/28/2009
-106.57291	68.0537633	1	very soft fines	8.58	2751	8/28/2009
-106.5730717	68.0537333	1	very soft fines	8.07	2771	8/28/2009
-106.5732383	68.0537067	1	very soft fines	7.19	2791	8/28/2009
-106.573405	68.0536817	1	very soft fines	6.46	2811	8/28/2009
-106.57357	68.0536567	1	very soft fines	5.09	2831	8/28/2009
-106.5737317	68.0536317	2	mud	4.83	2851	8/28/2009
-106.5738133	68.0536217	1	very soft fines	3.78	2871	8/28/2009
-106.5739767	68.053605	1	very soft fines	3.63	2891	8/28/2009
-106.5741383	68.05359	1	very soft fines	3.37	2911	8/28/2009
-106.574305	68.0535767	1	very soft fines	3.16	2931	8/28/2009
-106.5744633	68.0535617	1	very soft fines	3.07	2951	8/28/2009
-106.5746267	68.053545	1	very soft fines	3.04	2971	8/28/2009
-106.5747933	68.053525	1	very soft fines	3.04	2991	8/28/2009
-106.5749567	68.0535033	2	mud	3	3011	8/28/2009
-106.575115	68.05348	2	mud	2.99	3031	8/28/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately 5 m long transect segment (20 pings).
Bottom Type Codes: 1 = very soft fines, 2 = mud, 3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-2. Substrate Data Collected from Hydroacoustic and Underwater Video Surveys of Patch Lake, Hope Bay Belt Project, 2009

Longitude	Latitude	Type	Category	Depth	#Ping	Date
-106.57527	68.053455	2	mud	2.97	3051	8/28/2009
-106.5753467	68.0534433	2	mud	2.9	3071	8/28/2009
-106.5754983	68.0534183	2	mud	2.69	3091	8/28/2009
-106.57565	68.053395	2	mud	2.55	3111	8/28/2009
-106.575775	68.0533733	2	mud	2.34	3131	8/28/2009
-106.575905	68.0533533	3	gravel, cobble, boulder	2.31	3151	8/28/2009
-106.5760367	68.0533317	2	mud	2.1	3171	8/28/2009
-106.5761683	68.05331	3	gravel, cobble, boulder	1.82	3191	8/28/2009
-106.576285	68.0532883	3	gravel, cobble, boulder	1.75	3211	8/28/2009
-106.576385	68.0532683	3	gravel, cobble, boulder	1.72	3231	8/28/2009
-106.5764833	68.05325	3	gravel, cobble, boulder	1.68	3251	8/28/2009
-106.5765683	68.053235	3	gravel, cobble, boulder	1.67	3271	8/28/2009
-106.5766483	68.0532217	3	gravel, cobble, boulder	1.67	3291	8/28/2009
-106.5767283	68.0532067	3	gravel, cobble, boulder	1.67	3311	8/28/2009
-106.57677	68.0532	3	gravel, cobble, boulder	1.63	3331	8/28/2009
-106.5768483	68.0531867	2	mud	1.53	3351	8/28/2009
-106.5769233	68.0531733	3	gravel, cobble, boulder	1.54	3371	8/28/2009
-106.5769917	68.05316	3	gravel, cobble, boulder	1.48	3391	8/28/2009
-106.5697117	68.0499167	3	gravel, cobble, boulder	1.51	11	8/28/2009
-106.5696883	68.049905	2	mud	1.7	31	8/28/2009
-106.5696317	68.049885	2	mud	1.98	51	8/28/2009
-106.5695667	68.0498683	2	mud	2.4	71	8/28/2009
-106.5694967	68.0498567	2	mud	3.16	91	8/28/2009
-106.5694233	68.0498533	2	mud	4.25	111	8/28/2009
-106.5693433	68.049855	2	mud	5.47	131	8/28/2009
-106.5692183	68.0498683	1	very soft fines	6.58	151	8/28/2009
-106.5691467	68.0498783	1	very soft fines	7.99	171	8/28/2009
-106.5689983	68.0499	1	very soft fines	8.82	191	8/28/2009
-106.5688517	68.0499217	2	mud	8.94	211	8/28/2009
-106.5687167	68.0499467	1	very soft fines	9.08	231	8/28/2009
-106.5685583	68.0499717	1	very soft fines	9.1	251	8/28/2009
-106.568475	68.049985	1	very soft fines	8.99	271	8/28/2009
-106.5683133	68.050015	1	very soft fines	8.96	291	8/28/2009
-106.5681567	68.0500483	1	very soft fines	8.96	311	8/28/2009
-106.5680083	68.0500833	2	mud	8.96	331	8/28/2009
-106.567865	68.05012	1	very soft fines	8.96	351	8/28/2009
-106.567795	68.0501383	2	mud	8.96	371	8/28/2009
-106.5676517	68.0501783	2	mud	8.96	391	8/28/2009
-106.5675067	68.0502167	2	mud	9.01	411	8/28/2009
-106.5673683	68.050255	1	very soft fines	9.08	431	8/28/2009
-106.5672217	68.0502967	1	very soft fines	9.08	451	8/28/2009
-106.56715	68.0503167	2	mud	9.08	471	8/28/2009
-106.5670083	68.0503567	2	mud	9.11	491	8/28/2009
-106.5668617	68.050395	2	mud	9.22	511	8/28/2009
-106.5667117	68.0504317	2	mud	9.3	531	8/28/2009
-106.5665617	68.050465	2	mud	9.32	551	8/28/2009
-106.566485	68.0504817	3	gravel, cobble, boulder	9.32	571	8/28/2009
-106.56632	68.050515	2	mud	9.29	591	8/28/2009
-106.5661533	68.0505433	2	mud	9.15	611	8/28/2009
-106.5659867	68.0505733	2	mud	9.04	631	8/28/2009
-106.5658217	68.0506067	2	mud	8.96	651	8/28/2009
-106.5657383	68.0506217	2	mud	8.89	671	8/28/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately 5 m long transect segment (20 pings).
Bottom Type Codes: 1 = very soft fines, 2 = mud, 3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-2. Substrate Data Collected from Hydroacoustic and Underwater Video Surveys of Patch Lake, Hope Bay Belt Project, 2009

Longitude	Latitude	Type	Category	Depth	#Ping	Date
-106.565575	68.0506533	2	mud	8.75	691	8/28/2009
-106.5654133	68.0506833	2	mud	8.7	711	8/28/2009
-106.5652517	68.0507133	2	mud	8.64	731	8/28/2009
-106.5650917	68.0507433	2	mud	8.59	751	8/28/2009
-106.565015	68.0507567	–	–	8.54	771	8/28/2009
-106.564865	68.050785	3	gravel, cobble, boulder	8.52	791	8/28/2009
-106.5647033	68.0508133	2	mud	8.51	811	8/28/2009
-106.5645367	68.05084	2	mud	8.54	831	8/28/2009
-106.564365	68.050865	3	gravel, cobble, boulder	8.54	851	8/28/2009
-106.5642767	68.0508783	3	gravel, cobble, boulder	8.51	871	8/28/2009
-106.564105	68.0509033	–	–	8.52	891	8/28/2009
-106.5639333	68.0509283	2	mud	8.45	911	8/28/2009
-106.56376	68.0509533	2	mud	8.4	931	8/28/2009
-106.5635883	68.0509783	2	mud	8.21	951	8/28/2009
-106.5635	68.0509917	2	mud	8	971	8/28/2009
-106.5633267	68.051015	2	mud	7.72	991	8/28/2009
-106.563155	68.05104	2	mud	7.2	1011	8/28/2009
-106.562985	68.051065	2	mud	6.58	1031	8/28/2009
-106.5628133	68.05109	3	gravel, cobble, boulder	6.15	1051	8/28/2009
-106.5626433	68.0511133	3	gravel, cobble, boulder	5.94	1071	8/28/2009
-106.56256	68.051125	2	mud	5.73	1091	8/28/2009
-106.5623933	68.05115	2	mud	5.42	1111	8/28/2009
-106.5622217	68.051175	2	mud	5.29	1131	8/28/2009
-106.56205	68.0511967	2	mud	5.1	1151	8/28/2009
-106.5618767	68.0512217	2	mud	5	1171	8/28/2009
-106.5617033	68.0512467	3	gravel, cobble, boulder	4.91	1191	8/28/2009
-106.56153	68.0512717	1	very soft fines	4.74	1211	8/28/2009
-106.5614417	68.051285	2	mud	4.65	1231	8/28/2009
-106.561265	68.05131	2	mud	4.51	1251	8/28/2009
-106.5610917	68.051335	2	mud	4.46	1271	8/28/2009
-106.56092	68.0513583	2	mud	4.31	1291	8/28/2009
-106.5607517	68.051385	2	mud	4.11	1311	8/28/2009
-106.5605817	68.05141	2	mud	4.03	1331	8/28/2009
-106.5604967	68.0514233	2	mud	3.78	1351	8/28/2009
-106.5603233	68.0514483	3	gravel, cobble, boulder	3.73	1371	8/28/2009
-106.560155	68.0514717	2	mud	3.73	1391	8/28/2009
-106.559985	68.051495	2	mud	3.63	1411	8/28/2009
-106.5598167	68.0515217	2	mud	3.56	1431	8/28/2009
-106.5596533	68.0515533	2	mud	3.49	1451	8/28/2009
-106.5594833	68.051585	2	mud	3.49	1471	8/28/2009
-106.5593133	68.0516167	2	mud	3.45	1491	8/28/2009
-106.5592267	68.05163	2	mud	3.37	1511	8/28/2009
-106.55906	68.0516583	2	mud	3.35	1531	8/28/2009
-106.5588933	68.0516867	2	mud	3.32	1551	8/28/2009
-106.558725	68.051715	2	mud	3.3	1571	8/28/2009
-106.5585567	68.051745	2	mud	3.26	1591	8/28/2009
-106.558385	68.051775	2	mud	3.23	1611	8/28/2009
-106.5582167	68.0518033	2	mud	3.26	1631	8/28/2009
-106.558045	68.05183	2	mud	3.32	1651	8/28/2009
-106.5578717	68.051855	2	mud	3.35	1671	8/28/2009
-106.5576967	68.0518817	2	mud	3.3	1691	8/28/2009
-106.55761	68.051895	2	mud	3.09	1711	8/28/2009

Notes:
Coordinates (long, lat) are NAD83
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Bottom Type Codes: 1 = very soft fines, 2 = mud, 3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-2. Substrate Data Collected from Hydroacoustic and Underwater Video Surveys of Patch Lake, Hope Bay Belt Project, 2009

Longitude	Latitude	Type	Category	Depth	#Ping	Date
-106.5574367	68.0519217	3	gravel, cobble, boulder	2.93	1731	8/28/2009
-106.5572767	68.051945	3	gravel, cobble, boulder	2.78	1751	8/28/2009
-106.5571333	68.0519683	3	gravel, cobble, boulder	2.71	1771	8/28/2009
-106.5569933	68.0519883	3	gravel, cobble, boulder	2.67	1791	8/28/2009
-106.556855	68.05201	3	gravel, cobble, boulder	2.5	1811	8/28/2009
-106.55673	68.05203	3	gravel, cobble, boulder	2.34	1831	8/28/2009
-106.556625	68.0520467	3	gravel, cobble, boulder	1.68	1851	8/28/2009
-106.5565317	68.05206	3	gravel, cobble, boulder	1.58	1871	8/28/2009
-106.5564467	68.05207	3	gravel, cobble, boulder	1.61	1891	8/28/2009
-106.5563633	68.052075	3	gravel, cobble, boulder	1.58	1911	8/28/2009
-106.5562817	68.0520767	3	gravel, cobble, boulder	1.61	1931	8/28/2009
-106.5561983	68.0520783	3	gravel, cobble, boulder	1.61	1951	8/28/2009
-106.556115	68.05208	3	gravel, cobble, boulder	1.61	1971	8/28/2009
-106.5560333	68.0520817	3	gravel, cobble, boulder	1.61	1991	8/28/2009
-106.5559533	68.052085	3	gravel, cobble, boulder	1.56	2011	8/28/2009
-106.5558717	68.0520883	3	gravel, cobble, boulder	1.54	2031	8/28/2009
-106.5557917	68.052095	3	gravel, cobble, boulder	1.7	2051	8/28/2009
-106.5557517	68.0520983	3	gravel, cobble, boulder	1.81	2071	8/28/2009
-106.555675	68.0521067	3	gravel, cobble, boulder	1.87	2091	8/28/2009
-106.5556	68.0521183	3	gravel, cobble, boulder	1.89	2111	8/28/2009
-106.5555317	68.0521317	3	gravel, cobble, boulder	1.96	2131	8/28/2009
-106.5554667	68.05215	3	gravel, cobble, boulder	2	2151	8/28/2009
-106.555405	68.0521683	3	gravel, cobble, boulder	2.08	2171	8/28/2009
-106.555345	68.0521883	3	gravel, cobble, boulder	2.17	2191	8/28/2009
-106.5552867	68.0522083	3	gravel, cobble, boulder	2.2	2211	8/28/2009
-106.555215	68.0522317	3	gravel, cobble, boulder	2.26	2231	8/28/2009
-106.5551267	68.0522633	2	mud	2.33	2251	8/28/2009
-106.5550267	68.0523	2	mud	2.31	2271	8/28/2009
-106.5549183	68.0523383	3	gravel, cobble, boulder	2.69	2291	8/28/2009
-106.554805	68.0523767	3	gravel, cobble, boulder	2.9	2311	8/28/2009
-106.5546817	68.0524167	3	gravel, cobble, boulder	3.16	2331	8/28/2009
-106.5545583	68.0524583	2	mud	3.25	2351	8/28/2009
-106.5544983	68.05248	3	gravel, cobble, boulder	3.37	2371	8/28/2009
-106.55437	68.0525233	3	gravel, cobble, boulder	3.47	2391	8/28/2009
-106.5542367	68.052565	2	mud	3.52	2411	8/28/2009
-106.5540983	68.0526067	2	mud	3.58	2431	8/28/2009
-106.5539533	68.0526467	2	mud	3.56	2451	8/28/2009
-106.5538117	68.05269	2	mud	3.52	2471	8/28/2009
-106.553665	68.0527317	3	gravel, cobble, boulder	3.44	2491	8/28/2009
-106.5535083	68.0527683	2	mud	3.42	2511	8/28/2009
-106.5533467	68.052805	2	mud	3.28	2531	8/28/2009
-106.5531783	68.0528383	3	gravel, cobble, boulder	3.12	2551	8/28/2009
-106.5530933	68.0528533	2	mud	3.18	2571	8/28/2009
-106.5529233	68.052885	2	mud	3.09	2591	8/28/2009
-106.5527517	68.052915	2	mud	3.09	2611	8/28/2009
-106.5525767	68.052945	3	gravel, cobble, boulder	3.18	2631	8/28/2009
-106.5523983	68.0529733	2	mud	3.21	2651	8/28/2009
-106.5522233	68.0530033	3	gravel, cobble, boulder	3.33	2671	8/28/2009
-106.5520483	68.0530333	2	mud	3.54	2691	8/28/2009
-106.5518717	68.05306	3	gravel, cobble, boulder	3.61	2711	8/28/2009
-106.551695	68.0530883	2	mud	3.65	2731	8/28/2009
-106.5515183	68.0531167	2	mud	3.71	2751	8/28/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately 5 m long transect segment (20 pings).
Bottom Type Codes: 1 = very soft fines, 2 = mud, 3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-2. Substrate Data Collected from Hydroacoustic and Underwater Video Surveys of Patch Lake, Hope Bay Belt Project, 2009

Longitude	Latitude	Type	Category	Depth	#Ping	Date
-106.5514317	68.0531317	2	mud	3.73	2771	8/28/2009
-106.5512617	68.053165	1	very soft fines	3.77	2791	8/28/2009
-106.5511017	68.053195	2	mud	3.77	2811	8/28/2009
-106.5509367	68.0532283	2	mud	3.73	2831	8/28/2009
-106.550765	68.0532583	2	mud	3.75	2851	8/28/2009
-106.5505933	68.0532867	2	mud	3.75	2871	8/28/2009
-106.55042	68.053315	2	mud	3.77	2891	8/28/2009
-106.550335	68.05333	2	mud	3.71	2911	8/28/2009
-106.55016	68.05336	2	mud	3.71	2931	8/28/2009
-106.5499817	68.0533883	2	mud	3.73	2951	8/28/2009
-106.5498083	68.0534183	1	very soft fines	3.73	2971	8/28/2009
-106.5496333	68.0534483	2	mud	3.73	2991	8/28/2009
-106.5494567	68.0534783	2	mud	3.77	3011	8/28/2009
-106.54937	68.0534933	2	mud	3.77	3031	8/28/2009
-106.5492	68.0535267	2	mud	3.77	3051	8/28/2009
-106.54903	68.0535583	2	mud	3.73	3071	8/28/2009
-106.5488633	68.05359	2	mud	3.71	3091	8/28/2009
-106.5487033	68.0536217	2	mud	3.68	3111	8/28/2009
-106.548545	68.0536517	2	mud	3.68	3131	8/28/2009
-106.5483867	68.0536817	2	mud	3.65	3151	8/28/2009
-106.54823	68.0537117	2	mud	3.65	3171	8/28/2009
-106.5480817	68.0537417	2	mud	3.54	3191	8/28/2009
-106.5479283	68.0537733	2	mud	3.47	3211	8/28/2009
-106.5478517	68.0537883	2	mud	3.37	3231	8/28/2009
-106.5477	68.0538183	2	mud	3.33	3251	8/28/2009
-106.5475367	68.05385	3	gravel, cobble, boulder	3.23	3271	8/28/2009
-106.5473733	68.0538817	2	mud	2.99	3291	8/28/2009
-106.5472133	68.05391	3	gravel, cobble, boulder	2.73	3311	8/28/2009
-106.5470567	68.0539417	3	gravel, cobble, boulder	2.52	3331	8/28/2009
-106.5469033	68.05397	3	gravel, cobble, boulder	2.41	3351	8/28/2009
-106.5467467	68.054	3	gravel, cobble, boulder	2.17	3371	8/28/2009
-106.5466283	68.0540233	3	gravel, cobble, boulder	2.12	3391	8/28/2009
-106.546535	68.0540417	3	gravel, cobble, boulder	1.87	3411	8/28/2009
-106.5464533	68.0540567	3	gravel, cobble, boulder	1.75	3431	8/28/2009
-106.54637	68.05407	3	gravel, cobble, boulder	1.51	3451	8/28/2009
-106.5462917	68.0540817	3	gravel, cobble, boulder	1.56	3471	8/28/2009
-106.5462133	68.054095	3	gravel, cobble, boulder	1.56	3491	8/28/2009
-106.546135	68.0541083	3	gravel, cobble, boulder	1.53	3511	8/28/2009
-106.5460567	68.05412	3	gravel, cobble, boulder	1.41	3531	8/28/2009
-106.5460267	68.0541267	3	gravel, cobble, boulder	1.18	3551	8/28/2009
-106.5374217	68.0491667	3	gravel, cobble, boulder	1.68	11	8/28/2009
-106.5374233	68.0491367	3	gravel, cobble, boulder	1.84	31	8/28/2009
-106.5374267	68.0491217	3	gravel, cobble, boulder	1.84	51	8/28/2009
-106.537435	68.04909	2	mud	1.87	71	8/28/2009
-106.5374517	68.0490533	3	gravel, cobble, boulder	1.91	91	8/28/2009
-106.5374733	68.0490133	3	gravel, cobble, boulder	1.93	111	8/28/2009
-106.537495	68.04897	3	gravel, cobble, boulder	1.96	131	8/28/2009
-106.5375367	68.048915	3	gravel, cobble, boulder	1.98	151	8/28/2009
-106.5375883	68.0488533	3	gravel, cobble, boulder	2.03	171	8/28/2009
-106.5376417	68.04879	2	mud	2.07	191	8/28/2009
-106.5377017	68.048725	2	mud	2.08	211	8/28/2009
-106.537765	68.0486617	2	mud	2.08	231	8/28/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately 5 m long transect segment (20 pings).
Bottom Type Codes: 1 = very soft fines, 2 = mud, 3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-2. Substrate Data Collected from Hydroacoustic and Underwater Video Surveys of Patch Lake, Hope Bay Belt Project, 2009

Longitude	Latitude	Type	Category	Depth	#Ping	Date
-106.5377967	68.04863	3	gravel, cobble, boulder	2.14	251	8/28/2009
-106.537865	68.0485633	2	mud	2.15	271	8/28/2009
-106.5379317	68.0484967	3	gravel, cobble, boulder	2.17	291	8/28/2009
-106.5379917	68.04843	2	mud	2.19	311	8/28/2009
-106.53804	68.0483633	2	mud	2.19	331	8/28/2009
-106.5380817	68.048295	2	mud	2.19	351	8/28/2009
-106.5381267	68.0482267	3	gravel, cobble, boulder	2.2	371	8/28/2009
-106.53818	68.04816	3	gravel, cobble, boulder	2.2	391	8/28/2009
-106.5382433	68.0480933	3	gravel, cobble, boulder	2.2	411	8/28/2009
-106.53831	68.0480283	3	gravel, cobble, boulder	2.22	431	8/28/2009
-106.5383833	68.0479633	2	mud	2.22	451	8/28/2009
-106.53842	68.0479317	2	mud	2.22	471	8/28/2009
-106.538495	68.0478667	2	mud	2.22	491	8/28/2009
-106.5385667	68.0478017	2	mud	2.2	511	8/28/2009
-106.538625	68.0477383	2	mud	2.2	531	8/28/2009
-106.538685	68.0476733	2	mud	2.19	551	8/28/2009
-106.5387467	68.0476083	2	mud	2.17	571	8/28/2009
-106.5388067	68.0475433	2	mud	2.17	591	8/28/2009
-106.53887	68.0474767	2	mud	2.17	611	8/28/2009
-106.5389317	68.0474117	2	mud	2.15	631	8/28/2009
-106.5390067	68.0473483	2	mud	2.14	651	8/28/2009
-106.5390833	68.047285	2	mud	2.14	671	8/28/2009
-106.53917	68.0472233	2	mud	2.15	691	8/28/2009
-106.5392167	68.0471933	3	gravel, cobble, boulder	2.17	711	8/28/2009
-106.539315	68.0471333	2	mud	2.19	731	8/28/2009
-106.53941	68.0470733	2	mud	2.19	751	8/28/2009
-106.5395017	68.0470133	3	gravel, cobble, boulder	2.17	771	8/28/2009
-106.5395917	68.0469517	3	gravel, cobble, boulder	2.17	791	8/28/2009
-106.5396817	68.04689	2	mud	2.17	811	8/28/2009
-106.5397733	68.0468283	2	mud	2.15	831	8/28/2009
-106.5398617	68.0467683	2	mud	2.15	851	8/28/2009
-106.5399433	68.0467083	2	mud	2.15	871	8/28/2009
-106.5400283	68.0466483	2	mud	2.14	891	8/28/2009
-106.540115	68.0465867	2	mud	2.14	911	8/28/2009
-106.5401917	68.04653	3	gravel, cobble, boulder	2.08	931	8/28/2009
-106.5402583	68.0464767	3	gravel, cobble, boulder	2.07	951	8/28/2009
-106.5403283	68.046425	3	gravel, cobble, boulder	2.05	971	8/28/2009
-106.54036	68.0464	3	gravel, cobble, boulder	2.05	991	8/28/2009
-106.54042	68.0463533	2	mud	2.01	1011	8/28/2009
-106.5404633	68.0463183	3	gravel, cobble, boulder	2.01	1031	8/28/2009
-106.5405017	68.0462867	3	gravel, cobble, boulder	2	1051	8/28/2009
-106.5405383	68.0462567	3	gravel, cobble, boulder	1.98	1071	8/28/2009
-106.5405767	68.046225	3	gravel, cobble, boulder	1.98	1091	8/28/2009
-106.5406167	68.0461917	3	gravel, cobble, boulder	1.96	1111	8/28/2009
-106.540655	68.0461583	3	gravel, cobble, boulder	1.94	1131	8/28/2009
-106.5406933	68.0461267	3	gravel, cobble, boulder	1.91	1151	8/28/2009
-106.5407317	68.046095	3	gravel, cobble, boulder	1.89	1171	8/28/2009
-106.5407717	68.0460617	2	mud	1.87	1191	8/28/2009
-106.54081	68.0460317	3	gravel, cobble, boulder	1.84	1211	8/28/2009
-106.540845	68.0460033	3	gravel, cobble, boulder	1.81	1231	8/28/2009
-106.54086	68.0459883	3	gravel, cobble, boulder	1.79	1251	8/28/2009
-106.5408917	68.04596	3	gravel, cobble, boulder	1.77	1271	8/28/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately 5 m long transect segment (20 pings).
Bottom Type Codes: 1 = very soft fines, 2 = mud, 3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-2. Substrate Data Collected from Hydroacoustic and Underwater Video Surveys of Patch Lake, Hope Bay Belt Project, 2009

Longitude	Latitude	Type	Category	Depth	#Ping	Date
-106.5409217	68.0459317	3	gravel, cobble, boulder	1.74	1291	8/28/2009
-106.54095	68.0459033	3	gravel, cobble, boulder	1.72	1311	8/28/2009
-106.5409817	68.045875	3	gravel, cobble, boulder	1.7	1331	8/28/2009
-106.5410117	68.045845	3	gravel, cobble, boulder	1.65	1351	8/28/2009
-106.5410367	68.0458183	3	gravel, cobble, boulder	1.6	1371	8/28/2009
-106.541045	68.045805	3	gravel, cobble, boulder	1.58	1391	8/28/2009
-106.5410467	68.0458033	3	gravel, cobble, boulder	1.6	1411	8/28/2009
-106.5427633	68.045535	3	gravel, cobble, boulder	1.87	11	8/28/2009
-106.5428033	68.0455133	3	gravel, cobble, boulder	1.87	31	8/28/2009
-106.5428583	68.045495	3	gravel, cobble, boulder	1.89	51	8/28/2009
-106.5429217	68.0454833	3	gravel, cobble, boulder	1.89	71	8/28/2009
-106.5429917	68.0454717	3	gravel, cobble, boulder	1.91	91	8/28/2009
-106.5430717	68.04546	3	gravel, cobble, boulder	1.93	111	8/28/2009
-106.5431767	68.0454483	3	gravel, cobble, boulder	1.93	131	8/28/2009
-106.54329	68.0454317	3	gravel, cobble, boulder	1.94	151	8/28/2009
-106.543405	68.0454117	3	gravel, cobble, boulder	1.96	171	8/28/2009
-106.5434617	68.0454	3	gravel, cobble, boulder	1.98	191	8/28/2009
-106.5435733	68.0453717	3	gravel, cobble, boulder	2	211	8/28/2009
-106.5436883	68.04534	3	gravel, cobble, boulder	2.01	231	8/28/2009
-106.5438033	68.04531	3	gravel, cobble, boulder	2.01	251	8/28/2009
-106.54392	68.0452767	3	gravel, cobble, boulder	2	271	8/28/2009
-106.5440383	68.0452433	3	gravel, cobble, boulder	1.98	291	8/28/2009
-106.5441533	68.04521	3	gravel, cobble, boulder	1.96	311	8/28/2009
-106.5442717	68.0451783	3	gravel, cobble, boulder	1.94	331	8/28/2009
-106.5443933	68.0451517	3	gravel, cobble, boulder	1.93	351	8/28/2009
-106.544515	68.045125	3	gravel, cobble, boulder	1.91	371	8/28/2009
-106.54464	68.0451017	3	gravel, cobble, boulder	1.91	391	8/28/2009
-106.5447033	68.04509	3	gravel, cobble, boulder	1.89	411	8/28/2009
-106.5448317	68.04507	3	gravel, cobble, boulder	1.72	431	8/28/2009
-106.5449633	68.0450483	3	gravel, cobble, boulder	1.84	451	8/28/2009
-106.5450967	68.0450267	3	gravel, cobble, boulder	1.84	471	8/28/2009
-106.5452083	68.04501	3	gravel, cobble, boulder	1.91	491	8/28/2009
-106.5452967	68.044995	3	gravel, cobble, boulder	1.91	511	8/28/2009
-106.545375	68.0449833	3	gravel, cobble, boulder	1.93	531	8/28/2009
-106.54545	68.04497	2	mud	1.98	551	8/28/2009
-106.5455233	68.044955	3	gravel, cobble, boulder	2.01	571	8/28/2009
-106.5455983	68.0449417	2	mud	2.1	591	8/28/2009
-106.5456733	68.0449267	3	gravel, cobble, boulder	2.26	611	8/28/2009
-106.5457517	68.0449067	3	gravel, cobble, boulder	2.4	631	8/28/2009
-106.5458317	68.0448883	3	gravel, cobble, boulder	2.41	651	8/28/2009
-106.5459283	68.0448667	3	gravel, cobble, boulder	2.46	671	8/28/2009
-106.5459817	68.044855	3	gravel, cobble, boulder	2.48	691	8/28/2009
-106.54609	68.0448317	3	gravel, cobble, boulder	2.48	711	8/28/2009
-106.5461983	68.044805	3	gravel, cobble, boulder	2.48	731	8/28/2009
-106.54631	68.0447783	3	gravel, cobble, boulder	2.46	751	8/28/2009
-106.5464283	68.0447517	3	gravel, cobble, boulder	2.48	771	8/28/2009
-106.5465483	68.0447267	3	gravel, cobble, boulder	2.46	791	8/28/2009
-106.5466683	68.0447033	3	gravel, cobble, boulder	2.41	811	8/28/2009
-106.5467917	68.04468	3	gravel, cobble, boulder	2.4	831	8/28/2009
-106.5469167	68.0446567	3	gravel, cobble, boulder	2.36	851	8/28/2009
-106.547045	68.0446367	3	gravel, cobble, boulder	2.34	871	8/28/2009
-106.5471483	68.04462	3	gravel, cobble, boulder	2.34	891	8/28/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately 5 m long transect segment (20 pings).
Bottom Type Codes: 1 = very soft fines, 2 = mud, 3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-2. Substrate Data Collected from Hydroacoustic and Underwater Video Surveys of Patch Lake, Hope Bay Belt Project, 2009

Longitude	Latitude	Type	Category	Depth	#Ping	Date
-106.5472483	68.0446083	3	gravel, cobble, boulder	2.33	911	8/28/2009
-106.5473467	68.044595	3	gravel, cobble, boulder	2.29	931	8/28/2009
-106.5474	68.04459	3	gravel, cobble, boulder	2.27	951	8/28/2009
-106.5475117	68.0445783	3	gravel, cobble, boulder	2.27	971	8/28/2009
-106.5476233	68.0445683	3	gravel, cobble, boulder	2.27	991	8/28/2009
-106.5477317	68.0445567	3	gravel, cobble, boulder	2.29	1011	8/28/2009
-106.5478217	68.0445483	3	gravel, cobble, boulder	2.27	1031	8/28/2009
-106.5479083	68.04454	3	gravel, cobble, boulder	2.29	1051	8/28/2009
-106.548005	68.04453	3	gravel, cobble, boulder	2.29	1071	8/28/2009
-106.54811	68.0445183	3	gravel, cobble, boulder	2.33	1091	8/28/2009
-106.5482217	68.0445083	3	gravel, cobble, boulder	2.38	1111	8/28/2009
-106.5483383	68.044495	3	gravel, cobble, boulder	2.48	1131	8/28/2009
-106.5484567	68.04448	3	gravel, cobble, boulder	2.57	1151	8/28/2009
-106.5485767	68.044465	2	mud	2.67	1171	8/28/2009
-106.5486383	68.0444567	1	very soft fines	2.71	1191	8/28/2009
-106.5487617	68.0444417	2	mud	2.64	1211	8/28/2009
-106.5488917	68.0444233	3	gravel, cobble, boulder	2.57	1231	8/28/2009
-106.549015	68.0444083	3	gravel, cobble, boulder	2.55	1251	8/28/2009
-106.5491367	68.0443967	3	gravel, cobble, boulder	2.53	1271	8/28/2009
-106.5492617	68.0443833	3	gravel, cobble, boulder	2.53	1291	8/28/2009
-106.54939	68.04437	2	mud	2.53	1311	8/28/2009
-106.5495183	68.044355	2	mud	2.5	1331	8/28/2009
-106.5496483	68.04434	3	gravel, cobble, boulder	2.43	1351	8/28/2009
-106.5497117	68.0443317	2	mud	2.38	1371	8/28/2009
-106.5498417	68.0443167	2	mud	2.34	1391	8/28/2009
-106.549975	68.0443033	2	mud	2.29	1411	8/28/2009
-106.5501117	68.0442883	2	mud	2.27	1431	8/28/2009
-106.5502533	68.0442733	2	mud	2.22	1451	8/28/2009
-106.550395	68.0442617	3	gravel, cobble, boulder	2.2	1471	8/28/2009
-106.5505333	68.0442517	2	mud	2.22	1491	8/28/2009
-106.55067	68.0442417	2	mud	2.2	1511	8/28/2009
-106.550805	68.04423	2	mud	2.2	1531	8/28/2009
-106.5509417	68.0442183	3	gravel, cobble, boulder	2.22	1551	8/28/2009
-106.55101	68.0442133	2	mud	2.24	1571	8/28/2009
-106.5511467	68.0442017	3	gravel, cobble, boulder	2.2	1591	8/28/2009
-106.5512867	68.04419	3	gravel, cobble, boulder	2.15	1611	8/28/2009
-106.551425	68.0441767	3	gravel, cobble, boulder	2.12	1631	8/28/2009
-106.551565	68.0441617	3	gravel, cobble, boulder	2.05	1651	8/28/2009
-106.5516983	68.0441483	3	gravel, cobble, boulder	2.03	1671	8/28/2009
-106.551835	68.0441367	3	gravel, cobble, boulder	2.01	1691	8/28/2009
-106.5519733	68.0441267	3	gravel, cobble, boulder	2.03	1711	8/28/2009
-106.5521117	68.0441167	3	gravel, cobble, boulder	2.03	1731	8/28/2009
-106.55225	68.0441067	3	gravel, cobble, boulder	2.12	1751	8/28/2009
-106.5523883	68.0440967	3	gravel, cobble, boulder	2.15	1771	8/28/2009
-106.5525267	68.044085	3	gravel, cobble, boulder	2.2	1791	8/28/2009
-106.5525933	68.04408	3	gravel, cobble, boulder	2.26	1811	8/28/2009
-106.55273	68.04407	3	gravel, cobble, boulder	2.33	1831	8/28/2009
-106.552865	68.04406	3	gravel, cobble, boulder	2.38	1851	8/28/2009
-106.5529983	68.0440483	3	gravel, cobble, boulder	2.4	1871	8/28/2009
-106.5531333	68.0440383	2	mud	2.41	1891	8/28/2009
-106.5532683	68.0440267	3	gravel, cobble, boulder	2.4	1911	8/28/2009
-106.5534017	68.044015	3	gravel, cobble, boulder	2.41	1931	8/28/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately 5 m long transect segment (20 pings).
Bottom Type Codes: 1 = very soft fines, 2 = mud, 3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-2. Substrate Data Collected from Hydroacoustic and Underwater Video Surveys of Patch Lake, Hope Bay Belt Project, 2009

Longitude	Latitude	Type	Category	Depth	#Ping	Date
-106.5535317	68.0440033	2	mud	2.26	1951	8/28/2009
-106.5536633	68.04399	3	gravel, cobble, boulder	2.12	1971	8/28/2009
-106.5537967	68.0439767	3	gravel, cobble, boulder	2.1	1991	8/28/2009
-106.5539283	68.0439667	3	gravel, cobble, boulder	2.12	2011	8/28/2009
-106.5540617	68.0439517	2	mud	2.12	2031	8/28/2009
-106.5541983	68.0439367	3	gravel, cobble, boulder	2.12	2051	8/28/2009
-106.5542633	68.0439283	2	mud	2.14	2071	8/28/2009
-106.5543933	68.0439133	2	mud	2.17	2091	8/28/2009
-106.55452	68.0438983	3	gravel, cobble, boulder	2.71	2111	8/28/2009
-106.5546433	68.0438833	3	gravel, cobble, boulder	2.69	2131	8/28/2009
-106.55477	68.0438683	3	gravel, cobble, boulder	2.59	2151	8/28/2009
-106.5548967	68.0438517	3	gravel, cobble, boulder	2.52	2171	8/28/2009
-106.5550133	68.0438367	3	gravel, cobble, boulder	2.41	2191	8/28/2009
-106.5551283	68.0438233	3	gravel, cobble, boulder	2.31	2211	8/28/2009
-106.55524	68.04381	3	gravel, cobble, boulder	2.27	2231	8/28/2009
-106.5553483	68.0437983	3	gravel, cobble, boulder	2.26	2251	8/28/2009
-106.55544	68.0437867	3	gravel, cobble, boulder	2.22	2271	8/28/2009
-106.5555267	68.043775	3	gravel, cobble, boulder	2.26	2291	8/28/2009
-106.55557	68.04377	3	gravel, cobble, boulder	2.26	2311	8/28/2009
-106.5556533	68.0437583	3	gravel, cobble, boulder	2.29	2331	8/28/2009
-106.5557367	68.0437467	3	gravel, cobble, boulder	2.2	2351	8/28/2009
-106.5558167	68.0437333	3	gravel, cobble, boulder	2.33	2371	8/28/2009
-106.555895	68.0437217	3	gravel, cobble, boulder	2.4	2391	8/28/2009
-106.5559733	68.04371	3	gravel, cobble, boulder	2.36	2411	8/28/2009
-106.55605	68.0437	3	gravel, cobble, boulder	2.14	2431	8/28/2009
-106.556105	68.04369	3	gravel, cobble, boulder	1.94	2451	8/28/2009
-106.563355	68.0453733	3	gravel, cobble, boulder	0.9	11	8/28/2009
-106.5634017	68.045355	3	gravel, cobble, boulder	0.83	31	8/28/2009
-106.5634617	68.045345	3	gravel, cobble, boulder	1.01	51	8/28/2009
-106.5635333	68.0453383	3	gravel, cobble, boulder	1.13	71	8/28/2009
-106.5636233	68.045335	3	gravel, cobble, boulder	1.41	91	8/28/2009
-106.56373	68.0453333	3	gravel, cobble, boulder	1.87	111	8/28/2009
-106.5638483	68.045335	3	gravel, cobble, boulder	1.96	131	8/28/2009
-106.5639667	68.045345	3	gravel, cobble, boulder	1.93	151	8/28/2009
-106.5640867	68.0453533	3	gravel, cobble, boulder	1.86	171	8/28/2009
-106.56415	68.0453567	3	gravel, cobble, boulder	1.87	191	8/28/2009
-106.5642833	68.0453633	3	gravel, cobble, boulder	1.94	211	8/28/2009
-106.5644183	68.0453683	3	gravel, cobble, boulder	1.98	231	8/28/2009
-106.5645533	68.0453717	3	gravel, cobble, boulder	2	251	8/28/2009
-106.564685	68.0453767	3	gravel, cobble, boulder	2.08	271	8/28/2009
-106.5648167	68.0453833	3	gravel, cobble, boulder	2.15	291	8/28/2009
-106.56495	68.04539	3	gravel, cobble, boulder	2.24	311	8/28/2009
-106.56508	68.045395	2	mud	2.34	331	8/28/2009
-106.5652133	68.0454	2	mud	2.4	351	8/28/2009
-106.5652783	68.0454033	2	mud	2.48	371	8/28/2009
-106.5654083	68.0454067	2	mud	2.48	391	8/28/2009
-106.5655383	68.04541	2	mud	2.5	411	8/28/2009
-106.5656667	68.045415	2	mud	2.48	431	8/28/2009
-106.5657967	68.0454183	2	mud	2.5	451	8/28/2009
-106.5659283	68.0454233	2	mud	2.52	471	8/28/2009
-106.5660567	68.0454267	2	mud	2.48	491	8/28/2009
-106.5661867	68.0454317	2	mud	2.5	511	8/28/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately 5 m long transect segment (20 pings).
Bottom Type Codes: 1 = very soft fines, 2 = mud, 3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-2. Substrate Data Collected from Hydroacoustic and Underwater Video Surveys of Patch Lake, Hope Bay Belt Project, 2009

Longitude	Latitude	Type	Category	Depth	#Ping	Date
-106.5662533	68.045435	3	gravel, cobble, boulder	2.52	531	8/28/2009
-106.566385	68.0454417	2	mud	2.5	551	8/28/2009
-106.5665183	68.04545	2	mud	2.52	571	8/28/2009
-106.5666517	68.04546	2	mud	2.5	591	8/28/2009
-106.566785	68.04547	2	mud	2.52	611	8/28/2009
-106.566915	68.0454817	3	gravel, cobble, boulder	2.5	631	8/28/2009
-106.5670417	68.0454933	2	mud	2.5	651	8/28/2009
-106.56717	68.0455067	2	mud	2.52	671	8/28/2009
-106.5672983	68.04552	2	mud	2.52	691	8/28/2009
-106.5673633	68.0455267	2	mud	2.46	711	8/28/2009
-106.5674917	68.04554	3	gravel, cobble, boulder	2.45	731	8/28/2009
-106.5676183	68.0455533	2	mud	2.46	751	8/28/2009
-106.5677467	68.0455667	3	gravel, cobble, boulder	2.4	771	8/28/2009
-106.5678733	68.0455783	2	mud	2.52	791	8/28/2009
-106.5680033	68.0455883	2	mud	2.48	811	8/28/2009
-106.5681317	68.0455983	2	mud	2.43	831	8/28/2009
-106.5682617	68.0456083	2	mud	2.33	851	8/28/2009
-106.5683933	68.0456167	2	mud	2.31	871	8/28/2009
-106.56846	68.0456217	2	mud	2.33	891	8/28/2009
-106.5685917	68.04563	3	gravel, cobble, boulder	2.34	911	8/28/2009
-106.5687233	68.0456367	3	gravel, cobble, boulder	2.34	931	8/28/2009
-106.56886	68.0456417	2	mud	2.33	951	8/28/2009
-106.5689933	68.0456467	3	gravel, cobble, boulder	2.4	971	8/28/2009
-106.56913	68.0456517	2	mud	2.31	991	8/28/2009
-106.5692617	68.0456533	2	mud	2.33	1011	8/28/2009
-106.5693817	68.045655	2	mud	2.36	1031	8/28/2009
-106.5695017	68.0456583	2	mud	2.36	1051	8/28/2009
-106.5696183	68.0456633	2	mud	2.33	1071	8/28/2009
-106.5696767	68.045665	2	mud	2.29	1091	8/28/2009
-106.56979	68.0456717	2	mud	2.33	1111	8/28/2009
-106.5699033	68.0456783	3	gravel, cobble, boulder	2.33	1131	8/28/2009
-106.5700133	68.0456833	3	gravel, cobble, boulder	2.34	1151	8/28/2009
-106.57012	68.04569	3	gravel, cobble, boulder	2.33	1171	8/28/2009
-106.5702267	68.0456983	3	gravel, cobble, boulder	2.27	1191	8/28/2009
-106.5703333	68.045705	3	gravel, cobble, boulder	2.29	1211	8/28/2009
-106.57043	68.0457117	2	mud	2.27	1231	8/28/2009
-106.5705183	68.0457167	1	very soft fines	2.22	1251	8/28/2009
-106.5706017	68.0457217	3	gravel, cobble, boulder	2.05	1271	8/28/2009
-106.5706867	68.0457267	3	gravel, cobble, boulder	1.86	1291	8/28/2009
-106.5707667	68.0457333	3	gravel, cobble, boulder	1.65	1311	8/28/2009
-106.5708067	68.045735	3	gravel, cobble, boulder	1.51	1331	8/28/2009
-106.5708883	68.04574	3	gravel, cobble, boulder	1.39	1351	8/28/2009
-106.5709683	68.045745	3	gravel, cobble, boulder	1.16	1371	8/28/2009
-106.5533583	68.0377917	3	gravel, cobble, boulder	2.29	11	8/28/2009
-106.5532783	68.0377867	3	gravel, cobble, boulder	2.41	31	8/28/2009
-106.5531867	68.0377867	1	very soft fines	2.53	51	8/28/2009
-106.55308	68.0377917	2	mud	2.62	71	8/28/2009
-106.5530183	68.0377967	1	very soft fines	2.71	91	8/28/2009
-106.55288	68.03781	2	mud	2.83	111	8/28/2009
-106.552725	68.0378233	1	very soft fines	2.9	131	8/28/2009
-106.5525717	68.0378433	1	very soft fines	3.02	151	8/28/2009
-106.5524183	68.0378667	2	mud	3.11	171	8/28/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately 5 m long transect segment (20 pings).
Bottom Type Codes: 1 = very soft fines, 2 = mud, 3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-2. Substrate Data Collected from Hydroacoustic and Underwater Video Surveys of Patch Lake, Hope Bay Belt Project, 2009

Longitude	Latitude	Type	Category	Depth	#Ping	Date
-106.55226	68.0378883	1	very soft fines	3.14	191	8/28/2009
-106.55218	68.0378967	1	very soft fines	3.49	211	8/28/2009
-106.5520217	68.03791	1	very soft fines	3.54	231	8/28/2009
-106.5518583	68.0379233	1	very soft fines	3.78	251	8/28/2009
-106.5516883	68.0379333	1	very soft fines	4.08	271	8/28/2009
-106.5515183	68.0379433	1	very soft fines	4.24	291	8/28/2009
-106.5514333	68.03795	2	mud	4.37	311	8/28/2009
-106.5512617	68.0379617	1	very soft fines	4.58	331	8/28/2009
-106.5510917	68.0379717	1	very soft fines	4.76	351	8/28/2009
-106.55092	68.0379817	1	very soft fines	4.84	371	8/28/2009
-106.550835	68.0379867	1	very soft fines	4.91	391	8/28/2009
-106.550665	68.0379983	1	very soft fines	5.1	411	8/28/2009
-106.5504917	68.03801	1	very soft fines	5.28	431	8/28/2009
-106.5503183	68.03802	1	very soft fines	5.38	451	8/28/2009
-106.5501433	68.0380283	1	very soft fines	5.49	471	8/28/2009
-106.5500533	68.03803	1	very soft fines	5.61	491	8/28/2009
-106.5498717	68.038035	1	very soft fines	5.62	511	8/28/2009
-106.54969	68.0380417	1	very soft fines	5.42	531	8/28/2009
-106.5495067	68.0380483	1	very soft fines	5.16	551	8/28/2009
-106.5493217	68.0380533	1	very soft fines	5	571	8/28/2009
-106.54923	68.0380567	1	very soft fines	4.7	591	8/28/2009
-106.549045	68.0380633	1	very soft fines	4.67	611	8/28/2009
-106.5488567	68.0380667	1	very soft fines	4.39	631	8/28/2009
-106.5486683	68.0380733	1	very soft fines	4.29	651	8/28/2009
-106.5484783	68.0380817	1	very soft fines	4.13	671	8/28/2009
-106.5482867	68.0380883	1	very soft fines	4.06	691	8/28/2009
-106.5481917	68.03809	1	very soft fines	4.06	711	8/28/2009
-106.5480067	68.038095	1	very soft fines	4.08	731	8/28/2009
-106.5478267	68.0381017	1	very soft fines	4.17	751	8/28/2009
-106.547645	68.03811	1	very soft fines	4.25	771	8/28/2009
-106.547465	68.0381167	1	very soft fines	4.51	791	8/28/2009
-106.5473767	68.0381183	1	very soft fines	5.14	811	8/28/2009
-106.547205	68.03812	1	very soft fines	5.43	831	8/28/2009
-106.54704	68.03812	1	very soft fines	6.63	851	8/28/2009
-106.5468733	68.0381183	1	very soft fines	7.26	871	8/28/2009
-106.5467067	68.03812	1	very soft fines	7.99	891	8/28/2009
-106.5466217	68.0381217	1	very soft fines	8.99	911	8/28/2009
-106.5464533	68.038125	1	very soft fines	9.58	931	8/28/2009
-106.5462833	68.0381317	1	very soft fines	10.16	951	8/28/2009
-106.5461133	68.0381383	1	very soft fines	10.8	971	8/28/2009
-106.5459433	68.038145	1	very soft fines	11.01	991	8/28/2009
-106.5458583	68.03815	1	very soft fines	11.08	1011	8/28/2009
-106.5456867	68.03816	1	very soft fines	11.2	1031	8/28/2009
-106.545515	68.0381683	1	very soft fines	11.2	1051	8/28/2009
-106.5453383	68.038175	1	very soft fines	11.14	1071	8/28/2009
-106.5451617	68.0381817	2	mud	11.09	1091	8/28/2009
-106.54498	68.03819	2	mud	11.01	1111	8/28/2009
-106.544795	68.0381933	2	mud	10.92	1131	8/28/2009
-106.5447033	68.0381933	1	very soft fines	10.88	1151	8/28/2009
-106.54452	68.0381967	2	mud	10.87	1171	8/28/2009
-106.5443367	68.0381983	1	very soft fines	10.88	1191	8/28/2009
-106.5441517	68.0382	1	very soft fines	10.99	1211	8/28/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately 5 m long transect segment (20 pings).
Bottom Type Codes: 1 = very soft fines, 2 = mud, 3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-2. Substrate Data Collected from Hydroacoustic and Underwater Video Surveys of Patch Lake, Hope Bay Belt Project, 2009

Longitude	Latitude	Type	Category	Depth	#Ping	Date
-106.5439683	68.0382033	1	very soft fines	11.14	1231	8/28/2009
-106.5438767	68.0382033	1	very soft fines	11.2	1251	8/28/2009
-106.5436917	68.0382067	1	very soft fines	11.6	1271	8/28/2009
-106.5435083	68.0382067	1	very soft fines	11.96	1291	8/28/2009
-106.54333	68.0382083	1	very soft fines	12.17	1311	8/28/2009
-106.54315	68.0382117	1	very soft fines	12.32	1331	8/28/2009
-106.5429717	68.038215	2	mud	12.36	1351	8/28/2009
-106.5428817	68.0382167	2	mud	12.31	1371	8/28/2009
-106.5427	68.03822	2	mud	12.32	1391	8/28/2009
-106.5425183	68.03822	2	mud	12.29	1411	8/28/2009
-106.5423367	68.0382217	1	very soft fines	12.2	1431	8/28/2009
-106.542155	68.0382233	2	mud	12.03	1451	8/28/2009
-106.5420633	68.038225	2	mud	11.84	1471	8/28/2009
-106.54188	68.0382267	2	mud	11.65	1491	8/28/2009
-106.541695	68.0382267	1	very soft fines	11.47	1511	8/28/2009
-106.5415083	68.0382267	1	very soft fines	11.37	1531	8/28/2009
-106.541325	68.0382233	1	very soft fines	11.25	1551	8/28/2009
-106.5412333	68.0382233	1	very soft fines	10.81	1571	8/28/2009
-106.54105	68.0382217	1	very soft fines	9.79	1591	8/28/2009
-106.5408667	68.0382183	1	very soft fines	9.22	1611	8/28/2009
-106.5406833	68.0382183	2	mud	5.92	1631	8/28/2009
-106.5405017	68.03822	2	mud	3.87	1651	8/28/2009
-106.5403233	68.0382183	1	very soft fines	3.23	1671	8/28/2009
-106.540145	68.0382183	3	gravel, cobble, boulder	1.98	1691	8/28/2009
-106.5399917	68.03822	3	gravel, cobble, boulder	1.96	1711	8/28/2009
-106.5398833	68.0382233	3	gravel, cobble, boulder	2	1731	8/28/2009
-106.5397767	68.038225	3	gravel, cobble, boulder	2.01	1751	8/28/2009
-106.5396783	68.038225	3	gravel, cobble, boulder	2	1771	8/28/2009
-106.5395783	68.038225	3	gravel, cobble, boulder	2.01	1791	8/28/2009
-106.5395217	68.0382233	3	gravel, cobble, boulder	2.03	1811	8/28/2009
-106.5394017	68.0382217	3	gravel, cobble, boulder	2.26	1831	8/28/2009
-106.5392767	68.03822	3	gravel, cobble, boulder	2.31	1851	8/28/2009
-106.5391517	68.0382183	3	gravel, cobble, boulder	2.27	1871	8/28/2009
-106.5390333	68.038215	3	gravel, cobble, boulder	2.15	1891	8/28/2009
-106.538915	68.03821	3	gravel, cobble, boulder	1.93	1911	8/28/2009
-106.5388083	68.0382067	3	gravel, cobble, boulder	1.86	1931	8/28/2009
-106.538715	68.0382033	3	gravel, cobble, boulder	1.82	1951	8/28/2009
-106.5386267	68.0382	3	gravel, cobble, boulder	1.82	1971	8/28/2009
-106.5385417	68.0381967	3	gravel, cobble, boulder	1.77	1991	8/28/2009
-106.5384567	68.0381933	3	gravel, cobble, boulder	1.58	2011	8/28/2009
-106.5383717	68.0381917	3	gravel, cobble, boulder	1.39	2031	8/28/2009
-106.5382867	68.0381917	3	gravel, cobble, boulder	1.41	2051	8/28/2009
-106.538215	68.038195	3	gravel, cobble, boulder	1.41	2071	8/28/2009
-106.5325267	68.0342433	–	–	0.92	11	8/28/2009
-106.532545	68.0342333	2	mud	1.09	31	8/28/2009
-106.5325967	68.034215	3	gravel, cobble, boulder	1.11	51	8/28/2009
-106.5326617	68.034205	3	gravel, cobble, boulder	1.2	71	8/28/2009
-106.5327317	68.0341967	3	gravel, cobble, boulder	1.23	91	8/28/2009
-106.5328083	68.03419	3	gravel, cobble, boulder	1.53	111	8/28/2009
-106.5328867	68.0341833	3	gravel, cobble, boulder	1.56	131	8/28/2009
-106.5329667	68.0341783	3	gravel, cobble, boulder	1.6	151	8/28/2009
-106.5330467	68.0341733	3	gravel, cobble, boulder	1.54	171	8/28/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately 5 m long transect segment (20 pings).
Bottom Type Codes: 1 = very soft fines, 2 = mud, 3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-2. Substrate Data Collected from Hydroacoustic and Underwater Video Surveys of Patch Lake, Hope Bay Belt Project, 2009

Longitude	Latitude	Type	Category	Depth	#Ping	Date
-106.5331283	68.03417	3	gravel, cobble, boulder	1.53	191	8/28/2009
-106.5332117	68.0341683	3	gravel, cobble, boulder	1.53	211	8/28/2009
-106.5332917	68.0341667	3	gravel, cobble, boulder	1.46	231	8/28/2009
-106.5333733	68.0341667	3	gravel, cobble, boulder	1.48	251	8/28/2009
-106.533455	68.034165	3	gravel, cobble, boulder	1.58	271	8/28/2009
-106.5335383	68.034165	3	gravel, cobble, boulder	1.72	291	8/28/2009
-106.53358	68.034165	3	gravel, cobble, boulder	1.82	311	8/28/2009
-106.5336617	68.034165	3	gravel, cobble, boulder	2.27	331	8/28/2009
-106.5337417	68.034165	3	gravel, cobble, boulder	2.41	351	8/28/2009
-106.5338233	68.0341633	2	mud	2.92	371	8/28/2009
-106.5339083	68.0341617	1	very soft fines	3.65	391	8/28/2009
-106.5340233	68.03416	1	very soft fines	4.62	411	8/28/2009
-106.5341717	68.0341567	1	very soft fines	5.52	431	8/28/2009
-106.53425	68.0341533	1	very soft fines	7.01	451	8/28/2009
-106.5344167	68.0341483	1	very soft fines	8.59	471	8/28/2009
-106.5345883	68.0341417	1	very soft fines	9.37	491	8/28/2009
-106.534765	68.0341317	1	very soft fines	10.28	511	8/28/2009
-106.5349417	68.0341233	2	mud	10.43	531	8/28/2009
-106.53503	68.03412	2	mud	10.54	551	8/28/2009
-106.5352067	68.034115	1	very soft fines	10.45	571	8/28/2009
-106.535385	68.0341083	1	very soft fines	10.42	591	8/28/2009
-106.53556	68.0341017	2	mud	10.33	611	8/28/2009
-106.5357367	68.0340933	2	mud	10.22	631	8/28/2009
-106.5358267	68.03409	1	very soft fines	10.19	651	8/28/2009
-106.536	68.0340817	1	very soft fines	10.19	671	8/28/2009
-106.536175	68.0340733	1	very soft fines	10.12	691	8/28/2009
-106.53635	68.034065	1	very soft fines	10.1	711	8/28/2009
-106.53652	68.034055	1	very soft fines	10.09	731	8/28/2009
-106.5366033	68.03405	1	very soft fines	10.1	751	8/28/2009
-106.5367717	68.03404	2	mud	10.1	771	8/28/2009
-106.53695	68.0340317	1	very soft fines	10.14	791	8/28/2009
-106.5371317	68.03403	2	mud	10.22	811	8/28/2009
-106.5373117	68.03403	2	mud	10.26	831	8/28/2009
-106.5374	68.0340317	2	mud	10.4	851	8/28/2009
-106.53758	68.0340317	1	very soft fines	10.55	871	8/28/2009
-106.53776	68.03403	2	mud	10.66	891	8/28/2009
-106.5379417	68.03403	–	–	10.75	911	8/28/2009
-106.53812	68.0340283	2	mud	10.83	931	8/28/2009
-106.5382083	68.0340283	2	mud	10.95	951	8/28/2009
-106.5383883	68.034025	2	mud	11.06	971	8/28/2009
-106.5385667	68.0340217	2	mud	11.16	991	8/28/2009
-106.5387417	68.0340167	2	mud	11.25	1011	8/28/2009
-106.53892	68.0340133	2	mud	11.28	1031	8/28/2009
-106.5390083	68.03401	2	mud	11.35	1051	8/28/2009
-106.539185	68.0340033	2	mud	11.39	1071	8/28/2009
-106.53936	68.0339983	2	mud	11.47	1091	8/28/2009
-106.5395367	68.03399	2	mud	11.49	1111	8/28/2009
-106.5396233	68.033985	2	mud	11.53	1131	8/28/2009
-106.5397983	68.0339767	2	mud	11.56	1151	8/28/2009
-106.5399767	68.0339683	2	mud	11.63	1171	8/28/2009
-106.540155	68.0339633	2	mud	11.67	1191	8/28/2009
-106.540335	68.03396	2	mud	11.73	1211	8/28/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately 5 m long transect segment (20 pings).
Bottom Type Codes: 1 = very soft fines, 2 = mud, 3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-2. Substrate Data Collected from Hydroacoustic and Underwater Video Surveys of Patch Lake, Hope Bay Belt Project, 2009

Longitude	Latitude	Type	Category	Depth	#Ping	Date
-106.540425	68.0339583	2	mud	11.79	1231	8/28/2009
-106.54061	68.0339517	2	mud	11.86	1251	8/28/2009
-106.54079	68.0339417	2	mud	11.91	1271	8/28/2009
-106.5409683	68.0339317	2	mud	11.93	1291	8/28/2009
-106.5411467	68.0339183	2	mud	11.94	1311	8/28/2009
-106.541235	68.0339117	2	mud	11.94	1331	8/28/2009
-106.5414133	68.0339	2	mud	11.94	1351	8/28/2009
-106.5415917	68.0338883	2	mud	11.94	1371	8/28/2009
-106.54177	68.0338767	2	mud	11.93	1391	8/28/2009
-106.5419483	68.0338667	2	mud	11.93	1411	8/28/2009
-106.5420383	68.0338617	2	mud	11.94	1431	8/28/2009
-106.5422183	68.0338533	2	mud	11.94	1451	8/28/2009
-106.5423983	68.0338467	–	–	11.98	1471	8/28/2009
-106.5425767	68.0338383	2	mud	11.89	1491	8/28/2009
-106.5427517	68.0338283	1	very soft fines	11.67	1511	8/28/2009
-106.5428383	68.0338217	1	very soft fines	11.44	1531	8/28/2009
-106.5430183	68.0338083	1	very soft fines	10.81	1551	8/28/2009
-106.5431967	68.0337967	1	very soft fines	10.73	1571	8/28/2009
-106.5433717	68.033785	1	very soft fines	10.48	1591	8/28/2009
-106.5435483	68.0337733	2	mud	10.38	1611	8/28/2009
-106.5436367	68.0337683	2	mud	10.31	1631	8/28/2009
-106.5438133	68.033755	1	very soft fines	10.29	1651	8/28/2009
-106.5439883	68.0337433	1	very soft fines	10.29	1671	8/28/2009
-106.5441667	68.0337317	1	very soft fines	10.35	1691	8/28/2009
-106.544345	68.0337217	2	mud	10.48	1711	8/28/2009
-106.544435	68.033715	1	very soft fines	10.57	1731	8/28/2009
-106.54461	68.033705	2	mud	10.85	1751	8/28/2009
-106.5447917	68.033695	1	very soft fines	10.95	1771	8/28/2009
-106.5449733	68.0336883	1	very soft fines	11.14	1791	8/28/2009
-106.5451433	68.0336817	1	very soft fines	11.18	1811	8/28/2009
-106.5452317	68.0336783	2	mud	11.14	1831	8/28/2009
-106.5454033	68.0336783	1	very soft fines	10.78	1851	8/28/2009
-106.545575	68.03368	1	very soft fines	10.61	1871	8/28/2009
-106.5457483	68.0336783	2	mud	10.16	1891	8/28/2009
-106.54592	68.0336733	1	very soft fines	9.62	1911	8/28/2009
-106.546005	68.0336717	1	very soft fines	9.3	1931	8/28/2009
-106.5461683	68.033665	1	very soft fines	8.47	1951	8/28/2009
-106.546335	68.0336583	1	very soft fines	7.55	1971	8/28/2009
-106.546505	68.0336533	1	very soft fines	7.01	1991	8/28/2009
-106.5465917	68.0336517	1	very soft fines	5.97	2011	8/28/2009
-106.5467633	68.0336467	1	very soft fines	5.21	2031	8/28/2009
-106.54693	68.0336417	1	very soft fines	3.68	2051	8/28/2009
-106.547085	68.033635	1	very soft fines	3.07	2071	8/28/2009
-106.547225	68.0336283	1	very soft fines	2.85	2091	8/28/2009
-106.5473633	68.0336233	1	very soft fines	2.78	2111	8/28/2009
-106.5474317	68.03362	2	mud	2.71	2131	8/28/2009
-106.5475717	68.033615	2	mud	2.6	2151	8/28/2009
-106.5477117	68.0336117	1	very soft fines	2.57	2171	8/28/2009
-106.5478533	68.0336083	1	very soft fines	2.57	2191	8/28/2009
-106.547995	68.0336067	2	mud	2.57	2211	8/28/2009
-106.5481317	68.033605	2	mud	2.57	2231	8/28/2009
-106.5481983	68.033605	1	very soft fines	2.59	2251	8/28/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately 5 m long transect segment (20 pings).
Bottom Type Codes: 1 = very soft fines, 2 = mud, 3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-2. Substrate Data Collected from Hydroacoustic and Underwater Video Surveys of Patch Lake, Hope Bay Belt Project, 2009

Longitude	Latitude	Type	Category	Depth	#Ping	Date
-106.5483317	68.033605	1	very soft fines	2.6	2271	8/28/2009
-106.548465	68.033605	1	very soft fines	2.64	2291	8/28/2009
-106.5485983	68.033605	1	very soft fines	2.66	2311	8/28/2009
-106.54873	68.033605	1	very soft fines	2.69	2331	8/28/2009
-106.5488617	68.0336083	2	mud	2.76	2351	8/28/2009
-106.5489283	68.0336083	1	very soft fines	2.78	2371	8/28/2009
-106.5490617	68.0336117	1	very soft fines	2.81	2391	8/28/2009
-106.5491917	68.033615	1	very soft fines	2.85	2411	8/28/2009
-106.5493217	68.0336183	1	very soft fines	2.9	2431	8/28/2009
-106.5494433	68.0336217	1	very soft fines	2.97	2451	8/28/2009
-106.5495683	68.0336233	1	very soft fines	3.04	2471	8/28/2009
-106.5496333	68.033625	1	very soft fines	3.19	2491	8/28/2009
-106.5497567	68.033625	1	very soft fines	3.25	2511	8/28/2009
-106.5498883	68.0336267	1	very soft fines	3.42	2531	8/28/2009
-106.5500167	68.0336267	1	very soft fines	3.61	2551	8/28/2009
-106.5501483	68.0336267	1	very soft fines	4.01	2571	8/28/2009
-106.5502733	68.033625	1	very soft fines	4.1	2591	8/28/2009
-106.55034	68.0336267	1	very soft fines	4.39	2611	8/28/2009
-106.55047	68.0336267	1	very soft fines	4.74	2631	8/28/2009
-106.5505983	68.033625	2	mud	4.76	2651	8/28/2009
-106.5507267	68.0336233	2	mud	4.72	2671	8/28/2009
-106.5508383	68.0336217	1	very soft fines	4.53	2691	8/28/2009
-106.5508917	68.0336217	1	very soft fines	4.04	2711	8/28/2009
-106.5509883	68.03362	1	very soft fines	3.71	2731	8/28/2009
-106.551075	68.0336217	2	mud	3.23	2751	8/28/2009
-106.5511583	68.0336233	2	mud	2.83	2771	8/28/2009
-106.55124	68.033625	2	mud	2.38	2791	8/28/2009
-106.5513233	68.0336233	2	mud	1.54	2811	8/28/2009
-106.551405	68.0336233	3	gravel, cobble, boulder	1.08	2831	8/28/2009
-106.5514633	68.03362	3	gravel, cobble, boulder	0.95	2851	8/28/2009
-106.5514767	68.0336183	3	gravel, cobble, boulder	0.94	2871	8/28/2009
-106.5503933	68.0278217	3	gravel, cobble, boulder	2.69	11	8/28/2009
-106.5503	68.0278383	3	gravel, cobble, boulder	2.67	31	8/28/2009
-106.5501833	68.0278533	3	gravel, cobble, boulder	2.5	51	8/28/2009
-106.5500583	68.027865	3	gravel, cobble, boulder	2.71	71	8/28/2009
-106.5499183	68.0278767	3	gravel, cobble, boulder	2.78	91	8/28/2009
-106.5497667	68.0278917	3	gravel, cobble, boulder	2.38	111	8/28/2009
-106.5496167	68.0279067	3	gravel, cobble, boulder	2.38	131	8/28/2009
-106.5494533	68.0279183	2	mud	2.71	151	8/28/2009
-106.54937	68.0279217	2	mud	2.79	171	8/28/2009
-106.5492017	68.0279217	2	mud	2.79	191	8/28/2009
-106.5490333	68.02792	1	very soft fines	2.79	211	8/28/2009
-106.5488633	68.02792	2	mud	2.81	231	8/28/2009
-106.5486933	68.0279217	2	mud	2.88	251	8/28/2009
-106.548525	68.027925	2	mud	2.93	271	8/28/2009
-106.5484417	68.0279283	1	very soft fines	2.95	291	8/28/2009
-106.5482733	68.0279367	1	very soft fines	2.9	311	8/28/2009
-106.5481033	68.027945	1	very soft fines	2.93	331	8/28/2009
-106.547935	68.027955	1	very soft fines	2.9	351	8/28/2009
-106.5477667	68.0279667	2	mud	2.83	371	8/28/2009
-106.5475983	68.02798	2	mud	2.5	391	8/28/2009
-106.5475133	68.0279867	3	gravel, cobble, boulder	2.24	411	8/28/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately 5 m long transect segment (20 pings).
Bottom Type Codes: 1 = very soft fines, 2 = mud, 3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-2. Substrate Data Collected from Hydroacoustic and Underwater Video Surveys of Patch Lake, Hope Bay Belt Project, 2009

Longitude	Latitude	Type	Category	Depth	#Ping	Date
-106.547345	68.0280017	3	gravel, cobble, boulder	2.03	431	8/28/2009
-106.5471833	68.0280183	3	gravel, cobble, boulder	1.91	451	8/28/2009
-106.5470217	68.0280383	3	gravel, cobble, boulder	1.89	471	8/28/2009
-106.5468583	68.0280583	3	gravel, cobble, boulder	1.81	491	8/28/2009
-106.5466933	68.028075	3	gravel, cobble, boulder	1.79	511	8/28/2009
-106.5465383	68.0280917	3	gravel, cobble, boulder	1.79	531	8/28/2009
-106.546385	68.0281083	3	gravel, cobble, boulder	1.82	551	8/28/2009
-106.54626	68.0281233	3	gravel, cobble, boulder	1.86	571	8/28/2009
-106.5461433	68.028135	3	gravel, cobble, boulder	1.89	591	8/28/2009
-106.5460383	68.028145	3	gravel, cobble, boulder	1.94	611	8/28/2009
-106.54594	68.028155	3	gravel, cobble, boulder	2	631	8/28/2009
-106.545835	68.0281633	3	gravel, cobble, boulder	2.31	651	8/28/2009
-106.5457183	68.0281717	2	mud	2.48	671	8/28/2009
-106.5456567	68.028175	1	very soft fines	3.06	691	8/28/2009
-106.54553	68.0281833	1	very soft fines	3.52	711	8/28/2009
-106.5454	68.02819	1	very soft fines	3.8	731	8/28/2009
-106.545265	68.0281983	1	very soft fines	4.32	751	8/28/2009
-106.5451967	68.0282017	2	mud	4.74	771	8/28/2009
-106.545055	68.0282083	2	mud	4.76	791	8/28/2009
-106.5449133	68.028215	2	mud	5.05	811	8/28/2009
-106.5447667	68.0282233	2	mud	5.23	831	8/28/2009
-106.5446183	68.0282333	2	mud	5.26	851	8/28/2009
-106.544545	68.02824	2	mud	5.52	871	8/28/2009
-106.5444	68.0282533	2	mud	5.55	891	8/28/2009
-106.544255	68.0282667	1	very soft fines	5.87	911	8/28/2009
-106.5441117	68.0282817	1	very soft fines	6.2	931	8/28/2009
-106.5439667	68.0282917	2	mud	6.35	951	8/28/2009
-106.5438933	68.0282967	2	mud	6.49	971	8/28/2009
-106.5437417	68.028305	1	very soft fines	6.61	991	8/28/2009
-106.54359	68.0283117	2	mud	6.7	1011	8/28/2009
-106.5434367	68.0283167	2	mud	6.75	1031	8/28/2009
-106.5433617	68.0283183	2	mud	6.8	1051	8/28/2009
-106.5432117	68.0283217	2	mud	6.77	1071	8/28/2009
-106.5430633	68.0283267	2	mud	6.75	1091	8/28/2009
-106.5429883	68.02833	2	mud	6.72	1111	8/28/2009
-106.5428383	68.02834	1	very soft fines	6.72	1131	8/28/2009
-106.5426933	68.0283517	2	mud	6.67	1151	8/28/2009
-106.5425467	68.0283667	2	mud	6.63	1171	8/28/2009
-106.5424717	68.028375	1	very soft fines	6.61	1191	8/28/2009
-106.54232	68.02839	2	mud	6.51	1211	8/28/2009
-106.5421667	68.0284083	1	very soft fines	6.44	1231	8/28/2009
-106.542015	68.028425	2	mud	6.37	1251	8/28/2009
-106.5419383	68.028435	1	very soft fines	6.34	1271	8/28/2009
-106.5417833	68.0284533	1	very soft fines	6.28	1291	8/28/2009
-106.5416283	68.0284733	2	mud	6.27	1311	8/28/2009
-106.5414733	68.0284933	1	very soft fines	6.2	1331	8/28/2009
-106.541395	68.028505	1	very soft fines	6.16	1351	8/28/2009
-106.5412383	68.028525	1	very soft fines	6.15	1371	8/28/2009
-106.5410867	68.028545	1	very soft fines	6.15	1391	8/28/2009
-106.5409317	68.028565	2	mud	6.16	1411	8/28/2009
-106.540775	68.028585	2	mud	6.16	1431	8/28/2009
-106.5406967	68.0285967	1	very soft fines	6.27	1451	8/28/2009

Notes:
Coordinates (long, lat) are NAD83
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Bottom Type Codes: 1 = very soft fines, 2 = mud, 3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-2. Substrate Data Collected from Hydroacoustic and Underwater Video Surveys of Patch Lake, Hope Bay Belt Project, 2009

Longitude	Latitude	Type	Category	Depth	#Ping	Date
-106.54054	68.0286167	2	mud	6.44	1471	8/28/2009
-106.5403817	68.0286367	2	mud	6.44	1491	8/28/2009
-106.54022	68.0286583	2	mud	6.02	1511	8/28/2009
-106.54014	68.0286683	1	very soft fines	5.76	1531	8/28/2009
-106.5399817	68.02869	2	mud	5.45	1551	8/28/2009
-106.5398233	68.0287117	1	very soft fines	4.84	1571	8/28/2009
-106.5396717	68.028735	2	mud	4.58	1591	8/28/2009
-106.5395933	68.0287467	2	mud	4.36	1611	8/28/2009
-106.5394367	68.02877	2	mud	4.01	1631	8/28/2009
-106.53928	68.0287917	2	mud	3.56	1651	8/28/2009
-106.5391233	68.0288133	3	gravel, cobble, boulder	3.25	1671	8/28/2009
-106.5389717	68.028835	3	gravel, cobble, boulder	2.88	1691	8/28/2009
-106.5389	68.0288467	3	gravel, cobble, boulder	2.57	1711	8/28/2009
-106.5387667	68.02887	3	gravel, cobble, boulder	2.46	1731	8/28/2009
-106.53866	68.0288917	3	gravel, cobble, boulder	2.4	1751	8/28/2009
-106.5385617	68.0289083	3	gravel, cobble, boulder	2.34	1771	8/28/2009
-106.53846	68.0289233	3	gravel, cobble, boulder	2.33	1791	8/28/2009
-106.5383567	68.0289367	3	gravel, cobble, boulder	2.31	1811	8/28/2009
-106.53825	68.02895	3	gravel, cobble, boulder	2.29	1831	8/28/2009
-106.5381933	68.0289583	3	gravel, cobble, boulder	2.29	1851	8/28/2009
-106.53808	68.0289733	3	gravel, cobble, boulder	2.24	1871	8/28/2009
-106.5379633	68.0289883	3	gravel, cobble, boulder	2.24	1891	8/28/2009
-106.5378383	68.029005	3	gravel, cobble, boulder	2.22	1911	8/28/2009
-106.537705	68.02902	3	gravel, cobble, boulder	2.2	1931	8/28/2009
-106.5375633	68.029035	3	gravel, cobble, boulder	2.19	1951	8/28/2009
-106.537495	68.02904	3	gravel, cobble, boulder	2.17	1971	8/28/2009
-106.537355	68.0290517	3	gravel, cobble, boulder	2.17	1991	8/28/2009
-106.5372117	68.0290617	3	gravel, cobble, boulder	2.12	2011	8/28/2009
-106.5370683	68.02907	3	gravel, cobble, boulder	2.1	2031	8/28/2009
-106.5369233	68.0290783	3	gravel, cobble, boulder	2.08	2051	8/28/2009
-106.5367833	68.0290867	3	gravel, cobble, boulder	2.07	2071	8/28/2009
-106.5367133	68.02909	3	gravel, cobble, boulder	2.05	2091	8/28/2009
-106.536575	68.0290983	2	mud	2.01	2111	8/28/2009
-106.536435	68.029105	2	mud	2	2131	8/28/2009
-106.5362967	68.0291117	3	gravel, cobble, boulder	1.98	2151	8/28/2009
-106.5361567	68.02912	2	mud	1.98	2171	8/28/2009
-106.536085	68.0291233	2	mud	1.98	2191	8/28/2009
-106.5359467	68.0291317	3	gravel, cobble, boulder	1.96	2211	8/28/2009
-106.5358083	68.0291417	2	mud	1.98	2231	8/28/2009
-106.5356717	68.02915	2	mud	1.98	2251	8/28/2009
-106.53553	68.0291567	3	gravel, cobble, boulder	1.96	2271	8/28/2009
-106.5353883	68.0291617	3	gravel, cobble, boulder	1.94	2291	8/28/2009
-106.535245	68.0291667	3	gravel, cobble, boulder	1.93	2311	8/28/2009
-106.5351033	68.02917	3	gravel, cobble, boulder	1.89	2331	8/28/2009
-106.5350317	68.0291733	3	gravel, cobble, boulder	1.87	2351	8/28/2009
-106.5348917	68.0291783	3	gravel, cobble, boulder	1.86	2371	8/28/2009
-106.5347483	68.0291833	3	gravel, cobble, boulder	1.86	2391	8/28/2009
-106.5346067	68.0291917	3	gravel, cobble, boulder	1.86	2411	8/28/2009
-106.5344633	68.0292017	2	mud	1.86	2431	8/28/2009
-106.5343217	68.0292083	3	gravel, cobble, boulder	1.84	2451	8/28/2009
-106.5341767	68.0292133	3	gravel, cobble, boulder	1.84	2471	8/28/2009
-106.53403	68.029215	3	gravel, cobble, boulder	1.82	2491	8/28/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately 5 m long transect segment (20 pings).
Bottom Type Codes: 1 = very soft fines, 2 = mud, 3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-2. Substrate Data Collected from Hydroacoustic and Underwater Video Surveys of Patch Lake, Hope Bay Belt Project, 2009

Longitude	Latitude	Type	Category	Depth	#Ping	Date
-106.53388	68.0292167	3	gravel, cobble, boulder	1.82	2511	8/28/2009
-106.5337317	68.0292183	3	gravel, cobble, boulder	1.81	2531	8/28/2009
-106.5335817	68.0292217	3	gravel, cobble, boulder	1.79	2551	8/28/2009
-106.533435	68.029225	3	gravel, cobble, boulder	1.79	2571	8/28/2009
-106.53329	68.0292283	3	gravel, cobble, boulder	1.79	2591	8/28/2009
-106.533215	68.02923	3	gravel, cobble, boulder	1.77	2611	8/28/2009
-106.533065	68.0292333	3	gravel, cobble, boulder	1.79	2631	8/28/2009
-106.5329133	68.0292367	3	gravel, cobble, boulder	1.81	2651	8/28/2009
-106.53278	68.0292417	3	gravel, cobble, boulder	1.81	2671	8/28/2009
-106.532665	68.029245	3	gravel, cobble, boulder	1.81	2691	8/28/2009
-106.53254	68.0292483	3	gravel, cobble, boulder	1.82	2711	8/28/2009
-106.5324117	68.0292517	3	gravel, cobble, boulder	1.82	2731	8/28/2009
-106.5322767	68.0292567	3	gravel, cobble, boulder	1.86	2751	8/28/2009
-106.5321417	68.0292633	3	gravel, cobble, boulder	1.84	2771	8/28/2009
-106.5320083	68.02927	3	gravel, cobble, boulder	1.89	2791	8/28/2009
-106.531875	68.029275	3	gravel, cobble, boulder	1.91	2811	8/28/2009
-106.5318083	68.0292783	3	gravel, cobble, boulder	1.91	2831	8/28/2009
-106.531675	68.0292867	3	gravel, cobble, boulder	1.89	2851	8/28/2009
-106.5315417	68.0292917	3	gravel, cobble, boulder	1.89	2871	8/28/2009
-106.531405	68.0292983	3	gravel, cobble, boulder	1.89	2891	8/28/2009
-106.5312667	68.029305	3	gravel, cobble, boulder	1.89	2911	8/28/2009
-106.5311267	68.02931	3	gravel, cobble, boulder	1.87	2931	8/28/2009
-106.530985	68.029315	3	gravel, cobble, boulder	1.86	2951	8/28/2009
-106.530845	68.02932	3	gravel, cobble, boulder	1.86	2971	8/28/2009
-106.5307083	68.0293267	3	gravel, cobble, boulder	1.86	2991	8/28/2009
-106.5305683	68.0293317	3	gravel, cobble, boulder	1.84	3011	8/28/2009
-106.5305	68.029335	3	gravel, cobble, boulder	1.84	3031	8/28/2009
-106.53036	68.02934	3	gravel, cobble, boulder	1.86	3051	8/28/2009
-106.53022	68.0293467	3	gravel, cobble, boulder	1.86	3071	8/28/2009
-106.5300833	68.0293533	3	gravel, cobble, boulder	1.89	3091	8/28/2009
-106.5299433	68.0293583	3	gravel, cobble, boulder	1.94	3111	8/28/2009
-106.5298	68.0293633	3	gravel, cobble, boulder	2.05	3131	8/28/2009
-106.5296567	68.02937	3	gravel, cobble, boulder	2.12	3151	8/28/2009
-106.5295067	68.029375	3	gravel, cobble, boulder	2.31	3171	8/28/2009
-106.52943	68.0293783	2	mud	2.53	3191	8/28/2009
-106.5292817	68.029385	2	mud	2.64	3211	8/28/2009
-106.5291367	68.0293917	2	mud	2.67	3231	8/28/2009
-106.5289933	68.0293983	2	mud	2.67	3251	8/28/2009
-106.5288467	68.029405	2	mud	2.67	3271	8/28/2009
-106.5287017	68.02941	1	very soft fines	2.64	3291	8/28/2009
-106.5286283	68.0294117	2	mud	2.64	3311	8/28/2009
-106.5284833	68.0294183	1	very soft fines	2.64	3331	8/28/2009
-106.5283367	68.0294233	1	very soft fines	2.6	3351	8/28/2009
-106.52819	68.0294283	2	mud	2.57	3371	8/28/2009
-106.52804	68.0294367	2	mud	2.53	3391	8/28/2009
-106.527895	68.029445	2	mud	2.5	3411	8/28/2009
-106.5278233	68.02945	2	mud	2.46	3431	8/28/2009
-106.527675	68.0294567	2	mud	2.43	3451	8/28/2009
-106.5275267	68.029465	2	mud	2.4	3471	8/28/2009
-106.527385	68.029475	2	mud	2.38	3491	8/28/2009
-106.5272433	68.0294833	1	very soft fines	2.34	3511	8/28/2009
-106.5271	68.02949	1	very soft fines	2.34	3531	8/28/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately 5 m long transect segment (20 pings).
Bottom Type Codes: 1 = very soft fines, 2 = mud, 3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-2. Substrate Data Collected from Hydroacoustic and Underwater Video Surveys of Patch Lake, Hope Bay Belt Project, 2009

Longitude	Latitude	Type	Category	Depth	#Ping	Date
-106.5270283	68.0294933	1	very soft fines	2.33	3551	8/28/2009
-106.5268867	68.0295	2	mud	2.31	3571	8/28/2009
-106.526745	68.0295067	2	mud	2.29	3591	8/28/2009
-106.5266033	68.0295133	1	very soft fines	2.27	3611	8/28/2009
-106.5264683	68.0295217	1	very soft fines	2.27	3631	8/28/2009
-106.5263367	68.02953	2	mud	2.27	3651	8/28/2009
-106.5262683	68.029535	1	very soft fines	2.26	3671	8/28/2009
-106.52613	68.0295467	2	mud	2.22	3691	8/28/2009
-106.5259933	68.0295567	2	mud	2.19	3711	8/28/2009
-106.52586	68.0295667	1	very soft fines	2.19	3731	8/28/2009
-106.5257317	68.0295767	2	mud	2.15	3751	8/28/2009
-106.525605	68.0295883	2	mud	2.08	3771	8/28/2009
-106.5255433	68.0295933	2	mud	1.89	3791	8/28/2009
-106.5254233	68.029605	2	mud	1.96	3811	8/28/2009
-106.525305	68.0296167	2	mud	1.79	3831	8/28/2009
-106.5252033	68.0296267	3	gravel, cobble, boulder	1.72	3851	8/28/2009
-106.5251167	68.029635	3	gravel, cobble, boulder	1.37	3871	8/28/2009
-106.525035	68.029645	3	gravel, cobble, boulder	1.61	3891	8/28/2009
-106.5249567	68.029655	2	mud	2.41	3911	8/28/2009
-106.5249183	68.02966	2	mud	2.5	3931	8/28/2009
-106.52484	68.02967	3	gravel, cobble, boulder	2.57	3951	8/28/2009
-106.5247617	68.02968	3	gravel, cobble, boulder	2.55	3971	8/28/2009
-106.5246833	68.02969	2	mud	2.67	3991	8/28/2009
-106.524605	68.0296983	3	gravel, cobble, boulder	2.67	4011	8/28/2009
-106.5245267	68.0297083	3	gravel, cobble, boulder	2.69	4031	8/28/2009
-106.52445	68.0297167	3	gravel, cobble, boulder	2.62	4051	8/28/2009
-106.5243717	68.0297267	3	gravel, cobble, boulder	2.57	4071	8/28/2009
-106.5242933	68.0297333	2	mud	2.53	4091	8/28/2009
-106.524255	68.0297367	2	mud	2.46	4111	8/28/2009
-106.524175	68.029745	2	mud	2.29	4131	8/28/2009
-106.5240967	68.0297517	3	gravel, cobble, boulder	1.94	4151	8/28/2009
-106.5240167	68.02976	3	gravel, cobble, boulder	1.84	4171	8/28/2009
-106.5239367	68.029765	3	gravel, cobble, boulder	1.74	4191	8/28/2009
-106.5238583	68.02977	2	mud	1.65	4211	8/28/2009
-106.52378	68.029775	3	gravel, cobble, boulder	1.58	4231	8/28/2009
-106.5237167	68.0297817	3	gravel, cobble, boulder	1.46	4251	8/28/2009
-106.5236733	68.0297867	3	gravel, cobble, boulder	1.22	4271	8/28/2009
-106.5236567	68.02979	3	gravel, cobble, boulder	0.95	4291	8/28/2009
-106.5376317	68.0246017	3	gravel, cobble, boulder	1.32	11	8/28/2009
-106.53766	68.0245917	3	gravel, cobble, boulder	1.32	31	8/28/2009
-106.537725	68.02458	3	gravel, cobble, boulder	1.34	51	8/28/2009
-106.5378	68.0245767	3	gravel, cobble, boulder	1.35	71	8/28/2009
-106.5378867	68.0245783	3	gravel, cobble, boulder	1.37	91	8/28/2009
-106.5379917	68.0245867	3	gravel, cobble, boulder	1.41	111	8/28/2009
-106.5381117	68.0245917	3	gravel, cobble, boulder	1.46	131	8/28/2009
-106.5382333	68.0245983	3	gravel, cobble, boulder	1.48	151	8/28/2009
-106.5383583	68.0246067	3	gravel, cobble, boulder	1.53	171	8/28/2009
-106.53848	68.024615	3	gravel, cobble, boulder	1.56	191	8/28/2009
-106.5385983	68.0246267	3	gravel, cobble, boulder	1.58	211	8/28/2009
-106.5386567	68.0246317	3	gravel, cobble, boulder	1.63	231	8/28/2009
-106.5387767	68.02464	3	gravel, cobble, boulder	1.65	251	8/28/2009
-106.5388967	68.0246483	3	gravel, cobble, boulder	1.68	271	8/28/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately 5 m long transect segment (20 pings).
Bottom Type Codes: 1 = very soft fines, 2 = mud, 3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-2. Substrate Data Collected from Hydroacoustic and Underwater Video Surveys of Patch Lake, Hope Bay Belt Project, 2009

Longitude	Latitude	Type	Category	Depth	#Ping	Date
-106.5390167	68.024655	3	gravel, cobble, boulder	1.74	291	8/28/2009
-106.5391367	68.02466	3	gravel, cobble, boulder	1.74	311	8/28/2009
-106.5392517	68.0246633	3	gravel, cobble, boulder	1.79	331	8/28/2009
-106.5393667	68.0246667	3	gravel, cobble, boulder	1.79	351	8/28/2009
-106.5394217	68.0246667	3	gravel, cobble, boulder	1.82	371	8/28/2009
-106.5395383	68.02467	3	gravel, cobble, boulder	1.84	391	8/28/2009
-106.539665	68.0246717	3	gravel, cobble, boulder	1.87	411	8/28/2009
-106.5397967	68.0246733	3	gravel, cobble, boulder	1.89	431	8/28/2009
-106.5399317	68.024675	3	gravel, cobble, boulder	1.91	451	8/28/2009
-106.5400683	68.0246767	3	gravel, cobble, boulder	1.94	471	8/28/2009
-106.54021	68.0246767	3	gravel, cobble, boulder	1.96	491	8/28/2009
-106.5403533	68.0246783	3	gravel, cobble, boulder	1.96	511	8/28/2009
-106.5404933	68.02468	3	gravel, cobble, boulder	2	531	8/28/2009
-106.5406317	68.0246817	3	gravel, cobble, boulder	2	551	8/28/2009
-106.5407017	68.0246817	3	gravel, cobble, boulder	2.01	571	8/28/2009
-106.5408417	68.024685	3	gravel, cobble, boulder	2.01	591	8/28/2009
-106.5409833	68.0246883	3	gravel, cobble, boulder	2.03	611	8/28/2009
-106.541125	68.0246917	3	gravel, cobble, boulder	1.96	631	8/28/2009
-106.5412667	68.0246983	3	gravel, cobble, boulder	1.93	651	8/28/2009
-106.5414083	68.024705	3	gravel, cobble, boulder	1.93	671	8/28/2009
-106.5415483	68.0247133	3	gravel, cobble, boulder	1.98	691	8/28/2009
-106.5416883	68.02472	3	gravel, cobble, boulder	2.01	711	8/28/2009
-106.5418267	68.0247283	3	gravel, cobble, boulder	2.08	731	8/28/2009
-106.5419667	68.0247367	3	gravel, cobble, boulder	2.14	751	8/28/2009
-106.5421067	68.0247433	3	gravel, cobble, boulder	2.14	771	8/28/2009
-106.5422467	68.02475	3	gravel, cobble, boulder	2.14	791	8/28/2009
-106.5423167	68.0247517	3	gravel, cobble, boulder	2.15	811	8/28/2009
-106.5424583	68.0247567	3	gravel, cobble, boulder	2.17	831	8/28/2009
-106.5426033	68.0247617	2	mud	2.19	851	8/28/2009
-106.5427433	68.024765	2	mud	2.2	871	8/28/2009
-106.5428833	68.0247683	3	gravel, cobble, boulder	2.24	891	8/28/2009
-106.5430217	68.0247733	3	gravel, cobble, boulder	2.26	911	8/28/2009
-106.5431667	68.0247783	3	gravel, cobble, boulder	2.26	931	8/28/2009
-106.543315	68.0247833	3	gravel, cobble, boulder	2.34	951	8/28/2009
-106.543465	68.024785	3	gravel, cobble, boulder	2.41	971	8/28/2009
-106.5435383	68.0247867	2	mud	2.45	991	8/28/2009
-106.5436867	68.0247883	3	gravel, cobble, boulder	2.46	1011	8/28/2009
-106.5438367	68.02479	3	gravel, cobble, boulder	2.48	1031	8/28/2009
-106.5439833	68.0247933	2	mud	2.45	1051	8/28/2009
-106.5441283	68.024795	3	gravel, cobble, boulder	2.41	1071	8/28/2009
-106.544275	68.0247983	3	gravel, cobble, boulder	2.4	1091	8/28/2009
-106.54442	68.0247983	3	gravel, cobble, boulder	2.38	1111	8/28/2009
-106.5445667	68.0248	3	gravel, cobble, boulder	2.01	1131	8/28/2009
-106.54464	68.0248017	3	gravel, cobble, boulder	1.77	1151	8/28/2009
-106.5447617	68.0248033	3	gravel, cobble, boulder	1.63	1171	8/28/2009
-106.544855	68.024805	3	gravel, cobble, boulder	1.53	1191	8/28/2009
-106.54494	68.0248083	3	gravel, cobble, boulder	1.53	1211	8/28/2009
-106.5450233	68.02481	3	gravel, cobble, boulder	1.54	1231	8/28/2009
-106.545105	68.0248133	3	gravel, cobble, boulder	1.56	1251	8/28/2009
-106.5451867	68.0248167	3	gravel, cobble, boulder	1.61	1271	8/28/2009
-106.5452683	68.0248217	3	gravel, cobble, boulder	1.65	1291	8/28/2009
-106.5453483	68.0248267	3	gravel, cobble, boulder	1.68	1311	8/28/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately 5 m long transect segment (20 pings).
Bottom Type Codes: 1 = very soft fines, 2 = mud, 3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-2. Substrate Data Collected from Hydroacoustic and Underwater Video Surveys of Patch Lake, Hope Bay Belt Project, 2009

Longitude	Latitude	Type	Category	Depth	#Ping	Date
-106.54543	68.0248317	3	gravel, cobble, boulder	1.68	1331	8/28/2009
-106.5455117	68.024835	3	gravel, cobble, boulder	1.72	1351	8/28/2009
-106.5455917	68.02484	3	gravel, cobble, boulder	1.72	1371	8/28/2009
-106.5456733	68.0248433	3	gravel, cobble, boulder	1.7	1391	8/28/2009
-106.545715	68.0248467	3	gravel, cobble, boulder	1.74	1411	8/28/2009
-106.5457967	68.02485	3	gravel, cobble, boulder	1.77	1431	8/28/2009
-106.5458767	68.0248533	3	gravel, cobble, boulder	1.79	1451	8/28/2009
-106.5459583	68.0248567	3	gravel, cobble, boulder	1.81	1471	8/28/2009
-106.54604	68.02486	3	gravel, cobble, boulder	1.84	1491	8/28/2009
-106.54612	68.0248617	3	gravel, cobble, boulder	1.86	1511	8/28/2009
-106.5462	68.0248633	3	gravel, cobble, boulder	1.84	1531	8/28/2009
-106.54628	68.0248633	3	gravel, cobble, boulder	1.84	1551	8/28/2009
-106.5463617	68.0248633	3	gravel, cobble, boulder	1.86	1571	8/28/2009
-106.5464433	68.024865	3	gravel, cobble, boulder	1.86	1591	8/28/2009
-106.5465233	68.024865	3	gravel, cobble, boulder	1.84	1611	8/28/2009
-106.5466033	68.0248667	3	gravel, cobble, boulder	1.82	1631	8/28/2009
-106.5466833	68.0248667	3	gravel, cobble, boulder	1.79	1651	8/28/2009
-106.546765	68.0248667	3	gravel, cobble, boulder	1.75	1671	8/28/2009
-106.5468467	68.0248667	3	gravel, cobble, boulder	1.74	1691	8/28/2009
-106.5468883	68.0248667	3	gravel, cobble, boulder	1.68	1711	8/28/2009
-106.5469683	68.0248667	3	gravel, cobble, boulder	1.63	1731	8/28/2009
-106.5470483	68.024865	3	gravel, cobble, boulder	1.6	1751	8/28/2009
-106.54713	68.0248633	3	gravel, cobble, boulder	1.49	1771	8/28/2009
-106.5472083	68.0248633	3	gravel, cobble, boulder	1.41	1791	8/28/2009
-106.547275	68.0248617	3	gravel, cobble, boulder	1.28	1811	8/28/2009
-106.5473233	68.02486	3	gravel, cobble, boulder	1.25	1831	8/28/2009
-106.5473583	68.0248567	3	gravel, cobble, boulder	1.23	1851	8/28/2009
-106.5473867	68.024855	3	gravel, cobble, boulder	1.15	1871	8/28/2009
-106.5474117	68.0248517	3	gravel, cobble, boulder	1.11	1891	8/28/2009
-106.54743	68.02485	3	gravel, cobble, boulder	1.09	1911	8/28/2009
-106.5474467	68.0248483	3	gravel, cobble, boulder	1.15	1931	8/28/2009
-106.5474517	68.0248483	3	gravel, cobble, boulder	1.16	1951	8/28/2009
-106.5474333	68.0248533	3	gravel, cobble, boulder	1.15	1971	8/28/2009

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately 5 m long transect segment (20 pings).
Bottom Type Codes: 1 = very soft fines, 2 = mud, 3 = gravel, cobble, boulder
Dashes (-) = no data collected

Notes:
Coordinates (long, lat) are NAD83
Each data point represents an approximately 5 m long
transect segment (20 pings).
Bottom Type Codes: 1 = very soft fines, 2 = mud,
3 = gravel, cobble, boulder
Dashes (-) = no data collected

Appendix 3.1-3

Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Engineers and Scientists

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID:	Doris O/F1	Survey Date (d/m/y):	27-Jun-09	Coordinates: Start	Coordinates:
Survey Distance (m):	200	Survey Crew:	TR/KE	434067 7559440	
		Time:	12:20pm		
Temperature (°C):	4.8	Transparency:	Medium	Comments: Good for electrofishing, fine sand, hard pack bottom	
Channel Velocity (m/s):	Hydro st.	Conductivity (µS/cm):	255	Lake trout hanging out, 10 lb Lake Trout!!	
Current Flow Conditions:	High	pH:	8.66	Weather:	
Discharge estimate (m^3/s):	Hydro st.			Sunny/warm	

Hab Unit No.	Hab Type	Dist. fr start (m)	Length (m)	Slope (%)	Depth (m) Mean	Depth (m) Bank-full	Width (m) Mean	Width (m) Bank-full	Bed Material Fines (%)	Sand (%)	Gravel (%)	Cobble (%)	Boulder (%)	Bedrock (%)	Pool Info Type	Pool Depth (m) Max	Pool Depth (m) Crest	Fish Passage Barriers Type	T/P
1	G	0	150	1-2	0.63	0.88	11.6	20.2	40	40	14	5	1		-	-	-	None	
2	R	150	50	1	0.46	0.50	9.2		20		40	35	5		-	-	-	None	
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			
18																			
19																			
20																			

Flow Conditions: H = High flow, M = Medium flow, L = Low flow
Habitat Unit: Under bankfull conditions: 0 - 2.5 m = > 1 m^2, 2.5 - 5 m = > 2 m^2, 5 - 10 m = > 4 m^2, 10 -15 m = > 6 m^2, 15 -20 = > 8 m^2, > 20 m = > 10 m^2
Hab Type: P = pool, G = glide, R = riffle, C = cascade, O = other
Dist. fr start: distance from beginning of the survey to the beginning of the habitat unit being surveyed
Pool Type: S = scour, D = dammed, U = unknown
Substrate: Sand (silt, clay, fine organic< 2 mm), Gravel (2 - 64 mm), Cobble (64 - 256 mm), Boulders (256 - 4000 mm), Bedrock (>4000 mm)
Fish Passage Barriers: IF = Impassible waterfall
BF = Boulder Field, passage through the boulder arrangement is not possible for fish
D = dry channel, no stream flow
NC = no distinct channel, water drains over land
N = no barrier to fish passage through the habitat unit
T/P: T = temporary, portion of open water season
P = Permanent, all year round

Overall Rating

Spawning: Good
-abundance of fish substrates for small fish (ie. sculpins)
-good coverage of cobble substrates for RDWH/cisco in d/s portion of location

Rearing: Good
-abundance of cover for juvenile fish

Adult Feeding: Good

Over-wintering: Poor or N/A

Migration: Good
-falls located ~ 500m downstream

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID:	Doris O/F1
Survey Date:	27-Jun-09
Survey Crew:	KE/TR
Survey Distance (m):	200

Hab Unit No.	Banks of Channel: L Bank Height (m)	R Bank Height (m)	L Bank Stab	R Bank Stab	Instream Cover: Pool %	Boulder %	Instream Veg %	Overhang Veg %	Undercut Bank %	LWD %	SWD %	Riparian Cover (%): Canopy	LB	RB	Photos (Role #) (Photo #)
1	0.88	0.88	U	S		1	40	10	10		5	-	-	10	
2	0.50	0.50	S	S		5	20	20	15		5	-	10	10	
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															

Comments: Photos taken for Navigable waters # 299-310
Falls located @ 0434101 E 7559776N. ~ 3 m high. Acts as barrier to fish migration
Photos of falls 290-292
Several adult LKTR observed holding in stream inlet/outlet from lake
One LKTR ~ 75 cm in length
Hydrology station located at this site

Banks of Channel (Stability): H = highly stable, S = stable, U = unstable

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID: Doris O/F2
Survey Distance (m): 200
Survey Date (d/m/y): July 29/09
Survey Crew: EG/WK
Time:
Coordinates: 434044 7559575
Coordinates: 434056 7559407

Temperature (°C):
Channel Velocity (m/s):
Current Flow Conditions:
Discharge estimate (m³/s):
Transparency:
Conductivity (µS/cm):
pH:

Comments: S4 - fish bearing (LKTR), <1.5m

Weather: windy, sunny, clear, cool

Hab Unit No.	Hab Type	Dist. fr start (m)	Length (m)	Slope (%)	Depth (m) Mean	Depth (m) Bank-full	Width (m) Mean	Width (m) Bank-full	Bed Material Fines (%)	Sand (%)	Gravel (%)	Cobble (%)	Boulder (%)	Bedrock (%)	Pool Info Type	Pool Depth (m) Max	Pool Depth (m) Crest	Fish Passage Barriers Type	T/P
1	R	0	200	<5	0.50	>1	1.5	3.5	25		35	25	10	5				N	
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			
18																			
19																			
20																			

Flow Conditions: H = High flow, M = Medium flow, L = Low flow

Habitat Unit: Under bankfull conditions: 0 - 2.5 m = > 1 m², 2.5 - 5 m = > 2 m², 5 - 10 m = > 4 m², 10 -15 m = > 6 m², 15 -20 = > 8 m², > 20 m = > 10 m²
Hab Type: P = pool, G = glide, R = riffle, C = cascade, O = other
Dist. fr start: distance from beginning of the survey to the beginning of the habitat unit being surveyed
Pool Type: S = scour, D = dammed, U = unknown
Substrate: Sand (silt, clay, fine organic< 2 mm), Gravel (2 - 64 mm), Cobble (64 - 256 mm), Boulders (256 - 4000 mm), Bedrock (>4000 mm)
Fish Passage Barriers: IF = Impassible waterfall
BF = Boulder Field, passage through the boulder arrangement is not possible for fish
D = dry channel, no stream flow
NC = no distinct channel, water drains over land
N = no barrier to fish passage through the habitat unit
T/P: T = temporary, portion of open water season
P = Permanent, all year round

Overall Rating

Spawning: good **Rearing:** good **Adult Feeding:** poor/fair **Over-wintering:** none **Migration:** good

***no juveniles or minnows caught, however many blackfly larvae on surface**

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID: Doris O/F2
Survey Date: July 29/09
Survey Crew: EG/WK
Survey Distance (m): 200

Hab Unit No.	Banks of Channel: L Bank Height (m)	R Bank Height (m)	L Bank Stab	R Bank Stab	Instream Cover: Pool %	Boulder %	Instream Veg %	Overhang Veg %	Undercut Bank %	LWD %	SWD %	Riparian Cover (%): Canopy	LB	RB	Photos (Role #) (Photo #)
1	<1	<1	Stab	Stab	5	10	5								1309-1312
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															

Comments:

whole stream is riffle with gravel/cobble bottom, some larger boulders, lake trout holding in slower areas/pools and behind boulders
1309 - d/s, N
1310 - u/s S
1311 - u/s to Doris L
1312 - d/s N

Banks of Channel (Stability): H = highly stable, S = stable, U = unstable

Station ID: Doris O/F3
Survey Distance (m): 200m
Survey Date (d/m/y): 28-Jul-09
Survey Crew: EG/JK
Time: 13:30
Coordinates: 434124 7559869
Coordinates:

Temperature (°C):
Channel Velocity (m/s):
Current Flow Conditions:
Discharge estimate (m³/s):
Transparency: clear
Conductivity (µS/cm):
pH:

Comments: S5 (non fish bearing, >3m channel)

Weather: overcast, cool, cloudy

Hab Unit No.	Hab Type	Dist. fr start (m)	Length (m)	Slope (%)	Depth (m) Mean	Depth (m) Bank-full	Width (m) Mean	Width (m) Bank-full	Bed Material Fines (%)	Sand (%)	Gravel (%)	Cobble (%)	Boulder (%)	Bedrock (%)	Pool Info Type	Pool Depth (m) Max	Pool Depth (m) Crest	Fish Passage Barriers Type	T/P
1	R	0	190	<10	1m	1m	1.5	3.0		10	10	20	40	20					
2	WF	200	-	DROP	-	-	-	-		-	-	-	-	-				IF	P
3	P	0	10	<5	1-2	1	5.0	12.0		80	10		10		U	>2			
4	G	10	100	<5	1-2	1	2.5	6.0		80	10		10						
5	R	100	100	<5	1-2	1	2.5	5.0		80	10		10		U				
6																			
7																			
8																			
9																			
10																			
11																			
12																			
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15																			
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17																			
18																			
19																			
20																			

Flow Conditions: H = High flow, M = Medium flow, L = Low flow
Habitat Unit: Under bankfull conditions: 0 - 2.5 m = > 1 m², 2.5 - 5 m = > 2 m², 5 - 10 m = > 4 m², 10 -15 m = > 6 m², 15 -20 = > 8 m², > 20 m = > 10 m²
Hab Type: P = pool, G = glide, R = riffle, C = cascade, O = other
Dist. fr start: distance from beginning of the survey to the beginning of the habitat unit being surveyed
Pool Type: S = scour, D = dammed, U = unknown
Substrate: Sand (silt, clay, fine organic< 2 mm), Gravel (2 - 64 mm), Cobble (64 - 256 mm), Boulders (256 - 4000 mm), Bedrock (>4000 mm)
Fish Passage Barriers: IF = Impassible waterfall
BF = Boulder Field, passage through the boulder arrangement is not possible for fish
D = dry channel, no stream flow
NC = no distinct channel, water drains over land
N = no barrier to fish passage through the habitat unit
T/P: T = temporary, portion of open water season
P = Permanent, all year round

Overall Rating

Spawning: poor **Rearing:** poor **Adult Feeding:** none **Over-wintering:** na **Migration:** poor

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID: Doris O/F3
Survey Date: 28-Jul-09
Survey Crew: EG/JK
Survey Distance (m): 200m

Hab Unit No.	Banks of Channel: L Bank Height (m)	R Bank Height (m)	L Bank Stab	R Bank Stab	Instream Cover: Pool %	Boulder %	Instream Veg %	Overhang Veg %	Undercut Bank %	LWD %	SWD %	Riparian Cover (%): Canopy	LB	RB	Photos (Role #) (Photo #)
1	>1	>1	U	U	0	20	2-5%	2%	10	0	0	0	0	0	1260-1266
2	>1	>1	U	U	0	5	2-5%	2%	10	0	0	0	0	0	
3	>1	>1	U	U	100	0	2-5%	2%	10	0	0	0	0	0	
4	>1	>1	U	U	0	5	2-5%	2%	10	0	0	0	0	0	
5	>1	>1	U	U	0	5	2-5%	2%	10	0	0	0	0	0	
6							(grass)	(bushes)							
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															

Comments:
Cannot see bottom, so not sure about cobble/boulders in mid channel (very deep).

Banks of Channel (Stability): H = highly stable, S = stable, U = unstable




Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID: Doris I/F1
Survey Distance (m): 200+
Survey Date (d/m/y): 30-Jun-09
Survey Crew: KE/TR
Time: 8:26
Coordinates: Start 434901 7552300
Coordinates:

Temperature (°C): 7.2
Channel Velocity (m/s): -
Current Flow Conditions: Somewhat fast
Discharge estimate (m^3/s): -
Transparency: Clear
Conductivity (µS/cm): 54.7
pH: 8.14

Comments:

Weather: Clear, wind form SE

Hab Unit No.	Hab Type	Dist. fr start (m)	Length (m)	Slope (%)	Depth (m) Mean	Depth (m) Bank-full	Width (m) Mean	Width (m) Bank-full	Bed Material Fines (%)	Sand (%)	Gravel (%)	Cobble (%)	Boulder (%)	Bedrock (%)	Pool Info Type	Pool Depth (m) Max	Pool Depth (m) Crest	Fish Passage Barriers Type	T/P
1	G	0	200+	1-2	0.17	0.29	1.5	1.8	100						-	-	-	-	-
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			
18																			
19																			
20																			

Flow Conditions: H = High flow, M = Medium flow, L = Low flow
Habitat Unit: Under bankfull conditions: 0 - 2.5 m = > 1 m^2, 2.5 - 5 m = > 2 m^2, 5 - 10 m = > 4 m^2, 10 -15 m = > 6 m^2, 15 -20 = > 8 m^2, > 20 m = > 10 m^2
Hab Type: P = pool, G = glide, R = riffle, C = cascade, O = other
Dist. fr start: distance from beginning of the survey to the beginning of the habitat unit being surveyed
Pool Type: S = scour, D = dammed, U = unknown
Substrate: Sand (silt, clay, fine organic< 2 mm), Gravel (2 - 64 mm), Cobble (64 - 256 mm), Boulders (256 - 4000 mm), Bedrock (>4000 mm)
Fish Passage Barriers: IF = Impassible waterfall
BF = Boulder Field, passage through the boulder arrangement is not possible for fish
D = dry channel, no stream flow
NC = no distinct channel, water drains over land
N = no barrier to fish passage through the habitat unit
T/P: T = temporary, portion of open water season
P = Permanent, all year round

Overall Rating

Spawning: None
- No rock substrates
- Streams completely terrestrial and aquatic vegetation

Rearing: Poor
- Very shallow and no cover

Adult Feeding: None

Over-wintering: N/A

Migration: Poor
- Stream is poorly connected to d/s of Windy Lake

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID: Doris I/F1
Survey Date: 30-Jun-09
Survey Crew: KE/TR
Survey Distance (m): 200+

Hab Unit No.	Banks of Channel: L Bank Height (m)	R Bank Height (m)	L Bank Stab	R Bank Stab	Instream Cover: Pool %	Boulder %	Instream Veg %	Overhang Veg %	Undercut Bank %	LWD %	SWD %	Riparian Cover (%): Canopy	LB	RB	Photos (Role #) (Photo #)
1	0.29	0.29	H	H			100					-	-	-	
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															

Comments:
Photos 401-408
Overall habitat quality: Marginal
Stream appears ephemeral, some permanent channels observed

Banks of Channel (Stability): H = highly stable, S = stable, U = unstable

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID:	Doris I/F2	Survey Date (d/m/y):	28-Jun-09	Coordinates:
Survey Distance (m):	200	Survey Crew:	KE/TR	
		Time:	17:15	434906 7553648

Coordinates:

Temperature (°C):	8.4	Transparency:	Clear
Channel Velocity (m/s):	-	Conductivity (µS/cm):	65.5
Current Flow Conditions:	Freshet	pH:	7.42
Discharge estimate (m^3/s):	-		

Comments:
No Fish Habitat

Weather:

Hab Unit No.	Hab Type	Dist. fr start (m)	Length (m)	Slope (%)	Depth (m) Mean	Depth (m) Bank-full	Width (m) Mean	Width (m) Bank-full	Bed Material Fines (%)	Sand (%)	Gravel (%)	Cobble (%)	Boulder (%)	Bedrock (%)	Pool Info Type	Pool Depth (m) Max	Pool Depth (m) Crest	Fish Passage Barriers Type	T/P
1	O	0	200	1	0.15	0.30	0.3	0.3	100						-	-	-	-	-
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			
18																			
19																			
20																			

Flow Conditions:	H = High flow, M = Medium flow, L = Low flow
Habitat Unit:	Under bankfull conditions: 0 - 2.5 m = > 1 m^2, 2.5 - 5 m = > 2 m^2, 5 - 10 m = > 4 m^2, 10 -15 m = > 6 m^2, 15 -20 = > 8 m^2, > 20 m = > 10 m^2
Hab Type:	P = pool, G = glide, R = riffle, C = cascade, O = other
Dist. fr start:	distance from beginning of the survey to the beginning of the habitat unit being surveyed
Pool Type:	S = scour, D = dammed, U = unknown
Substrate:	Sand (silt, clay, fine organic< 2 mm), Gravel (2 - 64 mm), Cobble (64 - 256 mm), Boulders (256 - 4000 mm), Bedrock (>4000 mm)
Fish Passage Barriers:	IF = Impassible waterfall
	BF = Boulder Field, passage through the boulder arrangement is not possible for fish
	D = dry channel, no stream flow
	NC = no distinct channel, water drains over land
	N = no barrier to fish passage through the habitat unit
T/P:	T = temporary, portion of open water season
	P = Permanent, all year round

Overall Rating

Spawning: None **Rearing:** None **Adult Feeding:** None **Over-wintering:** N/A **Migration:** Poor

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID: Doris I/F2
Survey Date: 28-Jun-09
Survey Crew: KE/TR
Survey Distance (m): 200

Hab Unit No.	Banks of Channel: L Bank Height (m)	R Bank Height (m)	L Bank Stab	R Bank Stab	Instream Cover: Pool %	Boulder %	Instream Veg %	Overhang Veg %	Undercut Bank %	LWD %	SWD %	Riparian Cover (%): Canopy	LB	RB	Photos (Role #) (Photo #)
1	0.15	0.15	H	H			100					-	100	100	
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															

Comments:
Photos: 372-378
Overall classification: no fish habitat
S6 Stream Class
Assess in summer for presence
Stream is entirely overland flow, ephemeral

Banks of Channel (Stability): H = highly stable, S = stable, U = unstable

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID: Doris I/F3	Survey Date (d/m/y): 28-Jun-09	Coordinates: Start 434738 7553696	Coordinates:
Survey Distance (m):	Survey Crew: KE/TR		
	Time: 16:38		

Temperature (°C): 16.3	Transparency: Clear	Comments:	
Channel Velocity (m/s): -	Conductivity (µS/cm): 54		
Current Flow Conditions: Freshet - Fast	pH: 7.5	Weather:	
Discharge estimate (m³/s): -		sunny and warm	

Hab Unit No.	Hab Type	Dist. fr start (m)	Length (m)	Slope (%)	Depth (m) Mean	Depth (m) Bank-full	Width (m) Mean	Width (m) Bank-full	Bed Material Fines (%)	Sand (%)	Gravel (%)	Cobble (%)	Boulder (%)	Bedrock (%)	Pool Info Type	Pool Depth (m) Max	Pool Depth (m) Crest	Fish Passage Barriers Type	T/P
1	G	0	200	1-2	0.26	0.26	0.75*	**	100						-	-	-	-	-
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			
18																			
19																			
20																			

Flow Conditions: H = High flow, M = Medium flow, L = Low flow
Habitat Unit: Under bankfull conditions: 0 - 2.5 m = > 1 m², 2.5 - 5 m = > 2 m², 5 - 10 m = > 4 m², 10 -15 m = > 6 m², 15 -20 = > 8 m², > 20 m = > 10 m²
Hab Type: P = pool, G = glide, R = riffle, C = cascade, O = other
Dist. fr start: distance from beginning of the survey to the beginning of the habitat unit being surveyed
Pool Type: S = scour, D = dammed, U = unknown
Substrate: Sand (silt, clay, fine organic< 2 mm), Gravel (2 - 64 mm), Cobble (64 - 256 mm), Boulders (256 - 4000 mm), Bedrock (>4000 mm)
Fish Passage Barriers: IF = Impassible waterfall
BF = Boulder Field, passage through the boulder arrangement is not possible for fish
D = dry channel, no stream flow
NC = no distinct channel, water drains over land
N = no barrier to fish passage through the habitat unit
T/P: T = temporary, portion of open water season
P = Permanent, all year round
* Main Channel
** Very large wetland, area to big and expansive to measure

Overall Rating

Spawning: None
- No rock substrate

Rearing: Poor
- Very shallow
- Very limited habitat for fish

Adult Feeding: None

Over-wintering: None

Migration: Poor
- Connected to Doris Lake no barriers, very shallow and small ephemeral stream

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID: Doris I/F3
Survey Date: 28-Jun-09
Survey Crew: KE/TR
Survey Distance (m):

Hab Unit No.	Banks of Channel: L Bank Height (m)	R Bank Height (m)	L Bank Stab	R Bank Stab	Instream Cover: Pool %	Boulder %	Instream Veg %	Overhang Veg %	Undercut Bank %	LWD %	SWD %	Riparian Cover (%): Canopy	LB	RB	Photos (Role #) (Photo #)
1	0.26	0.26	H	H			100					-	-	-	
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															

Comments:
Photos: 366-371
Very large wetland, area too big/expansive to measure
Overall: Marginal fish habitat
Very limited fish habitat, all life cycles and species apply
Stream flows through wetland at south end of Doris Lake
Stream is predominately overland flow at freshet period.

Banks of Channel (Stability): H = highly stable, S = stable, U = unstable

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID: P.O. O/F1	Survey Date (d/m/y): 27-Jun-09	Coordinates: Start	Coordinates: Finish
Survey Distance (m): 200	Survey Crew: TR/KE	436591 7550740	200 m from start
	Time: 9:57		

Temperature (°C): 4.6	Transparency: Clear	Comments: Bear was sighted nearby - therefore change of plans
Channel Velocity (m/s): Hydro st.	Conductivity (µS/cm): 180	
Current Flow Conditions: High/Freshet	pH: 8.7	Weather: High cloud, partly blue skies
Discharge estimate (m^3/s): Hydro st.		

Hab Unit No.	Hab Type	Dist. fr start (m)	Length (m)	Slope (%)	Depth (m) Mean	Depth (m) Bank-full	Width (m) Mean	Width (m) Bank-full	Bed Material Fines (%)	Sand (%)	Gravel (%)	Cobble (%)	Boulder (%)	Bedrock (%)	Pool Info Type	Depth (m) Max	Depth (m) Crest	Fish Passage Barriers Type	T/P
1	R	0	21.4	1-2	0.50	0.65	14	14	60		35		5		-	-	-	None	
2	C	21.4	10.1	3	0.45	0.65	8	10	40		50		10		-	-	-	None	
3	R	31.5	10.0	1-2	0.45	0.75	9.4	9.4	30		65		5		-	-	-	None	
4	P	41.5	10.0	1-2	1.50	1.80	12	12	30	40	10		20		5	1.5	0.75	None	
5	G	51.5	148.5	1	0.90	1.20	20	20	30		60		10		-	-	-	None	
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			
18																			
19																			
20																			

Flow Conditions: H = High flow, M = Medium flow, L = Low flow
Habitat Unit: Under bankfull conditions: 0 - 2.5 m = > 1 m^2, 2.5 - 5 m = > 2 m^2, 5 - 10 m = > 4 m^2, 10 -15 m = > 6 m^2, 15 -20 = > 8 m^2, > 20 m = > 10 m^2
Hab Type: P = pool, G = glide, R = riffle, C = cascade, O = other
Dist. fr start: distance from beginning of the survey to the beginning of the habitat unit being surveyed
Pool Type: S = scour, D = dammed, U = unknown
Substrate: Sand (silt, clay, fine organic< 2 mm), Gravel (2 - 64 mm), Cobble (64 - 256 mm), Boulders (256 - 4000 mm), Bedrock (>4000 mm)
Fish Passage Barriers: IF = Impassible waterfall
BF = Boulder Field, passage through the boulder arrangement is not possible for fish
D = dry channel, no stream flow
NC = no distinct channel, water drains over land
N = no barrier to fish passage through the habitat unit
T/P: T = temporary, portion of open water season
P = Permanent, all year round

Overall Rating

Spawning: Fair **Rearing:** Good **Adult Feeding:** Good **Over-wintering:** N/A **Migration:** Good

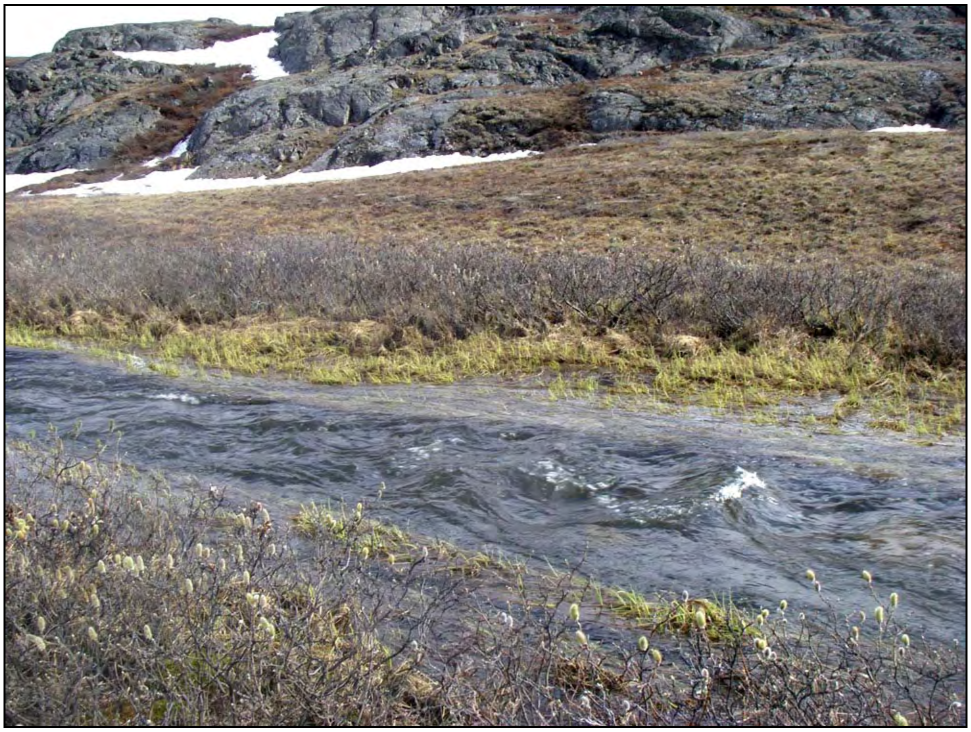
Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

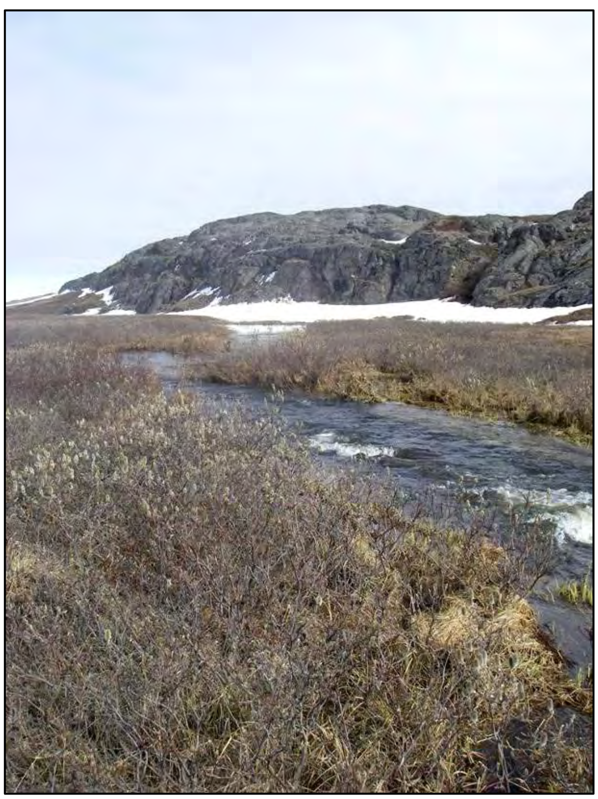
Station ID: P.O. O/F1
Survey Date: 27-Jun-09
Survey Crew: TR/KE
Survey Distance (m): 200

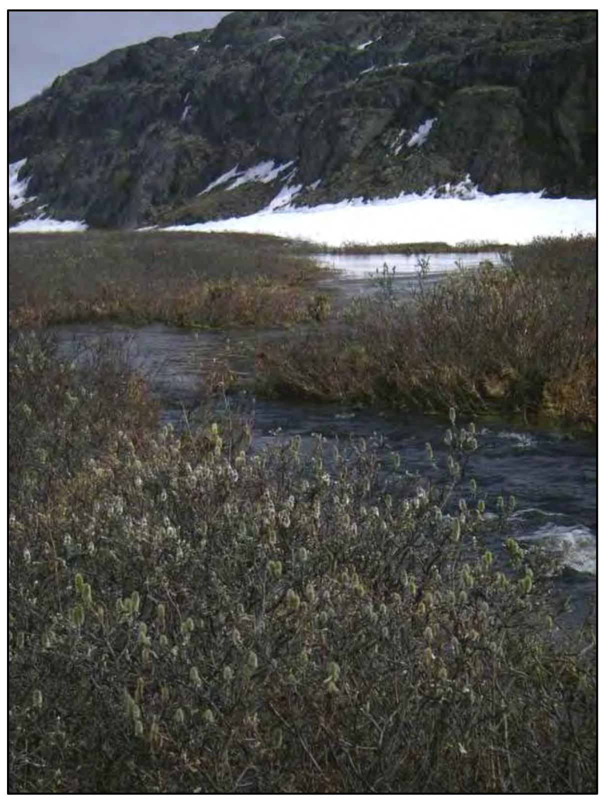
Hab Unit No.	Banks of Channel: L Bank Height (m)	R Bank Height (m)	L Bank Stab	R Bank Stab	Instream Cover: Pool %	Boulder %	Instream Veg %	Overhang Veg %	Undercut Bank %	LWD %	SWD %	Riparian Cover (%): Canopy	LB	RB	Photos (Role #) (Photo #)
1	0.65	0.65	H	H		5	60	2				-	2	2	
2	0.65	0.65	H	H		20	40	10				-	5	5	
3	0.75	0.75	H	H		10	20	20	15		5	-	10	10	
4	1.80	1.80	H	H	30		30	2	20			-	2	2	
5	1.20	1.20	H	H		5	30	10	20		5	-	5	5	
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															

Comments:
Photo: 285-289
Bear spotted in area, were forced to move prior to completing survey

Banks of Channel (Stability): H = highly stable, S = stable, U = unstable







Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID:	P.O. O/F2	Survey Date (d/m/y):	29-Jun-09	Coordinates:	Coordinates:
Survey Distance (m):	~ 50 m total length of stream	Survey Crew:	KE/TR	Start	
		Time:	10:45	436649 7550190	

Temperature (°C):	2.9	Transparency:	Clear	Comments: Good stream channel with large banks, wetland area surrounding it
Channel Velocity (m/s):	-	Conductivity (µS/cm):	181	
Current Flow Conditions:	Medium-Slow	pH:	8.19	Weather:
Discharge estimate (m³/s):	-			Windy/cloudy

Hab Unit No.	Hab Type	Dist. fr start (m)	Length (m)	Slope (%)	Depth (m) Mean	Depth (m) Bank-full	Width (m) Mean	Width (m) Bank-full	Bed Material Fines (%)	Sand (%)	Gravel (%)	Cobble (%)	Boulder (%)	Bedrock (%)	Pool Info Type	Pool Depth (m) Max	Pool Depth (m) Crest	Fish Passage Barriers Type	T/P
1	G	0	*	1-2	~1	~1.15	25	28	95				5		-	-	-	-	-
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			
18																			
19																			
20																			

Flow Conditions: H = High flow, M = Medium flow, L = Low flow
Habitat Unit: Under bankfull conditions: 0 - 2.5 m = > 1 m², 2.5 - 5 m = > 2 m², 5 - 10 m = > 4 m², 10 -15 m = > 6 m², 15 -20 = > 8 m², > 20 m = > 10 m²
Hab Type: P = pool, G = glide, R = riffle, C = cascade, O = other
Dist. fr start: distance from beginning of the survey to the beginning of the habitat unit being surveyed
Pool Type: S = scour, D = dammed, U = unknown
Substrate: Sand (silt, clay, fine organic< 2 mm), Gravel (2 - 64 mm), Cobble (64 - 256 mm), Boulders (256 - 4000 mm), Bedrock (>4000 mm)
Fish Passage Barriers: IF = Impassible waterfall
BF = Boulder Field, passage through the boulder arrangement is not possible for fish
D = dry channel, no stream flow
NC = no distinct channel, water drains over land
N = no barrier to fish passage through the habitat unit
T/P: T = temporary, portion of open water season
P = Permanent, all year round
*** = Entire length of the stream**

Overall Rating

Spawning: None
- No rock substrate

Rearing: Poor
- Poor cover/habitat

Adult Feeding: Poor

Over-wintering: N/A

Migration: Good
- No barriers, good depth

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID: PO Outflow 2
Survey Date: 29-Jun-09
Survey Crew: TR/KE
Survey Distance (m): Entire Length

Hab Unit No.	Banks of Channel: L Bank Height (m)	R Bank Height (m)	L Bank Stab	R Bank Stab	Instream Cover: Pool %	Boulder %	Instream Veg %	Overhang Veg %	Undercut Bank %	LWD %	SWD %	Riparian Cover (%): Canopy	LB	RB	Photos (Role #) (Photo #)
1	1.15	1.15	H	H			90					-	-	-	383
2															to
3															385
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															

Comments:
Overall Habitat = Marginal
Flooded channelized stream channel observed at freshet.

Banks of Channel (Stability): H = highly stable, S = stable, U = unstable

Station ID:	P.O. O/F2	Survey Date (d/m/y):	July-26/09	Coordinates:	Coordinates:
Survey Distance (m):	45 m	Survey Crew:	EG/JK		
		Time:	16:05	436648 7550208	436652 7550175

Temperature (°C):	-	Transparency:	poor
Channel Velocity (m/s):	-	Conductivity (µS/cm):	-
Current Flow Conditions:	low	pH:	-
Discharge estimate (m^3/s):	-		

Comments: S6 - no fish, <3m channel width

Weather: cool, cloudy, windy

Hab Unit No.	Hab Type	Dist. fr start (m)	Length (m)	Slope (%)	Depth (m) Mean	Depth (m) Bank-full	Width (m) Mean	Width (m) Bank-full	Bed Material Fines (%)	CLAY (%)	Gravel (%)	Cobble (%)	Boulder (%)	Bedrock (%)	Pool Info Type	Pool Depth (m) Max	Pool Depth (m) Crest	Fish Passage Barriers Type	T/P
1	G	0	45	0	0.75	1.30	1.2	1.3		100					-	-	-	-	-
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			
18																			
19																			
20																			

Flow Conditions:	H = High flow, M = Medium flow, L = Low flow
Habitat Unit:	Under bankfull conditions: 0 - 2.5 m = > 1 m^2, 2.5 - 5 m = > 2 m^2, 5 - 10 m = > 4 m^2, 10 -15 m = > 6 m^2, 15 -20 = > 8 m^2, > 20 m = > 10 m^2
Hab Type:	P = pool, G = glide, R = riffle, C = cascade, O = other
Dist. fr start:	distance from beginning of the survey to the beginning of the habitat unit being surveyed
Pool Type:	S = scour, D = dammed, U = unknown
Substrate:	Sand (silt, clay, fine organic< 2 mm), Gravel (2 - 64 mm), Cobble (64 - 256 mm), Boulders (256 - 4000 mm), Bedrock (>4000 mm)
Fish Passage Barriers:	IF = Impassible waterfall
	BF = Boulder Field, passage through the boulder arrangement is not possible for fish
	D = dry channel, no stream flow
	NC = no distinct channel, water drains over land
	N = no barrier to fish passage through the habitat unit
T/P:	T = temporary, portion of open water season
	P = Permanent, all year round

Overall Rating

Spawning: Poor **Rearing:** Poor **Adult Feeding:** None **Over-wintering:** None **Migration:** Good

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID: P.O. 0/F2
Survey Date: July 26-09
Survey Crew: EG/JK
Survey Distance (m): 45 m

Hab Unit No.	Banks of Channel: L Bank Height (m)	R Bank Height (m)	L Bank Stab	R Bank Stab	Instream Cover: Pool %	Boulder %	Instream Veg %	Overhang Veg %	Undercut Bank %	LWD %	SWD %	Riparian Cover (%): Canopy	LB	RB	Photos (Role #) (Photo #)
1	0.75	0.75	Stab	Stab	100	0	0	0	0	0	0	0	0	0	1229-1231
2		*very mucky and swamy, clay bottom													
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															

Comments:

Banks of Channel (Stability): H = highly stable, S = stable, U = unstable

Station ID:	Ogama O/F1	Survey Date (d/m/y):	27-Jun-09	Coordinates:	Coordinates:
Survey Distance (m):	200	Survey Crew:	KE/TR		
		Time:	17:00	435223 7555438	

Temperature (°C):	4	Transparency:	Medium	Comments: Ice chunks flowing
Channel Velocity (m/s):	-	Conductivity (µS/cm):	4	
Current Flow Conditions:	Freshet	pH:	7.87	Weather: Sunny/clear
Discharge estimate (m³/s):	-			

Hab Unit No.	Hab Type	Dist. fr start (m)	Length (m)	Slope (%)	Depth (m) Mean	Depth (m) Bank-full	Width (m) Mean	Width (m) Bank-full	Bed Material Fines (%)	Sand (%)	Gravel (%)	Cobble (%)	Boulder (%)	Bedrock (%)	Pool Info Type	Pool Depth (m) Max	Pool Depth (m) Crest	Fish Passage Barriers Type	T/P
1	G	0	70	1-2	0.75	0.95	9	9	*unknown						-	-	-	-	-
2	R	70	15	2	0.36	0.46	6	6	49			50	1		-	-	-	-	-
3	G	85	115+	1-2	1.33	1.53	15	15	*unknown						-	-	-	-	-
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			
18																			
19																			
20																			

Flow Conditions: H = High flow, M = Medium flow, L = Low flow
Habitat Unit: Under bankfull conditions: 0 - 2.5 m = > 1 m², 2.5 - 5 m = > 2 m², 5 - 10 m = > 4 m², 10 -15 m = > 6 m², 15 -20 = > 8 m², > 20 m = > 10 m²
Hab Type: P = pool, G = glide, R = riffle, C = cascade, O = other
Dist. fr start: distance from beginning of the survey to the beginning of the habitat unit being surveyed
Pool Type: S = scour, D = dammed, U = unknown
Substrate: Sand (silt, clay, fine organic< 2 mm), Gravel (2 - 64 mm), Cobble (64 - 256 mm), Boulders (256 - 4000 mm), Bedrock (>4000 mm)
Fish Passage Barriers: IF = Impassible waterfall
BF = Boulder Field, passage through the boulder arrangement is not possible for fish
D = dry channel, no stream flow
NC = no distinct channel, water drains over land
N = no barrier to fish passage through the habitat unit
T/P: T = temporary, portion of open water season
P = Permanent, all year round
* Cannot see bottom - very deep

Overall Rating

Spawning: Poor
- Stream bed is predominately fine substrate

Rearing: Good
- Good cover for juvenile fish

Adult Feeding: Fair

Over-wintering: N/A

Migration: Good
- No barriers to migration, good depth

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID: Ogama O/F1
Survey Date: 27-Jun-09
Survey Crew: KE/TR
Survey Distance (m): 200

Hab Unit No.	Banks of Channel: L Bank Height (m)	R Bank Height (m)	L Bank Stab	R Bank Stab	Instream Cover: Pool %	Boulder %	Instream Veg %	Overhang Veg %	Undercut Bank %	LWD %	SWD %	Riparian Cover (%): Canopy	LB	RB	Photos (Role #) (Photo #)
1	0.95	0.95	H	H			60*		10			-	-	-	
2	0.46	0.46	H	H			20	10	10		5	-	-	10	
3	1.53	1.53	H	H			20		20			-	-	-	
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															

Comments:
Photos 318-324
Return in summer to evaluate substrate types due to deep water at freshet

* maybe more instream vegetation but difficult to see
Banks of Channel (Stability): H = highly stable, S = stable, U = unstable

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID: Ogama O/F2
Survey Distance (m):
*at confluence with Doris inflow

Survey Date (d/m/y):
Survey Crew:
Time:

Coordinates: 435059 7555575

Coordinates: 435250 7555393

Temperature (°C):
Channel Velocity (m/s):
Current Flow Conditions:
Discharge estimate (m^3/s):

Transparency: clear
Conductivity (µS/cm):
pH:

Comments: S3 - fish bearing, 1.5-5m

Weather: cold, overcast

Hab Unit No.	Hab Type	Dist. fr start (m)	Length (m)	Slope (%)	Depth (m) Mean	Depth (m) Bank-full	Width (m) Mean	Width (m) Bank-full	Bed Material Fines (%)	Sand (%)	Gravel (%)	Cobble (%)	Boulder (%)	Bedrock (%)	Pool Info Type	Pool Depth (m) Max	Pool Depth (m) Crest	Fish Passage Barriers Type	T/P
1	P	0	10	0	0.75	>1	6.0	8.0	75		10	10	5			>1		N	
2	R	10	50	0	0.50	>1	1.5	3.0	60		15	10	15					N	
3	P	60	12	0	0.75	>1	4.5	6.0	unsure, can't see bottom							>1		N	
4	R	72	10	0	0.25	0.75	1.0	1.5	50		20	15	15					N	
5	P	82	10	0	1.00	>1.5	2.0	3.0	unsure, can't see bottom							>1.5		N	
6	R	92	40	0	0.50	>1	1.0	2.5	35		40	10	10	5				N	
7	P	122	20	0	>1	>1.5	20.0	30.0	unsure, can't see bottom							>1.5		N	
8	R	140	5	<5	0.25	0.50	0.8	1.5	30		35	15	15					N	
9																			
10	R	0	100	<5	0.50	>1	1.5-2	4.0	35		25	15	15	10				N	
11																			
12																			
13																			
14																			
15																			
16																			
17																			
18																			
19																			
20																			

Flow Conditions: H = High flow, M = Medium flow, L = Low flow
Habitat Unit: Under bankfull conditions: 0 - 2.5 m = > 1 m^2, 2.5 - 5 m = > 2 m^2, 5 - 10 m = > 4 m^2, 10 -15 m = > 6 m^2, 15 -20 = > 8 m^2, > 20 m = > 10 m^2
Hab Type: P = pool, G = glide, R = riffle, C = cascade, O = other
Dist. fr start: distance from beginning of the survey to the beginning of the habitat unit being surveyed
Pool Type: S = scour, D = dammed, U = unknown
Substrate: Sand (silt, clay, fine organic< 2 mm), Gravel (2 - 64 mm), Cobble (64 - 256 mm), Boulders (256 - 4000 mm), Bedrock (>4000 mm)
Fish Passage Barriers: IF = Impassible waterfall
BF = Boulder Field, passage through the boulder arrangement is not possible for fish
D = dry channel, no stream flow
NC = no distinct channel, water drains over land
N = no barrier to fish passage through the habitat unit
T/P: T = temporary, portion of open water season
P = Permanent, all year round

Overall Rating

Spawning: good
gravelly sites

Rearing: fair

Adult Feeding: good
minnows

Over-wintering:
na

Migration:
good

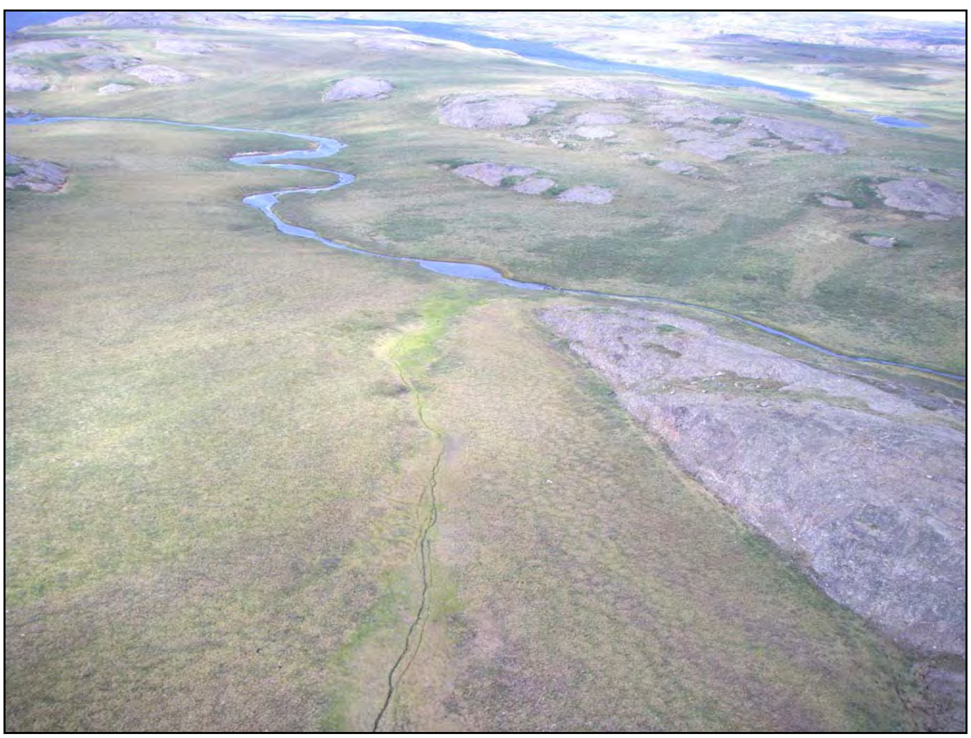
Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID: Ogama O/F2
Survey Date: July 29/09
Survey Crew: EG/JK
Survey Distance (m): 300

Hab Unit No.	Banks of Channel: L Bank Height (m)	R Bank Height (m)	L Bank Stab	R Bank Stab	Instream Cover: Pool %	Boulder %	Instream Veg %	Overhang Veg %	Undercut Bank %	LWD %	SWD %	Riparian Cover (%): Canopy	LB	RB	Photos (Role #) (Photo #)
1	varies only	relatively stable			100	5-10	5-15		5-10			no cover anywhere!			1284-1298
2	slightly	(under cut in pools)				5-10	5-15		5-10						
3	due to				100	5-10	5-15		5-10						
4	no definite					5-10	5-15		5-10						
5	banks...				100	5-10	5-15		5-10						
6	<1m					5-10	5-15		5-10						
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															

Comments:
1284 - facing N
1285- facing N
1286 - pool
1287 - facing S
1288 - facing Ogama l
1289 - facing Ogama L
1290 - facing Ogama L
1291
1291 - riffle/small cascade
1292 - LKWH
1293 - LKWH
1294 - fish (kept)
1298 - LKWH
1299-1300 - confluence of Doris inflow, Ogama outflow and small creek (dry) from unidentified pond between Doris L and Ogama L.

Banks of Channel (Stability): H = highly stable, S = stable, U = unstable



Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID: Ogama O/F3 **Survey Date (d/m/y):** 29-Jul-09 **Coordinates:** 434784 7555878 **Coordinates:** 434999 7555848
Survey Distance (m): 200 **Survey Crew:** EG/WK
Time:

Temperature (°C):
Transparency: clear
Channel Velocity (m/s):
Conductivity (µS/cm):
Current Flow Conditions:
pH:
Discharge estimate (m³/s):

Comments: S3 - fish bearing (LKTR and whitefish), 1.5-5m

Weather: cool, sunny, windy

Hab Unit No.	Hab Type	Dist. fr start (m)	Length (m)	Slope (%)	Depth (m) Mean	Depth (m) Bank-full	Width (m) Mean	Width (m) Bank-full	Bed Material Fines (%)	Sand (%)	Gravel (%)	Cobble (%)	Boulder (%)	Bedrock (%)	Pool Info Type	Pool Depth (m) Max	Pool Depth (m) Crest	Fish Passage Barriers Type	T/P
1	R	0	200	<5	0.30	>1	1.5	4	20		25	25	20	10		>1.5		N	
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			
18																			
19																			
20																			

Flow Conditions: H = High flow, M = Medium flow, L = Low flow
Habitat Unit: Under bankfull conditions: 0 - 2.5 m = > 1 m², 2.5 - 5 m = > 2 m², 5 - 10 m = > 4 m², 10 -15 m = > 6 m², 15 -20 = > 8 m², > 20 m = > 10 m²
Hab Type: P = pool, G = glide, R = riffle, C = cascade, O = other
Dist. fr start: distance from beginning of the survey to the beginning of the habitat unit being surveyed
Pool Type: S = scour, D = dammed, U = unknown
Substrate: Sand (silt, clay, fine organic< 2 mm), Gravel (2 - 64 mm), Cobble (64 - 256 mm), Boulders (256 - 4000 mm), Bedrock (>4000 mm)
Fish Passage Barriers: IF = Impassible waterfall
BF = Boulder Field, passage through the boulder arrangement is not possible for fish
D = dry channel, no stream flow
NC = no distinct channel, water drains over land
N = no barrier to fish passage through the habitat unit
T/P: T = temporary, portion of open water season
P = Permanent, all year round

Overall Rating

Spawning: Good **Rearing:** fair **Adult Feeding:** good **Over-wintering:** na **Migration:** good

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID:	Ogama O/F3
Survey Date:	29-Jul-09
Survey Crew:	EG/WK
Survey Distance (m):	200

Hab Unit No.	Banks of Channel L Bank Height (m)	R Bank Height (m)	L Bank Stab	R Bank Stab	Instream Cover Pool %	Boulder %	Instream Veg %	Overhang Veg %	Undercut Bank %	LWD %	SWD %	Riparian Cover (%) Canopy	LB	RB	Photos (Role #) (Photo #)
1	>1	>1	mucky and deep holes		5.0	5-10	25-45								1315-1317
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															

Comments:

Constant riffle habitat, pretty deep with mucky (clay) bottom edges surrounded by vegetation--thick mats, very concentrated

1315 - u/s facing SE (towards Ogama L)

1316 - d/s facing NW (towards Doris L)

1317 - opening of inflow into Doris L

Banks of Channel (Stability): H = highly stable, S = stable, U = unstable

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID: Patch O/F
Survey Distance (m): The length of the outflow
Survey Date (d/m/y): 29-Jun-09
Survey Crew: KE/TR
Time: 8:41
Coordinates: 4362255 7549016
Coordinates:

Temperature (°C): 4.2
Channel Velocity (m/s):
Current Flow Conditions: Medium
Discharge estimate (m^3/s):
Transparency: Clear
Conductivity (µS/cm): 152
pH: 8.26
Comments:
Weather: Windy

Hab Unit No.	Hab Type	Dist. fr start (m)	Length (m)	Slope (%)	Depth (m) Mean	Depth (m) Bank-full	Width (m) Mean	Width (m) Bank-full	Bed Material Fines (%)	Sand (%)	Gravel (%)	Cobble (%)	Boulder (%)	Bedrock (%)	Pool Info Type	Pool Depth (m) Max	Pool Depth (m) Crest	Fish Passage Barriers Type	T/P
1	G	0	*	1-2	0.52	0.52	10.5	14	50	25	10	5	10		-	-	-	None	
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			
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14																			
15																			
16																			
17																			
18																			
19																			
20																			

Flow Conditions: H = High flow, M = Medium flow, L = Low flow
Habitat Unit: Under bankfull conditions: 0 - 2.5 m = > 1 m^2, 2.5 - 5 m = > 2 m^2, 5 - 10 m = > 4 m^2, 10 -15 m = > 6 m^2, 15 -20 = > 8 m^2, > 20 m = > 10 m^2
Hab Type: P = pool, G = glide, R = riffle, C = cascade, O = other
Dist. fr start: distance from beginning of the survey to the beginning of the habitat unit being surveyed
Pool Type: S = scour, D = dammed, U = unknown
Substrate: Sand (silt, clay, fine organic< 2 mm), Gravel (2 - 64 mm), Cobble (64 - 256 mm), Boulders (256 - 4000 mm), Bedrock (>4000 mm)
Fish Passage Barriers: IF = Impassible waterfall
BF = Boulder Field, passage through the boulder arrangement is not possible for fish
D = dry channel, no stream flow
NC = no distinct channel, water drains over land
N = no barrier to fish passage through the habitat unit
T/P: T = temporary, portion of open water season
P = Permanent, all year round
*** = Assessed entire ouflow < 200 m**

Overall Rating

Spawning: Poor
- Predominately fines/organic substrate

Rearing: Fair
- Fair cover and depth for juvenile fish, especially at inflow to PO Lake

Adult Feeding: Fair

Over-wintering: N/A

Migration: G
- Good connection between Patch and PO Lakes at Freshet

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID: Patch O/F
Survey Date: 29-Jun-09
Survey Crew: KE/TR
Survey Distance (m): Entire outflow

Hab Unit No.	Banks of Channel: L Bank Height (m)	Banks of Channel: R Bank Height (m)	Banks of Channel: L Bank Stab	Banks of Channel: R Bank Stab	Instream Cover: Pool %	Instream Cover: Boulder %	Instream Cover: Instream Veg %	Instream Cover: Overhang Veg %	Instream Cover: Undercut Bank %	Instream Cover: LWD %	Instream Cover: SWD %	Riparian Cover (%): Canopy	Riparian Cover (%): LB	Riparian Cover (%): RB	Photos (Role #) (Photo #)
1	0.52	0.52	H	H		10	50	5				-	2.5	2.5	
2															
3															
4															
5															
6															
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15															
16															
17															
18															
19															
20															

Comments:
Photos 379-382
Overall habitat quality = Marginal

Banks of Channel (Stability): H = highly stable, S = stable, U = unstable

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID: Patch O/F
Survey Distance (m): 123m
Survey Date (d/m/y): 27-Jul-09
Survey Crew: EG/WK
Time: 1430-1530
Coordinates: 436651 7550173
Coordinates: 436255 7549004

Temperature (°C):
Channel Velocity (m/s):
Current Flow Conditions:
Discharge estimate (m³/s):
Transparency: clear
Conductivity (µS/cm):
pH:

Comments:
S1-S2 (varying channel width), fish bearing, (NSSB and LKTR)

Weather:
cool, windy, overcast

Hab Unit No.	Hab Type	Dist. fr start (m)	Length (m)	Slope (%)	Depth (m) Mean	Depth (m) Bank-full	Width (m) Mean	Width (m) Bank-full	Bed Material Fines (%)	Sand (%)	Gravel (%)	Cobble (%)	Boulder (%)	Bedrock (%)	Pool Info Type	Pool Info Depth (m) Max
1	P	0	55	<5	>1	>1	12	35	100 (Clay)							>2
2	R	55	250	<5	>1	>1	1.3	4	50	25	20	5				
3																
4																
5																
6																
7																
8																
9																
10																
11																
12																
13																
14																
15																
16																
17																
18																
19																
20																

Flow Conditions: H = High flow, M = Medium flow, L = Low flow
Habitat Unit: Under bankfull conditions: 0 - 2.5 m = > 1 m², 2.5 - 5 m = > 2 m², 5 - 10 m = > 4 m², 10 -15 m = > 6 m², 15 -20 = > 8 m², > 20 m = > 10 m²
Hab Type: P = pool, G = glide, R = riffle, C = cascade, O = other
Dist. fr start: distance from beginning of the survey to the beginning of the habitat unit being surveyed
Pool Type: S = scour, D = dammed, U = unknown
Substrate: Sand (silt, clay, fine organic< 2 mm), Gravel (2 - 64 mm), Cobble (64 - 256 mm), Boulders (256 - 4000 mm), Bedrock (>4000 mm)
Fish Passage Barriers: IF = Impassible waterfall
BF = Boulder Field, passage through the boulder arrangement is not possible for fish
D = dry channel, no stream flow

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID: Patch O/F
Survey Date: July 27/09
Survey Crew: EG/WK
Survey Distance (m): 123

Hab Unit No.	Banks of Channel: L Bank Height (m)	R Bank Height (m)	L Bank Stab	R Bank Stab	Instream Cover: Pool %	Boulder %	Instream Veg %	Overhang Veg %	Undercut Bank %	LWD %	SWD %	Riparian Cover (%): Canopy	LB	RB	Photos (Role #) (Photo #)
1	0.75	0.75	U	U	100		15								1228-1236 (walking E to W)
2	0.50	0.75	Stab	Stab	25		15								
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															

Comments:

Banks of Channel (Stability): H = highly stable, S = stable, U = unstable

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID: Patch I/F | Survey Date (d/m/y): 30-Jun-09 | Coordinates: Start 433821 7552530 | Coordinates:

Survey Distance (m): 200 | Survey Crew: KE/TR | Time: 9:47

Temperature (°C): 9.5 | Transparency: Clear

Channel Velocity (m/s): - | Conductivity (µS/cm): 76.5

Current Flow Conditions: Fast | pH: 7.6

Discharge estimate (m³/s): -

Comments:
Near the major laydown area
Lots of braids to the stream

Weather:
Partly cloudy skies

Hab Unit No.	Hab Type	Dist. fr start (m)	Length (m)	Slope (%)	Depth (m) Mean	Depth (m) Bank-full	Width (m) Mean	Width (m) Bank-full	Bed Material Fines (%)	Sand (%)	Gravel (%)	Cobble (%)	Boulder (%)	Bedrock (%)	Pool Info Type	Pool Depth (m) Max	Pool Depth (m) Crest	Fish Passage Barriers Type	T/P
1	P	0	5	1	0.35	0.85	2.80	2.80	100						S	1.20	0.24	-	-
2	G	5	6	1-2	0.39	0.54	1.80	1.80	100						-	-	-	-	-
3	P	11	8	1	2.00	2.00	0.68	0.83	100						S	0.80	0.22	-	-
4	R	19	5	1-2	0.16	0.27	1.10	1.10	100						-	-	-	-	-
5	P	24	3	1	0.45	0.62	4.50	4.50	100						S	0.68	0.19	-	-
6	G	27	6	1-2	0.35	0.57	1.60	1.80	100						-	-	-	-	-
7	P	33	15	1	1.30	1.45	7.00	8.00	100						S	1.50	0.40	-	-
8	R	48	142	1-2	0.16	0.36	1.20*	1.20	100						-	-	-	-	-
9	P	190	10	1	0.90	1.06	2.10	2.60	100						S	1.10	0.44	-	-
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			
18																			
19																			
20																			

Flow Conditions: H = High flow, M = Medium flow, L = Low flow
Habitat Unit: Under bankfull conditions: 0 - 2.5 m = > 1 m², 2.5 - 5 m = > 2 m², 5 - 10 m = > 4 m², 10 -15 m = > 6 m², 15 -20 = > 8 m², > 20 m = > 10 m²
Hab Type: P = pool, G = glide, R = riffle, C = cascade, O = other
Dist. fr start: distance from beginning of the survey to the beginning of the habitat unit being surveyed
Pool Type: S = scour, D = dammed, U = unknown
Substrate: Sand (silt, clay, fine organic< 2 mm), Gravel (2 - 64 mm), Cobble (64 - 256 mm), Boulders (256 - 4000 mm), Bedrock (>4000 mm)
Fish Passage Barriers: IF = Impassible waterfall
BF = Boulder Field, passage through the boulder arrangement is not possible for fish
D = dry channel, no stream flow
NC = no distinct channel, water drains over land
N = no barrier to fish passage through the habitat unit
T/P: T = temporary, portion of open water season
P = Permanent, all year round
* Part of a braided stream/flooded area

Overall Rating

Spawning: None
- No rock substrates
- All organic substrates

Rearing: Fair
- Few good pools with cover for fish

Adult Feeding: Poor
- Poor habitat for adult fish

Over-wintering: N/A

Migration: Poor
- Poor connection to inflow of Patch Lake
- Predominately overland flow at inflow

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID: Patch I/F
Survey Date: 30-Jun-09
Survey Crew: KE/TR
Survey Distance (m): 200

Hab Unit No.	Banks of Channel: L Bank Height (m)	R Bank Height (m)	L Bank Stab	R Bank Stab	Instream Cover: Pool %	Boulder %	Instream Veg %	Overhang Veg %	Undercut Bank %	LWD %	SWD %	Riparian Cover (%): Canopy	LB	RB	Photos (Role #) (Photo #)
1	0.85	0.85	H	H	20		20		10			-	-	-	
2	0.54	0.54	H	H			40					-	-	-	
3	0.83	0.83	H	H	40		20		5			-	-	-	
4	0.27	0.27	H	H			100					-	-	-	
5	0.62	0.62	H	H	20		25					-	-	-	
6	0.57	0.57	H	H			50					-	-	-	
7	1.45	1.45	H	H	40		30		30			-	-	-	
8	0.36	0.36	H	H			100					-	-	-	
9	1.06	1.06	H	H	75		10		15			-	-	-	
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															

Comments:
Photos: 409-417
Overall habitat quality: Marginal
Assess for fish presence in summer
part of a braided stream/flooded area

Banks of Channel (Stability): H = highly stable, S = stable, U = unstable

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID:	P.O. I/F1	Survey Date (d/m/y):	30-Jun-09	Coordinates:	Coordinates:
Survey Distance (m):	200	Survey Crew:	KE/TR	Start	
		Time:	13:26	438010 7546164	

Temperature (°C):	10.4	Transparency:	Clear	Comments:
Channel Velocity (m/s):	-	Conductivity (µS/cm):	157.4	Nice meandering stream; surrounding wetlands
Current Flow Conditions:	Fast	pH:	7.5	Aquatic plants permanent in stream; pool/glide complex
Discharge estimate (m^3/s):	-			Weather:
				Mostly cloudy, SE wind

Hab Unit No.	Hab Type	Dist. fr start (m)	Length (m)	Slope (%)	Depth (m) Mean	Depth (m) Bank-full	Width (m) Mean	Width (m) Bank-full	Bed Material Fines (%)	Sand (%)	Gravel (%)	Cobble (%)	Boulder (%)	Bedrock (%)	Pool Info Type	Pool Depth (m) Max	Pool Depth (m) Crest	Fish Passage Barriers Type	T/P
1	G	0	75	1-2	0.50	0.65	14	20	100						-	-	-	-	-
2	R	75	25	1-2	0.17	0.34	12	14	100						-	-	-	-	-
3	P	100	30	1	> 2.00	+2.30	10	10	100						S	> 2	0.46	-	-
4	G	130	55	1-2	0.23	0.50	9	11	100						-	-	-	-	-
5	P	185	15	1	0.65	0.93	9	12	100						S	2	0.37	-	-
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			
18																			
19																			
20																			

Flow Conditions: H = High flow, M = Medium flow, L = Low flow
Habitat Unit: Under bankfull conditions: 0 - 2.5 m = > 1 m^2, 2.5 - 5 m = > 2 m^2, 5 - 10 m = > 4 m^2, 10 -15 m = > 6 m^2, 15 -20 = > 8 m^2, > 20 m = > 10 m^2
Hab Type: P = pool, G = glide, R = riffle, C = cascade, O = other
Dist. fr start: distance from beginning of the survey to the beginning of the habitat unit being surveyed
Pool Type: S = scour, D = dammed, U = unknown
Substrate: Sand (silt, clay, fine organic< 2 mm), Gravel (2 - 64 mm), Cobble (64 - 256 mm), Boulders (256 - 4000 mm), Bedrock (>4000 mm)
Fish Passage Barriers: IF = Impassible waterfall
BF = Boulder Field, passage through the boulder arrangement is not possible for fish
D = dry channel, no stream flow
NC = no distinct channel, water drains over land
N = no barrier to fish passage through the habitat unit
T/P: T = temporary, portion of open water season
P = Permanent, all year round

Overall Rating

Spawning: None	Rearing: Good	Adult Feeding: Good	Over-wintering: N/A	Migration: Good
- No rock substrate - Stream bed is 100% organic or aquatic vegetation	- Good depth in pools with excellent aquatic vegetation cover	- Good habitat for adults in pools		- Good connectivity downstream to ancient/dried lake and further d/s to PO Lake

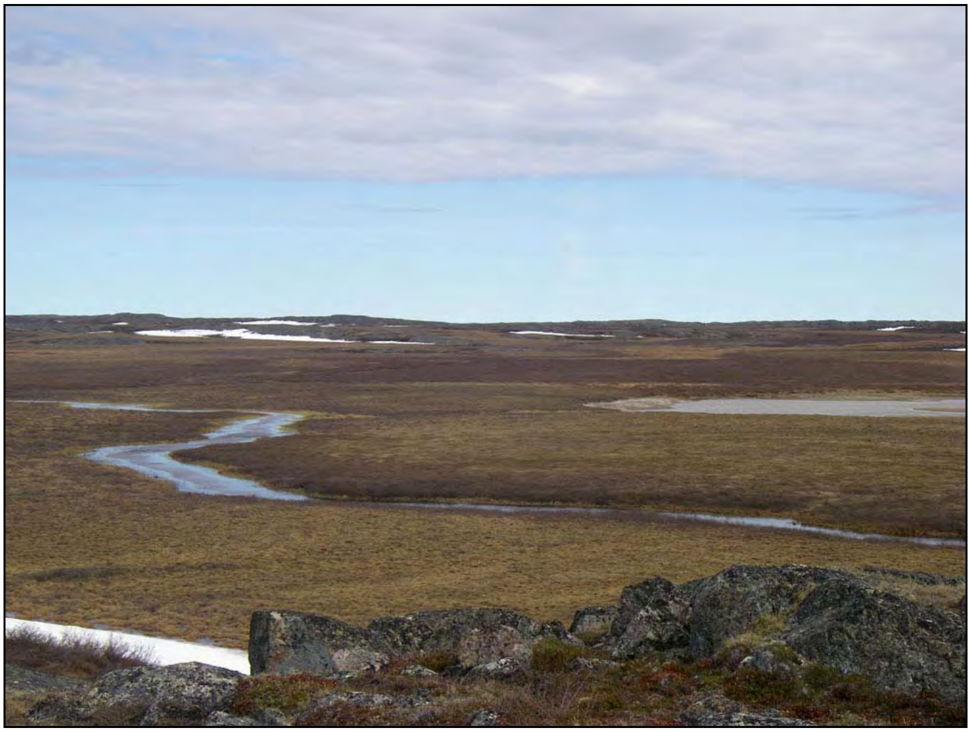
Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID: P.O. I/F1
Survey Date: June 30. 2009
Survey Crew: KE/TR
Survey Distance (m): 200

Hab Unit No.	Banks of Channel: L Bank Height (m)	R Bank Height (m)	L Bank Stab	R Bank Stab	Instream Cover: Pool %	Boulder %	Instream Veg %	Overhang Veg %	Undercut Bank %	LWD %	SWD %	Riparian Cover (%): Canopy	LB	RB	Photos (Role #) (Photo #)
1	0.65	0.65	H	H			100					-	-	-	
2	0.34	0.34	H	H			100					-	-	-	
3	+2.30	+2.30	H	H			90	10				-	5	5	
4	0.50	0.50	H	H			100					-	-	-	
5	0.93	0.93	H	H			95	5				-	5	-	
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															

Comments:
Photos 418-437
Newly emerged insects
Overall habitat quality: Important
Assess in summer for fish abundance/populations
Area is located near potentially significant wildlife area
Near proposed tailings area west of surveyed stream

Banks of Channel (Stability): H = highly stable, S = stable, U = unstable



Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID:	P.O. I/F2	Survey Date (d/m/y):	30-Jun-09	Coordinates: Start	Coordinates: End
Survey Distance (m):	200	Survey Crew:	KE/TR	437821 7547195	437774 7547418
		Time:	15:10		
Temperature (°C):	11.6	Transparency:	Turbid	Comments: Muddy after the lake	
Channel Velocity (m/s):	-	Conductivity (µS/cm):	131.6		
Current Flow Conditions:	Fast	pH:	7.5	Weather: High cloud, sunny, SE wind	
Discharge estimate (m^3/s):	-				

Hab Unit No.	Hab Type	Dist. fr start (m)	Length (m)	Slope (%)	Depth (m) Mean	Depth (m) Bank-full	Width (m) Mean	Width (m) Bank-full	Bed Material Fines (%)	Sand (%)	Gravel (%)	Cobble (%)	Boulder (%)	Bedrock (%)	Pool Info Type	Pool Depth (m) Max	Pool Depth (m) Crest	Fish Passage Barriers Type	T/P
1	G	0	7	1-2	0.31	0.43	10	10	100						-	-	-	-	-
2	P	7	20	1	~2.00	~2.15	15	15	100						S	~2	0.19	-	-
3	G	27	70	1-2	0.33	0.43	12	15	100						-	-	-	-	-
4	P	97	18	1	~2.00	~2.14	14	14	100						S	~2	0.37	-	-
5	G	115	10	1-2	0.45	0.55	7	9	100						-	-	-	-	-
6	P	125	20	1	~2.00	2.17	16	18	100						S	~2	0.45	-	-
7	G	145	55	1-2	0.34	0.44	5	7	100						-	-	-	-	-
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			
18																			
19																			
20																			

Flow Conditions: H = High flow, M = Medium flow, L = Low flow
Habitat Unit: Under bankfull conditions: 0 - 2.5 m = > 1 m^2, 2.5 - 5 m = > 2 m^2, 5 - 10 m = > 4 m^2, 10 -15 m = > 6 m^2, 15 -20 = > 8 m^2, > 20 m = > 10 m^2
Hab Type: P = pool, G = glide, R = riffle, C = cascade, O = other
Dist. fr start: distance from beginning of the survey to the beginning of the habitat unit being surveyed
Pool Type: S = scour, D = dammed, U = unknown
Substrate: Sand (silt, clay, fine organic< 2 mm), Gravel (2 - 64 mm), Cobble (64 - 256 mm), Boulders (256 - 4000 mm), Bedrock (>4000 mm)
Fish Passage Barriers: IF = Impassible waterfall
BF = Boulder Field, passage through the boulder arrangement is not possible for fish
D = dry channel, no stream flow
NC = no distinct channel, water drains over land
N = no barrier to fish passage through the habitat unit
T/P: T = temporary, portion of open water season
P = Permanent, all year round

Overall Rating

Spawning: Poor to None
- No rock substrates
- Completely organic/vegetation bottom

Rearing: Good
- Excellent depth in pools with extensive cover/vegetation

Adult Feeding: Good

Over-wintering: N/A

Migration: Good
- Well connected

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID:	P.O. I/F2
Survey Date:	30-Jun-09
Survey Crew:	KE/TR
Survey Distance (m):	200

Hab Unit No.	Banks of Channel: L Bank Height (m)	R Bank Height (m)	L Bank Stab	R Bank Stab	Instream Cover: Pool %	Boulder %	Instream Veg %	Overhang Veg %	Undercut Bank %	LWD %	SWD %	Riparian Cover (%): Canopy	LB	RB	Photos (Role #) (Photo #)
1	0.43	0.43	H	H			100					-	-	-	
2	~2.15	~2.15	H	H			100					-	-	-	
3	0.43	0.43	H	H			100					-	-	-	
4	~2.14	~2.14	H	H			100					-	-	-	
5	0.55	0.55	H	H			100					-	-	-	
6	~2.17	~2.17	H	H			100					-	-	-	
7	0.44	0.44	H	H			100					-	-	-	
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															

Comments:
Photos: 441-445
Overall habitat quality = Important
Abundance of wildlife observed in area, including Peregrine falcons, swans, geese, ducks
Site and remainder of stream displays rare pool - glide complexes
Stream flows over sediment/fines enabling pools to be scoured
Stream gradient is very low gradient/profile
Potential for fish habitat compensation. Stream has appropriate profile and flow but lacking appropriate substrate
Potential barrier located near inflow at PO Lake
Re-evaluate in summer for fish presence/community

Banks of Channel (Stability): H = highly stable, S = stable, U = unstable

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID:	Koignuk D/S	Survey Date (d/m/y):	28-Jun-09	Coordinates: Start	Coordinates:
Survey Distance (m):		Survey Crew:	TR/KE		
		Time:	9:09	429569 7554988	

Temperature (°C):	4.3	Transparency:	Medium	Comments: Big, fast flowing river
Channel Velocity (m/s):		Conductivity (µS/cm):	53.5	
Current Flow Conditions:	Freshet - Fast	pH:	8.4	Weather:
Discharge estimate (m³/s):				Cloudy, windy, cool, rainy

Hab Unit No.	Hab Type	Dist. fr start (m)	Length (m)	Slope (%)	Depth (m) Mean	Depth (m) Bank-full	Width (m) Mean	Width (m) Bank-full	Bed Material Fines (%)	Sand (%)	Gravel (%)	Cobble (%)	Boulder (%)	Bedrock (%)	Pool Info Type	Pool Depth (m) Max	Pool Depth (m) Crest	Fish Passage Barriers Type	T/P
1	C	0	41	4-5	-	-	36	41						100*	-	-	-	-	-
2	R	41	26	1-2	~ 2-3	-	58	58				15*	15*	70*	-	-	-	-	-
3	G	68	132+	1	~ 2-3	-	71	78	unknown						-	-	-	-	-
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			
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17																			
18																			
19																			
20																			

Flow Conditions:	H = High flow, M = Medium flow, L = Low flow
Habitat Unit:	Under bankfull conditions: 0 - 2.5 m = > 1 m², 2.5 - 5 m = > 2 m², 5 - 10 m = > 4 m², 10 -15 m = > 6 m², 15 -20 = > 8 m², > 20 m = > 10 m²
Hab Type:	P = pool, G = glide, R = riffle, C = cascade, O = other
Dist. fr start:	distance from beginning of the survey to the beginning of the habitat unit being surveyed
Pool Type:	S = scour, D = dammed, U = unknown
Substrate:	Sand (silt, clay, fine organic< 2 mm), Gravel (2 - 64 mm), Cobble (64 - 256 mm), Boulders (256 - 4000 mm), Bedrock (>4000 mm)
Fish Passage Barriers:	IF = Impassible waterfall
	BF = Boulder Field, passage through the boulder arrangement is not possible for fish
	D = dry channel, no stream flow
	NC = no distinct channel, water drains over land
	N = no barrier to fish passage through the habitat unit
T/P:	T = temporary, portion of open water season
	P = Permanent, all year round
	* = Difficult to see bottom, this is an estimate

Overall Rating

Spawning: Poor/None	Rearing: Poor	Adult Feeding: Fair	Over-wintering: N/A	Migration: Fair
- Predominately bedrock substrate - Fast flow - Tidal influenced downstream of cascade	- Fast flow - Potential rearing habitat upstream of cascade			- Fast flows over cascade, but no barrier to fish migration, paticulary Arctic Char

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID: Koignuk D/S
Survey Date: 28-Jun-09
Survey Crew: KE/TR
Survey Distance (m):

Hab Unit No.	Banks of Channel: L Bank Height (m)	R Bank Height (m)	L Bank Stab	R Bank Stab	Instream Cover: Pool %	Boulder %	Instream Veg %	Overhang Veg %	Undercut Bank %	LWD %	SWD %	Riparian Cover (%): Canopy	LB	RB	Photos (Role #) (Photo #)
1	-	-	H	H		10						-	-	-	
2	-	-	H	H		20						-	-	-	
3	-	-	H	H		10						-	-	-	
4															
5															
6															
7															
8															
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12															
13															
14															
15															
16															
17															
18															
19															
20															

Comments:
Photos: 331-336
Site is most likely a migration corridor for Arctic Char
No barriers to Arctic Char movement observed along the Koignuk River

Banks of Channel (Stability): H = highly stable, S = stable, U = unstable

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID:	Koignuk D_S	Survey Date (d/m/y):	5-Aug-09	Coordinates: E 429570 N 7554875	Coordinates: E 429629 N 7554454
Survey Distance (m):	420 m	Survey Crew:	EG/CK	0m	420 m
		Time:			

Comments: S2 - fish bearing (SLSC) 5-20 m channel width

Temperature (°C):	n/a	Transparency:	clear
Channel Velocity (m/s):	n/a	Conductivity (µS/cm):	n/a
Current Flow Conditions:	n/a	pH:	n/a
Discharge estimate (m³/s):	n/a		

Weather:

Hab Unit No.	Hab Type	Dist. fr start (m)	Length (m)	Slope (%)	Depth (m) Mean	Depth (m) Bank-full	Width (m) Mean	Width (m) Bank-full	Bed Material Sand (%)	Gravel (%)	Cobble (%)	Boulder (%)	Bedrock (%)	Pool Info Type	Pool Depth (m) Max	Pool Depth (m) Crest	Fish Passage Barriers Type	T/P
1	F	0	5	0.5	0.30	>1	2	4	0	0	0	10	90	/	/	/	N	/
2	P	6	5	0	0.50	>1	6	8	85	0	5	10	0	/	>1.5	/	N	/
3	G	11	50	0	0.40	>1	12.0	30	78	2	5	10	0	/	/	/	N	/
4	R	51	250	0	0.25	0.50	30.0	50.0	80	10	5	5	0	/	/	/	N	/
5	G	251	110	0	0.25	0.50	25	40.0	60	30	5	5	0	/	/	/	N	/
6																		
7																		
8																		
9																		
10																		
11																		
12																		
13																		
14																		
15																		
16																		
17																		
18																		
19																		
20																		

Flow Conditions:	H = High flow, M = Medium flow, L = Low flow
Habitat Unit:	Under bankfull conditions: 0 - 2.5 m = > 1 m², 2.5 - 5 m = > 2 m², 5 - 10 m = > 4 m², 10 -15 m = > 6 m², 15 -20 = > 8 m², > 20 m = > 10 m²
Hab Type:	P = pool, G = glide, R = riffle, C = cascade, O = other
Dist. fr start:	distance from beginning of the survey to the beginning of the habitat unit being surveyed
Pool Type:	S = scour, D = dammed, U = unknown
Substrate:	Sand (silt, clay, fine organic< 2 mm), Gravel (2 - 64 mm), Cobble (64 - 256 mm), Boulders (256 - 4000 mm), Bedrock (>4000 mm)
Fish Passage Barriers:	IF = Impassible waterfall
	BF = Boulder Field, passage through the boulder arrangement is not possible for fish
	D = dry channel, no stream flow
	NC = no distinct channel, water drains over land
	N = no barrier to fish passage through the habitat unit
T/P:	T = temporary, portion of open water season
	P = Permanent, all year round

Overall Rating

Spawning: Good - gravel beds **Rearing:** Fair **Adult Feeding:** Poor **Over-wintering:** None **Migration:** Good (falls passable?

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID: Koignuk D/S
Survey Date: Aug. 5, 2009
Survey Crew: EG/CK
Survey Distance (m): 420

Hab Unit No.	Banks of Channel: L Bank Height (m)	R Bank Height (m)	L Bank Stab	R Bank Stab	Instream Cover: Pool %	Boulder %	Instream Veg %	Overhang Veg %	Undercut Bank %	LWD %	SWD %	Riparian Cover (%): Canopy	LB	RB	Photos (Role #) (Photo #)
1	n/a	n/a	n/a	n/a	0	10	0	0	0	0	0	0	0	0	1450
2	n/a	n/a	n/a	n/a	2	10	0	0	0	0	0	0	0	0	to
3	n/a	n/a	n/a	n/a	0	10	0	0	0	0	0	0	0	0	1470
4	n/a	n/a	n/a	n/a	0	10	0	0	0	0	0	0	0	0	
5	n/a	n/a	n/a	n/a	0	10	0	0	0	0	0	0	0	0	
6															
7															
8															
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18															
19															
20															

Comments:

Overall Habitat Rating: Fair

Photos:
1454 and 1458 - facing d/s @ falls
1456 - facing u/s @ falls
1456 - east side @ falls
1457 - west side @ falls
1459- sandy bank mid river
1460- facing u/s
1461- side pool u/s at falls MT set here, no fish
1463- falls
1464- riffle mid river
1468- 500 m u/s of falls
1469, 1470- u/s of falls

Banks of Channel (Stability): H = highly stable, S = stable, U = unstable

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID: Koignuk M/S
Survey Distance (m): 200
Survey Date (d/m/y): 29-Jun-09
Survey Crew: KE/TR
Time: 15:33
Coordinates: 431015 7546380
Coordinates:

Temperature (°C): 6.1
Channel Velocity (m/s): -
Current Flow Conditions: Fast
Discharge estimate (m^3/s): -
Transparency: Medium
Conductivity (µS/cm): 51.9
pH: 7.81

Comments:
River with steep clay left-bank. Right-bank is marshy with lots of vegetation

Weather:
Cloudy

Hab Unit No.	Hab Type	Dist. fr start (m)	Length (m)	Slope (%)	Depth (m) Mean	Depth (m) Bank-full	Width (m) Mean	Width (m) Bank-full	Bed Material Fines (%)	Sand (%)	Gravel (%)	Cobble (%)	Boulder (%)	Bedrock (%)	Pool Info Type	Pool Depth (m) Max	Pool Depth (m) Crest	Fish Passage Barriers Type	T/P
1	G	0	200+	1-2	*		80	80	100*						-	-	-	-	-
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
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14																			
15																			
16																			
17																			
18																			
19																			
20																			

Flow Conditions: H = High flow, M = Medium flow, L = Low flow
Habitat Unit: Under bankfull conditions: 0 - 2.5 m = > 1 m^2, 2.5 - 5 m = > 2 m^2, 5 - 10 m = > 4 m^2, 10 -15 m = > 6 m^2, 15 -20 = > 8 m^2, > 20 m = > 10 m^2
Hab Type: P = pool, G = glide, R = riffle, C = cascade, O = other
Dist. fr start: distance from beginning of the survey to the beginning of the habitat unit being surveyed
Pool Type: S = scour, D = dammed, U = unknown
Substrate: Sand (silt, clay, fine organic< 2 mm), Gravel (2 - 64 mm), Cobble (64 - 256 mm), Boulders (256 - 4000 mm), Bedrock (>4000 mm)
Fish Passage Barriers: IF = Impassible waterfall
BF = Boulder Field, passage through the boulder arrangement is not possible for fish
D = dry channel, no stream flow
NC = no distinct channel, water drains over land
N = no barrier to fish passage through the habitat unit
T/P: T = temporary, portion of open water season
P = Permanent, all year round
* Cannot estimate because too deep and turbid

Overall Rating

Spawning: Poor
- Predominately fine clay substrate
- Little rock substrate

Rearing: Fair
- Good depth
- Little instream cover

Adult Feeding: Good

Over-wintering: Good
- Depth over 3m

Migration: Good
- No limits to migration through this section of river

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID:	**Koignuk M/S**
Survey Date:	**29-Jun-09**
Survey Crew:	**KE/TR**
Survey Distance (m):	**200+**

Hab Unit No.	Banks of Channel L Bank Height (m)	R Bank Height (m)	L Bank Stab	R Bank Stab	Instream Cover Pool %	Boulder %	Instream Veg %	Overhang Veg %	Undercut Bank %	LWD %	SWD %	Riparian Cover (%) Canopy	LB	RB	Photos (Role #) (Photo #)
1	*	*	U	H		*		1		*		-	-	1	
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
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14															
15															
16															
17															
18															
19															
20															

Comments:
Photos: 397-400
Overall habitat quality: Important
Recommend to re-evaluate in summer low flow

* Cannot estimate because too deep and turbid
Banks of Channel (Stability): H = highly stable, S = stable, U = unstable

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID: Koignuk M/S
Survey Distance (m): 400 m
Survey Date (d/m/y): 6-Aug-09
Survey Crew: EG/CK
Time:
Coordinates: E 431082 N 7546699 **0m**
Coordinates: **400 m upstream**

Temperature (°C): /
Channel Velocity (m/s): /
Current Flow Conditions: /
Discharge estimate (m^3/s): /
Transparency: fair
Conductivity (µS/cm): /
pH: /
Comments:
Weather: overcast, cool, light wind

Hab Unit No.	Hab Type	Dist. fr start (m)	Length (m)	Slope (%)	Depth (m) Mean	Depth (m) Bank-full	Width (m) Mean	Width (m) Bank-full	Bed Material Sand (%)	Gravel (%)	Cobble (%)	Boulder (%)	Bedrock (%)	Pool Info Type	Pool Depth (m) Max	Pool Depth (m) Crest	Fish Passage Barriers Type	T/P
1	G	0	400	0	1.50	3	25	60	80	0	5	10	5	U	>3 m	/	N	/
2	slow meandering, wide, deep where fisheries survey was conducted																	
3	G	400	150	0	0.50	> 1	25.0	50	65	0	5	20	10	U	/	/	N	/
4	R	550	3	< 5	0.25	0.50	4.5	10.0	60	0	10	25	5	/	/	/	N	/
5	end @ south confluence (Koig R and outflow from small lake)																	
6	going other way (north)																	
7	R	10	5	< 5	0.50	0.75	3.5	8.0	70	5	10	15	0	/	/	/	N	/
8																		
9																		
10																		
11																		
12																		
13																		
14																		
15																		
16																		
17																		
18																		
19																		
20																		

Flow Conditions: H = High flow, M = Medium flow, L = Low flow
Habitat Unit: Under bankfull conditions: 0 - 2.5 m = > 1 m^2, 2.5 - 5 m = > 2 m^2, 5 - 10 m = > 4 m^2, 10 -15 m = > 6 m^2, 15 -20 = > 8 m^2, > 20 m = > 10 m^2
Hab Type: P = pool, G = glide, R = riffle, C = cascade, O = other
Dist. fr start: distance from beginning of the survey to the beginning of the habitat unit being surveyed
Pool Type: S = scour, D = dammed, U = unknown
Substrate: Sand (silt, clay, fine organic< 2 mm), Gravel (2 - 64 mm), Cobble (64 - 256 mm), Boulders (256 - 4000 mm), Bedrock (>4000 mm)
Fish Passage Barriers: IF = Impassible waterfall
BF = Boulder Field, passage through the boulder arrangement is not possible for fish
D = dry channel, no stream flow
NC = no distinct channel, water drains over land
N = no barrier to fish passage through the habitat unit
T/P: T = temporary, portion of open water season
P = Permanent, all year round

Overall Rating Fair
Spawning: Poor **Rearing:** Good **Adult Feeding:** Poor **Over-wintering:** None **Migration:** Good

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID: Koignuk M/S
Survey Date:
Survey Crew:
Survey Distance (m): BACK PAGE WAS COMPLETELY BLANK

Hab Unit No.	Banks of Channel L Bank Height (m)	R Bank Height (m)	L Bank Stab	R Bank Stab	Instream Cover Pool %	Boulder %	Instream Veg %	Overhang Veg %	Undercut Bank %	LWD %	SWD %	Riparian Cover (%) Canopy	LB	RB	Photos (Role #) (Photo #)
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															

Comments:

Banks of Channel (Stability): H = highly stable, S = stable, U = unstable

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID: Glenn O/F1
Survey Distance (m): 200
Survey Date (d/m/y): 28-Jun-09
Survey Crew: KE/TR
Time: 13:50
Coordinates: 431657 7563884
Coordinates:

Temperature (°C): -
Channel Velocity (m/s): -
Current Flow Conditions: -
Discharge estimate (m³/s): -
Transparency: Very Turbid
Conductivity (µS/cm): -
pH: -
Comments:
Weather:

Hab Unit No.	Hab Type	Dist. fr start (m)	Length (m)	Slope (%)	Depth (m) Mean	Depth (m) Bank-full	Width (m) Mean	Width (m) Bank-full	Bed Material Fines (%)	Sand (%)	Gravel (%)	Cobble (%)	Boulder (%)	Bedrock (%)	Pool Info Type	Pool Depth (m) Max	Pool Depth (m) Crest	Fish Passage Barriers Type	T/P
1	O	0	200+	<1	>1.0	1.50			90	5	5	5			-	-	-	-	-
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			
18																			
19																			
20																			

Flow Conditions: H = High flow, M = Medium flow, L = Low flow
Habitat Unit: Under bankfull conditions: 0 - 2.5 m = > 1 m², 2.5 - 5 m = > 2 m², 5 - 10 m = > 4 m², 10 -15 m = > 6 m², 15 -20 = > 8 m², > 20 m = > 10 m²
Hab Type: P = pool, G = glide, R = riffle, C = cascade, O = other
Dist. fr start: distance from beginning of the survey to the beginning of the habitat unit being surveyed
Pool Type: S = scour, D = dammed, U = unknown
Substrate: Sand (silt, clay, fine organic< 2 mm), Gravel (2 - 64 mm), Cobble (64 - 256 mm), Boulders (256 - 4000 mm), Bedrock (>4000 mm)
Fish Passage Barriers: IF = Impassible waterfall
BF = Boulder Field, passage through the boulder arrangement is not possible for fish
D = dry channel, no stream flow
NC = no distinct channel, water drains over land
N = no barrier to fish passage through the habitat unit
T/P: T = temporary, portion of open water season
P = Permanent, all year round

Overall Rating

Spawning: None
- Abundance of fine substrates
- No Arctic char spawning site

Rearing: Poor
- No cover
- Little habitat for juvenile fish

Adult Feeding: Poor

Over-wintering: N/A

Migration: Good
- No barriers
- Arctic char free to migrate from ocean

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID:	Glenn O/F1
Survey Date:	28-Jun-09
Survey Crew:	KE/TR
Survey Distance (m):	200

Hab Unit No.	Banks of Channel				Instream Cover							Riparian Cover (%)			Photos (Role #) (Photo #)
	L Bank Height (m)	R Bank Height (m)	L Bank Stab	R Bank Stab	Pool %	Boulder %	Instream Veg %	Overhang Veg %	Undercut Bank %	LWD %	SWD %	Canopy	LB	RB	
1	1.50	1.50	U	U					5			-	-	-	
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															

Comments:
Photos: 352-359
Possible Arctic char spawning stream
Arctic char are able to freely migrate from ocean to Glenn Lake outflow
Stream is very marginal fish habitat, especially for char.
No spawning habitat although char could migrate from ocean

Banks of Channel (Stability): H = highly stable, S = stable, U = unstable

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID: Glenn O/F1
Survey Distance (m): 200
Survey Date (d/m/y): 31-Jul-09
Survey Crew: EG/JK
Time:
Coordinates: 431756 7563960
Coordinates: 431548 7563557

Temperature (°C):
Channel Velocity (m/s):
Current Flow Conditions:
Discharge estimate (m^3/s):
Transparency: clear
Conductivity (µS/cm):
pH:

Comments:
S3 - fish bearing, 1.5-5m

Weather:
cool, clear, sunny

Hab Unit No.	Hab Type	Dist. fr start (m)	Length (m)	Slope (%)	Depth (m) Mean	Depth (m) Bank-full	Width (m) Mean	Width (m) Bank-full	Bed Material Fines (%)	Sand (%)	Gravel (%)	Cobble (%)	Boulder (%)	Bedrock (%)	Pool Info Type	Pool Depth (m) Max	Pool Depth (m) Crest	Fish Passage Barriers Type	T/P
1	R	0	50	0	0.25	0.75	3	5		70	20	10						N	
2	P	50	10	0	0.50	>1	8	10		60	20	20						N	
3	R	60	140	<2	0.50	>1	4	5		70	5	20	5					N	
4	R	140	60	<2	0.50	>1	4	5		100								N	
5	R	200	500	0	0.30	>1	3	5		75	5	10	10					N	
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			
18																			
19																			
20																			

Flow Conditions: H = High flow, M = Medium flow, L = Low flow
Habitat Unit: Under bankfull conditions: 0 - 2.5 m = > 1 m^2, 2.5 - 5 m = > 2 m^2, 5 - 10 m = > 4 m^2, 10 -15 m = > 6 m^2, 15 -20 = > 8 m^2, > 20 m = > 10 m^2
Hab Type: P = pool, G = glide, R = riffle, C = cascade, O = other
Dist. fr start: distance from beginning of the survey to the beginning of the habitat unit being surveyed
Pool Type: S = scour, D = dammed, U = unknown
Substrate: Sand (silt, clay, fine organic< 2 mm), Gravel (2 - 64 mm), Cobble (64 - 256 mm), Boulders (256 - 4000 mm), Bedrock (>4000 mm)
Fish Passage Barriers: IF = Impassible waterfall
BF = Boulder Field, passage through the boulder arrangement is not possible for fish
D = dry channel, no stream flow
NC = no distinct channel, water drains over land
N = no barrier to fish passage through the habitat unit
T/P: T = temporary, portion of open water season
P = Permanent, all year round

Overall Rating

Spawning: good/fair **Rearing:** poor **Adult Feeding:** poor **Over-wintering:** none **Migration:** good

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID:	Glenn O/F1
Survey Date:	July 31/09
Survey Crew:	EG/JK
Survey Distance (m):	200

Hab Unit No.	Banks of Channel: L Bank Height (m)	Banks of Channel: R Bank Height (m)	Banks of Channel: L Bank Stab	Banks of Channel: R Bank Stab	Instream Cover: Pool %	Instream Cover: Boulder %	Instream Cover: Instream Veg %	Instream Cover: Overhang Veg %	Instream Cover: Undercut Bank %	Instream Cover: LWD %	Instream Cover: SWD %	Riparian Cover (%): Canopy	Riparian Cover (%): LB	Riparian Cover (%): RB	Photos (Role #) (Photo #)
1	>1	>1	mucky but stable												1333-1334
2	>1	>1	mucky but stable		100										
3	>1	>1	mucky but stable												
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															

Comments:

Banks of Channel (Stability): H = highly stable, S = stable, U = unstable

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID:	Glenn O/F2	Survey Date (d/m/y):	28-Jun-09	Coordinates: Start	Coordinates:
Survey Distance (m):	200	Survey Crew:	KE/TR		
		Time:	13:00	431154 7563342	

Temperature (°C):	5	Transparency:	Very Turbid	Comments: Cannot see bottom of stream; banks are all mud.
Channel Velocity (m/s):	-	Conductivity (µS/cm):	104	
Current Flow Conditions:	Freshet	pH:	8.2	Weather: Partly Cloudy, sunny, windy
Discharge estimate (m³/s):	-			

Hab Unit No.	Hab Type	Dist. fr start (m)	Length (m)	Slope (%)	Depth (m) Mean	Depth (m) Bank-full	Width (m) Mean	Width (m) Bank-full	Fines (%)	Sand (%)	Gravel (%)	Cobble (%)	Boulder (%)	Bedrock (%)	Pool Info Type	Pool Depth (m) Max	Pool Depth (m) Crest	Fish Passage Barriers Type	T/P
1	G	0	200+	1-2	~ 0.75	~ 1.05	3	8	100						-	-	-	-	-
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
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13																			
14																			
15																			
16																			
17																			
18																			
19																			
20																			

Flow Conditions: H = High flow, M = Medium flow, L = Low flow
Habitat Unit: Under bankfull conditions: 0 - 2.5 m = > 1 m², 2.5 - 5 m = > 2 m², 5 - 10 m = > 4 m², 10 -15 m = > 6 m², 15 -20 = > 8 m², > 20 m = > 10 m²
Hab Type: P = pool, G = glide, R = riffle, C = cascade, O = other
Dist. fr start: distance from beginning of the survey to the beginning of the habitat unit being surveyed
Pool Type: S = scour, D = dammed, U = unknown
Substrate: Sand (silt, clay, fine organic< 2 mm), Gravel (2 - 64 mm), Cobble (64 - 256 mm), Boulders (256 - 4000 mm), Bedrock (>4000 mm)
Fish Passage Barriers: IF = Impassible waterfall
BF = Boulder Field, passage through the boulder arrangement is not possible for fish
D = dry channel, no stream flow
NC = no distinct channel, water drains over land
N = no barrier to fish passage through the habitat unit
T/P: T = temporary, portion of open water season
P = Permanent, all year round

Overall Rating

Spawning: None	Rearing: F	Adult Feeding: Poor	Over-wintering: N/A	Migration: Good
- Stream bed is completely fines (clay/silt) substrate	- Good depth with limited cover for juvenile fish	- Very poor water clarity - No cover		- No obstructions

Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheet Used to Assess Fish Habitat in the Hope Bay Project Area, 2009 (completed)

Station ID: Glenn O/F2
Survey Date: 28-Jun-09
Survey Crew: TR/KE
Survey Distance (m):

Hab Unit No.	Banks of Channel: L Bank Height (m)	R Bank Height (m)	L Bank Stab	R Bank Stab	Instream Cover: Pool %	Boulder %	Instream Veg %	Overhang Veg %	Undercut Bank %	LWD %	SWD %	Riparian Cover (%): Canopy	LB	RB	Photos (Role #) (Photo #)
1	1.05	1.05	H	H			10		10			-	-	-	
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															

Comments:
Photos: 342-350
Site assessed as stream crossing location for proposed infrastructure road.

Banks of Channel (Stability): H = highly stable, S = stable, U = unstable

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID: Windy O/F1	Survey Date (d/m/y): 28-Jun-09	Coordinates: Start 431405 7555594	Coordinates: End 431371 7555484
Survey Distance (m):	Survey Crew: KE/TR		
	Time: 10:09		
Temperature (°C): 3.3	Transparency: Clear	Comments:	
Channel Velocity (m/s): -	Conductivity (µS/cm): 90		
Current Flow Conditions: Freshet - Fast	pH: 8.2	Weather: Windy	
Discharge estimate (m³/s): -			

Hab Unit No.	Hab Type	Dist. fr start (m)	Length (m)	Slope (%)	Depth (m) Mean	Depth (m) Bank-full	Width (m) Mean	Width (m) Bank-full	Bed Material Fines (%)	Sand (%)	Gravel (%)	Cobble (%)	Boulder (%)	Bedrock (%)	Pool Info Type	Pool Depth (m) Max	Pool Depth (m) Crest	Fish Passage Barriers Type	T/P
1	R	0	13.1	1-2	0.37	0.47	5.8	5.8	30		30	20	20		-	-	-	-	-
2	G	13.1	35.0	1-2	0.75	0.95	12.0	20.0	90 (silt)			10			-	-	-	-	-
3	R	48.1	12.0	1-2	0.63	0.85	3.7	4.3	80		10	5	5		-	-	-	-	-
4	P	60.1	8.2	1	>1.0	>1.2	8.0	8.0	95 (silt)		5				S	>1.0	0.39	-	-
5	G	69.0	62+	1	0.60	0.90	4.0	8.0	90	5	5				-	-	-	-	-
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			
18																			
19																			
20																			

Flow Conditions: H = High flow, M = Medium flow, L = Low flow
Habitat Unit: Under bankfull conditions: 0 - 2.5 m = > 1 m², 2.5 - 5 m = > 2 m², 5 - 10 m = > 4 m², 10 -15 m = > 6 m², 15 -20 = > 8 m², > 20 m = > 10 m²
Hab Type: P = pool, G = glide, R = riffle, C = cascade, O = other
Dist. fr start: distance from beginning of the survey to the beginning of the habitat unit being surveyed
Pool Type: S = scour, D = dammed, U = unknown
Substrate: Sand (silt, clay, fine organic< 2 mm), Gravel (2 - 64 mm), Cobble (64 - 256 mm), Boulders (256 - 4000 mm), Bedrock (>4000 mm)
Fish Passage Barriers: IF = Impassible waterfall
BF = Boulder Field, passage through the boulder arrangement is not possible for fish
D = dry channel, no stream flow
NC = no distinct channel, water drains over land
N = no barrier to fish passage through the habitat unit
T/P: T = temporary, portion of open water season
P = Permanent, all year round

Overall Rating

Spawning: Poor
- Few areas of gravel substrate
- Predominately fine/organic substrate

Rearing: Good
- Good cover for juvenile fish

Adult Feeding: Good

Over-wintering: N/A

Migration: Good
- No barriers from outlow of Windy Lake to end of site

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID:	Windy O/F1
Survey Date:	28-Jun-09
Survey Crew:	KE/TR
Survey Distance (m):	

Hab Unit No.	Banks of Channel L Bank Height (m)	R Bank Height (m)	L Bank Stab	R Bank Stab	Instream Cover Pool %	Boulder %	Instream Veg %	Overhang Veg %	Undercut Bank %	LWD %	SWD %	Riparian Cover (%) Canopy	LB	RB	Photos (Role #) (Photo #)
1	0.47	0.47	H	H		20	30	5				-	-	5	
2	0.95	0.95	H	H			90					-	-	-	
3	0.85	0.85	H	H			80	5	5			-	-	5	
4	>1.2	>1.2	H	H			90		5			-	-	-	
5	0.85	0.85	H	H			90					-	-	-	
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															

Comments:
Photos: 337 to 342
fines=organics

Banks of Channel (Stability): H = highly stable, S = stable, U = unstable

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID: Windy O/F
Survey Distance (m): 300m
Survey Date (d/m/y): July 28/09
Survey Crew: EG/JK
Time:

Coordinates: 431444 7555566
Coordinates: 431410 7555417

Temperature (°C):
Channel Velocity (m/s):
Current Flow Conditions:
Discharge estimate (m^3/s):
Transparency: clear
Conductivity (µS/cm):
pH:

Comments:
S5 - fish bearing (LKTR), <3m

Weather:
cool, overcast, windy

Hab Unit No.	Hab Type	Dist. fr start (m)	Length (m)	Slope (%)	Depth (m) Mean	Depth (m) Bank-full	Width (m) Mean	Width (m) Bank-full	Bed Material Fines (%)	Sand (%)	Gravel (%)	Cobble (%)	Boulder (%)	Bedrock (%)	Pool Info Type	Pool Depth (m) Max	Pool Depth (m) Crest	Fish Passage Barriers Type	T/P
1	R/G	0	300	0	0.75	1.50	2	4.5	100									N	
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			
18																			
19																			
20																			

Flow Conditions: H = High flow, M = Medium flow, L = Low flow
Habitat Unit: Under bankfull conditions: 0 - 2.5 m = > 1 m^2, 2.5 - 5 m = > 2 m^2, 5 - 10 m = > 4 m^2, 10 -15 m = > 6 m^2, 15 -20 = > 8 m^2, > 20 m = > 10 m^2
Hab Type: P = pool, G = glide, R = riffle, C = cascade, O = other
Dist. fr start: distance from beginning of the survey to the beginning of the habitat unit being surveyed
Pool Type: S = scour, D = dammed, U = unknown
Substrate: Sand (silt, clay, fine organic< 2 mm), Gravel (2 - 64 mm), Cobble (64 - 256 mm), Boulders (256 - 4000 mm), Bedrock (>4000 mm)
Fish Passage Barriers: IF = Impassible waterfall
BF = Boulder Field, passage through the boulder arrangement is not possible for fish
D = dry channel, no stream flow
NC = no distinct channel, water drains over land
N = no barrier to fish passage through the habitat unit
T/P: T = temporary, portion of open water season
P = Permanent, all year round

Overall Rating

Spawning: Poor **Rearing:** Fair **Adult Feeding:** Poor **Over-wintering:** na **Migration:** good

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID:	Windy O/F
Survey Date:	28-Jul-09
Survey Crew:	EG/JK
Survey Distance (m):	300m

Hab Unit No.	Banks of Channel				Instream Cover							Riparian Cover (%)			Photos (Role #) (Photo #)
	L Bank Height (m)	R Bank Height (m)	L Bank Stab	R Bank Stab	Pool %	Boulder %	Instream Veg %	Overhang Veg %	Undercut Bank %	LWD %	SWD %	Canopy	LB	RB	
1	<0.5	<0.5	Stab	Stab			90								1273-1279
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															

Comments:

1273 - facing d/s at start of shocking
1274 - facing u/s towards Windy L
1275 - pretty yellow flowers along shore
1276 - lake trout released after sampling
1277 - facing d/s
1279 - facing d/s at end of shocking
*very turbid once disturbed, lots of instream veg, no gravel or cobble

Banks of Channel (Stability): H = highly stable, S = stable, U = unstable

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID:	Windy I/F	Survey Date (d/m/y):	2-Jul-09
Survey Distance (m):	200	Survey Crew:	KE/TB
		Time:	13:08

Coordinates: Downstream 432218 7549585

Coordinates: Upstream 432119 7549448

Temperature (°C):	15.4	Transparency:	Clear
Channel Velocity (m/s):	-	Conductivity (µS/cm):	192
Current Flow Conditions:	Freshet	pH:	7.7
Discharge estimate (m³/s):	-		

Comments: Fish bearing, wetland - not true channalized stream

Weather:

Hab Unit No.	Hab Type	Dist. fr start (m)	Length (m)	Slope (%)	Depth (m) Mean	Depth (m) Bank-full	Width (m) Mean	Width (m) Bank-full	Bed Material Fines (%)	Sand (%)	Gravel (%)	Cobble (%)	Boulder (%)	Bedrock (%)	Pool Info Type	Pool Depth (m) Max	Pool Depth (m) Crest	Fish Passage Barriers Type	T/P
1	O*	0	150	1	0.17	0.32	1.0	13.12	100						-	-	-	-	-
2	F	151	49	1	0.25	0.30	4.1	15.2	100						-	-	-	-	-
3	O*																		
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			
18																			
19																			
20																			

Flow Conditions: H = High flow, M = Medium flow, L = Low flow
Habitat Unit: Under bankfull conditions: 0 - 2.5 m = > 1 m², 2.5 - 5 m = > 2 m², 5 - 10 m = > 4 m², 10 -15 m = > 6 m², 15 -20 = > 8 m², > 20 m = > 10 m²
Hab Type: P = pool, G = glide, R = riffle, C = cascade, O = other
Dist. fr start: distance from beginning of the survey to the beginning of the habitat unit being surveyed
Pool Type: S = scour, D = dammed, U = unknown
Substrate: Sand (silt, clay, fine organic< 2 mm), Gravel (2 - 64 mm), Cobble (64 - 256 mm), Boulders (256 - 4000 mm), Bedrock (>4000 mm)
Fish Passage Barriers: IF = Impassible waterfall
BF = Boulder Field, passage through the boulder arrangement is not possible for fish
D = dry channel, no stream flow
NC = no distinct channel, water drains over land
N = no barrier to fish passage through the habitat unit
T/P: T = temporary, portion of open water season
P = Permanent, all year round
O* = Wetland

Overall Rating

Spawning: Poor
- Absence of rock/sand substrate
- 100% organic substrate
- Potential for SLSC spawning

Rearing: Good
- Good rearing conditions for SLSC
- Abundant instream/aquatic vegetation

Adult Feeding: Poor
- Very Shallow

Over-wintering: N/A

Migration: Fair
- Stream channel is relatively shallow and choked with vegetation in some locations

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID:	Windy I/F
Survey Date:	2-Jul-09
Survey Crew:	KE/TB
Survey Distance (m):	200

Hab Unit No.	Banks of Channel				Instream Cover							Riparian Cover (%)			Photos (Role #) (Photo #)
	L Bank Height (m)	R Bank Height (m)	L Bank Stab	R Bank Stab	Pool %	Boulder %	Instream Veg %	Overhang Veg %	Undercut Bank %	LWD %	SWD %	Canopy	LB	RB	
1	0.15	0.15	H	H	-	-	100	-	-	-	-	-	-	-	
2	0.15	0.15	H	H	-	-	100	-	-	-	-	-	-	-	
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															

Comments:
Photo: 479-485
Overall Habitat Quality = Important
Numerous SLSC observed in shallow wetland areas of stream site
Abundance of submergent and emergent aquatic vegetation, suggesting the stream is permanent
Return for electrofishing in summer to assess fish community/species

Banks of Channel (Stability): H = highly stable, S = stable, U = unstable

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID:	Glenn I/F	Survey Date (d/m/y):	1-Jul-09	Coordinates:	Coordinates:
Survey Distance (m):	200	Survey Crew:	KE/TR	Start (d/s)	End (u/s)
		Time:	8:42	431028 7559547	431113 7559888

Comments:
Assessed due to location near proposed tailings area east of Glenn Lake

Temperature (°C):	8.4	Transparency:	Clear
Channel Velocity (m/s):	-	Conductivity (µS/cm):	99
Current Flow Conditions:	Freshet	pH:	7.73
Discharge estimate (m^3/s):	-		

Weather:

Hab Unit No.	Hab Type	Dist. fr start (m)	Length (m)	Slope (%)	Depth (m) Mean	Depth (m) Bank-full	Width (m) Mean	Width (m) Bank-full	Bed Material Fines (%)	Sand (%)	Gravel (%)	Cobble (%)	Boulder (%)	Bedrock (%)	Pool Info Type	Pool Depth (m) Max	Pool Depth (m) Crest	Fish Passage Barriers Type	T/P
1	G	0	45	1	0.20	0.45	7.1	11.1	100						-	-	-	-	-
2	R	46	3	2	0.15	0.40	1.0	1.0	100						-	-	-	-	-
3	G	50	27	1	0.18	0.43	8.3	14.5	100						-	-	-	-	-
4	R	78	4	2	0.15	0.40	2.5	2.7	100						-	-	-	-	-
5	G	83	14	1	0.20	0.70	4.4	4.6	100						-	-	-	-	-
6	R	98	3	2	0.11	0.37	0.3	0.3	100						-	-	-	-	-
7	G	101	99	1	0.18	0.38	7.2	8.3	100						-	-	-	-	-
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			
18																			
19																			
20																			

Flow Conditions:	H = High flow, M = Medium flow, L = Low flow
Habitat Unit:	Under bankfull conditions: 0 - 2.5 m = > 1 m^2, 2.5 - 5 m = > 2 m^2, 5 - 10 m = > 4 m^2, 10 -15 m = > 6 m^2, 15 -20 = > 8 m^2, > 20 m = > 10 m^2
Hab Type:	P = pool, G = glide, R = riffle, C = cascade, O = other
Dist. fr start:	distance from beginning of the survey to the beginning of the habitat unit being surveyed
Pool Type:	S = scour, D = dammed, U = unknown
Substrate:	Sand (silt, clay, fine organic< 2 mm), Gravel (2 - 64 mm), Cobble (64 - 256 mm), Boulders (256 - 4000 mm), Bedrock (>4000 mm)
Fish Passage Barriers:	IF = Impassible waterfall
	BF = Boulder Field, passage through the boulder arrangement is not possible for fish
	D = dry channel, no stream flow
	NC = no distinct channel, water drains over land
	N = no barrier to fish passage through the habitat unit
T/P:	T = temporary, portion of open water season
	P = Permanent, all year round

Overall Rating

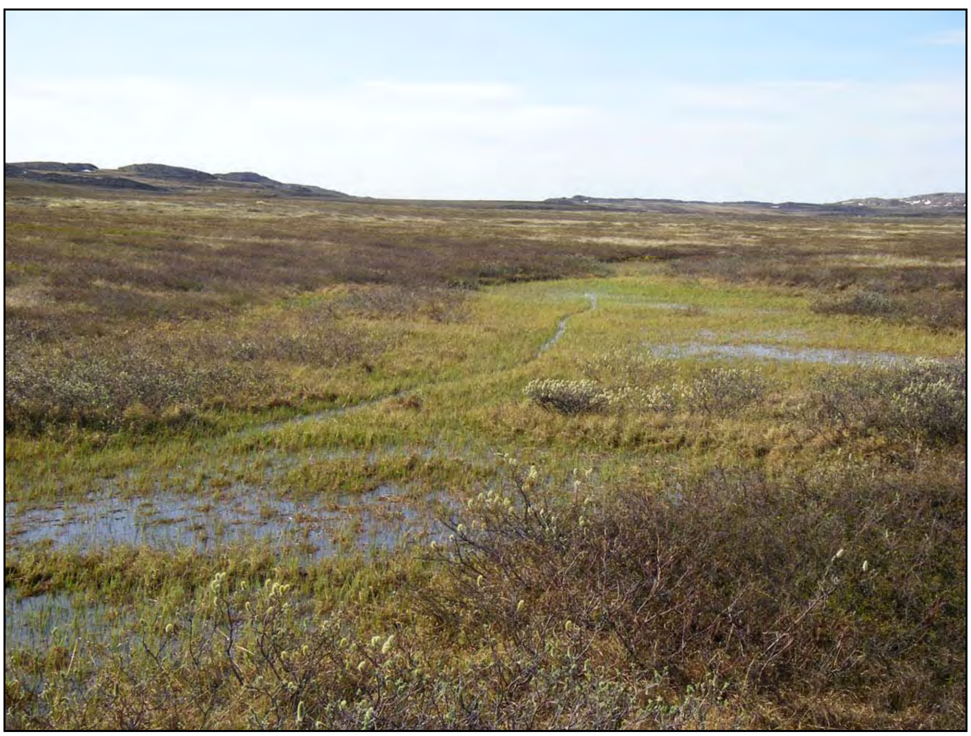
Spawning: None	**Rearing:** None	**Adult Feeding:** None	**Over-wintering:** N/A	**Migration:** Poor
- No rock substrates	- No depth			- Very shallow, narrow
	- No pools for cover			- Heavy vegetation

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID: Glenn I/F
Survey Date: 1-Jul-09
Survey Crew: KE/TR
Survey Distance (m): 200

Hab Unit No.	Banks of Channel: L Bank Height (m)	Banks of Channel: R Bank Height (m)	Banks of Channel: L Bank Stab	Banks of Channel: R Bank Stab	Instream Cover: Pool %	Instream Cover: Boulder %	Instream Cover: Instream Veg %	Instream Cover: Overhang Veg %	Instream Cover: Undercut Bank %	Instream Cover: LWD %	Instream Cover: SWD %	Riparian Cover (%): Canopy	Riparian Cover (%): LB	Riparian Cover (%): RB	Photos (Role #) (Photo #)
1	0.45	0.45	H	H			90	10				-	10	-	
2	0.25	0.25	H	H			95	5				-	5	-	
3	0.25	0.25	H	H			95	5				-	-	5	
4	0.25	0.25	H	H			85	15				-	10	5	
5	0.45	0.45	H	H			90	10				-	-	10	
6	0.25	0.25	H	H			75	25				-	25	-	
7	0.20	0.20	H	H			95	5				-	2.5	2.5	
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															

Comments:
Photos: 452-457
Overall habitat quality: Marginal to no fish habitat
Re-evaluate in summer to confirm quality



Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID: Ref A O/F
Survey Distance (m): 49
left upstream branch

Survey Date (d/m/y): July 28/09
Survey Crew: EG/JK
Time: 8:39

Coordinates: 448509 7561825

Coordinates: 448502 7561748

Temperature (°C): -
Channel Velocity (m/s): -
Current Flow Conditions: -
Discharge estimate (m^3/s): -

Transparency: clear
Conductivity (µS/cm): -
pH: -

Comments:
S2-S3 fishbearing (LKTR, SLSC), 1.5-5m

Weather:
overcast, cool, clear, no precip

Hab Unit No.	Hab Type	Dist. fr start (m)	Length (m)	Slope (%)	Depth (m) Mean	Depth (m) Bank-full	Width (m) Mean	Width (m) Bank-full	Bed Material Fines (%)	Bed Material Sand (%)	Bed Material Gravel (%)	Bed Material Cobble (%)	Bed Material Boulder (%)	Bed Material Bedrock (%)	Pool Info Type	Pool Info Depth (m) Max	Pool Info Depth (m) Crest	Fish Passage Barriers Type	Fish Passage Barriers T/P
1	R	0	12	10	0.10	0.17	0.5	5			5	45	40	10				D	P
2	P	13	4	10	0.20	0.50	3.0	6				10	80	10					
3	R	18	49	10	0.20	0.33	1.5	4				25	65	10					
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			
18																			
19																			
20																			

Flow Conditions: H = High flow, M = Medium flow, L = Low flow
Habitat Unit: Under bankfull conditions: 0 - 2.5 m = > 1 m^2, 2.5 - 5 m = > 2 m^2, 5 - 10 m = > 4 m^2, 10 -15 m = > 6 m^2, 15 -20 = > 8 m^2, > 20 m = > 10 m^2
Hab Type: P = pool, G = glide, R = riffle, C = cascade, O = other
Dist. fr start: distance from beginning of the survey to the beginning of the habitat unit being surveyed
Pool Type: S = scour, D = dammed, U = unknown
Substrate: Sand (silt, clay, fine organic< 2 mm), Gravel (2 - 64 mm), Cobble (64 - 256 mm), Boulders (256 - 4000 mm), Bedrock (>4000 mm)
Fish Passage Barriers: IF = Impassible waterfall
BF = Boulder Field, passage through the boulder arrangement is not possible for fish
D = dry channel, no stream flow
NC = no distinct channel, water drains over land
N = no barrier to fish passage through the habitat unit
T/P: T = temporary, portion of open water season
P = Permanent, all year round

Overall Rating

Spawning: fair-good **Rearing:** good **Adult Feeding:** fair **Over-wintering:** none **Migration:** fair

Station ID:	Ref A O/F	left upstream branch
Survey Date:	July 28/09	
Survey Crew:	EG/JK	
Survey Distance (m):	49m	

Hab Unit No.	Banks of Channel				Instream Cover							Riparian Cover (%)			Photos (Role #) (Photo #)
	L Bank Height (m)	R Bank Height (m)	L Bank Stab	R Bank Stab	Pool %	Boulder %	Instream Veg %	Overhang Veg %	Undercut Bank %	LWD %	SWD %	Canopy	LB	RB	
1	<1	<1	Stab	Stab	0	70									1241 - bottom of outflow
2	<1	<1	Stab	Stab	100	60									1242 - right upstream branch
3	<1	<1	Stab	Stab	0	75									1243-1244 - left upstream bank
4															1246-1247 - boulder field
5															1248 - pool
6															1249 - right upsteam branch
7															1250 - left upstream riffle
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															

Comments:

Banks of Channel (Stability): H = highly stable, S = stable, U = unstable

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID: Ref A O/F
Survey Distance (m): 200 m
right upstream branch

Survey Date (d/m/y): July 28-09
Survey Crew: EG/JK
Time: 9:00

Coordinates: 448484 7561740

Coordinates:

Temperature (°C): -
Channel Velocity (m/s): -
Current Flow Conditions: -
Discharge estimate (m^3/s): -

Transparency: clear
Conductivity (µS/cm): -
pH: -

Comments:
S2-S3 - fish bearing: LKTR and SLSC

Weather:
cool, overcast, no precip

Hab Unit No.	Hab Type	Dist. fr start (m)	Length (m)	Slope (%)	Depth (m) Mean	Depth (m) Bank-full	Width (m) Mean	Width (m) Bank-full	Bed Material Fines (%)	Sand (%)	Gravel (%)	Cobble (%)	Boulder (%)	Bedrock (%)	Pool Info Type	Pool Depth (m) Max	Pool Depth (m) Crest	Fish Passage Barriers Type	T/P
1	R	0	25	15	0.10	0.20	8-10	25					75	20	none			none	
2	R	25	12	<10	0.20	0.50	4	10			5	20	55	20	none			none	
3	P	37	3	<10	0.20	0.50	2	4				20	60	20	none			none	
4	R	40	15	<10	<0.1	0.25	7	10				20	60	20	none			none	
5	C	55	2.5	15-20	<0.2	0.50	4	4					80	20	none			none	
6	R	58	10	10	<0.2	0.50	2	4.5				40	40	20	none			none	
7																			
8																			
9																			
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13																			
14																			
15																			
16																			
17																			
18																			
19																			
20																			

Flow Conditions: H = High flow, M = Medium flow, L = Low flow
Habitat Unit: Under bankfull conditions: 0 - 2.5 m = > 1 m^2, 2.5 - 5 m = > 2 m^2, 5 - 10 m = > 4 m^2, 10 -15 m = > 6 m^2, 15 -20 = > 8 m^2, > 20 m = > 10 m^2
Hab Type: P = pool, G = glide, R = riffle, C = cascade, O = other
Dist. fr start: distance from beginning of the survey to the beginning of the habitat unit being surveyed
Pool Type: S = scour, D = dammed, U = unknown
Substrate: Sand (silt, clay, fine organic< 2 mm), Gravel (2 - 64 mm), Cobble (64 - 256 mm), Boulders (256 - 4000 mm), Bedrock (>4000 mm)
Fish Passage Barriers: IF = Impassible waterfall
BF = Boulder Field, passage through the boulder arrangement is not possible for fish
D = dry channel, no stream flow
NC = no distinct channel, water drains over land
N = no barrier to fish passage through the habitat unit
T/P: T = temporary, portion of open water season
P = Permanent, all year round

Overall Rating

Spawning: good **Rearing:** fair **Adult Feeding:** good **Over-wintering:** NA **Migration:** fair

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID: Ref A O/F — right upstream branch
Survey Date: July 28/09
Survey Crew: EG/JK
Survey Distance (m): 200m

Hab Unit No.	Banks of Channel: L Bank Height (m)	R Bank Height (m)	L Bank Stab	R Bank Stab	Instream Cover: Pool %	Boulder %	Instream Veg %	Overhang Veg %	Undercut Bank %	LWD %	SWD %	Riparian Cover (%): Canopy	LB	RB	Photos (Role #) (Photo #)
1	<1	<1	Stab	Stab	0	high 50-100%									1241-1242
2	<1	<1	Stab	Stab	0	high 50-100%									1246-47
3	<1	<1	Stab	Stab	100	high 50-100%									1249
4	<1	<1	Stab	Stab	0	high 50-100%									
5	<1	<1	Stab	Stab	0	high 50-100%									
6	<1	<1	Stab	Stab	0	high 50-100%									
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															

Comments:

Banks of Channel (Stability): H = highly stable, S = stable, U = unstable

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID: Ref B O/F
Survey Distance (m): 200 m
Survey Date (d/m/y): 29/06/2009
Survey Crew: TR/KE
Time: 14:06
Coordinates: Start 427170 7530483
Coordinates:

Temperature (°C): 4.3
Channel Velocity (m/s): -
Current Flow Conditions: Fast (Freshet)
Discharge estimate (m^3/s): -
Transparency: clear
Conductivity (µS/cm): 49
pH: 8.07
Comments: Wide river
Weather: cloudy

Hab Unit No.	Hab Type	Dist. fr start (m)	Length (m)	Slope (%)	Depth (m) Mean	Depth (m) Bank-full	Width (m) Mean	Width (m) Bank-full	Bed Material Fines (%)	Sand (%)	Gravel (%)	Cobble (%)	Boulder (%)	Bedrock (%)	Pool Info Type	Pool Depth (m) Max	Pool Depth (m) Crest	Fish Passage Barriers Type	T/P
1	P	0	25	1	1.50	2.00	23	32				25	60	15	0	1.5	0.5		
2	R	25	37	1 - 2	0.36	0.76	41	41				40	40	20					
3	C	62	32	2 - 3	0.25	0.25	31	31					85	15					
4	G	94	44	1	0.30	0.50	52	52				20	60	20					
5	R	138	62	1 - 2	0.30	0.50	55	55				50	40	10					
6																			
7																			
8																			
9																			
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13																			
14																			
15																			
16																			
17																			
18																			
19																			
20																			

Flow Conditions: H = High flow, M = Medium flow, L = Low flow
Habitat Unit: Under bankfull conditions: 0 - 2.5 m = > 1 m^2, 2.5 - 5 m = > 2 m^2, 5 - 10 m = > 4 m^2, 10 -15 m = > 6 m^2, 15 -20 = > 8 m^2, > 20 m = > 10 m^2
Hab Type: P = pool, G = glide, R = riffle, C = cascade, O = other
Dist. fr start: distance from beginning of the survey to the beginning of the habitat unit being surveyed
Pool Type: S = scour, D = dammed, U = unknown
Substrate: Sand (silt, clay, fine organic< 2 mm), Gravel (2 - 64 mm), Cobble (64 - 256 mm), Boulders (256 - 4000 mm), Bedrock (>4000 mm)
Fish Passage Barriers: IF = Impassible waterfall
BF = Boulder Field, passage through the boulder arrangement is not possible for fish
D = dry channel, no stream flow
NC = no distinct channel, water drains over land
N = no barrier to fish passage through the habitat unit
T/P: T = temporary, portion of open water season
P = Permanent, all year round

Overall Rating

Spawning: Poor
- generally large substrate
- no gravel substrate observed

Rearing: Fair
- good depth and flow, but stream lacks cover

Adult Feeding: Fair

Over-wintering: N/A

Migration: Fair
- some shallow cascade sections, fair connection for stream dwelling fish

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID:	Ref B O/F
Survey Date:	29-Jun-09
Survey Crew:	KE/TR
Survey Distance (m):	200 m

Hab Unit No.	Banks of Channel: L Bank Height (m)	R Bank Height (m)	L Bank Stab	R Bank Stab	Instream Cover: Pool %	Boulder %	Instream Veg %	Overhang Veg %	Undercut Bank %	LWD %	SWD %	Riparian Cover (%): Canopy	LB	RB	Photos (Role #) (Photo #)
1	1.50	1.50	H	H	40	50									
2	0.76	0.76	H	H		40									
3	0.25	0.25	H	H		85									
4	0.50	0.50	H	H		60									
5	0.50	0.50	H	H		50									
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															

Comments:
Photos 392 to 396
Overall habitat quality = important.
No wading in this fast moving stream.

Banks of Channel (Stability): H = highly stable, S = stable, U = unstable

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID:	Ref B O/F	Survey Date (d/m/y):	25-Jul-09	Coordinates:		
Survey Distance (m):	200	Survey Crew:	EG/JK	427140 7530403 d/s start	Coordinates:	427083 7530373 u/s start
		Time:	10:56	427141 7530567 d/s end		426997 7530296 u/s end

Temperature (°C):		Transparency:	very clear	Comments: S1 - grayling caught, >20m channel width
Channel Velocity (m/s):		Conductivity (µS/cm):		
Current Flow Conditions:	fast!	pH:		Weather: cool, cloudy, light wind
Discharge estimate (m³/s):				

Hab Unit No.	Hab Type	Dist. fr start (m)	Length (m)	Slope (%)	Depth (m) Mean	Depth (m) Bank-full	Width (m) Mean	Width (m) Bank-full	Bed Material Fines (%)	Sand (%)	Gravel (%)	Cobble (%)	Boulder (%)	Bedrock (%)	Pool Info Type	Pool Depth (m) Max	Pool Depth (m) Crest	Fish Passage Barriers Type	T/P
1	R	0	64	<5	0.25	-	20	31	0	0	0	0	55	45	0	0	0	0	0
2	R	104	40	<5	0.25	-	10	22	0	0	0	5	50	45	0	0	0	0	0
3	G	124	20	<5	0.20	-	15	36	0	15	15	25	45	20	0	0	0	0	0
4	R	0	70	<5	0.25	-	22	31	0	0	0	10	45	45	0	0	0	0	0
5	C	70	5	<5	0.25	-	2	-	0	0	0	10	50	40	0	0	0	0	0
6	R	75	65	<5	0.25	-	45	60	0		15	10	40	35	0	0	0	0	0
7	P	140	5	<5	0.75	-	2	-	0	0	5	20	40	35	0	0	0	0	0
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			
18																			
19																			
20																			

Flow Conditions: H = High flow, M = Medium flow, L = Low flow
Habitat Unit: Under bankfull conditions: 0 - 2.5 m = > 1 m², 2.5 - 5 m = > 2 m², 5 - 10 m = > 4 m², 10 -15 m = > 6 m², 15 -20 = > 8 m², > 20 m = > 10 m²
Hab Type: P = pool, G = glide, R = riffle, C = cascade, O = other
Dist. fr start: distance from beginning of the survey to the beginning of the habitat unit being surveyed
Pool Type: S = scour, D = dammed, U = unknown
Substrate: Sand (silt, clay, fine organic< 2 mm), Gravel (2 - 64 mm), Cobble (64 - 256 mm), Boulders (256 - 4000 mm), Bedrock (>4000 mm)
Fish Passage Barriers: IF = Impassible waterfall
BF = Boulder Field, passage through the boulder arrangement is not possible for fish
D = dry channel, no stream flow
NC = no distinct channel, water drains over land
N = no barrier to fish passage through the habitat unit
T/P: T = temporary, portion of open water season
P = Permanent, all year round

Overall Rating

Spawning: Good (gravel) **Rearing:** fair **Adult Feeding:** no (no forage) **Over-wintering:** na **Migration:** Good (no barriers)

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID: Ref B O/F
Survey Date: July 26/09
Survey Crew: EG/JK
Survey Distance (m): 200m

Hab Unit No.	Banks of Channel: L Bank Height (m)	R Bank Height (m)	L Bank Stab	R Bank Stab	Instream Cover: Pool %	Boulder %	Instream Veg %	Overhang Veg %	Undercut Bank %	LWD %	SWD %	Riparian Cover (%): Canopy	LB	RB	Photos (Role #) (Photo #)
1	<0.25	<0.25	Stab	Stab	0	55	0	0	0	0	0	0	0	0	1214-1215
2	<0.25	<0.25	Stab	Stab	0	0	20	0	0	0	0	0	0	0	1216-1219
3	<0.25	<0.25	Stab	Stab	0	40	0	0	0	0	0	0	0	0	
4	<0.25	<0.25	Stab	Stab	0	40	5	0	0	0	0	0	0	0	1220-1226
5	<0.25	<0.25	Stab	Stab	40	40	0	0	0	0	0	0	0	0	
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															

Comments:

Banks of Channel (Stability): H = highly stable, S = stable, U = unstable

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID: Reference C Outflow | Survey Date (d/m/y): 2-Jul-09 | Coordinates: | Coordinates:

Survey Distance (m): | Survey Crew: KE/TR

Time: 11:32 | 421313 7547669

Temperature (°C): N/A | Transparency: Clear | Comments: Too much snow and ice at site/time of survey

Channel Velocity (m/s): - | Conductivity (µS/cm): N/A

Current Flow Conditions: Freshet | pH: N/A | Weather:

Discharge estimate (m^3/s): -

Hab Unit No.	Hab Type	Dist. fr start (m)	Length (m)	Slope (%)	Depth (m) Mean	Depth (m) Bank-full	Width (m) Mean	Width (m) Bank-full	Bed Material Fines (%)	Sand (%)	Gravel (%)	Cobble (%)	Boulder (%)	Bedrock (%)	Pool Info Type	Pool Depth (m) Max	Pool Depth (m) Crest	Fish Passage Barriers Type	T/P
1	C	0	200	2-3	0.40	0.75	6	8				5	20	75	-	-	-	-	-
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			
18																			
19																			
20																			

Flow Conditions: H = High flow, M = Medium flow, L = Low flow

Habitat Unit: Under bankfull conditions: 0 - 2.5 m = > 1 m^2, 2.5 - 5 m = > 2 m^2, 5 - 10 m = > 4 m^2, 10 -15 m = > 6 m^2, 15 -20 = > 8 m^2, > 20 m = > 10 m^2

Hab Type: P = pool, G = glide, R = riffle, C = cascade, O = other

Dist. fr start: distance from beginning of the survey to the beginning of the habitat unit being surveyed

Pool Type: S = scour, D = dammed, U = unknown

Substrate: Sand (silt, clay, fine organic< 2 mm), Gravel (2 - 64 mm), Cobble (64 - 256 mm), Boulders (256 - 4000 mm), Bedrock (>4000 mm)

Fish Passage Barriers: IF = Impassible waterfall
BF = Boulder Field, passage through the boulder arrangement is not possible for fish
D = dry channel, no stream flow
NC = no distinct channel, water drains over land
N = no barrier to fish passage through the habitat unit

T/P: T = temporary, portion of open water season
P = Permanent, all year round

Overall Rating

Spawning: Poor
- Predominately bedrock and coarse substrate

Rearing: Poor
- No pools
- Mainly fast flowing

Adult Feeding: Poor

Over-wintering: N/A

Migration: Fair
- Some small, fast flowing cascades
- No barriers observed

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID: Reference C Outflow
Survey Date: 2-Jul-09
Survey Crew: KE/TR
Survey Distance (m): 200

Hab Unit No.	Banks of Channel: L Bank Height (m)	R Bank Height (m)	L Bank Stab	R Bank Stab	Instream Cover: Pool %	Boulder %	Instream Veg %	Overhang Veg %	Undercut Bank %	LWD %	SWD %	Riparian Cover (%): Canopy	LB	RB	Photos (Role #) (Photo #)
1	0.35	0.35	H	H		20						-	-	-	
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															

Comments:
Photos: 476-47 (d/s, xs, u/s)
Overall habitat quality: Marginal
Must re-assess for FHAP in summer
Too much snow at time of survey to access river bank/stream bed

Banks of Channel (Stability): H = highly stable, S = stable, U = unstable

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID:	Angimajug Riv Ref	Survey Date (d/m/y):	2-Jul-09	Coordinates: Downstream	Coordinates: Upstream
Survey Distance (m):	200	Survey Crew:	KE/TR	447496 7563941	447753 7563970
		Time:	9:57		
Temperature (°C):	9.5	Transparency:		Comments: Fish bearing, S1 - Large river classification	
Channel Velocity (m/s):	-	Conductivity (µS/cm):	30.1		
Current Flow Conditions:	-	pH:	8.4	Weather:	
Discharge estimate (m^3/s):	-				

Hab Unit No.	Hab Type	Dist. fr start (m)	Length (m)	Slope (%)	Depth (m) Mean	Depth (m) Bank-full	Width (m) Mean	Width (m) Bank-full	Bed Material Fines (%)	Sand (%)	Gravel (%)	Cobble (%)	Boulder (%)	Bedrock (%)	Pool Info Type	Pool Depth (m) Max	Pool Depth (m) Crest	Fish Passage Barriers Type	T/P
1	R	0	200	2	0.50	1.50	41	137			15	25	60	10	-	-	-	-	-
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			
18																			
19																			
20																			

Flow Conditions: H = High flow, M = Medium flow, L = Low flow
Habitat Unit: Under bankfull conditions: 0 - 2.5 m = > 1 m^2, 2.5 - 5 m = > 2 m^2, 5 - 10 m = > 4 m^2, 10 -15 m = > 6 m^2, 15 -20 = > 8 m^2, > 20 m = > 10 m^2
Hab Type: P = pool, G = glide, R = riffle, C = cascade, O = other
Dist. fr start: distance from beginning of the survey to the beginning of the habitat unit being surveyed
Pool Type: S = scour, D = dammed, U = unknown
Substrate: Sand (silt, clay, fine organic< 2 mm), Gravel (2 - 64 mm), Cobble (64 - 256 mm), Boulders (256 - 4000 mm), Bedrock (>4000 mm)
Fish Passage Barriers: IF = Impassible waterfall
BF = Boulder Field, passage through the boulder arrangement is not possible for fish
D = dry channel, no stream flow
NC = no distinct channel, water drains over land
N = no barrier to fish passage through the habitat unit
T/P: T = temporary, portion of open water season
P = Permanent, all year round

Overall Rating

Spawning: Good	Rearing: Good	Adult Feeding: Good	Over-wintering: N/A	Migration: Good
- Abundance of gravel substrates in side channels - Good amount of gravel subrates for all species	- Abundance of cover for juvenile fish - Pool located downstream	- Good depth and cover for ambush predators	- Possible overwintering habitat downstream in pool	- No barriers at site - Good depth, wide stream channel

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID: Angimajug Riv Ref
Survey Date: 2-Jul-09
Survey Crew: KE/TR
Survey Distance (m): 200

Hab Unit No.	Banks of Channel: L Bank Height (m)	R Bank Height (m)	L Bank Stab	R Bank Stab	Instream Cover: Pool %	Boulder %	Instream Veg %	Overhang Veg %	Undercut Bank %	LWD %	SWD %	Riparian Cover (%): Canopy	LB	RB	Photos (Role #) (Photo #)
1	0.75	0.75	HS	U		60						-	-	-	
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															

Comments:
Photos: 470-475
Overall habitat classification: Important, possibly critical.
Potential for Arctic char and grayling spawning
Evaluate in summer for presence of Arctic char juveniles.
Inflow stream flowing from southwest of site has potential as spawning habitat.

470- adult burbot dead on shore
471 riffle d/s
472 - x stream
473 - riffle u/s
474 - spawning side channel, gravel substrate
475 - habitat unit d/s

Banks of Channel (Stability): H = highly stable, S = stable, U = unstable

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID: Roberts Bay I/F1 | Survey Date (d/m/y): Aug 1/09 | Coordinates: 432364 7563182 | Coordinates: 432354 7563181

Survey Distance (m): 250 | Survey Crew: EG/CK | Time:

Temperature (°C):
Channel Velocity (m/s):
Current Flow Conditions:
Discharge estimate (m^3/s):

Transparency: clear*
Conductivity (µS/cm):
pH:
*turbid at mouth

Comments:
S3 - fish bearing (1.5-5m)

Weather:
warm, calm

Hab Unit No.	Hab Type	Dist. fr start (m)	Length (m)	Slope (%)	Depth (m) Mean	Depth (m) Bank-full	Width (m) Mean	Width (m) Bank-full	Bed Material Fines (%)	Sand (%)	Gravel (%)	Cobble (%)	Boulder (%)	Bedrock (%)	Pool Info Type	Pool Depth (m) Max	Pool Depth (m) Crest	Fish Passage Barriers Type	T/P
1	R	0	100	<5	0.20	0.40	0.3	2.5	80	10	10							N	
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			
18																			
19																			
20																			

Flow Conditions: H = High flow, M = Medium flow, L = Low flow
Habitat Unit: Under bankfull conditions: 0 - 2.5 m = > 1 m^2, 2.5 - 5 m = > 2 m^2, 5 - 10 m = > 4 m^2, 10 -15 m = > 6 m^2, 15 -20 = > 8 m^2, > 20 m = > 10 m^2
Hab Type: P = pool, G = glide, R = riffle, C = cascade, O = other
Dist. fr start: distance from beginning of the survey to the beginning of the habitat unit being surveyed
Pool Type: S = scour, D = dammed, U = unknown
Substrate: Sand (silt, clay, fine organic< 2 mm), Gravel (2 - 64 mm), Cobble (64 - 256 mm), Boulders (256 - 4000 mm), Bedrock (>4000 mm)
Fish Passage Barriers: IF = Impassible waterfall
BF = Boulder Field, passage through the boulder arrangement is not possible for fish
D = dry channel, no stream flow
NC = no distinct channel, water drains over land
N = no barrier to fish passage through the habitat unit
T/P: T = temporary, portion of open water season
P = Permanent, all year round

Overall Rating

Spawning: fair | **Rearing:** poor | **Adult Feeding:** poor | **Over-wintering:** none | **Migration:** poor

Station ID: Roberts Bay I/F1
Survey Date: Aug 1/09
Survey Crew: EG/CK
Survey Distance (m): 200

Hab Unit No.	Banks of Channel: L Bank Height (m)	Banks of Channel: R Bank Height (m)	Banks of Channel: L Bank Stab	Banks of Channel: R Bank Stab	Instream Cover: Pool %	Instream Cover: Boulder %	Instream Cover: Instream Veg %	Instream Cover: Overhang Veg %	Instream Cover: Undercut Bank %	Instream Cover: LWD %	Instream Cover: SWD %	Riparian Cover (%): Canopy	Riparian Cover (%): LB	Riparian Cover (%): RB	Photos (Role #) (Photo #)
1	<1	<1	Stab	Stab	10	5	10		10						1390-1401
2															
3															
4															
5															
6															
7															
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17															
18															
19															
20															

Comments:

*dries up after this point, spots and pockets of water, but no flow.
*photos walking away from Roberts bay (south)

Banks of Channel (Stability): H = highly stable, S = stable, U = unstable

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID:	Roberts Bay I/F2	Survey Date (d/m/y):	28-Jun-09	Coordinates:	Coordinates:
Survey Distance (m):	200	Survey Crew:	KE/TR		
		Time:	14:49	432000 7562700	

Temperature (°C):	N/A	Transparency:	N/A	Comments: NCD - No fish habitat
Channel Velocity (m/s):	-	Conductivity (µS/cm):	N/A	
Current Flow Conditions:	Freshet/high	pH:	N/A	Weather:
Discharge estimate (m³/s):	-			(no comments)

Hab Unit No.	Hab Type	Dist. fr start (m)	Length (m)	Slope (%)	Depth (m) Mean	Depth (m) Bank-full	Width (m) Mean	Width (m) Bank-full	Bed Material Fines (%)	Sand (%)	Gravel (%)	Cobble (%)	Boulder (%)	Bedrock (%)	Pool Info Type	Pool Depth (m) Max	Pool Depth (m) Crest	Fish Passage Barriers Type	T/P
1	O	0	200	<1	N/A		N/A		N/A						N/A			N/A	
2																			
3																			
4																			
5																			
6																			
7																			
8																			
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19																			
20																			

Flow Conditions:	H = High flow, M = Medium flow, L = Low flow
Habitat Unit:	Under bankfull conditions: 0 - 2.5 m = > 1 m², 2.5 - 5 m = > 2 m², 5 - 10 m = > 4 m², 10 -15 m = > 6 m², 15 -20 = > 8 m², > 20 m = > 10 m²
Hab Type:	P = pool, G = glide, R = riffle, C = cascade, O = other
Dist. fr start:	distance from beginning of the survey to the beginning of the habitat unit being surveyed
Pool Type:	S = scour, D = dammed, U = unknown
Substrate:	Sand (silt, clay, fine organic< 2 mm), Gravel (2 - 64 mm), Cobble (64 - 256 mm), Boulders (256 - 4000 mm), Bedrock (>4000 mm)
Fish Passage Barriers:	IF = Impassible waterfall
	BF = Boulder Field, passage through the boulder arrangement is not possible for fish
	D = dry channel, no stream flow
	NC = no distinct channel, water drains over land
	N = no barrier to fish passage through the habitat unit
T/P:	T = temporary, portion of open water season
	P = Permanent, all year round

Overall Rating

Spawning: None **Rearing:** None **Adult Feeding:** None **Over-wintering:** None **Migration:** None

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID:	Roberts Bay I/F2
Survey Date:	28-Jun-09
Survey Crew:	KE/TR
Survey Distance (m):	200

Hab Unit No.	Banks of Channel L Bank Height (m)	R Bank Height (m)	L Bank Stab	R Bank Stab	Instream Cover Pool %	Boulder %	Instream Veg %	Overhang Veg %	Undercut Bank %	LWD %	SWD %	Riparian Cover (%) Canopy	LB	RB	Photos (Role #) (Photo #)
1	N/A				N/A							N/A			N/A
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															

Comments:
Photos: 360-365
No stream habitat found at road crossing site
Stream habitat from inflow at ocean, then becomes NCD approximately 300 m upstream from outflow
Habitat at defined channel section is marginal, some pools > 1m exist in this section. However, substrate is completely fines and organics (no rock substrate)
Stream becomes NCD/overland flow as the slope increases from the outlet (see NCD location on map)
Above NCD to proposed stream crossing no habitat in stream observed, area is a large wetland

Banks of Channel (Stability): H = highly stable, S = stable, U = unstable

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID: Wolverine I/F
Survey Date (d/m/y): 29-Jun-09
Coordinates: Start 435768 7543745
Coordinates:
Survey Distance (m):
Survey Crew: TR/KE
Time: 13:22

Temperature (°C): 6
Transparency: Clear
Channel Velocity (m/s): -
Conductivity (µS/cm): 181
Current Flow Conditions: Fast, but not far
pH: 7.3
Discharge estimate (m^3/s): -

Comments:
Just a small stream, then marshland (NOT MUCH TO CHARACTERIZE)

Weather:
Cloudy, cool and windy

Hab Unit No.	Hab Type	Dist. fr start (m)	Length (m)	Slope (%)	Depth (m) Mean	Depth (m) Bank-full	Width (m) Mean	Width (m) Bank-full	Bed Material Fines (%)	Sand (%)	Gravel (%)	Cobble (%)	Boulder (%)	Bedrock (%)	Pool Info Type	Pool Depth (m) Max	Pool Depth (m) Crest	Fish Passage Barriers Type	T/P
1										N/A									
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			
18																			
19																			
20																			

Flow Conditions:	H = High flow, M = Medium flow, L = Low flow
Habitat Unit:	Under bankfull conditions: 0 - 2.5 m = > 1 m^2, 2.5 - 5 m = > 2 m^2, 5 - 10 m = > 4 m^2, 10 -15 m = > 6 m^2, 15 -20 = > 8 m^2, > 20 m = > 10 m^2
Hab Type:	P = pool, G = glide, R = riffle, C = cascade, O = other
Dist. fr start:	distance from beginning of the survey to the beginning of the habitat unit being surveyed
Pool Type:	S = scour, D = dammed, U = unknown
Substrate:	Sand (silt, clay, fine organic< 2 mm), Gravel (2 - 64 mm), Cobble (64 - 256 mm), Boulders (256 - 4000 mm), Bedrock (>4000 mm)
Fish Passage Barriers:	IF = Impassible waterfall
	BF = Boulder Field, passage through the boulder arrangement is not possible for fish
	D = dry channel, no stream flow
	NC = no distinct channel, water drains over land
	N = no barrier to fish passage through the habitat unit
T/P:	T = temporary, portion of open water season
	P = Permanent, all year round

Overall Rating

Spawning: None
Rearing: None
Adult Feeding: None
Over-wintering: N/A
Migration: None

- area is completely marsh/wetland
- connection to Wolverine Lake and other ponds is very poor, no ability for fish to migrate between lakes in freshet

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID:	Wolverine I/F
Survey Date:	20-Jun-09
Survey Crew:	KE/TR
Survey Distance (m):	N/A

	Banks of Channel				Instream Cover							Riparian Cover (%)			
Hab Unit No.	L Bank Height (m)	R Bank Height (m)	L Bank Stab	R Bank Stab	Pool %	Boulder %	Instream Veg %	Overhang Veg %	Undercut Bank %	LWD %	SWD %	Canopy	LB	RB	Photos (Role #) (Photo #)
1								N/A							
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															

Comments:

Photos 389-391

No Fish Habitat, NCD

Very tiny stream flowing out of small lake south of Wolverine Lake

Banks of Channel (Stability): H = highly stable, S = stable, U = unstable

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID:	Wolverine O/F	Survey Date (d/m/y):	29-Jun-09	Coordinates:	Coordinates:
Survey Distance (m):		Survey Crew:	KE/TR		
		Time:	11:14am	434751 7547152	

Temperature (°C):	8.4	Transparency:	Clear	Comments: Marshland - no fish habitat
Channel Velocity (m/s):		Conductivity (µS/cm):	63	
Current Flow Conditions:	No Flow	pH:	6.84	Weather: Windy and cloudy
Discharge estimate (m^3/s):				

Hab Unit No.	Hab Type	Dist. fr start (m)	Length (m)	Slope (%)	Depth (m) Mean	Depth (m) Bank-full	Width (m) Mean	Width (m) Bank-full	Bed Material Fines (%)	Sand (%)	Gravel (%)	Cobble (%)	Boulder (%)	Bedrock (%)	Pool Info Type	Pool Depth (m) Max	Pool Depth (m) Crest	Fish Passage Barriers Type	T/P
1	N/A																		
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			
18																			
19																			
20																			

Flow Conditions: H = High flow, M = Medium flow, L = Low flow
Habitat Unit: Under bankfull conditions: 0 - 2.5 m = > 1 m^2, 2.5 - 5 m = > 2 m^2, 5 - 10 m = > 4 m^2, 10 -15 m = > 6 m^2, 15 -20 = > 8 m^2, > 20 m = > 10 m^2
Hab Type: P = pool, G = glide, R = riffle, C = cascade, O = other
Dist. fr start: distance from beginning of the survey to the beginning of the habitat unit being surveyed
Pool Type: S = scour, D = dammed, U = unknown
Substrate: Sand (silt, clay, fine organic< 2 mm), Gravel (2 - 64 mm), Cobble (64 - 256 mm), Boulders (256 - 4000 mm), Bedrock (>4000 mm)
Fish Passage Barriers: IF = Impassible waterfall
BF = Boulder Field, passage through the boulder arrangement is not possible for fish
D = dry channel, no stream flow
NC = no distinct channel, water drains over land
N = no barrier to fish passage through the habitat unit
T/P: T = temporary, portion of open water season
P = Permanent, all year round

Overall Rating

Spawning: None **Rearing:** None **Adult Feeding:** None **Over-wintering:** N/A **Migration:** None

Appendix 3.1-3. Detailed Fish Habitat Assessment Protocol (FHAP) Data Sheets and Site Photographs, Hope Bay Belt Project, 2009

Station ID:	Wolverine O/F
Survey Date:	29-Jun-09
Survey Crew:	TR/KE
Survey Distance (m):	N/A

Hab Unit No.	Banks of Channel: L Bank Height (m)	Banks of Channel: R Bank Height (m)	Banks of Channel: L Bank Stab	Banks of Channel: R Bank Stab	Instream Cover: Pool %	Instream Cover: Boulder %	Instream Cover: Instream Veg %	Instream Cover: Overhang Veg %	Instream Cover: Undercut Bank %	Instream Cover: LWD %	Instream Cover: SWD %	Riparian Cover (%): Canopy	Riparian Cover (%): LB	Riparian Cover (%): RB	Photos (Role #) (Photo #)
1	N/A														
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															

Comments:
Photos 386-388
Entire area is NCD - no fish habitat
Overall habitat quality = no fish habitat
Stream is likely ephemeral and dry in summer

Banks of Channel (Stability): H = highly stable, S = stable, U = unstable

Appendix 3.1-4

Summary of Detailed Fish Habitat Assessment Data for Streams, Hope Bay Belt Project, 2009

Engineers and Scientists

Appendix 3.1-4. Summary of Detailed Fish Habitat Assessment Data for Streams, Hope Bay Belt Project, 2009

	Receiving Environment																
Watershed	Doris																
Site ID	**Doris O/F1**	**Doris O/F2**	**Doris O/F3**	**Doris I/F1**	**Doris I/F2**	**Doris I/F3**	**P.O. O/F1**	**P.O. O/F2 (1)**	**P.O. O/F2 (2)**	**P.O. I/F1**	**P.O. I/F2**	**Ogama O/F1**	**Ogama O/F2**	**Ogama O/F3**	**Patch O/F**	**Patch O/F**	**Patch I/F**
Date Surveyed	**27-Jun-09**	**29-Jul-09**	**28-Jul-09**	**30-Jun-09**	**28-Jun-09**	**28-Jun-09**	**27-Jun-09**	**29-Jun-09**	**26-Jul-09**	**30-Jun-09**	**30-Jun-09**	**27-Jun-09**	**29-Jul-09**	**29-Jul-09**	**29-Jun-09**	**27-Jul-09**	**30-Jun-09**
Length of stream surveyed	200	200	400	200	200	200	200	50	45	200	200	200	257	200	125	305	200
Total number of habitat units	2	1	4	1	1	1	5	1	1	5	7	3	9	1	1	2	9
Number of pools	0	0	1	0	0	0	1	0	0	2	3	0	4	0	0	1	5
Number of glides	1	0	1	1	0	1	1	1	1	2	4	2	0	0	1	0	2
Number of riffles	1	1	2	0	0	0	2	0	0	1	0	1	5	1	0	1	2
Number of cascades	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Number of Other	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Mean habitat unit length	100	200	100	200	0	200	40	50	45	40	29	67	29	200	125	153	22
Mean pool length	0	0	10	0	0	0	10	0	0	23	19	0	13	0	0	55	8
Mean glide length	150	0	100	200	0	200	149	50	45	65	36	93	0	0	125	0	6
Mean riffle length	50	200	145	0	0	0	16	0	0	25	0	15	41	200	0	250	74
Mean cascade length	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0
Mean Other length	0	0	0	0	200	0	0	0	0	0	0	0	0	0	0	0	0
Wetted area surveyed (%)																	
Pool	0	0	6	0	0	0	3	0	0	19	41	0	64	0	0	67	45
Glide	79	0	30	100	0	200	83	100	100	68	59	96	0	0	100	0	6
Riffle	21	100	64	0	0	0	11	0	0	13	0	4	36	100	0	33	50
Cascade	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0
Gradient	1.4	5.0	5.0	1.5	1.0	1.5	1.2	1.5	0.0	1.4	1.4	1.5	1.2	4.0	1.5	2.8	1.4
Wetted depth	0.6	0.5	1.3	0.2	0.2	0.3	0.9	1.0	0.8	0.7	1.0	1.1	1.0	0.3	0.5	2.1	0.6
Bankfull depth	0.8	1.2	5.0	0.3	0.3	0.3	1.1	1.2	1.3	0.8	1.1	1.3	2.2	1.5	0.5	1.3	0.8
Wetted width	11.0	1.5	2.1	1.5	0.3	0.8	17.8	25.0	1.2	11.4	10.6	12.2	3.3	1.5	10.5	3.2	1.8
Bankfull width	15.2	3.5	4.5	1.8	0.3	0.8	17.9	28.0	1.3	14.7	12.5	12.2	5.7	4.0	14.0	9.6	1.9
Fine substrate	67	25	56	100	100	100	34	95	100	100	100	49	47	20	75	92	100
Gravel substrate	19	35	10	0	0	0	56	0	0	0	0	0	22	25	10	7	0
Cobble substrate	11	25	7	0	0	0	0	0	0	0	0	50	13	25	5	2	0
Boulder substrate	2	10	20	0	0	0	10	5	0	0	0	1	13	20	10	0	0
Bedrock substrate	0	5	7	0	0	0	0	0	0	0	0	0	5	10	0	0	0
Maximum pool depth			1.5				1.5			2.0	2.0		1.9	>1.5			1.3
Pool crest depth			-				0.8			0.4	0.3						0.4
Pool cover	0	5	6	0	0	0	1	0	100	0	0	0	16	5	0	75	18
Boulder cover	2	10	10	0	0	0	5	0	0	0	0	0	0	8	10	0	0
Instream vegetation cover	12	5	0	100	100	100	9	90	0	98	100	30	5	35	50	15	64
Overhanging vegetation cover	11	0	10	0	0	0	18	0	0	0	0	17	3	0	5	0	10
Undercut bank cover	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Large woody debris cover	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small woody debris cover	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	**30**	**20**	**26**	**100**	**100**	**100**	**33**	**90**	**100**	**98**	**100**	**48**	**24**	**48**	**65**	**90**	**92**
Left bank height	0.8	0.8	1.5	0.3	0.2	0.3	4.8	1.2	0.8	0.9	0.9	1.2	0.0	>1	0.5	0.5	0.5
Right bank height	0.8	0.8	1.5	0.3	0.2	0.3	4.8	1.2	0.8	0.9	0.9	1.2	0.0	>1	0.5	0.8	0.5
Left bank stability	0.1	0.5	0.0	1.0	1.0	1.0	1.0	1.0	0.5	1.0	1.0	1.0	0.5	0.5	1.0	0.4	1.0
Right bank stability	0.5	0.5	0.0	1.0	1.0	1.0	1.0	1.0	0.5	1.0	1.0	1.0	0.5	0.5	1.0	0.4	1.0

Dashes indicate data were not collected.

Highly stable (H) = 1.0, Stable (S) = 0.5, Unstable (U) = 0.0.

Appendix 3.1-4. Summary of Detailed Fish Habitat Assessment Data for Streams, Hope Bay Belt Project, 2009

	Receiving Environment												
Watershed	**Koignuk**				**Windy**							**Roberts Bay**	
Site ID	**Koignuk D/S (1)**	**Koignuk D/S (2)**	**Koignuk M/S**	**Koignuk M/S**	**Glenn O/F1**	**Glenn O/F1**	**Glenn O/F2**	**Glenn I/F**	**Windy O/F1**	**Windy O/F1**	**Windy I/F**	**Roberts Bay I/F1**	**Roberts Bay I/F2**
Date Surveyed	**28-Jun-09**	**5-Aug-09**	**29-Jun-09**	**6-Aug-09**	**28-Jun-09**	**31-Jul-09**	**28-Jun-09**	**1-Jul-09**	**28-Jun-09**	**28-Jul-09**	**2-Jul-09**	**1-Aug-09**	**28-Jun-09**
Length of stream surveyed	207	420	200	558	200	760	200	195	189.2	300	199	100	200
Total number of habitat units	3	5	1	4	1	5	1	7	5	1	2	1	1
Number of pools	0	1	0	2	0	1	0	0	1	0	0	0	0
Number of glides	1	2	1	0	0	0	1	4	2	1	0	0	0
Number of riffles	1	1	0	2	0	4	0	3	2	0	0	1	0
Number of cascades	1	0	0	0	0	0	0	0	0	0	0	0	0
Number of Other	0	1	0	0	1	0	0	0	0	0	2	0	1
Mean habitat unit length	69	84	200	140	200	152	200	28	38	300	100	100	200
Mean pool length	0	5	0	0	0	10	0	0	8	0	0	0	0
Mean glide length	140	80	200	275	0	0	200	330	50	300	0	0	0
Mean riffle length	26	250	0	4	0	188	0	5	41	0	0	1	0
Mean cascade length	41	0	0	0	0	0	0	0	0	0	0	0	0
Mean Other length	0	5	0	0	200	0	0	0	0	0	100	0	1
Wetted area surveyed (%)													
Pool	0	0	0	0	0	3	0	0	6	0	0	0	0
Glide	77	31	100	100	0	0	100	99	57	100	0	0	0
Riffle	12	69	0	0	0	97	0	1	37	0	0	100	0
Cascade	11	0	0	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	100	0	0	0	0	0	100	0	1
Gradient	1.8	0.0	1.5	0.1	0.8	0.5	1.5	1.1	1.3	0.0	1.0	4	1
Wetted depth	2.2	0.3	-	1.2	1.2	0.4	0.8	0.2	0.6	0.8	0.2	0.2	-
Bankfull depth	-	0.6	-	2.6	1.5	1.4	1.1	0.4	0.8	1.5	0.3	0.4	-
Wetted width	62.4	25.9	80.0	24.7	-	3.3	3.0	6.8	6.3	2.0	1.8	0.3	-
Bankfull width	68.2	44.0	80.0	56.6	-	5.1	8.0	9.2	9.2	4.5	13.6	2.5	-
Fine substrate	0	89	100	76	90	76	100	100	71	100	100	90	-
Gravel substrate	0	0	0	0	5	6	0	0	12	0	0	10	-
Cobble substrate	8	5	0	5	5	12	0	0	10	0	0	0	-
Boulder substrate	8	5	0	13	0	7	0	0	7	0	0	0	-
Bedrock substrate	85	0	0	6	0	0	0	0	0	0	0	0	-
Maximum pool depth						-		-	1.5		-		
Pool crest depth						-		-	0.4		-		
Pool cover	0	0	0	-	0	3	0	0	0	0	0	10	-
Boulder cover	11	10	0	-	0	0	0	0	7	0	0	5	-
Instream vegetation cover	0	0	0	-	0	0	10	7	2	90	100	10	-
Overhanging vegetation cover	0	0	1	-	0	0	0	0	69	0	0	0	-
Undercut bank cover	0	0	0	-	5	0	10	0	0	0	0	10	-
Large woody debris cover	0	0	0	-	0	0	0	0	0	0	0	0	-
Small woody debris cover	0	0	0	-	0	0	0	0	0	0	0	0	-
Total	**11**	**10**	**1**		**5**	**3**	**20**	**7**	**78**	**90**	**100**	**35**	**-**
Left bank height	-	-	-	-	1.5	1.5	1.05	0.3	0.8	0.5	0.2	0.8	1.0
Right bank height	-	-	-	-	1.5	1.5	1.05	0.3	0.8	0.5	0.2	0.8	-
Left bank stability	1.0	-	0.0	-	0	0.5	1	1.0	1.0	0.5	1.0	0.5	-
Right bank stability	1.0	-	1.0	-	0	0.5	1	1.0	1.0	0.5	1.0	0.5	-

Appendix 3.1-4. Summary of Detailed Fish Habitat Assessment Data for Streams, Hope Bay Belt Project, 2009

	Reference Environment				
Watershed	**Roberts Bay**				**Angimajug South Tributary**
Site ID	**Ref A O/F_left**	**Ref A O/F_right**	**Ref B O/F**	**Ref B O/F**	**Angimajuq Riv Ref**
Date Surveyed	**28-Jul-09**	**28-Jul-09**	**29-Jun-09**	**26-Jul-09**	**2-Jul-09**
Length of stream surveyed	67.5	65	200	269	200
Total number of habitat units	6	3	5	7	1
Number of pools	1	1	1	1	0
Number of glides	0	0	1	1	0
Number of riffles	4	2	2	4	1
Number of cascades	1	0	1	1	0
Number of Other	0	0	0	0	0
Mean habitat unit length	11	22	40	38	200
Mean pool length	3	4	25	5	0
Mean glide length	0	0	44	20	0
Mean riffle length	16	31	50	60	1
Mean cascade length	3	0	0	5	0
Mean Other length	0	0	0	0	0
Wetted area surveyed (%)					
Pool	1	13	7	0	0
Glide	0	0	26	5	0
Riffle	96	87	56	95	100
Cascade	2	0	11	0	0
Other	0	0	0	0	0
Gradient	11.24074074	10	1.4875	3.5	2
Wetted depth	0.1	0.2	0.4	0.2	0.5
Bankfull depth	0.3	0.3	0.6	-	1.5
Wetted width	6.1	1.4	43.9	24.0	41.0
Bankfull width	14.3	4.3	45.0	35.9	137.0
Fine substrate	0	0	0	1	0
Gravel substrate	1	0	0	7	10
Cobble substrate	10	24	33	8	25
Boulder substrate	67	65	52	45	60
Bedrock substrate	23	10	15	39	5
Maximum pool depth			1.5	-	-
Pool crest depth			0.5	-	-
Pool cover	1	13	3	0	0
Boulder cover	75	73	55	22	60
Instream vegetation cover	0	0	0	2	0
Overhanging vegetation cover	0	0	0	0	0
Undercut bank cover	0	0	0	0	0
Large woody debris cover	0	0	0	0	0
Small woody debris cover	0	0	0	0	0
Total	**76**	**86**	**57**	**25**	**60**
Left bank height	0.8	0.8	0.6	0.2	0.8
Right bank height	0.8	0.8	0.6	0.2	0.8
Left bank stability	0.5	0.5	1.0	0.5	1.0
Right bank stability	0.5	0.5	1.0	0.5	0.0

Appendix 3.2-1

Biological Data for Fish Sampled from Lakes, Hope Bay Belt Project, 2009

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Appendix 3.2-1. Biological Data for Fish Sampled from Lakes, Hope Bay Belt Project, 2009

			Sample	Species	Sample	Fork	Weight	Condition				Aging Structure			Stm.	Tissue	Tag		
Water Body	Basin	Date	Number	Code	Method	Length (mm)	(g)	(g/mm^3)	Age	Sex	Maturity	Otolith	Scales	Fin Ray	Sample	Sample	T-bar	PIT	Comments
Doris Lake	Doris	7-Aug	1	LKWH	GN	402	610	0.9	12	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	7-Aug	2	LKWH	GN	532	3,100	2.1	unable to age > 20 years	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	7-Aug	3	LKWH	GN	448	880	1.0	17	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	7-Aug	4	LKWH	GN	427	885	1.1	14	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	7-Aug	5	LKWH	GN	408	615	0.9	12	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	7-Aug	6	LKWH	GN	487	2,050	1.8	38	2	2	Y	Y	Y	–	–	–	–	
Doris Lake	Doris	7-Aug	7	LKWH	GN	438	1,400	1.7	31	2	2	Y	Y	Y	–	–	–	–	
Doris Lake	Doris	7-Aug	8	LKWH	GN	392	1,000	1.7	18	1	1	Y	Y	Y	–	–	–	–	
Doris Lake	Doris	7-Aug	9	LKWH	GN	412	1,150	1.6	20	1	1	Y	Y	Y	–	–	–	–	
Doris Lake	Doris	7-Aug	10	LKWH	GN	390	900	1.5	21	2	2	Y	Y	Y	–	–	–	–	
Doris Lake	Doris	7-Aug	11	LCIS	GN	169	21	0.4	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	7-Aug	12	LCIS	GN	174	21	0.4	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	7-Aug	13	LCIS	GN	191	31	0.4	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	7-Aug	14	LCIS	GN	191	25	0.4	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	7-Aug	15	LCIS	GN	174	19	0.4	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	7-Aug	16	LCIS	GN	172	17	0.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	7-Aug	17	LCIS	GN	173	22	0.4	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	7-Aug	18	LCIS	GN	183	25	0.4	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	7-Aug	19	LCIS	GN	171	20	0.4	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	9-Aug	20	LKTR	GN	664	2,500	0.9	28	–	–	–	Y	Y	–	–	–	5751	
Doris Lake	Doris	9-Aug	21	LKTR	GN	708	–	–	16	–	–	–	Y	Y	–	–	–	–	PIT tag not recorded, too large for scale
Doris Lake	Doris	9-Aug	22	LKTR	GN	635	–	–	19	–	–	–	Y	Y	–	–	–	9014	too large for scale
Doris Lake	Doris	9-Aug	23	LKTR	GN	892	–	–	28	–	–	–	Y	Y	–	–	–	69761	too large for scale
Doris Lake	Doris	9-Aug	24	LKWH	GN	453	1,150	1.2	17	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	9-Aug	25	LKWH	GN	462	1,550	1.6	24	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	9-Aug	26	LKWH	GN	432	980	1.2	12	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	9-Aug	27	LKWH	GN	372	650	1.3	8	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	9-Aug	28	LKWH	GN	409	760	1.1	10	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	9-Aug	29	LKWH	GN	388	650	1.1	10	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	9-Aug	30	LKWH	GN	404	1,000	1.5	14	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	9-Aug	31	LKWH	GN	414	980	1.4	14	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	9-Aug	32	LCIS	GN	298	12	0.0	17	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	9-Aug	33	LCIS	GN	282	173	0.8	9	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	9-Aug	34	LCIS	GN	309	204	0.7	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	9-Aug	35	LCIS	GN	259	96	0.6	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	9-Aug	36	LCIS	GN	208	52	0.6	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	9-Aug	37	LCIS	GN	222	90	0.8	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	9-Aug	38	LCIS	GN	270	125	0.6	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	9-Aug	39	LCIS	GN	240	100	0.7	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	9-Aug	40	LCIS	GN	200	51	0.6	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	9-Aug	41	LCIS	GN	190	28	0.4	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	9-Aug	42	LCIS	GN	260	132	0.8	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	9-Aug	43	LCIS	GN	280	126	0.6	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	9-Aug	44	LCIS	GN	202	46	0.6	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	9-Aug	45	LCIS	GN	173	21	0.4	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	9-Aug	46	LCIS	GN	172	20	0.4	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	7-Aug	47	LKWH	GN	402	610	0.9	–	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	7-Aug	48	LKWH	GN	532	3,100	2.1	–	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	7-Aug	49	LKWH	GN	448	880	1.0	–	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	7-Aug	50	LKWH	GN	427	885	1.1	–	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	7-Aug	51	LKWH	GN	408	615	0.9	–	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	7-Aug	52	LKWH	GN	487	2,050	1.8	–	2	2	Y	Y	Y	–	–	–	–	
Doris Lake	Doris	7-Aug	53	LKWH	GN	438	1,400	1.7	–	2	2	Y	Y	Y	–	–	–	–	
Doris Lake	Doris	7-Aug	54	LKWH	GN	392	1,000	1.7	–	1	2	Y	Y	Y	–	–	–	–	
Doris Lake	Doris	7-Aug	55	LKWH	GN	412	1,150	1.6	–	1	2	Y	Y	Y	–	–	–	–	
Doris Lake	Doris	7-Aug	56	LKWH	GN	390	900	1.5	–	2	2	Y	Y	Y	–	–	–	–	
Doris Lake	Doris	9-Aug	57	LKTR	GN	664	2,500	0.9	–	–	–	–	Y	Y	–	–	–	5751	
Doris Lake	Doris	9-Aug	58	LKTR	GN	708	–	–	–	–	–	–	Y	Y	–	–	–	–	no tag
Doris Lake	Doris	9-Aug	59	LKTR	GN	635	–	–	–	–	–	–	Y	Y	–	–	–	90145	

Fish Species Codes: ARCH = Arctic char, LCIS = cisco,
LKTR = lake trout, LKWH = lake whitefish
Y = aging structure collected
Tag: Y = yellow, O = orange
Dashes (-) indicate data not collected

Appendix 3.2-1. Biological Data for Fish Sampled from Lakes, Hope Bay Belt Project, 2009

			Sample	Species	Sample	Fork	Weight	Condition				Aging Structure			Stm.	Tissue	Tag		
Water Body	Basin	Date	Number	Code	Method	Length (mm)	(g)	(g/mm^3)	Age	Sex	Maturity	Otolith	Scales	Fin Ray	Sample	Sample	T-bar	PIT	Comments
Doris Lake	Doris	9-Aug	60	LKTR	GN	892	–	–	–	–	–	–	Y	Y	–	–	–	69761	
Doris Lake	Doris	9-Aug	61	LKWH	GN	453	1,150	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	9-Aug	62	LKWH	GN	462	1,550	1.6	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	9-Aug	63	LKWH	GN	432	980	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	9-Aug	64	LKWH	GN	372	650	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	9-Aug	65	LKWH	GN	409	760	1.1	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	9-Aug	66	LKWH	GN	388	650	1.1	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	9-Aug	67	LKWH	GN	404	1,000	1.5	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	9-Aug	68	LKWH	GN	414	980	1.4	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	15-Aug	69	LKWH	GN	382	1,000	1.8	–	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	15-Aug	70	LKWH	GN	345	420	1.0	–	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	15-Aug	71	LCIS	GN	258	–	–	–	–	–	–	–	–	–	–	–	–	cisco not weighed
Doris Lake	Doris	15-Aug	72	LCIS	GN	238	–	–	–	–	–	–	–	–	–	–	–	–	cisco not weighed
Doris Lake	Doris	15-Aug	73	LCIS	GN	250	–	–	–	–	–	–	–	–	–	–	–	–	cisco not weighed
Doris Lake	Doris	15-Aug	74	LCIS	GN	258	–	–	–	–	–	–	–	–	–	–	–	–	cisco not weighed
Doris Lake	Doris	15-Aug	75	LCIS	GN	271	–	–	–	–	–	–	–	–	–	–	–	–	cisco not weighed
Doris Lake	Doris	15-Aug	76	LCIS	GN	242	–	–	–	–	–	–	–	–	–	–	–	–	cisco not weighed
Doris Lake	Doris	15-Aug	77	LCIS	GN	285	–	–	–	–	–	–	–	–	–	–	–	–	cisco not weighed
Doris Lake	Doris	15-Aug	78	LKWH	GN	402	760	1.2	14	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	15-Aug	79	LKWH	GN	420	910	1.2	12	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	15-Aug	80	LCIS	GN	275	–	–	–	–	–	–	–	–	–	–	–	–	cisco not weighed
Doris Lake	Doris	15-Aug	81	LCIS	GN	257	–	–	–	–	–	–	–	–	–	–	–	–	cisco not weighed
Doris Lake	Doris	15-Aug	82	LKWH	GN	347	480	1.1	10	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	15-Aug	83	LKWH	GN	402	820	1.3	12	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	15-Aug	84	LKWH	GN	281	210	0.9	10	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	15-Aug	85	LKWH	GN	375	640	1.2	11	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	15-Aug	86	LKWH	GN	317	320	1.0	7	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	15-Aug	87	LKWH	GN	290	240	1.0	10	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	15-Aug	88	LCIS	GN	282	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	15-Aug	89	LCIS	GN	282	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	15-Aug	90	LKTR	GN	605	2,750	1.2	14	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	15-Aug	91	LKTR	GN	712	–	–	35	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	15-Aug	92	LKTR	GN	595	2,000	0.9	14	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	15-Aug	93	LKTR	GN	697	–	–	25	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	15-Aug	94	LKWH	GN	458	1,090	1.1	23	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	15-Aug	95	LKWH	GN	425	850	1.1	23	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	15-Aug	96	LCIS	GN	107	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	15-Aug	97	LKWH	GN	316	340	1.1	15	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	15-Aug	98	LCIS	GN	268	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	15-Aug	99	LCIS	GN	244	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	15-Aug	100	LCIS	GN	257	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	15-Aug	101	LCIS	GN	247	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	15-Aug	102	LCIS	GN	247	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	15-Aug	103	LCIS	GN	160	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	15-Aug	104	LCIS	GN	227	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	15-Aug	105	LCIS	GN	133	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	15-Aug	106	LCIS	GN	147	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	15-Aug	107	LKWH	GN	484	2,450	2.2	–	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	15-Aug	108	LKWH	GN	478	2,100	1.9	–	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	15-Aug	109	LKTR	GN	790	–	–	27	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	15-Aug	110	LKTR	GN	690	–	–	19	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	15-Aug	111	LKWH	GN	363	560	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	15-Aug	112	LCIS	GN	255	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	15-Aug	113	LKWH	GN	425	1,060	1.4	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	15-Aug	114	LKWH	GN	425	920	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	15-Aug	115	LCIS	GN	281	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	15-Aug	116	LCIS	GN	288	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	15-Aug	117	LCIS	GN	255	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	15-Aug	118	LCIS	GN	295	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	15-Aug	119	LCIS	GN	264	–	–	–	–	–	–	–	–	–	–	–	–	

Fish Species Codes: ARCH = Arctic char, LCIS = cisco,
LKTR = lake trout, LKWH = lake whitefish
Y = aging structure collected
Tag: Y = yellow, O = orange
Dashes (-) indicate data not collected

Appendix 3.2-1. Biological Data for Fish Sampled from Lakes, Hope Bay Belt Project, 2009

Water Body	Basin	Date	Sample Number	Species Code	Sample Method	Fork Length (mm)	Weight (g)	Condition (g/mm^3)	Age	Sex	Maturity	Aging Structure: Otolith	Aging Structure: Scales	Aging Structure: Fin Ray	Stm. Sample	Tissue Sample	Tag: T-bar	Tag: PIT	Comments
Doris Lake	Doris	15-Aug	120	LCIS	GN	246	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	15-Aug	121	LCIS	GN	265	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	15-Aug	122	LCIS	GN	286	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	15-Aug	123	LCIS	GN	263	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	15-Aug	124	LCIS	GN	282	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	15-Aug	125	LCIS	GN	310	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	15-Aug	126	LCIS	GN	270	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	15-Aug	127	LCIS	GN	260	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	15-Aug	128	LCIS	GN	281	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	15-Aug	129	LCIS	GN	244	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	15-Aug	130	LCIS	GN	277	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	15-Aug	131	LCIS	GN	114	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	15-Aug	132	LCIS	GN	123	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	15-Aug	133	LCIS	GN	124	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	134	LKTR	GN	825	–	–	–	–	–	–	–	–	–	–	–	–	Golder green tag, uable to read number
Doris Lake	Doris	16-Aug	135	LKWH	GN	403	870	1.3	18	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	136	LKWH	GN	412	900	1.3	14	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	137	LKWH	GN	466	1,420	1.4	17	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	138	LCIS	GN	283	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	139	LCIS	GN	283	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	140	LCIS	GN	221	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	141	LCIS	GN	264	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	142	LCIS	GN	265	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	143	LKWH	GN	392	730	1.2	14	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	144	LKWH	GN	432	1,000	1.2	20	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	145	LKWH	GN	266	580	3.1	10	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	146	LCIS	GN	260	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	147	LKWH	GN	258	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	148	LCIS	GN	286	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	149	LCIS	GN	136	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	150	LCIS	GN	220	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	151	LCIS	GN	140	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	152	LKWH	GN	468	1,560	1.5	22	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	153	LKWH	GN	500	1,960	1.6	35	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	154	LKWH	GN	394	760	1.2	13	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	155	LCIS	GN	230	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	156	LCIS	GN	128	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	157	LCIS	GN	230	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	158	LKWH	GN	233	–	–	5	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	159	LCIS	GN	162	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	160	LCIS	GN	172	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	161	LCIS	GN	155	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	162	LKWH	GN	398	850	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	163	LKWH	GN	388	660	1.1	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	164	LKWH	GN	444	1,020	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	165	LKWH	GN	432	830	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	166	LKWH	GN	400	730	1.1	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	167	LKWH	GN	392	780	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	168	LCIS	GN	298	220	0.8	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	169	LCIS	GN	280	230	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	170	LCIS	GN	288	230	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	171	LCIS	GN	280	190	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	172	LCIS	GN	253	120	0.7	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	173	LKWH	GN	381	670	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	174	LKTR	GN	646	–	–	34	–	–	–	–	–	–	–	Y-25	–	
Doris Lake	Doris	16-Aug	175	LKTR	GN	782	–	–	22	–	–	–	–	–	–	–	Y-24	–	
Doris Lake	Doris	16-Aug	176	LCIS	GN	–	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	177	LKTR	GN	602	2,800	1.3	14	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	178	LKWH	GN	365	630	1.3	–	–	–	–	–	–	–	–	–	–	

Fish Species Codes: ARCH = Arctic char, LCIS = cisco,
LKTR = lake trout, LKWH = lake whitefish
Y = aging structure collected
Tag: Y = yellow, O = orange
Dashes (-) indicate data not collected

Appendix 3.2-1. Biological Data for Fish Sampled from Lakes, Hope Bay Belt Project, 2009

			Sample	Species	Sample	Fork	Weight	Condition				Aging Structure			Stm.	Tissue	Tag		
Water Body	Basin	Date	Number	Code	Method	Length (mm)	(g)	(g/mm^3)	Age	Sex	Maturity	Otolith	Scales	Fin Ray	Sample	Sample	T-bar	PIT	Comments
Doris Lake	Doris	16-Aug	179	LKWH	GN	379	700	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	180	LKWH	GN	391	800	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	181	LKWH	GN	400	820	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	182	LKWH	GN	354	560	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	183	LKWH	GN	405	880	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	184	LKWH	GN	382	710	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	185	LKWH	GN	500	1,640	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	186	LKWH	GN	404	830	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	187	LKWH	GN	355	530	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	188	LKWH	GN	398	810	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	189	LKWH	GN	385	710	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	190	LKWH	GN	412	990	1.4	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	191	LKWH	GN	435	800	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	192	LKWH	GN	352	610	1.4	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	193	LKWH	GN	363	620	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	194	LKWH	GN	342	480	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	195	LKWH	GN	459	1,280	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	16-Aug	196	LKTR	GN	542	–	–	10	–	–	–	–	–	–	–	Y-22	–	
Doris Lake	Doris	17-Aug	197	LKWH	GN	417	840	1.2	18	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	17-Aug	198	LKWH	GN	386	690	1.2	11	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	17-Aug	199	LKWH	GN	500	1,760	1.4	33	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	17-Aug	200	LKWH	GN	350	520	1.2	9	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	17-Aug	201	LKWH	GN	328	390	1.1	8	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	17-Aug	202	LKTR	GN	764	5,650	1.3	33	–	–	–	–	–	–	–	Y-21	–	
Doris Lake	Doris	17-Aug	203	LKTR	GN	664	2,700	0.9	19	–	–	–	–	–	–	–	Y-20	–	
Doris Lake	Doris	17-Aug	204	LKWH	GN	318	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	17-Aug	205	LKWH	GN	422	900	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	17-Aug	206	LKWH	GN	398	840	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	17-Aug	207	LKWH	GN	405	840	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	17-Aug	208	LKWH	GN	410	940	1.4	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	17-Aug	209	LKWH	GN	394	750	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	17-Aug	210	LKWH	GN	386	730	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	17-Aug	211	LKWH	GN	471	1,700	1.6	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	17-Aug	212	LKWH	GN	426	1,040	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	17-Aug	213	LKTR	GN	714	3,150	0.9	25	–	–	–	–	–	–	–	Y-19	–	
Doris Lake	Doris	17-Aug	214	LKTR	GN	794	5,425	1.1	unable to age > 20 yrs	–	–	–	–	–	–	–	Y-18	71888	
Doris Lake	Doris	17-Aug	215	LKWH	GN	426	940	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	17-Aug	216	LKWH	GN	378	660	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	17-Aug	217	LKWH	GN	336	440	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	17-Aug	218	LKWH	GN	392	740	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	17-Aug	219	LKWH	GN	330	440	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	17-Aug	220	LKTR	GN	629	2,625	1.1	18	–	–	–	–	–	–	–	Y-17	–	
Doris Lake	Doris	17-Aug	221	LKTR	GN	723	2,950	0.8	unable to age > 25 yrs	–	–	–	–	–	–	–	Y-16	–	
Doris Lake	Doris	17-Aug	222	LKTR	GN	530	1,800	1.2	8	–	–	–	–	–	–	–	Y-15	–	
Doris Lake	Doris	17-Aug	223	LKWH	GN	428	980	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	17-Aug	224	LKWH	GN	389	760	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	17-Aug	225	LKWH	GN	394	830	1.4	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	17-Aug	226	LKWH	GN	413	880	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	17-Aug	227	LKWH	GN	410	940	1.4	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	17-Aug	228	LKWH	GN	391	800	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	17-Aug	229	LKWH	GN	375	660	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	17-Aug	230	LKWH	GN	472	1,380	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	17-Aug	231	LKWH	GN	444	1,120	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	17-Aug	232	LKWH	GN	450	1,000	1.1	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	17-Aug	233	LKWH	GN	375	640	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	17-Aug	234	LKTR	GN	848	6,400	1.0	25	–	–	–	–	–	–	–	Y-14	–	
Doris Lake	Doris	17-Aug	235	LKTR	GN	698	3,750	1.1	unable to age > 20 yrs	–	–	–	–	–	–	–	Y-13	–	
Doris Lake	Doris	17-Aug	236	LKTR	GN	720	4,325	1.2	22	–	–	–	–	–	–	–	–	–	Golder green tag #4512
Doris Lake	Doris	17-Aug	237	LKTR	GN	640	2,650	1.0	–	–	–	–	–	–	–	–	Y-12	–	missing scale envelope
Doris Lake	Doris	18-Aug	238	LKWH	GN	438	380	0.5	8	–	–	–	–	–	–	–	–	–	

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LKTR = lake trout, LKWH = lake whitefish
Y = aging structure collected
Tag: Y = yellow, O = orange
Dashes (-) indicate data not collected

Appendix 3.2-1. Biological Data for Fish Sampled from Lakes, Hope Bay Belt Project, 2009

			Sample	Species	Sample	Fork	Weight	Condition				Aging Structure			Stm.	Tissue	Tag		
Water Body	Basin	Date	Number	Code	Method	Length (mm)	(g)	(g/mm^3)	Age	Sex	Maturity	Otolith	Scales	Fin Ray	Sample	Sample	T-bar	PIT	Comments
Doris Lake	Doris	18-Aug	239	LKWH	GN	424	980	1.3	18	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	240	LCIS	GN	172	46	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	241	LCIS	GN	188	62	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	242	LKWH	GN	388	780	1.3	10	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	243	LKWH	GN	390	720	1.2	11	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	244	LKWH	GN	379	780	1.4	12	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	245	LKWH	GN	456	1,280	1.3	25	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	246	LKWH	GN	407	820	1.2	12	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	247	LCIS	GN	272	–	–	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	248	LKWH	GN	432	1,070	1.3	18	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	249	LKWH	GN	411	850	1.2	12	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	250	LKWH	GN	400	820	1.3	17	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	251	LKWH	GN	388	720	1.2	13	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	252	LKWH	GN	424	920	1.2	17	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	253	LKWH	GN	335	420	1.1	9	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	254	LKWH	GN	402	780	1.2	12	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	255	LKTR	GN	801	550	0.1	26	–	–	–	–	–	–	–	Y-11	9433	
Doris Lake	Doris	18-Aug	256	LKWH	GN	525	2,600	1.8	27	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	257	LKWH	GN	396	760	1.2	12	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	258	LKWH	GN	381	700	1.3	10	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	259	LKWH	GN	346	540	1.3	10	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	260	LCIS	GN	271	140	0.7	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	261	LCIS	GN	292	220	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	262	LCIS	GN	260	140	0.8	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	263	LCIS	GN	130	18	0.8	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	264	LCIS	GN	149	31	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	265	LCIS	GN	127	18	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	266	LCIS	GN	162	41	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	267	LCIS	GN	129	21	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	268	LCIS	GN	151	44	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	269	LCIS	GN	165	46	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	270	LCIS	GN	130	19	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	271	LCIS	GN	132	23	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	272	LCIS	GN	117	15	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	273	LCIS	GN	134	23	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	274	LCIS	GN	132	21	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	275	LCIS	GN	266	160	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	276	LCIS	GN	236	131	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	277	LCIS	GN	266	210	1.1	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	278	LCIS	GN	175	49	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	279	LCIS	GN	176	240	4.4	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	280	LKWH	GN	320	340	1.0	8	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	281	LKTR	GN	663	2,600	0.9	22	–	–	–	–	–	–	–	Y-007	107783	
Doris Lake	Doris	18-Aug	282	LKWH	GN	399	800	1.3	13	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	283	LKWH	GN	400	880	1.4	12	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	284	LCIS	GN	130	19	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	285	LCIS	GN	60	36	16.7	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	286	LCIS	GN	120	20	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	287	LCIS	GN	271	170	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	288	LCIS	GN	242	147	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	289	LCIS	GN	290	272	1.1	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	290	LCIS	GN	246	144	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	291	LCIS	GN	133	23	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	292	LCIS	GN	127	21	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	293	LCIS	GN	275	214	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	294	LKTR	GN	631	2,850	1.1	26	–	–	–	–	–	–	–	Y-006	66525	
Doris Lake	Doris	18-Aug	295	LCIS	GN	267	198	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	296	LKWH	GN	401	830	1.3	14	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	297	LKWH	GN	428	920	1.2	21	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	298	LKWH	GN	395	750	1.2	13	–	–	–	–	–	–	–	–	–	

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LKTR = lake trout, LKWH = lake whitefish
Y = aging structure collected
Tag: Y = yellow, O = orange
Dashes (-) indicate data not collected

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Water Body	Basin	Date	Sample Number	Species Code	Sample Method	Fork Length (mm)	Weight (g)	Condition (g/mm³)	Age	Sex	Maturity	Aging Structure Otolith	Aging Structure Scales	Aging Structure Fin Ray	Stm. Sample	Tissue Sample	Tag T-bar	Tag PIT	Comments
Doris Lake	Doris	18-Aug	299	LKWH	GN	338	440	1.1	8	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	300	LKWH	GN	335	600	1.6	10	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	301	LKWH	GN	311	310	1.0	8	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	302	LKTR	GN	790	440	0.1	28	–	–	–	–	–	–	–	Y-005	106397	
Doris Lake	Doris	18-Aug	303	LKTR	GN	692	440	0.1	unable to age > 20 yrs	–	–	–	–	–	–	–	Y-003	106457	
Doris Lake	Doris	18-Aug	304	LKTR	GN	355	480	1.1	14	–	–	–	–	–	–	–	Y-003	111960	
Doris Lake	Doris	18-Aug	305	LKTR	GN	791	4,800	1.0	19	–	–	–	–	–	–	–	–	–	recap of tag #018, PIT 71888
Doris Lake	Doris	18-Aug	306	LKTR	GN	713	3,500	1.0	8	–	–	–	–	–	–	–	–	–	recap of Golder tag #051, PIT 066654
Doris Lake	Doris	18-Aug	307	LKWH	GN	304	331	1.2	20	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	308	LKWH	GN	444	1,169	1.3	11	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	309	LKWH	GN	383	636	1.1	7	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	310	LKWH	GN	337	458	1.2	8	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	311	LKWH	GN	321	392	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	312	LKWH	GN	92	12	1.5	39	–	–	–	–	–	–	–	–	–	juvenile photo 3411
Doris Lake	Doris	18-Aug	313	LKTR	GN	830	1,200	1.1	13	–	–	–	–	–	–	–	Y-010	67775	
Doris Lake	Doris	18-Aug	314	LKWH	GN	329	445	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	315	LKWH	GN	341	504	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	316	LCIS	GN	243	140	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	317	LCIS	GN	271	222	1.1	10	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	318	LCIS	GN	295	270	1.1	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	319	LCIS	GN	272	199	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	320	LCIS	GN	274	199	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	321	LKTR	GN	791	5,750	1.2	unable to age > 25 yrs	–	–	–	–	–	–	–	–	–	photo 3416, 3415. 3414, 3417. Fish may have been sampled in previous studies. Stomach content - large cisco
Doris Lake	Doris	18-Aug	322	LKTR	GN	685	3,400	1.1	20	–	–	–	–	–	–	–	Y-008	108639	
Doris Lake	Doris	18-Aug	323	LCIS	GN	234	104	0.8	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	324	LCIS	GN	190	69	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	325	LCIS	GN	124	13	0.7	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	326	LCIS	GN	99	7	0.7	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	327	LCIS	GN	100	9	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	328	LCIS	GN	232	195	1.6	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	329	LCIS	GN	87	6	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	330	LCIS	GN	131	18	0.8	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	331	LCIS	GN	132	19	0.8	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	332	LCIS	GN	128	16	0.8	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	333	LCIS	GN	124	15	0.8	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	18-Aug	334	LCIS	GN	125	17	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	335	LKWH	GN	521	1,682	1.2	unable to age > 20 yrs	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	19-Aug	336	LKWH	GN	455	1,111	1.2	unable to age > 15 yrs	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	19-Aug	337	LKWH	GN	503	1,933	1.5	33	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	19-Aug	338	LKWH	GN	466	1,423	1.4	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	339	LKWH	GN	487	1,474	1.3	28	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	19-Aug	340	LKWH	GN	422	943	1.3	15	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	19-Aug	341	LKWH	GN	402	875	1.3	13	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	19-Aug	342	LKWH	GN	369	616	1.2	10	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	19-Aug	343	LKWH	GN	401	870	1.3	17	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	19-Aug	344	LKWH	GN	395	841	1.4	12	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	19-Aug	345	LKWH	GN	438	1,205	1.4	17	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	19-Aug	346	LKWH	GN	392	768	1.3	11	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	19-Aug	347	LKWH	GN	347	486	1.2	9	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	19-Aug	348	LKWH	GN	330	435	1.2	8	–	–	–	Y	Y	–	–	–	–	
Doris Lake	Doris	19-Aug	349	LCIS	GN	274	199	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	350	LCIS	GN	259	160	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	351	LCIS	GN	267	215	1.1	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	352	LCIS	GN	246	161	1.1	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	353	LCIS	GN	279	254	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	354	LCIS	GN	243	145	1.0	–	–	–	–	–	–	–	–	–	–	

Fish Species Codes: ARCH = Arctic char, LCIS = cisco,
LKTR = lake trout, LKWH = lake whitefish
Y = aging structure collected
Tag: Y = yellow, O = orange
Dashes (-) indicate data not collected

Appendix 3.2-1. Biological Data for Fish Sampled from Lakes, Hope Bay Belt Project, 2009

Water Body	Basin	Date	Sample Number	Species Code	Sample Method	Fork Length (mm)	Weight (g)	Condition (g/mm^3)	Age	Sex	Maturity	Aging Structure Otolith	Aging Structure Scales	Aging Structure Fin Ray	Stm. Sample	Tissue Sample	Tag T-bar	Tag PIT	Comments
Doris Lake	Doris	19-Aug	355	LCIS	GN	199	72	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	356	LCIS	GN	210	102	1.1	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	357	LCIS	GN	155	46	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	358	LCIS	GN	156	37	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	359	LCIS	GN	149	31	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	360	LCIS	GN	134	21	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	361	LCIS	GN	125	18	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	362	LCIS	GN	130	22	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	363	LCIS	GN	137	20	0.8	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	364	LKWH	GN	430	1,030	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	365	LKWH	GN	395	835	1.4	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	366	LKWH	GN	440	1,205	1.4	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	367	LCIS	GN	290	283	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	368	LCIS	GN	273	239	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	369	LCIS	GN	266	227	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	370	LCIS	GN	302	272	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	371	LCIS	GN	304	303	1.1	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	372	LCIS	GN	293	285	1.1	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	373	LCIS	GN	284	255	1.1	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	374	LCIS	GN	262	208	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	375	LCIS	GN	260	181	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	376	LCIS	GN	284	219	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	377	LCIS	GN	125	20	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	378	LCIS	GN	140	22	0.8	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	379	LCIS	GN	143	27	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	380	LCIS	GN	133	19	0.8	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	381	LCIS	GN	131	18	0.8	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	382	LCIS	GN	126	20	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	383	LKTR	GN	539	1,474	0.9	14	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	384	LKTR	GN	685	3,166	1.0	22	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	385	LKTR	GN	680	2,337	0.7	18	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	386	LKWH	GN	502	1,996	1.6	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	387	LKWH	GN	421	1,040	1.4	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	388	LKWH	GN	415	932	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	389	LKWH	GN	398	826	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	390	LKWH	GN	370	685	1.4	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	391	LKWH	GN	435	1,062	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	392	LKWH	GN	381	681	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	393	LCIS	GN	295	284	1.1	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	394	LCIS	GN	259	185	1.1	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	395	LCIS	GN	281	249	1.1	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	396	LCIS	GN	230	124	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	397	LCIS	GN	296	261	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	398	LCIS	GN	283	261	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	399	LCIS	GN	295	252	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	400	LCIS	GN	281	233	1.1	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	401	LCIS	GN	256	153	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	402	LCIS	GN	268	192	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	403	LCIS	GN	237	132	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	404	LCIS	GN	208	85	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	405	LCIS	GN	229	121	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	406	LCIS	GN	130	17	0.8	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	407	LCIS	GN	154	32	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	408	LCIS	GN	192	65	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	409	LCIS	GN	141	24	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	410	LCIS	GN	144	25	0.8	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	411	LCIS	GN	133	22	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	412	LCIS	GN	127	22	1.1	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	413	LCIS	GN	139	21	0.8	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	414	LCIS	GN	128	23	1.1	–	–	–	–	–	–	–	–	–	–	

Fish Species Codes: ARCH = Arctic char, LCIS = cisco,
LKTR = lake trout, LKWH = lake whitefish
Y = aging structure collected
Tag: Y = yellow, O = orange
Dashes (-) indicate data not collected

Appendix 3.2-1. Biological Data for Fish Sampled from Lakes, Hope Bay Belt Project, 2009

			Sample	Species	Sample	Fork	Weight	Condition				Aging Structure			Stm.	Tissue	Tag		
Water Body	Basin	Date	Number	Code	Method	Length (mm)	(g)	(g/mm^3)	Age	Sex	Maturity	Otolith	Scales	Fin Ray	Sample	Sample	T-bar	PIT	Comments
Doris Lake	Doris	19-Aug	415	LCIS	GN	143	25	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	416	LCIS	GN	127	19	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	417	LCIS	GN	234	135	1.1	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	418	LCIS	GN	160	37	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	419	LCIS	GN	127	20	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	420	LCIS	GN	124	14	0.7	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	421	LCIS	GN	137	25	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	422	LKTR	GN	431	776	1.0	11	–	–	–	–	–	–	–	Y-100	111179	
Doris Lake	Doris	19-Aug	423	LKWH	GN	406	869	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	424	LKWH	GN	400	876	1.4	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	425	LCIS	GN	285	234	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	426	LCIS	GN	235	133	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	427	LCIS	GN	241	174	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	428	LCIS	GN	225	118	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	429	LCIS	GN	231	142	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	430	LCIS	GN	199	78	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	431	LCIS	GN	165	45	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	432	LCIS	GN	168	44	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	433	LCIS	GN	149	32	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	434	LKTR	GN	426	819	1.1	12	2	1	Y	Y	Y	–	–	–	–	mortality, cisco in stomach
Doris Lake	Doris	19-Aug	435	LCIS	GN	140	17	0.6	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	436	LCIS	GN	146	29	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	437	LCIS	GN	185	58	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	438	LCIS	GN	127	14	0.7	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	439	LCIS	GN	140	18	0.7	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	440	LCIS	GN	154	25	0.7	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	441	LCIS	GN	266	196	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	442	LCIS	GN	120	16	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	443	LCIS	GN	117	14	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	444	LCIS	GN	114	11	0.7	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	19-Aug	445	LCIS	GN	90	7	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	446	NSSB	GN	55	2	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	447	LKWH	GN	256	209	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	448	LCIS	GN	255	181	1.1	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	449	LCIS	GN	288	251	1.1	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	450	LCIS	GN	254	149	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	451	LCIS	GN	245	144	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	452	LCIS	GN	253	205	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	453	LCIS	GN	210	91	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	454	LCIS	GN	140	27	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	455	LKWH	GN	390	660	1.1	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	456	LKWH	GN	400	820	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	457	LKWH	GN	330	420	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	458	LKWH	GN	382	640	1.1	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	459	LKWH	GN	428	900	1.1	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	460	LKWH	GN	399	840	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	461	LKWH	GN	366	600	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	462	LKWH	GN	405	880	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	463	LKWH	GN	380	710	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	464	LKWH	GN	356	510	1.1	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	465	LKWH	GN	423	940	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	466	LKWH	GN	405	780	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	467	LKWH	GN	407	830	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	468	LKWH	GN	436	1,060	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	469	LCIS	GN	270	192	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	470	LCIS	GN	241	154	1.1	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	471	LCIS	GN	190	74	1.1	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	472	LCIS	GN	234	136	1.1	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	473	LKWH	GN	446	1,120	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	474	LKWH	GN	429	1,130	1.4	–	–	–	–	–	–	–	–	–	–	

Fish Species Codes: ARCH = Arctic char, LCIS = cisco,
LKTR = lake trout, LKWH = lake whitefish
Y = aging structure collected
Tag: Y = yellow, O = orange
Dashes (-) indicate data not collected

Appendix 3.2-1. Biological Data for Fish Sampled from Lakes, Hope Bay Belt Project, 2009

			Sample	Species	Sample	Fork	Weight	Condition				Aging Structure			Stm.	Tissue	Tag		
Water Body	Basin	Date	Number	Code	Method	Length (mm)	(g)	(g/mm^3)	Age	Sex	Maturity	Otolith	Scales	Fin Ray	Sample	Sample	T-bar	PIT	Comments
Doris Lake	Doris	20-Aug	475	LKWH	GN	378	610	1.1	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	476	LKWH	GN	384	680	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	477	LKWH	GN	380	600	1.1	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	478	LKWH	GN	309	339	1.1	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	479	LCIS	GN	232	137	1.1	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	480	LCIS	GN	224	123	1.1	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	481	LCIS	GN	261	138	0.8	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	482	LCIS	GN	240	137	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	483	LCIS	GN	225	118	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	484	LCIS	GN	203	75	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	485	LCIS	GN	256	163	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	486	LCIS	GN	216	107	1.1	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	487	LKWH	GN	405	870	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	488	LKWH	GN	423	970	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	489	LKWH	GN	310	300	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	490	LKWH	GN	388	730	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	491	LKWH	GN	397	890	1.4	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	492	LKWH	GN	508	2,750	2.1	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	493	LCIS	GN	236	129	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	494	LKWH	GN	309	365	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	495	LKWH	GN	340	440	1.1	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	496	LKWH	GN	412	890	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	497	LKWH	GN	408	850	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	498	LKWH	GN	395	810	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	499	LKWH	GN	372	640	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	500	LKWH	GN	400	770	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	501	LKWH	GN	250	181	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	502	LCIS	GN	247	154	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	503	LCIS	GN	265	215	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	504	LCIS	GN	194	77	1.1	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	505	LCIS	GN	158	48	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	506	LKTR	GN	605	3,050	1.4	14	–	–	–	Y	Y	–	–	yellow 099	107161	
Doris Lake	Doris	20-Aug	507	LKWH	GN	352	556	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	508	LKWH	GN	348	523	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	509	LKWH	GN	380	634	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	510	LCIS	GN	262	134	0.7	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	511	LCIS	GN	212	105	1.1	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	512	LCIS	GN	201	89	1.1	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	513	LCIS	GN	217	119	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	514	LKTR	GN	491	110	0.1	10	–	–	–	Y	Y	–	–	yellow 098	105749	
Doris Lake	Doris	20-Aug	515	LKTR	GN	502	1,099	0.9	11	–	–	–	Y	Y	–	–	yellow 097	5645	
Doris Lake	Doris	20-Aug	516	LKTR	GN	590	2,700	1.3	11	–	–	–	Y	Y	–	–	yellow 095	7363	
Doris Lake	Doris	20-Aug	517	LKWH	GN	115	13	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	518	LKWH	GN	113	14	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	519	LKWH	GN	103	10	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	20-Aug	520	LCIS	GN	100	10	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	21-Aug	521	LKTR	GN	648	3,120	1.1	unable to age	–	–	–	Y	Y	–	–	yellow 092	111332	
Doris Lake	Doris	21-Aug	522	LCIS	GN	147	25	0.8	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	21-Aug	523	LCIS	GN	94	6	0.7	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	21-Aug	524	LCIS	GN	104	9	0.8	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	21-Aug	525	LCIS	GN	103	8	0.7	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	21-Aug	526	LKTR	GN	372	3,120	6.1	17	–	–	–	Y	Y	–	–	yellow 091	114437	
Doris Lake	Doris	21-Aug	527	LKTR	GN	665	2,374	0.8	18	–	–	–	Y	Y	–	–	yellow 090	67513	
Doris Lake	Doris	21-Aug	528	LKTR	GN	735	6,000	1.5	19	–	–	–	Y	Y	–	–	yellow 089	69094	
Doris Lake	Doris	21-Aug	529	LKWH	GN	425	887	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	21-Aug	530	LKWH	GN	446	981	1.1	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	21-Aug	531	LKWH	GN	451	915	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	21-Aug	532	LKWH	GN	360	523	1.1	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	21-Aug	533	LCIS	GN	217	200	2.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	21-Aug	534	LKWH	GN	445	1,248	1.4	–	–	–	–	–	–	–	–	–	–	

Fish Species Codes: ARCH = Arctic char, LCIS = cisco,
LKTR = lake trout, LKWH = lake whitefish
Y = aging structure collected
Tag: Y = yellow, O = orange
Dashes (-) indicate data not collected

Appendix 3.2-1. Biological Data for Fish Sampled from Lakes, Hope Bay Belt Project, 2009

Water Body	Basin	Date	Sample Number	Species Code	Sample Method	Fork Length (mm)	Weight (g)	Condition (g/mm^3)	Age	Sex	Maturity	Aging Structure: Otolith	Aging Structure: Scales	Aging Structure: Fin Ray	Stm. Sample	Tissue Sample	Tag: T-bar	Tag: PIT	Comments
Doris Lake	Doris	21-Aug	535	LCIS	GN	145	26	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	21-Aug	536	LCIS	GN	142	24	0.8	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	21-Aug	537	LCIS	GN	131	21	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	21-Aug	538	LCIS	GN	224	143	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	21-Aug	539	LKWH	GN	432	1,050	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	21-Aug	540	LKWH	GN	430	1,008	1.3	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	21-Aug	541	LKWH	GN	318	390	1.2	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	21-Aug	542	LCIS	GN	275	235	1.1	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	21-Aug	543	LCIS	GN	281	228	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	21-Aug	544	LCIS	GN	136	28	1.1	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	21-Aug	545	LCIS	GN	130	20	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	21-Aug	546	LCIS	GN	128	18	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	21-Aug	547	LCIS	GN	256	169	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	21-Aug	548	LCIS	GN	128	13	0.6	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	21-Aug	549	LCIS	GN	158	35	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	21-Aug	550	LCIS	GN	173	45	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	21-Aug	551	LCIS	GN	255	173	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	21-Aug	552	LCIS	GN	269	190	1.0	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	21-Aug	553	LCIS	GN	105	9	0.8	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	21-Aug	554	LCIS	GN	96	7	0.8	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	21-Aug	555	LCIS	GN	135	20	0.8	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	21-Aug	556	LCIS	GN	116	12	0.8	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	21-Aug	557	LCIS	GN	94	7	0.8	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	21-Aug	558	LCIS	GN	118	13	0.8	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	21-Aug	559	LCIS	GN	104	10	0.9	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	21-Aug	560	LCIS	GN	104	8	0.7	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	21-Aug	561	LCIS	GN	109	11	0.8	–	–	–	–	–	–	–	–	–	–	
Doris Lake	Doris	21-Aug	562	LKTR	GN	530	1,380	0.9	16	–	–	–	Y	Y	–	–	yellow 088	114480	released alive
Doris Lake	Doris	21-Aug	563	LKTR	GN	614	1,804	0.8	16	2	1	Y	Y	Y	–	–	–	–	mortality
Ogama	Doris	30-Jul-09	1	LKTR	GN	690	3,000	0.9	unable to age	–	–	–	Y	Y	–	–	–	–	released
Ogama	Doris	30-Jul-09	2	LCIS	GN	243	177	1.2	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	30-Jul-09	3	LCIS	GN	196	237	3.1	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	30-Jul-09	4	LCIS	GN	321	348	1.1	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	30-Jul-09	5	LCIS	GN	261	159	0.9	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	30-Jul-09	6	LCIS	GN	192	64	0.9	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	30-Jul-09	7	LCIS	GN	195	52	0.7	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	30-Jul-09	8	LCIS	GN	194	77	1.1	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	30-Jul-09	9	LKTR	GN	846	6,000	1.0	unable to age	–	–	–	Y	Y	–	–	–	–	released
Ogama	Doris	30-Jul-09	10	LKTR	GN	618	1,838	0.8	12	–	–	–	Y	Y	–	–	–	–	released
Ogama	Doris	30-Jul-09	11	LKWH	GN	330	517	1.4	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	30-Jul-09	12	LKWH	GN	331	418	1.2	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	30-Jul-09	13	LKWH	GN	316	361	1.1	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	30-Jul-09	14	LKWH	GN	339	519	1.3	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	30-Jul-09	15	LKWH	GN	350	192	0.4	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	30-Jul-09	16	LKWH	GN	312	403	1.3	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	30-Jul-09	17	LCIS	GN	180	62	1.1	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	30-Jul-09	18	LCIS	GN	235	138	1.1	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	30-Jul-09	19	LKWH	GN	375	513	1.0	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	30-Jul-09	20	LCIS	GN	192	74	1.0	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	30-Jul-09	21	LCIS	GN	191	73	1.0	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	30-Jul-09	22	LCIS	GN	189	71	1.1	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	30-Jul-09	23	LKTR	GN	725	3,000	0.8	25	–	–	–	Y	Y	–	–	–	–	released
Ogama	Doris	30-Jul-09	24	LKTR	GN	515	1,249	0.9	12	–	–	–	Y	Y	–	–	–	–	released
Ogama	Doris	30-Jul-09	25	LKWH	GN	393	651	1.1	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	30-Jul-09	26	LKWH	GN	394	–	–	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	30-Jul-09	27	LKWH	GN	354	–	–	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	30-Jul-09	28	LKWH	GN	319	–	–	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	30-Jul-09	29	LKWH	GN	365	–	–	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	30-Jul-09	30	LKWH	GN	321	–	–	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	30-Jul-09	31	LKWH	GN	428	–	–	–	–	–	–	–	–	–	–	–	–	

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LKTR = lake trout, LKWH = lake whitefish
Y = aging structure collected
Tag: Y = yellow, O = orange
Dashes (-) indicate data not collected

Appendix 3.2-1. Biological Data for Fish Sampled from Lakes, Hope Bay Belt Project, 2009

			Sample	Species	Sample	Fork	Weight	Condition				Aging Structure			Stm.	Tissue	Tag		
Water Body	Basin	Date	Number	Code	Method	Length (mm)	(g)	(g/mm^3)	Age	Sex	Maturity	Otolith	Scales	Fin Ray	Sample	Sample	T-bar	PIT	Comments
Ogama	Doris	30-Jul-09	32	LKWH	GN	328	–	–	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	30-Jul-09	33	LCIS	GN	210	–	–	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	30-Jul-09	34	LCIS	GN	199	–	–	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	31-Jul-09	35	LKTR	GN	482	1,037	0.9	14	2	1	Y	Y	Y	–	–	–	–	mortality
Ogama	Doris	31-Jul-09	36	LCIS	GN	315	1,024	3.3	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	31-Jul-09	37	LCIS	GN	247	475	3.2	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	31-Jul-09	38	LCIS	GN	218	215	2.1	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	1-Aug-09	39	LCIS	GN	220	87	0.8	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	1-Aug-09	40	LCIS	GN	173	42	0.8	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	1-Aug-09	41	LCIS	GN	326	109	0.3	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	1-Aug-09	42	LCIS	GN	188	62	0.9	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	1-Aug-09	43	LCIS	GN	261	193	1.1	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	1-Aug-09	44	LKWH	GN	364	615	1.3	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	1-Aug-09	45	LKWH	GN	319	437	1.3	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	1-Aug-09	46	LKWH	GN	347	564	1.3	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	1-Aug-09	47	LKWH	GN	348	524	1.2	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	1-Aug-09	48	LKWH	GN	354	561	1.3	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	1-Aug-09	49	LKWH	GN	372	664	1.3	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	1-Aug-09	50	LKWH	GN	355	568	1.3	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	1-Aug-09	51	LKWH	GN	345	747	1.8	–	–	–	–	–	–	–	–	–	–	photo 3222
Ogama	Doris	1-Aug-09	52	LCIS	GN	345	323	0.8	–	–	–	–	–	–	–	–	–	–	photo 3223
Ogama	Doris	1-Aug-09	53	LCIS	GN	243	129	0.9	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	1-Aug-09	54	LCIS	GN	227	102	0.9	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	1-Aug-09	55	LCIS	GN	229	127	1.1	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	1-Aug-09	56	LCIS	GN	193	76	1.1	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	1-Aug-09	57	LCIS	GN	230	111	0.9	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	1-Aug-09	58	LCIS	GN	153	32	0.9	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	1-Aug-09	59	LCIS	GN	159	38	0.9	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	1-Aug-09	60	LCIS	GN	167	45	1.0	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	1-Aug-09	61	LCIS	GN	161	37	0.9	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	1-Aug-09	62	LCIS	GN	168	53	1.1	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	1-Aug-09	63	LCIS	GN	190	66	1.0	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	1-Aug-09	64	LCIS	GN	188	62	0.9	–	–	–	–	–	–	–	–	–	–	
Ogama	Doris	1-Aug-09	65	LCIS	GN	220	91	0.9	–	–	–	–	–	–	–	–	–	–	
PO Lake	Doris	23-Jul-09	1	LKWH	GN	255	155	0.9	–	–	–	–	–	–	–	–	–	–	
PO Lake	Doris	23-Jul-09	2	LKWH	GN	382	684	1.2	–	–	–	–	–	–	–	–	–	–	
PO Lake	Doris	23-Jul-09	3	LKTR	GN	558	1,872	1.1	15	2	2	Y	Y	Y	1	1	–	–	mortality
PO Lake	Doris	23-Jul-09	4	LKTR	GN	521	1,761	1.2	11	2	1	Y	Y	Y	2	2	–	–	mortality
PO Lake	Doris	23-Jul-09	5	LKWH	GN	472	1,013	1.0	–	–	–	–	–	–	–	–	–	–	
PO Lake	Doris	27-Jul-09	26	LKTR	GN	461	1,580	1.6	10	–	–	–	Y	Y	–	–	–	–	released, photo 3168,3169,3170
PO Lake	Doris	27-Jul-09	27	LCIS	GN	183	49	0.8	–	–	–	–	–	–	–	–	–	–	
PO Lake	Doris	27-Jul-09	28	LKTR	GN	525	2,059	1.4	9	–	–	–	Y	Y	–	–	–	–	
PO Lake	Doris	27-Jul-09	29	LCIS	GN	178	64	1.1	–	–	–	–	–	–	–	–	–	–	
PO Lake	Doris	27-Jul-09	30	LCIS	GN	438	129	0.2	–	–	–	–	–	–	–	–	–	–	
PO Lake	Doris	27-Jul-09	31	LCIS	GN	241	122	0.9	–	–	–	–	–	–	–	–	–	–	
PO Lake	Doris	27-Jul-09	32	LCIS	GN	232	131	1.0	–	–	–	–	–	–	–	–	–	–	
PO Lake	Doris	27-Jul-09	33	LKTR	GN	602	2,680	1.2	14	–	–	–	Y	Y	–	–	–	–	
PO Lake	Doris	27-Jul-09	34	LKWH	GN	453	1,968	2.1	–	–	–	–	–	–	–	–	–	–	
PO Lake	Doris	27-Jul-09	35	LKWH	GN	442	1,948	2.3	–	–	–	–	–	–	–	–	–	–	
PO Lake	Doris	27-Jul-09	36	LKWH	GN	447	1,939	2.2	–	–	–	–	–	–	–	–	–	–	
PO Lake	Doris	27-Jul-09	37	LCIS	GN	210	76	0.8	–	–	–	–	–	–	–	–	–	–	
PO Lake	Doris	27-Jul-09	38	LCIS	GN	175	53	1.0	–	–	–	–	–	–	–	–	–	–	
PO Lake	Doris	27-Jul-09	39	LCIS	GN	179	55	1.0	–	–	–	–	–	–	–	–	–	–	
PO Lake	Doris	27-Jul-09	40	LCIS	GN	224	107	1.0	–	–	–	–	–	–	–	–	–	–	
PO Lake	Doris	27-Jul-09	41	LCIS	GN	257	161	0.9	–	–	–	–	–	–	–	–	–	–	
PO Lake	Doris	27-Jul-09	42	LCIS	GN	179	52	0.9	–	–	–	–	–	–	–	–	–	–	
PO Lake	Doris	27-Jul-09	43	LKTR	GN	599	2,039	0.9	unable to age > 20 yrs	–	–	–	Y	Y	–	–	–	–	released
PO Lake	Doris	27-Jul-09	44	LKTR	GN	480	1,189	1.1	9	–	–	–	Y	Y	–	–	–	–	released
PO Lake	Doris	27-Jul-09	45	LKTR	GN	523	1,295	0.9	11	2	1	Y	Y	Y	3	3	–	–	mortality
PO Lake	Doris	27-Jul-09	46	LKTR	GN	510	1,259	0.9	13	1	1	Y	Y	Y	4	4	–	–	mortality

Fish Species Codes: ARCH = Arctic char, LCIS = cisco,
LKTR = lake trout, LKWH = lake whitefish
Y = aging structure collected
Tag: Y = yellow, O = orange
Dashes (-) indicate data not collected

Appendix 3.2-1. Biological Data for Fish Sampled from Lakes, Hope Bay Belt Project, 2009

			Sample	Species	Sample	Fork	Weight	Condition				Aging Structure			Stm.	Tissue	Tag		
Water Body	Basin	Date	Number	Code	Method	Length (mm)	(g)	(g/mm^3)	Age	Sex	Maturity	Otolith	Scales	Fin Ray	Sample	Sample	T-bar	PIT	Comments
PO Lake	Doris	27-Jul-09	47	LKTR	GN	454	877	0.9	9	1	1	Y	Y	Y	5	5	–	–	mortality
PO Lake	Doris	27-Jul-09	48	LKTR	GN	495	1,110	0.9	11	2	1	Y	Y	Y	6	6	–	–	mortality
PO Lake	Doris	27-Jul-09	49	LKWH	GN	387	761	1.3	16	1	1	Y	Y	Y	1	1	–	–	mortality
PO Lake	Doris	27-Jul-09	50	LKWH	GN	428	1,000	1.3	34	2	2	Y	Y	Y	2	2	–	–	mortality
PO Lake	Doris	27-Aug-09	51	LKTR	AG	396	585	0.9	6	2	1	Y	Y	Y	7	7	–	–	mortality
PO Lake	Doris	27-Aug-09	52	LKTR	GN	403	669	1.0	11	2	1	Y	Y	Y	8	8	–	–	mortality
PO Lake	Doris	27-Aug-09	53	LKTR	GN	420	722	1.0	10	2	1	Y	Y	Y	9	9	–	–	mortality
PO Lake	Doris	27-Aug-09	54	LKTR	GN	463	1,189	1.2	11	1	1	Y	Y	Y	10	10	–	–	mortality
Patch Lake	Dors	23-Aug-09	1	LKTR	GN	678	3,300	1.1	21	–	–	–	Y	Y	–	–	Y-087	70711	
Patch Lake	Dors	23-Aug-09	2	LKTR	GN	377	529	1.0	11	–	–	–	Y	Y	–	–	Y-086	113840	
Patch Lake	Dors	23-Aug-09	3	LKTR	GN	472	1,202	1.1	15	–	–	–	Y	Y	–	–	Y-085	108335	
Patch Lake	Dors	23-Aug-09	4	LKTR	GN	511	1,651	1.2	20	–	–	–	Y	Y	–	–	Y-084	68541	
Patch Lake	Dors	23-Aug-09	5	LKTR	GN	486	1,270	1.1	–	–	–	–	–	–	–	–	–	–	
Patch Lake	Dors	23-Aug-09	6	LKTR	GN	505	1,435	1.1	22	–	–	–	Y	Y	–	–	Y-083	113900	
Patch Lake	Dors	24-Aug-09	7	LCIS	GN	281	180	0.8	–	–	–	–	–	–	–	–	–	–	
Patch Lake	Dors	24-Aug-09	8	LKWH	GN	442	1,110	1.3	22	–	–	–	Y	Y	–	–	–	–	
Patch Lake	Dors	24-Aug-09	9	LKWH	GN	360	530	1.1	13	–	–	–	Y	Y	–	–	–	–	
Patch Lake	Dors	24-Aug-09	10	LKWH	GN	340	430	1.1	13	–	–	–	Y	Y	–	–	–	–	
Patch Lake	Dors	24-Aug-09	11	LKWH	GN	422	870	1.2	16	–	–	–	Y	Y	–	–	–	–	
Patch Lake	Dors	24-Aug-09	12	LKWH	GN	356	500	1.1	12	–	–	–	Y	Y	–	–	–	–	
Patch Lake	Dors	24-Aug-09	13	LKWH	GN	390	680	1.1	13	–	–	–	Y	Y	–	–	–	–	
Patch Lake	Dors	24-Aug-09	14	LKWH	GN	409	860	1.3	13	–	–	–	Y	Y	–	–	–	–	
Patch Lake	Dors	24-Aug-09	15	LKWH	GN	384	670	1.2	14	–	–	–	Y	Y	–	–	–	–	
Patch Lake	Dors	24-Aug-09	16	LKWH	GN	377	600	1.1	11	–	–	–	Y	Y	–	–	–	–	
Patch Lake	Dors	24-Aug-09	17	LKWH	GN	425	880	1.1	14	–	–	–	Y	Y	–	–	–	–	
Patch Lake	Dors	24-Aug-09	18	LKWH	GN	308	290	1.0	7	–	–	–	Y	Y	–	–	–	–	
Patch Lake	Dors	24-Aug-09	19	LKWH	GN	327	380	1.1	8	–	–	–	Y	Y	–	–	–	–	
Patch Lake	Dors	24-Aug-09	20	LKWH	GN	335	400	1.1	9	–	–	–	Y	Y	–	–	–	–	
Patch Lake	Dors	24-Aug-09	21	LKWH	GN	382	660	1.2	12	–	–	–	Y	Y	–	–	–	–	
Patch Lake	Dors	24-Aug-09	22	LKWH	GN	355	490	1.1	12	–	–	–	Y	Y	–	–	–	–	
Patch Lake	Dors	24-Aug-09	23	LKWH	GN	341	420	1.1	10	–	–	–	Y	Y	–	–	–	–	
Patch Lake	Dors	24-Aug-09	24	LKWH	GN	371	600	1.2	13	–	–	–	Y	Y	–	–	–	–	
Patch Lake	Dors	24-Aug-09	25	LKTR	GN	615	2,326	1.0	17	–	–	–	Y	Y	–	–	Y-082	2623	
Patch Lake	Dors	24-Aug-09	26	LKTR	GN	644	2,330	0.9	20	–	–	–	Y	Y	–	–	Y-081	72270	
Patch Lake	Dors	24-Aug-09	27	LCIS	GN	251	160	1.0	–	–	–	–	–	–	–	–	–	–	
Patch Lake	Dors	24-Aug-09	28	LCIS	GN	283	267	1.2	–	–	–	–	–	–	–	–	–	–	
Patch Lake	Dors	24-Aug-09	29	LCIS	GN	260	166	0.9	–	–	–	–	–	–	–	–	–	–	
Patch Lake	Dors	24-Aug-09	30	LKTR	GN	548	1,622	1.0	16	–	–	–	Y	Y	–	–	Y-080	71085	
Patch Lake	Dors	24-Aug-09	31	LKTR	GN	703	3,215	0.9	18	–	–	–	Y	Y	–	–	Y-079	114083	
Patch Lake	Dors	24-Aug-09	32	LKTR	GN	584	2,044	1.0	20	–	–	–	Y	Y	–	–	Y-078	5179	
Patch Lake	Dors	24-Aug-09	33	LKTR	GN	698	3,470	1.0	27	1	2	–	Y	Y	–	–	Y-076	70028	
Patch Lake	Dors	24-Aug-09	34	LKTR	GN	328	341	1.0	7	U	U	–	Y	Y	–	–	O-100	113437	
Patch Lake	Dors	24-Aug-09	35	LKTR	GN	403	695	1.1	16	2	1	Y	Y	Y	–	–	–	–	mortality
Patch Lake	Dors	24-Aug-09	36	LKWH	GN	357	502	1.1	13	–	–		Y	Y	–	–	–	–	
Patch Lake	Dors	24-Aug-09	37	LCIS	GN	231	103	0.8	–	–	–	–	–	–	–	–	–	–	
Patch Lake	Dors	24-Aug-09	38	LCIS	GN	284	255	1.1	–	–	–	–	–	–	–	–	–	–	
Patch Lake	Dors	24-Aug-09	39	LKWH	GN	362	530	1.1	11	–	–	–	Y	Y	–	–	–	–	
Patch Lake	Dors	24-Aug-09	40	LKWH	GN	392	755	1.3	14	–	–	–	Y	Y	–	–	–	–	
Patch Lake	Dors	24-Aug-09	41	LKWH	GN	418	1,001	1.4	14	–	–	–	Y	Y	–	–	–	–	
Patch Lake	Dors	24-Aug-09	42	LKWH	GN	322	399	1.2	9	–	–	–	Y	Y	–	–	–	–	
Patch Lake	Dors	24-Aug-09	43	LKWH	GN	388	771	1.3	13	–	–	–	Y	Y	–	–	–	–	
Patch Lake	Dors	24-Aug-09	44	LCIS	GN	294	261	1.0	11	–	–	–	–	–	–	–	–	–	
Patch Lake	Dors	24-Aug-09	45	LKWH	GN	346	463	1.1	–	–	–	–	Y	Y	–	–	–	–	
Patch Lake	Dors	24-Aug-09	46	LKWH	GN	442	1,016	1.2	14	–	–	–	Y	Y	–	–	–	–	
Patch Lake	Dors	24-Aug-09	47	LKWH	GN	349	553	1.3	11	–	–	–	Y	Y	–	–	–	–	
Patch Lake	Dors	24-Aug-09	48	LKTR	GN	684	3,121	1.0	24	–	–	–	Y	Y	–	–	O-99	67772	
Patch Lake	Dors	24-Aug-09	49	LKTR	GN	628	2,635	1.1	19	–	–	–	Y	Y	–	–	O-98	68728	
Patch Lake	Dors	24-Aug-09	50	LKTR	GN	428	785	1.0	18	–	–	–	Y	Y	–	–	O-97	110593	
Patch Lake	Dors	24-Aug-09	51	LKTR	GN	563	1,685	0.9	15	–	–	–	Y	Y	–	–	O-96	70900	
Patch Lake	Dors	24-Aug-09	52	LKTR	GN	699	3,730	1.1	24	–	–	–	Y	Y	–	–	O-95	109056	

Fish Species Codes: ARCH = Arctic char, LCIS = cisco,
LKTR = lake trout, LKWH = lake whitefish
Y = aging structure collected
Tag: Y = yellow, O = orange
Dashes (-) indicate data not collected

Appendix 3.2-1. Biological Data for Fish Sampled from Lakes, Hope Bay Belt Project, 2009

			Sample	Species	Sample	Fork	Weight	Condition				Aging Structure			Stm.	Tissue	Tag		
Water Body	**Basin**	**Date**	**Number**	**Code**	**Method**	**Length (mm)**	**(g)**	**(g/mm^3)**	**Age**	**Sex**	**Maturity**	**Otolith**	**Scales**	**Fin Ray**	**Sample**	**Sample**	**T-bar**	**PIT**	**Comments**
Patch Lake	Dors	24-Aug-09	53	LKTR	GN	732	3,750	1.0	unable to age > 20 yrs	–	–	–	Y	Y	–	–	O-94	105695	
Patch Lake	Dors	25-Aug-09	54	LKTR	GN	415	743	1.0	11	–	–	–	Y	Y	–	–	O-93	114687	
Patch Lake	Dors	25-Aug-09	55	LKWH	GN	390	759	1.3	10	–	–	–	Y	Y	–	–	–	–	
Patch Lake	Dors	25-Aug-09	56	LKWH	GN	391	650	1.1	16	–	–	–	Y	Y	–	–	–	–	
Patch Lake	Dors	25-Aug-09	57	LKWH	GN	384	732	1.3	12	–	–	–	Y	Y	–	–	–	–	
Patch Lake	Dors	25-Aug-09	58	LKTR	GN	648	2,489	0.9	19	–	–	–	Y	Y	–	–	O-92	72462	
Patch Lake	Dors	25-Aug-09	59	LKTR	GN	–	–	–	–	–	–	–	–	–	–	–	O-94	105695	
Patch Lake	Dors	25-Aug-09	60	LKWH	GN	357	522	1.1	10	–	–	–	Y	Y	–	–	–	–	
Patch Lake	Dors	25-Aug-09	61	LKWH	GN	413	886	1.3	14	–	–	–	Y	Y	–	–	–	–	
Patch Lake	Dors	25-Aug-09	62	LKWH	GN	427	994	1.3	16	–	–	–	Y	Y	–	–	–	–	adipose fin missing
Patch Lake	Dors	25-Aug-09	63	LKTR	GN	719	3,214	0.9	17	–	–	–	Y	Y	–	–	O-91	72645	
Patch Lake	Dors	25-Aug-09	64	LKTR	GN	649	2,914	1.1	14	–	–	–	Y	Y	–	–	O-90	104626	
Patch Lake	Dors	25-Aug-09	65	LKTR	GN	695	2,919	0.9	unable to age > 30	–	–	–	Y	Y	–	–	O-88	1581473	
Patch Lake	Dors	25-Aug-09	66	LKTR	GN	683	2,997	0.9	unable to age	–	–	–	Y	Y	–	–	O-87	114427	
Patch Lake	Dors	25-Aug-09	67	LKTR	GN	640	2,268	0.9	–	–	–	–	–	–	–	–	G-3900		Golder tag
Patch Lake	Dors	25-Aug-09	68	LKTR	GN	715	3,145	0.9	22	–	–	–	Y	Y	–	–	O-86	69335	
Patch Lake	Dors	25-Aug-09	69	LKTR	GN	650	2,812	1.0	7	–	–	–	–	–	–	–	G-3904		Golder tag
Patch Lake	Dors	25-Aug-09	70	LKTR	GN	380	500	0.9	10	–	–	–	Y	Y	–	–	O-85	113656	
Patch Lake	Dors	25-Aug-09	71	LKWH	GN	345	439	1.1	13	–	–	–	Y	Y	–	–	–	–	
Patch Lake	Dors	25-Aug-09	72	LKWH	GN	429	950	1.2	10	–	–	–	Y	Y	–	–	–	–	
Patch Lake	Dors	25-Aug-09	73	LKWH	GN	297	297	1.1	19	–	–	–	Y	Y	–	–	–	–	
Patch Lake	Dors	25-Aug-09	74	LCIS	GN	250	150	1.0	–	–	–	–	–	–	–	–	–	–	
Patch Lake	Dors	25-Aug-09	75	LKWH	GN	420	858	1.2	19	–	–	–	Y	Y	–	–	–	–	
Patch Lake	Dors	25-Aug-09	76	LKWH	GN	368	642	1.3	11	–	–	–	Y	Y	–	–	–	–	
Patch Lake	Dors	25-Aug-09	77	LKWH	GN	428	1,124	1.4	23	–	–	–	Y	Y	–	–	–	–	
Patch Lake	Dors	25-Aug-09	78	LKTR	GN	664	2,701	0.9	20	–	–	Y	Y	Y	–	–	–	–	mortality
Patch Lake	Dors	25-Aug-09	79	LKTR	GN	688	3,209	1.0	17	–	–	Y	Y	Y	–	–	–	–	mortality
Patch Lake	Dors	25-Aug-09	80	LKTR	GN	692	3,203	1.0	20	–	–	Y	Y	Y	–	–	–	–	mortality
Patch Lake	Dors	25-Aug-09	81	LKTR	GN	481	1,052	0.9	12	–	–	Y	Y	Y	–	–	–	–	mortality
Patch Lake	Dors	26-Aug-09	82	LKTR	GN	321	328	1.0	10	–	–	–	Y	Y	–	–	O-84		
Patch Lake	Dors	26-Aug-09	83	LKTR	GN	430	671	0.8	12	–	–	–	Y	Y	–	–	O-83		
Patch Lake	Dors	26-Aug-09	84	LKWH	GN	331	447	1.2	8	–	–	–	Y	Y	–	–	–	–	
Patch Lake	Dors	27-Aug-09	85	LKTR	GN	721	4,134	1.1	18	–	–	–	Y	Y	–	–	O-82	107163	
Patch Lake	Dors	27-Aug-09	86	LKTR	GN	668	3,009	1.0	19	–	–	–	Y	Y	–	–	O-81	69026	
Patch Lake	Dors	27-Aug-09	87	LKTR	GN	605	2,315	1.0	14	–	–	–	Y	Y	–	–	O-80	114421	
Patch Lake	Dors	27-Aug-09	88	LKTR	GN	580	1,899	1.0	15	–	–	–	Y	Y	–	–	O-79	104875	
Patch Lake	Dors	27-Aug-09	89	LKTR	GN	600	2,164	1.0	14	–	–	–	Y	Y	–	–	O-78	88712	
Patch Lake	Dors	27-Aug-09	90	LKTR	GN	445	884	1.0	13	–	–	–	Y	Y	–	–	O-77	69856	
Patch Lake	Dors	27-Aug-09	91	LKTR	GN	671	2,807	0.9	25	–	–	–	Y	Y	–	–	O-76	112380	
Patch Lake	Dors	27-Aug-09	92	LKTR	GN	703	2,968	0.9	24	–	–	–	Y	Y	–	–	Y-53		
Patch Lake	Dors	27-Aug-09	93	LKTR	GN	565	1,987	1.1	13	–	–	–	Y	Y	–	–	Y-54	2024	
Patch Lake	Dors	27-Aug-09	94	LKWH	GN	450	1,075	1.2	–	–	–	–	–	–	–	–	–	–	
Patch Lake	Dors	27-Aug-09	95	LKWH	GN	396	828	1.3	–	–	–	–	–	–	–	–	–	–	
Patch Lake	Dors	27-Aug-09	96	LKWH	GN	451	1,154	1.3	–	–	–	–	–	–	–	–	–	–	
Patch Lake	Dors	27-Aug-09	97	LKWH	GN	435	1,048	1.3	–	–	–	–	–	–	–	–	–	–	
Patch Lake	Dors	27-Aug-09	98	LKWH	GN	391	852	1.4	–	–	–	–	–	–	–	–	–	–	
Patch Lake	Dors	27-Aug-09	99	LKWH	GN	390	808	1.4	–	–	–	–	–	–	–	–	–	–	
Patch Lake	Dors	27-Aug-09	100	LKWH	GN	415	853	1.2	–	–	–	–	–	–	–	–	–	–	
Little Roberts Lake	Doris/Roberts	28-Jul-09	1	ARCH	GN	354	400	0.9	5	–	–	–	Y	Y	–	–	–	–	picture 3181 (released)
Little Roberts Lake	Doris/Roberts	28-Jul-09	2	ARCH	GN	303	260	0.9	4	–	–	–	Y	Y	–	–	–	–	
Little Roberts Lake	Doris/Roberts	28-Jul-09	3	ARCH	GN	314	292	0.9	5	–	–	–	Y	Y	–	–	–	–	
Little Roberts Lake	Doris/Roberts	28-Jul-09	4	ARCH	GN	249	192	1.2	4	–	–	–	Y	Y	–	–	–	–	
Little Roberts Lake	Doris/Roberts	28-Jul-09	5	LKWH	GN	428	1,162	1.5	14	–	–	–	Y	Y	–	–	–	–	
Little Roberts Lake	Doris/Roberts	28-Jul-09	6	LKTR	GN	593	2,821	1.4	25	2	2	Y	Y	Y	1	1	4009 (Golder Tag)	–	potentially anadromous; pictures 3182, 3183
Little Roberts Lake	Doris/Roberts	28-Jul-09	7	LKTR	GN	402	626	1.0	18	2	1	Y	Y	Y	2	2	–	–	
Little Roberts Lake	Doris/Roberts	28-Jul-09	8	LKTR	GN	420	937	1.3	15	2	2	Y	Y	Y	3	3	–	–	
Little Roberts Lake	Doris/Roberts	28-Jul-09	9	LKTR	GN	462	1,132	1.1	21	1	2	Y	Y	Y	4	4	–	–	picture 3189
Little Roberts Lake	Doris/Roberts	28-Jul-09	10	ARCH	GN	419	675	0.9	5	–	–	–	Y	Y	–	–	–	–	picture 3195
Little Roberts Lake	Doris/Roberts	28-Jul-09	11	LKTR	GN	415	825	1.2	22	2	2	Y	Y	Y	5	5	–	–	

Fish Species Codes: ARCH = Arctic char, LCIS = cisco,
LKTR = lake trout, LKWH = lake whitefish
Y = aging structure collected
Tag: Y = yellow, O = orange
Dashes (-) indicate data not collected

Appendix 3.2-1. Biological Data for Fish Sampled from Lakes, Hope Bay Belt Project, 2009

			Sample	Species	Sample	Fork	Weight	Condition				Aging Structure			Stm.	Tissue	Tag		
Water Body	Basin	Date	Number	Code	Method	Length (mm)	(g)	(g/mm^3)	Age	Sex	Maturity	Otolith	Scales	Fin Ray	Sample	Sample	T-bar	PIT	Comments
Little Roberts Lake	Doris/Roberts	28-Jul-09	12	ARCH	GN	398	678	1.1	5	–	–	–	Y	Y	–	–	–	–	released
Little Roberts Lake	Doris/Roberts	28-Jul-09	13	LKTR	AG	411	773	1.1	12	–	–	–	Y	Y	6	6	–	–	released angling
Little Roberts Lake	Doris/Roberts	28-Jul-09	14	ARCH	GN	336	392	1.0	5	–	–	–	Y	Y	–	–	–	–	
Little Roberts Lake	Doris/Roberts	28-Jul-09	15	ARCH	GN	355	443	1.0	6	1	1	Y	Y	Y	–	–	–	–	mortality
Little Roberts Lake	Doris/Roberts	28-Jul-09	16	LKTR	GN	368	511	1.0	10	1	1		Y	Y	7	7	–	–	
Little Roberts Lake	Doris/Roberts	29-Jul-09	17	ARCH	GN	321	327	1.0	4	–	–	–	Y	Y	–	–	–	–	
Little Roberts Lake	Doris/Roberts	29-Jul-09	18	ARCH	GN	250	135	0.9	3	–	–	–	Y	Y	–	–	–	–	
Little Roberts Lake	Doris/Roberts	29-Jul-09	19	LKTR	GN	391	618	1.0	13	–	–	–	–	–	8	8	–	–	
Little Roberts Lake	Doris/Roberts	29-Jul-09	20	LKTR	GN	454	1,080	1.2	15	1	2	Y	Y	Y	9	9	–	–	picture 3206
Little Roberts Lake	Doris/Roberts	29-Jul-09	21	LKTR	GN	344	402	1.0	9	–	1	Y	Y	Y	–	–	–	–	
Little Roberts Lake	Doris/Roberts	29-Jul-09	22	ARCH	GN	250	149	1.0	4	2	1	Y	Y	Y	–	–	–	–	picture 3207, possible smolt
Glenn Lake	Windy	31-Jul-09	1	LCIS	GN	135	33	1.3	–	–	–	–	–	–	–	–	–	–	
Glenn Lake	Windy	31-Jul-09	2	LCIS	GN	255	250	1.5	–	–	–	–	–	–	–	–	–	–	
Glenn Lake	Windy	2-Aug-09	3	LKTR	GN	703	4,000	1.2	29	–	–	–	Y	Y	–	–	–	–	
Glenn Lake	Windy	2-Aug-09	4	LKTR	GN	710	4,400	1.2	unable to age	–	–	–	Y	Y	–	–	–	–	
Glenn Lake	Windy	2-Aug-09	5	LKTR	GN	399	465	0.7	12	–	–	–	Y	Y	–	–	–	–	
Glenn Lake	Windy	2-Aug-09	6	LKTR	GN	398	430	0.7	22	1	2	Y	Y	Y	–	–	–	–	
Glenn Lake	Windy	2-Aug-09	7	LKTR	GN	403	550	0.8	unable to age > 20 yrs	–	–	–	Y	Y	–	–	–	–	
Glenn Lake	Windy	2-Aug-09	8	LKTR	GN	387	400	0.7	14	–	–	–	Y	Y	–	–	–	–	
Glenn Lake	Windy	2-Aug-09	9	LKTR	GN	304	240	0.9	–	–	–	–	–	–	–	–	–	–	not sampled
Glenn Lake	Windy	2-Aug-09	10	LCIS	GN	234	132	1.0	–	–	–	–	–	–	–	–	–	–	
Glenn Lake	Windy	2-Aug-09	11	LCIS	GN	194	76	1.0	–	–	–	–	–	–	–	–	–	–	
Glenn Lake	Windy	2-Aug-09	12	LCIS	GN	126	47	2.3	–	–	–	–	–	–	–	–	–	–	
Glenn Lake	Windy	2-Aug-09	13	LCIS	GN	282	178	0.8	–	–	–	–	–	–	–	–	–	–	
Glenn Lake	Windy	2-Aug-09	14	LCIS	GN	233	152	1.2	–	–	–	–	–	–	–	–	–	–	
Glenn Lake	Windy	2-Aug-09	15	LCIS	GN	219	109	1.0	–	–	–	–	–	–	–	–	–	–	
Glenn Lake	Windy	2-Aug-09	16	LCIS	GN	228	133	1.1	–	–	–	–	–	–	–	–	–	–	
Glenn Lake	Windy	2-Aug-09	17	LCIS	GN	223	119	1.1	–	–	–	–	–	–	–	–	–	–	
Glenn Lake	Windy	2-Aug-09	18	LCIS	GN	221	112	1.0	–	–	–	–	–	–	–	–	–	–	
Glenn Lake	Windy	3-Aug-09	19	LCIS	GN	187	63	1.0	–	–	–	–	–	–	–	–	–	–	
Glenn Lake	Windy	3-Aug-09	20	LCIS	GN	213	98	1.0	–	–	–	–	–	–	–	–	–	–	
Glenn Lake	Windy	3-Aug-09	21	LCIS	GN	196	93	1.2	–	–	–	–	–	–	–	–	–	–	
Glenn Lake	Windy	3-Aug-09	22	LCIS	GN	171	52	1.0	–	–	–	–	–	–	–	–	–	–	
Glenn Lake	Windy	3-Aug-09	23	LKTR	GN	448	660	0.7	17	–	–	–	Y	Y	–	–	–	–	
Glenn Lake	Windy	3-Aug-09	24	LKTR	GN	680	3,100	1.0	29	–	–	–	Y	Y	–	–	–	–	
Glenn Lake	Windy	3-Aug-09	25	LKTR	GN	648	2,400	0.9	–	–	–	–	Y	Y	–	–	–	–	not sampled
Glenn Lake	Windy	3-Aug-09	26	LCIS	GN	248	94	0.6	–	–	–	–	–	–	–	–	–	–	
Glenn Lake	Windy	3-Aug-09	27	LCIS	GN	252	109	0.7	–	–	–	–	–	–	–	–	–	–	
Glenn Lake	Windy	3-Aug-09	28	LCIS	GN	268	124	0.6	–	–	–	–	–	–	–	–	–	–	
Glenn Lake	Windy	3-Aug-09	29	LCIS	GN	232	141	1.1	–	–	–	–	–	–	–	–	–	–	
Glenn Lake	Windy	3-Aug-09	30	LCIS	GN	225	118	1.0	–	–	–	–	–	–	–	–	–	–	
Glenn Lake	Windy	3-Aug-09	31	LKTR	GN	472	740	0.7	unable to age	–	–	–	Y	Y	–	–	–	–	
Glenn Lake	Windy	3-Aug-09	32	LKTR	GN	612	2,050	0.9	21	–	–	–	Y	Y	–	–	–	–	
Glenn Lake	Windy	3-Aug-09	33	LCIS	GN	243	85	0.6	–	–	–	–	–	–	–	–	–	–	
Glenn Lake	Windy	3-Aug-09	34	LCIS	GN	251	118	0.7	–	–	–	–	–	–	–	–	–	–	
Glenn Lake	Windy	3-Aug-09	35	LCIS	GN	201	74	0.9	–	–	–	–	–	–	–	–	–	–	
Glenn Lake	Windy	3-Aug-09	36	LCIS	GN	203	80	1.0	–	–	–	–	–	–	–	–	–	–	
Glenn Lake	Windy	3-Aug-09	37	LCIS	GN	322	221	0.7	–	–	–	–	–	–	–	–	–	–	
Glenn Lake	Windy	3-Aug-09	38	LCIS	GN	138	22	0.8	–	–	–	–	–	–	–	–	–	–	
Glenn Lake	Windy	3-Aug-09	39	LKTR	GN	474	820	0.8	21	1	2	Y	Y	Y	–	–	–	–	
Glenn Lake	Windy	3-Aug-09	40	LKTR	GN	472	760	0.7	20	2	2	Y	–	–	–	–	–	–	
Glenn Lake	Windy	3-Aug-09	41	LCIS	GN	254	142	0.9	–	–	–	–	–	–	–	–	–	–	
Glenn Lake	Windy	3-Aug-09	42	LCIS	GN	180	54	0.9	–	–	–	–	–	–	–	–	–	–	
Glenn Lake	Windy	3-Aug-09	43	LKTR	GN	566	720	0.4	24	–	–	–	Y	Y	–	–	–	–	
Glenn Lake	Windy	3-Aug-09	44	LCIS	GN	250	150	1.0	–	–	–	–	–	–	–	–	–	–	
Glenn Lake	Windy	3-Aug-09	45	LCIS	GN	230	110	0.9	–	–	–	–	–	–	–	–	–	–	
Glenn Lake	Windy	3-Aug-09	46	LCIS	GN	237	135	1.0	–	–	–	–	–	–	–	–	–	–	
Glenn Lake	Windy	3-Aug-09	47	LCIS	GN	230	118	1.0	–	–	–	–	–	–	–	–	–	–	
Glenn Lake	Windy	4-Aug-09	48	LKTR	GN	605	2,700	1.2	unable to age > 20 yrs	–	–	–	Y	Y	–	–	–	–	
Glenn Lake	Windy	4-Aug-09	49	LCIS	GN	234	125	1.0	–	–	–	–	–	–	–	–	–	–	

Fish Species Codes: ARCH = Arctic char, LCIS = cisco,
LKTR = lake trout, LKWH = lake whitefish
Y = aging structure collected
Tag: Y = yellow, O = orange
Dashes (-) indicate data not collected

Appendix 3.2-1. Biological Data for Fish Sampled from Lakes, Hope Bay Belt Project, 2009

			Sample	Species	Sample	Fork	Weight	Condition				Aging Structure			Stm.	Tissue	Tag		
Water Body	**Basin**	**Date**	**Number**	**Code**	**Method**	**Length (mm)**	**(g)**	**(g/mm^3)**	**Age**	**Sex**	**Maturity**	**Otolith**	**Scales**	**Fin Ray**	**Sample**	**Sample**	**T-bar**	**PIT**	**Comments**
Glenn Lake	Windy	4-Aug-09	50	LCIS	GN	238	130	1.0	–	–	–	–	–	–	–	–	–	–	
Glenn Lake	Windy	4-Aug-09	51	LCIS	GN	285	296	1.3	–	–	–	–	–	–	–	–	–	–	
Glenn Lake	Windy	4-Aug-09	52	LCIS	GN	221	110	1.0	–	–	–	–	–	–	–	–	–	–	
Glenn Lake	Windy	4-Aug-09	53	LCIS	GN	233	117	0.9	–	–	–	–	–	–	–	–	–	–	
Glenn Lake	Windy	4-Aug-09	54	LCIS	GN	238	127	0.9	–	–	–	–	–	–	–	–	–	–	
Glenn Lake	Windy	4-Aug-09	55	LCIS	GN	241	160	1.1	–	–	–	–	–	–	–	–	–	–	
Glenn Lake	Windy	4-Aug-09	56	LCIS	GN	240	148	1.1	–	–	–	–	–	–	–	–	–	–	
Glenn Lake	Windy	4-Aug-09	57	LKTR	GN	726	3,900	1.0	unable to age > 20 yrs	–	–	–	Y	Y	–	–	–	–	
Glenn Lake	Windy	4-Aug-09	58	LCIS	GN	225	108	0.9	–	–	–	–	–	–	–	–	–	–	
Glenn Lake	Windy	4-Aug-09	59	LCIS	GN	234	118	0.9	–	–	–	–	–	–	–	–	–	–	
Glenn Lake	Windy	4-Aug-09	60	LKTR	GN	480	810	0.7	16	–	–	Y	Y	Y	–	–	–	–	mortality
Glenn Lake	Windy	4-Aug-09	61	LCIS	GN	211	103	1.1	–	–	–	–	–	–	–	–	–	–	
Glenn Lake	Windy	4-Aug-09	62	LCIS	GN	206	102	1.2	–	–	–	–	–	–	–	–	–	–	
Windy Lake	Windy	27-Jul-09	1	LKTR	GN	400	653	1.0	13	2	1	Y	Y	Y	1	1	–	–	mortality
Windy Lake	Windy	27-Jul-09	2	LCIS	GN	315	330	1.1	9	–	–	–	–	–	–	–	–	–	
Windy Lake	Windy	27-Jul-09	3	LCIS	GN	305	–	–	–	–							–	–	
Windy Lake	Windy	27-Jul-09	4	LKTR	GN	773	4,628	1.0	16				Y	Y			–	–	released, photos 498, 499
Windy Lake	Windy	27-Jul-09	5	LKTR	GN	450	987	1.1	15	1	1	Y	Y	Y	2	2	–	–	mortality, photos 500, 501
Windy Lake	Windy	27-Jul-09	6	LCIS	GN	315	321	1.0	–	–	–	–	–	–	–	–	–	–	
Windy Lake	Windy	27-Jul-09	7	LCIS	GN	300	288	1.1	–	–	–	–	–	–	–	–	–	–	
Windy Lake	Windy	27-Jul-09	8	LCIS	GN	275	188	0.9	–	–	–	–	–	–	–	–	–	–	
Windy Lake	Windy	27-Jul-09	9	LCIS	GN	360	457	1.0	–	–	–	–	–	–	–	–	–	–	
Windy Lake	Windy	27-Jul-09	10	LCIS	GN	318	303	0.9	–	–	–	–	–	–	–	–	–	–	
Windy Lake	Windy	27-Jul-09	11	LCIS	GN	319	273	0.8	–	–	–	–	–	–	–	–	–	–	
Windy Lake	Windy	27-Jul-09	12	LCIS	GN	294	239	0.9	–	–	–	–	–	–	–	–	–	–	
Windy Lake	Windy	27-Jul-09	13	LCIS	GN	306	288	1.0	–	–	–	–	–	–	–	–	–	–	
Windy Lake	Windy	27-Jul-09	14	LCIS	GN	298	258	1.0	–	–	–	–	–	–	–	–	–	–	
Windy Lake	Windy	27-Jul-09	15	LCIS	GN	309	292	1.0	–	–	–	–	–	–	–	–	–	–	
Windy Lake	Windy	27-Jul-09	16	LCIS	GN	288	232	1.0	–	–	–	–	–	–	–	–	–	–	
Windy Lake	Windy	27-Jul-09	17	LKTR	GN	825	6,000	1.1	28	–	–	–	Y	Y	–	–	–	–	released, photo 502
Windy Lake	Windy	27-Jul-09	18	LKTR	GN	738	2,790	0.7	14	–	–	–	Y	Y	–	–	–	–	
Windy Lake	Windy	27-Jul-09	19	LKTR	GN	614	2,348	1.0	16	–	–	–	Y	Y	–	–	–	–	
Windy Lake	Windy	27-Jul-09	20	LKTR	GN	734	2,670	0.7	16	–	–	–	Y	Y	–	–	–	–	
Windy Lake	Windy	27-Jul-09	21	LKTR	GN	338	407	1.1	9	2	1	Y	Y	Y	3	3	–	–	mortality, photo 503,504
Windy Lake	Windy	27-Jul-09	22	LCIS	GN	355	420	0.9	–	–	–	–	–	–	–	–	–	–	
Windy Lake	Windy	27-Jul-09	23	LCIS	GN	320	309	0.9	–	–	–	–	–	–	–	–	–	–	
Windy Lake	Windy	27-Jul-09	24	LCIS	GN	285	229	1.0	–	–	–	–	–	–	–	–	–	–	
Windy Lake	Windy	27-Jul-09	25	LCIS	GN	290	212	0.9	–	–	–	–	–	–	–	–	–	–	
Windy Lake	Windy	27-Jul-09	26	LCIS	GN	360	284	0.6	–	–	–	–	–	–	–	–	–	–	
Windy Lake	Windy	27-Jul-09	27	LCIS	GN	305	240	0.8	–	–	–	–	–	–	–	–	–	–	
Windy Lake	Windy	27-Jul-09	28	LCIS	GN	280	189	0.9	–	–	–	–	–	–	–	–	–	–	
Windy Lake	Windy	27-Jul-09	29	LKTR	GN	1020	–	–	28	–	–	–	Y	Y	–	–	–	–	released, photo 505, 506,507
Windy Lake	Windy	27-Jul-09	30	LKTR	GN	750	–	–	21	–	–	–	Y	Y	–	–	–	–	released
Windy Lake	Windy	27-Jul-09	31	LKTR	GN	378	567	1.0	13	2	1	Y	Y	Y	4	4	–	–	mortality
Windy Lake	Windy	27-Jul-09	32	LCIS	GN	290	203	0.8	–	–	–	–	–	–	–	–	–	–	
Windy Lake	Windy	27-Jul-09	33	LCIS	GN	310	278	0.9	–	–	–	–	–	–	–	–	–	–	
Windy Lake	Windy	29-Jul-09	49	LKTR	GN	352	452	1.0	10	2	1	Y	Y	Y	5	5	–	–	mortality
Windy Lake	Windy	29-Jul-09	62	LKTR	GN	413	809	1.1	14	2	1	Y	Y	Y	6	6	–	–	mortality
Windy Lake	Windy	29-Jul-09	65	LKTR	GN	893	6,000	0.8	27	–	–	–	–	Y	–	–	–	–	released, green Golder tag # 4769
Windy Lake	Windy	29-Jul-09	66	LKTR	GN	690	4,551	1.4	19	1	2	Y	Y	Y	7	7	–	–	mortality
Windy Lake	Windy	29-Jul-09	78	LKTR	GN	442	1,107	1.3	21	2	2	Y	Y	Y	8	8	–	–	mortality
Windy Lake	Windy	29-Jul-09	79	LKTR	GN	462	1,060	1.1	18	1	2	Y	Y	Y	9	9	–	–	mortality
Windy Lake	Windy	29-Jul-09	80	LKTR	GN	428	890	1.1	16	2	1	Y	Y	Y	10	10	–	–	mortality
Reference Lake A	Reference A	21-Jul-09	1	LKTR	GN	395	626	1.0	12	–	–	–	Y	Y	–	–	–	–	released; pictures 412, 413
Reference Lake A	Reference A	21-Jul-09	2	LKTR	GN	372	504	1.0	12	1	1	Y	Y	Y	1	1	–	–	
Reference Lake A	Reference A	21-Jul-09	3	LKTR	GN	348	430	1.0	11	2	2	Y	Y	Y	2	2	–	–	
Reference Lake A	Reference A	21-Jul-09	4	LKTR	GN	407	942	1.4	17	1	2	Y	Y	Y	3	3	–	–	good condition; picture 416
Reference Lake A	Reference A	22-Jul-09	5	LKTR	GN	745	approx 6 kg		29	–	–	–	Y	Y	–	–	–	–	released; picture 416
Reference Lake A	Reference A	22-Jul-09	6	LKTR	GN	392	456	0.8	13	–	–	–	Y	Y	–	–	–	–	

Fish Species Codes: ARCH = Arctic char, LCIS = cisco,
LKTR = lake trout, LKWH = lake whitefish
Y = aging structure collected
Tag: Y = yellow, O = orange
Dashes (-) indicate data not collected

Appendix 3.2-1. Biological Data for Fish Sampled from Lakes, Hope Bay Belt Project, 2009

Water Body	Basin	Date	Sample Number	Species Code	Sample Method	Fork Length (mm)	Weight (g)	Condition (g/mm^3)	Age	Sex	Maturity	Aging Structure: Otolith	Aging Structure: Scales	Aging Structure: Fin Ray	Stm. Sample	Tissue Sample	Tag: T-bar	Tag: PIT	Comments
Reference Lake A	Reference A	22-Jul-09	7	LKTR	GN	368	359	0.7	14	2	2	Y	Y	Y	4	4	–	–	
Reference Lake A	Reference A	22-Jul-09	8	LKTR	GN	419	528	0.7	18	2	1	Y	Y	Y	5	5	–	–	
Reference Lake A	Reference A	22-Jul-09	9	LKTR	GN	421	565	0.8	17	1	1	Y	Y	Y	6	6	–	–	
Reference Lake A	Reference A	22-Jul-09	10	LKTR	GN	355	484	1.1	10	1	1	Y	Y	Y	7	7	–	–	
Reference Lake A	Reference A	22-Jul-09	11	LKTR	GN	867	approx 6 kg	–	unable to age > 20 yrs	–	–	–	Y	Y	–	–	–	–	picture 418-421
Reference Lake A	Reference A	22-Jul-09	12	LKWH	GN	423	898	1.2	17	–	–	–	–	–	–	–	–	–	picture 423 - 426
Reference Lake A	Reference A	22-Jul-09	13	LKTR	GN	463	1,052	1.1	19	–	–	–	Y	Y	–	–	–	–	
Reference Lake A	Reference A	22-Jul-09	14	LKTR	GN	455	1,074	1.1	21	2	2	Y	Y	Y	8	8	–	–	
Reference Lake A	Reference A	22-Jul-09	15	LKTR	GN	437	897	1.1	24	1	2	Y	Y	Y	9	9	–	–	
Reference Lake A	Reference A	22-Jul-09	16	LKTR	GN	509	1,348	1.0	28	1	1	Y	Y	Y	10	10	–	–	
Reference Lake A	Reference A	22-Jul-09	17	LKTR	GN	714	–	–	21	–	–	–	–	Y	–	–	–	–	
Reference Lake A	Reference A	22-Jul-09	18	LKTR	GN	455	1,039	1.1	missing	–	–	–	–	Y	–	–	–	–	
Reference Lake B	Reference B	23-Jul-09	1	LKTR	GN	740	–	–	23	–	–	–	Y	Y	–	–	–	–	
Reference Lake B	Reference B	23-Jul-09	2	LKTR	GN	920	–	–	35	–	–	–	Y	Y	–	–	–	–	picture 438
Reference Lake B	Reference B	23-Jul-09	3	LKTR	GN	485	1,008	0.9	12	–	–	–	Y	Y	–	–	–	–	
Reference Lake B	Reference B	23-Jul-09	4	LKTR	GN	478	1,180	1.1	12	–	–	–	Y	Y	–	–	–	–	
Reference Lake B	Reference B	23-Jul-09	5	LKTR	GN	499	1,080	0.9	17	–	–	–	Y	Y	–	–	–	–	
Reference Lake B	Reference B	23-Jul-09	6	ARCH	GN	595	2,093	1.0	12	–	–	–	Y	Y	–	–	–	–	
Reference Lake B	Reference B	23-Jul-09	7	ARCH	GN	540	1,265	0.8	16	–	–	–	Y	Y	–	–	–	–	picture 549
Reference Lake B	Reference B	23-Jul-09	8	ARCH	GN	603	1,594	0.7	16	–	–	–	Y	Y	–	–	–	–	
Reference Lake B	Reference B	23-Jul-09	9	LKTR	GN	540	1,622	1.0	32	2	2	Y	Y	Y	1	1	–	–	
Reference Lake B	Reference B	23-Jul-09	10	LKTR	GN	525	1,230	0.9	21	2	2	Y	Y	Y	2	2	–	–	
Reference Lake B	Reference B	26-Jul-09	11	LKTR	GN	495	–	–	17	–	–	–	Y	Y	–	–	–	–	
Reference Lake B	Reference B	26-Jul-09	12	LKTR	GN	495	–	–	14	–	–	–	Y	Y	–	–	–	–	
Reference Lake B	Reference B	26-Jul-09	13	LKTR	GN	615	–	–	unable to age	–	–	–	Y	Y	–	–	–	–	
Reference Lake B	Reference B	26-Jul-09	14	LKTR	GN	740	–	–	unable to age	–	–	–	Y	Y	–	–	–	–	
Reference Lake B	Reference B	26-Jul-09	15	LKTR	GN	510	1,455	1.1	24	1	1	Y	Y	Y	3	3	–	–	
Reference Lake B	Reference B	26-Jul-09	16	LKTR	GN	525	–	–	19	1	2	Y	Y	Y	4	4	–	–	
Reference Lake B	Reference B	26-Jul-09	17	LKTR	GN	488	–	–	19	2	2	Y	Y	Y	5	5	–	–	
Reference Lake B	Reference B	26-Jul-09	18	LKTR	GN	772	–	–	unable to age > 25 yrs	–	–	–	Y	Y	–	–	–	–	
Reference Lake B	Reference B	26-Jul-09	19	LKTR	GN	743	–	–	27	–	–	–	Y	Y	–	–	–	–	
Reference Lake B	Reference B	26-Jul-09	20	ARCH	GN	380	–	–	6	–	–	–	Y	Y	–	–	–	–	picture 437, 438
Reference Lake B	Reference B	26-Jul-09	21	LKTR	GN	536	–	–	22	2	1	Y	Y	Y	6	6	–	–	
Reference Lake B	Reference B	26-Jul-09	22	LKTR	GN	511	1,488	1.1	25	2	2	Y	Y	Y	7	7	–	–	
Reference Lake B	Reference B	26-Jul-09	23	LKTR	GN	568	–	–	21	2	1	Y	Y	Y	8	8	–	–	
Reference Lake B	Reference B	26-Jul-09	24	LKTR	GN	488	1,272	1.1	16	1	2	Y	Y	Y	9	9	–	–	
Reference Lake B	Reference B	26-Jul-09	25	LKTR	GN	483	1,170	1.0	17	2	2	Y	Y	Y	10	10	–	–	

Fish Species Codes: ARCH = Arctic char, LCIS = cisco, LKTR = lake trout, LKWH = lake whitefish
Y = aging structure collected
Tag: Y = yellow, O = orange
Dashes (-) indicate data not collected

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LKTR = lake trout, LKWH = lake whitefish
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Dashes (-) indicate data not collected

Appendix 3.2-2

Fish Density Data Derived from Hydroacoustic Surveys of Doris Lake, Hope Bay Belt Project, 2009

Engineers and Scientists

Appendix 3.2-2. Fish Density Data Derived from Hydroacoustic Surveys of Doris Lake, Hope Bay Belt Project, 2009

Lake	Longitude	Latitude	# of Fish/Hectare	Lake Section	Transect	Interval	Depth	Habitat Zone	Habitat Zone Category	Period
Doris	-106.5737978	68.09318025	0	1	1	1	1.0	1	littoral	night
Doris	-106.5725281	68.09325507	0	1	1	2	1.6	1	littoral	night
Doris	-106.571318	68.09322571	0	1	1	3	1.6	1	littoral	night
Doris	-106.5701139	68.093205	0	1	1	4	1.5	1	littoral	night
Doris	-106.5689134	68.09318167	0	1	1	5	1.3	1	littoral	night
Doris	-106.567657	68.09321069	0	1	1	6	1.2	1	littoral	night
Doris	-106.5669337	68.09320555	0	1	1	7	1.0	1	littoral	night
Doris	-106.5685636	68.09620429	0	1	2	1	1.5	1	littoral	night
Doris	-106.5697573	68.09617858	0	1	2	2	1.5	1	littoral	night
Doris	-106.5709646	68.096145	0	1	2	3	1.8	1	littoral	night
Doris	-106.5721731	68.096125	59	1	2	4	2.3	1	littoral	night
Doris	-106.5733738	68.09613228	0	1	2	5	2.4	1	littoral	night
Doris	-106.5745778	68.09614833	0	1	2	6	2.4	1	littoral	night
Doris	-106.5757713	68.09613667	0	1	2	7	2.3	1	littoral	night
Doris	-106.5769859	68.09608357	0	1	2	8	2.1	1	littoral	night
Doris	-106.5778659	68.09603064	0	1	2	9	1.5	1	littoral	night
Doris	-106.5812833	68.09973212	0	1	3	1	1.8	1	littoral	night
Doris	-106.5800047	68.0998053	0	1	3	2	2.7	1	littoral	night
Doris	-106.578808	68.09984197	43	1	3	3	3.1	1	littoral	night
Doris	-106.577603	68.09989879	47	1	3	4	2.8	1	littoral	night
Doris	-106.5764105	68.09995009	0	1	3	5	2.4	1	littoral	night
Doris	-106.5752117	68.09998833	0	1	3	6	1.8	1	littoral	night
Doris	-106.5740121	68.10003045	0	1	3	7	1.7	1	littoral	night
Doris	-106.5728079	68.10007103	0	1	3	8	1.2	1	littoral	night
Doris	-106.5716059	68.10011333	0	1	3	9	1.6	1	littoral	night
Doris	-106.5703816	68.10016786	0	1	3	10	2.1	1	littoral	night
Doris	-106.5694661	68.10022476	0	1	3	11	1.0	1	littoral	night
Doris	-106.5726658	68.10364125	0	1	4	1	1.2	1	littoral	night
Doris	-106.5738342	68.10349583	0	1	4	2	1.4	1	littoral	night
Doris	-106.575013	68.10340214	0	1	4	3	1.4	1	littoral	night
Doris	-106.5762164	68.10335357	0	1	4	4	1.7	1	littoral	night
Doris	-106.5774069	68.10333802	0	1	4	5	1.4	1	littoral	night
Doris	-106.5786118	68.10337611	0	1	4	6	2.0	1	littoral	night
Doris	-106.5798122	68.10338817	0	1	4	7	2.7	1	littoral	night
Doris	-106.5810204	68.10339333	46	1	4	8	2.9	1	littoral	night
Doris	-106.5822312	68.10338508	0	1	4	9	3.2	1	littoral	night
Doris	-106.583441	68.10340136	0	1	4	10	2.0	1	littoral	night
Doris	-106.5871935	68.10841772	187	1	5	1	5.1	2	pelagic	night
Doris	-106.5859888	68.10837136	357	1	5	2	5.5	2	pelagic	night
Doris	-106.5847758	68.10841429	381	1	5	3	5.4	2	pelagic	night
Doris	-106.5835864	68.10844426	136	1	5	4	4.9	2	pelagic	night
Doris	-106.5823854	68.10847	100	1	5	5	4.4	2	pelagic	night
Doris	-106.5811846	68.1085008	79	1	5	6	3.6	1	littoral	night
Doris	-106.5799711	68.108535	29	1	5	7	3.1	1	littoral	night
Doris	-106.5787707	68.10853667	23	1	5	8	5.4	2	pelagic	night
Doris	-106.5775692	68.10853817	45	1	5	9	7.2	2	pelagic	night
Doris	-106.5763593	68.10851667	902	1	5	10	7.6	2	pelagic	night
Doris	-106.5751384	68.10851659	68	1	5	11	6.3	2	pelagic	night
Doris	-106.57396	68.10850167	102	1	5	12	5.8	2	pelagic	night
Doris	-106.572877	68.10848079	0	1	5	13	2.1	1	littoral	night
Doris	-106.5745185	68.11249293	340	1	6	1	7.5	2	pelagic	night
Doris	-106.5756803	68.11229767	595	1	6	2	10.9	2	pelagic	night
Doris	-106.5768377	68.11215853	308	1	6	3	11.0	2	pelagic	night
Doris	-106.5780203	68.11207119	68	1	6	4	9.9	2	pelagic	night
Doris	-106.5791998	68.1119891	185	1	6	5	10.0	2	pelagic	night
Doris	-106.5803605	68.11188606	286	1	6	6	12.3	2	pelagic	night
Doris	-106.5815622	68.11180808	412	1	6	7	12.0	2	pelagic	night
Doris	-106.5827576	68.1117495	264	1	6	8	9.9	2	pelagic	night
Doris	-106.5839273	68.11163565	486	1	6	9	8.7	2	pelagic	night
Doris	-106.5851111	68.11154136	300	1	6	10	9.0	2	pelagic	night

Notes:
Coordinates (lat, log) are NAD83
Lake Section: 1 = south of proposed dyke, 2 = north of proposed dyke
Intervals numbered every 50 m
Habitat Zone: 1 = littoral, 2 = pelagic
Habitat zones were defined for each transect interval by their mean water column depth: littoral <= 5 m, pelagic > 5 m

Appendix 3.2-2. Fish Density Data Derived from Hydroacoustic Surveys of Doris Lake, Hope Bay Belt Project, 2009

Lake	Longitude	Latitude	# of Fish/Hectare	Lake Section	Transect	Interval	Depth	Habitat Zone	Habitat Zone Category	Period
Doris	-106.586251	68.11142508	543	1	6	11	7.6	2	pelagic	night
Doris	-106.5874185	68.11128738	91	1	6	12	5.0	2	pelagic	night
Doris	-106.5885797	68.11117742	108	1	6	13	5.0	2	pelagic	night
Doris	-106.5896669	68.11113856	0	1	6	14	3.7	1	littoral	night
Doris	-106.5924017	68.11412167	70	1	7	1	2.0	1	littoral	night
Doris	-106.5910217	68.11422317	0	1	7	2	5.4	2	pelagic	night
Doris	-106.5898589	68.11433112	46	1	7	3	6.9	2	pelagic	night
Doris	-106.5886804	68.11444566	257	1	7	4	8.7	2	pelagic	night
Doris	-106.5875031	68.11454451	160	1	7	5	10.7	2	pelagic	night
Doris	-106.5863213	68.11464033	632	1	7	6	12.0	2	pelagic	night
Doris	-106.5851296	68.11471257	889	1	7	7	13.0	2	pelagic	night
Doris	-106.5839452	68.11478227	285	1	7	8	13.4	2	pelagic	night
Doris	-106.5827562	68.11486358	308	1	7	9	13.5	2	pelagic	night
Doris	-106.5815661	68.11494254	622	1	7	10	13.6	2	pelagic	night
Doris	-106.5803721	68.11502121	849	1	7	11	13.7	2	pelagic	night
Doris	-106.5791916	68.11507332	584	1	7	12	13.9	2	pelagic	night
Doris	-106.577989	68.11512462	258	1	7	13	12.9	2	pelagic	night
Doris	-106.5766811	68.11516288	0	1	7	14	4.3	2	pelagic	night
Doris	-106.5779825	68.11779567	0	2	8	1	7.4	2	pelagic	night
Doris	-106.5791566	68.11767841	546	2	8	2	14.3	2	pelagic	night
Doris	-106.5803551	68.117665	459	2	8	3	15.3	2	pelagic	night
Doris	-106.5815517	68.11765	0	2	8	4	15.3	2	pelagic	night
Doris	-106.5827705	68.11765676	185	2	8	5	15.2	2	pelagic	night
Doris	-106.583947	68.11759992	220	2	8	6	15.2	2	pelagic	night
Doris	-106.5851594	68.11756183	470	2	8	7	15.2	2	pelagic	night
Doris	-106.5863554	68.11753444	617	2	8	8	15.0	2	pelagic	night
Doris	-106.587556	68.11746611	250	2	8	9	14.8	2	pelagic	night
Doris	-106.5887584	68.11743968	292	2	8	10	12.4	2	pelagic	night
Doris	-106.5899634	68.11743833	264	2	8	11	9.2	2	pelagic	night
Doris	-106.5911613	68.11739643	275	2	8	12	8.1	2	pelagic	night
Doris	-106.5923566	68.11731196	384	2	8	13	7.2	2	pelagic	night
Doris	-106.5935739	68.11729833	45	2	8	14	0.6	1	littoral	night
Doris	-106.5935739	68.11729833	45	2	8	14	3.2	2	pelagic	night
Doris	-106.5942968	68.11729702	0	2	8	15	1.3	1	littoral	night
Doris	-106.593395	68.12060992	0	2	9	1	2.3	1	littoral	night
Doris	-106.5921519	68.12066302	0	2	9	2	3.8	1	littoral	night
Doris	-106.590956	68.1206797	278	2	9	3	7.9	2	pelagic	night
Doris	-106.5897578	68.12063833	431	2	9	4	12.8	2	pelagic	night
Doris	-106.5885607	68.12067457	109	2	9	5	15.4	2	pelagic	night
Doris	-106.5873785	68.12075955	283	2	9	6	16.0	2	pelagic	night
Doris	-106.5861811	68.12080431	129	2	9	7	16.4	2	pelagic	night
Doris	-106.5849719	68.1208254	1050	2	9	8	16.4	2	pelagic	night
Doris	-106.5837685	68.12085956	461	2	9	9	16.3	2	pelagic	night
Doris	-106.5825658	68.1208693	480	2	9	10	16.4	2	pelagic	night
Doris	-106.5813648	68.12085857	697	2	9	11	16.4	2	pelagic	night
Doris	-106.58016	68.12081333	107	2	9	12	15.0	2	pelagic	night
Doris	-106.5793106	68.12078302	0	2	9	13	4.6	2	pelagic	night
Doris	-106.5810256	68.12382549	0	2	10	1	9.7	2	pelagic	night
Doris	-106.5822042	68.12366563	0	2	10	2	15.3	2	pelagic	night
Doris	-106.5833728	68.1235662	213	2	10	3	16.2	2	pelagic	night
Doris	-106.5845468	68.12345499	347	2	10	4	16.1	2	pelagic	night
Doris	-106.5857385	68.12336834	0	2	10	5	15.9	2	pelagic	night
Doris	-106.5868927	68.12327119	488	2	10	6	15.5	2	pelagic	night
Doris	-106.5881131	68.12323682	23	2	10	7	15.2	2	pelagic	night
Doris	-106.5893133	68.12321485	289	2	10	8	15.3	2	pelagic	night
Doris	-106.5905156	68.1231431	331	2	10	9	14.1	2	pelagic	night
Doris	-106.5917124	68.12314518	55	2	10	10	9.7	2	pelagic	night
Doris	-106.5929227	68.12313071	0	2	10	11	2.1	1	littoral	night
Doris	-106.5941219	68.12309413	0	2	10	12	2.1	1	littoral	night
Doris	-106.5950328	68.12307741	0	2	10	13	0.8	1	littoral	night
Doris	-106.5988308	68.12691121	0	2	11	1	2.1	1	littoral	night
Doris	-106.5976179	68.12689	33	2	11	2	2.7	1	littoral	night
Doris	-106.5964117	68.126905	24	2	11	3	3.8	1	littoral	night

Notes:
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Intervals numbered every 50 m
Habitat Zone: 1 = littoral, 2 = pelagic
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Appendix 3.2-2. Fish Density Data Derived from Hydroacoustic Surveys of Doris Lake, Hope Bay Belt Project, 2009

Lake	Longitude	Latitude	# of Fish/Hectare	Lake Section	Transect	Interval	Depth	Habitat Zone	Habitat Zone Category	Period
Doris	-106.5952015	68.12690912	0	2	11	4	5.8	2	pelagic	night
Doris	-106.5940071	68.12686833	0	2	11	5	8.7	2	pelagic	night
Doris	-106.5927953	68.12687536	157	2	11	6	10.9	2	pelagic	night
Doris	-106.5915941	68.12689079	240	2	11	7	12.7	2	pelagic	night
Doris	-106.5903887	68.12695643	239	2	11	8	13.3	2	pelagic	night
Doris	-106.5892027	68.12701418	290	2	11	9	13.0	2	pelagic	night
Doris	-106.5879947	68.12705097	632	2	11	10	11.8	2	pelagic	night
Doris	-106.5868016	68.12710618	704	2	11	11	15.5	2	pelagic	night
Doris	-106.5855997	68.12717255	519	2	11	12	16.8	2	pelagic	night
Doris	-106.5844119	68.12721651	143	2	11	13	13.5	2	pelagic	night
Doris	-106.5831938	68.12719383	239	2	11	14	10.0	2	pelagic	night
Doris	-106.5821372	68.12714635	381	2	11	15	5.0	2	pelagic	night
Doris	-106.5844803	68.13143094	0	2	12	1	3.1	1	littoral	night
Doris	-106.5856901	68.13135492	0	2	12	2	7.1	2	pelagic	night
Doris	-106.5869063	68.13131308	0	2	12	3	8.9	2	pelagic	night
Doris	-106.5881123	68.13127894	411	2	12	4	9.1	2	pelagic	night
Doris	-106.5893152	68.13123348	165	2	12	5	10.1	2	pelagic	night
Doris	-106.5905032	68.13120412	461	2	12	6	11.5	2	pelagic	night
Doris	-106.5917086	68.13120167	142	2	12	7	13.5	2	pelagic	night
Doris	-106.5929268	68.13118293	0	2	12	8	10.2	2	pelagic	night
Doris	-106.59414	68.13119119	0	2	12	9	7.0	2	pelagic	night
Doris	-106.5953445	68.13115983	0	2	12	10	9.2	2	pelagic	night
Doris	-106.5965384	68.13112629	0	2	12	11	8.8	2	pelagic	night
Doris	-106.5977364	68.13115705	0	2	12	12	7.8	2	pelagic	night
Doris	-106.5989523	68.13114255	51	2	12	13	5.7	2	pelagic	night
Doris	-106.6001513	68.13112129	32	2	12	14	3.5	1	littoral	night
Doris	-106.6013429	68.13105455	0	2	12	15	1.9	1	littoral	night
Doris	-106.602543	68.13097882	51	2	12	16	2.3	1	littoral	night
Doris	-106.603794	68.13092063	0	2	12	17	1.3	1	littoral	night
Doris	-106.5971582	68.13465696	0	2	13	1	6.9	2	pelagic	night
Doris	-106.595928	68.13450141	23	2	13	2	11.1	2	pelagic	night
Doris	-106.5947284	68.13444059	392	2	13	3	10.3	2	pelagic	night
Doris	-106.593533	68.13437349	0	2	13	4	9.5	2	pelagic	night
Doris	-106.5923393	68.13431222	0	2	13	5	8.5	2	pelagic	night
Doris	-106.5911464	68.13428091	0	2	13	6	7.6	2	pelagic	night
Doris	-106.589937	68.13425083	577	2	13	7	6.9	2	pelagic	night
Doris	-106.5887367	68.13424983	0	2	13	8	6.5	2	pelagic	night
Doris	-106.5875207	68.1342153	0	2	13	9	6.0	2	pelagic	night
Doris	-106.5863268	68.13415621	0	2	13	10	5.6	2	pelagic	night
Doris	-106.584997	68.13406867	64	2	13	11	2.3	1	littoral	night
Doris	-106.5863043	68.13819076	0	2	14	1	2.9	1	littoral	night
Doris	-106.5875424	68.13827174	0	2	14	2	2.0	1	littoral	night
Doris	-106.5887365	68.1383385	0	2	14	3	1.1	1	littoral	night
Doris	-106.5899516	68.13840425	0	2	14	4	2.1	1	littoral	night
Doris	-106.5911045	68.13843762	0	2	14	5	2.0	1	littoral	night

Notes:
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Intervals numbered every 50 m
Habitat Zone: 1 = littoral, 2 = pelagic
Habitat zones were defined for each transect interval by their mean water column depth: littoral <= 5 m, pelagic > 5 m

Notes:
Coordinates (lat, log) are NAD83
Lake Section: 1 = south of proposed dyke, 2 = north of proposed dyke
Intervals numbered every 50 m
Habitat Zone: 1 = littoral, 2 = pelagic
Habitat zones were defined for each transect interval by their mean water column depth: littoral <= 5 m, pelagic > 5 m

Appendix 3.2-3

Fish Density Data Derived from Hydroacoustic Surveys of Patch Lake, Hope Bay Belt Project, 2009

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Appendix 3.2-3. Fish Density Data Derived from Hydroacoustic Surveys of Patch Lake, Hope Bay Belt Project, 2009

Lake	Longitude	Latitude	# of Fish/Hectare	LakeSection	Transect	Interval	Habitat Zone	Habitat Zone Category	Period
Patch	-106.58239	68.0712738	0	1	1	1	1	littoral	night
Patch	-106.58122	68.0715104	0	1	1	2	1	littoral	night
Patch	-106.58018	68.0717346	0	1	1	3	1	littoral	night
Patch	-106.57915	68.0719741	0	1	1	4	1	littoral	night
Patch	-106.57812	68.0722135	0	1	1	5	1	littoral	night
Patch	-106.57706	68.0724447	0	1	1	6	1	littoral	night
Patch	-106.57613	68.072625	0	1	1	7	1	littoral	night
Patch	-106.5737	68.0681758	0	1	2	1	1	littoral	night
Patch	-106.575	68.067988	264	1	2	2	1	littoral	night
Patch	-106.57614	68.0678395	124	1	2	3	1	littoral	night
Patch	-106.57724	68.0676683	0	1	2	4	1	littoral	night
Patch	-106.5783	68.0674583	153	1	2	5	1	littoral	night
Patch	-106.57935	68.0672177	0	1	2	6	1	littoral	night
Patch	-106.58034	68.0669444	0	1	2	7	1	littoral	night
Patch	-106.56181	68.0630367	0	1	3	1	1	littoral	night
Patch	-106.56303	68.0628743	39	1	3	2	1	littoral	night
Patch	-106.56418	68.0627041	0	1	3	3	2	pelagic	night
Patch	-106.56534	68.0625773	51	1	3	4	2	pelagic	night
Patch	-106.56646	68.0624218	0	1	3	5	2	pelagic	night
Patch	-106.56759	68.0622674	23	1	3	6	2	pelagic	night
Patch	-106.56871	68.0621224	46	1	3	7	2	pelagic	night
Patch	-106.56987	68.061991	51	1	3	8	2	pelagic	night
Patch	-106.57102	68.0618412	0	1	3	9	1	littoral	night
Patch	-106.57214	68.0616759	0	1	3	10	1	littoral	night
Patch	-106.57326	68.0615289	0	1	3	11	1	littoral	night
Patch	-106.57441	68.0613596	0	1	3	12	1	littoral	night
Patch	-106.57562	68.0612241	0	1	3	13	1	littoral	night
Patch	-106.57872	68.060184	0	1	4	1	1	littoral	night
Patch	-106.57992	68.0599672	0	1	4	2	1	littoral	night
Patch	-106.58102	68.0597778	134	1	4	3	1	littoral	night
Patch	-106.58205	68.0595496	0	1	4	4	1	littoral	night
Patch	-106.58308	68.059303	0	1	4	5	1	littoral	night
Patch	-106.58405	68.0590459	0	1	4	6	1	littoral	night
Patch	-106.58506	68.0587906	0	1	4	7	1	littoral	night
Patch	-106.58621	68.0585494	0	1	4	8	1	littoral	night
Patch	-106.5805	68.0566717	0	1	5	1	1	littoral	night
Patch	-106.5794	68.0569067	0	1	5	2	2	pelagic	night
Patch	-106.57829	68.0570759	0	1	5	3	2	pelagic	night
Patch	-106.57721	68.0572739	74	1	5	4	1	littoral	night
Patch	-106.5761	68.0574419	0	1	5	5	1	littoral	night
Patch	-106.57493	68.0575964	0	1	5	6	1	littoral	night
Patch	-106.5739	68.0577603	0	1	5	7	1	littoral	night
Patch	-106.57277	68.0579312	0	1	5	8	1	littoral	night
Patch	-106.57163	68.058112	0	1	5	9	1	littoral	night
Patch	-106.57053	68.0583033	0	1	5	10	1	littoral	night
Patch	-106.56943	68.0584707	79	1	5	11	1	littoral	night
Patch	-106.56832	68.0586583	0	1	5	12	1	littoral	night
Patch	-106.56725	68.0588569	0	1	5	13	1	littoral	night
Patch	-106.56617	68.0590552	0	1	5	14	1	littoral	night
Patch	-106.56506	68.0592344	0	1	5	15	1	littoral	night
Patch	-106.56393	68.0593898	63	1	5	16	1	littoral	night
Patch	-106.5628	68.05954	0	1	5	17	1	littoral	night
Patch	-106.56165	68.0596856	0	1	5	18	1	littoral	night
Patch	-106.56052	68.0598487	0	1	5	19	1	littoral	night
Patch	-106.55939	68.0600593	0	1	5	20	1	littoral	night

Notes:
Coordinates (lat, log) are NAD83
Lake Section: 1 = north of proposed dyke, 2 = south of proposed dyke
Intervals numbered every 50 m
Habitat Zone: 1 = littoral, 2 = pelagic
Habitat zones were defined for each transect interval by their mean water column depth: littoral <= 5 m, pelagic > 5 m

Appendix 3.2-3. Fish Density Data Derived from Hydroacoustic Surveys of Patch Lake, Hope Bay Belt Project, 2009

Lake	Longitude	Latitude	# of Fish/Hectare	LakeSection	Transect	Interval	Habitat Zone	Habitat Zone Category	Period
Patch	-106.55844	68.0602016	0	1	5	21	1	littoral	night
Patch	-106.55327	68.0571883	0	1	6	1	1	littoral	night
Patch	-106.55455	68.0569483	28	1	6	2	1	littoral	night
Patch	-106.55561	68.0567789	32	1	6	3	1	littoral	night
Patch	-106.5567	68.0565765	0	1	6	4	1	littoral	night
Patch	-106.55778	68.0563693	48	1	6	5	1	littoral	night
Patch	-106.55885	68.056161	0	1	6	6	1	littoral	night
Patch	-106.55993	68.0559766	0	1	6	7	1	littoral	night
Patch	-106.56105	68.0558006	43	1	6	8	1	littoral	night
Patch	-106.56216	68.0556258	0	1	6	9	1	littoral	night
Patch	-106.56329	68.0554343	0	1	6	10	1	littoral	night
Patch	-106.56432	68.0552436	0	1	6	11	1	littoral	night
Patch	-106.56546	68.0550963	38	1	6	12	1	littoral	night
Patch	-106.56659	68.0549345	67	1	6	13	1	littoral	night
Patch	-106.56772	68.0547724	646	1	6	14	2	pelagic	night
Patch	-106.56884	68.0546241	1006	1	6	15	2	pelagic	night
Patch	-106.56994	68.0544293	203	1	6	16	2	pelagic	night
Patch	-106.57097	68.0542023	665	1	6	17	2	pelagic	night
Patch	-106.572	68.0539617	356	1	6	18	2	pelagic	night
Patch	-106.57304	68.0537393	94	1	6	19	2	pelagic	night
Patch	-106.57417	68.0535875	0	1	6	20	1	littoral	night
Patch	-106.57534	68.0534449	0	1	6	21	1	littoral	night
Patch	-106.5765	68.053246	0	1	6	22	1	littoral	night
Patch	-106.56941	68.0498533	1057	1	7	1	2	pelagic	night
Patch	-106.56815	68.0500491	592	1	7	2	2	pelagic	night
Patch	-106.56718	68.0503093	818	1	7	3	2	pelagic	night
Patch	-106.56616	68.0505421	1318	1	7	4	2	pelagic	night
Patch	-106.56507	68.0507464	349	1	7	5	2	pelagic	night
Patch	-106.56397	68.0509223	45	1	7	6	2	pelagic	night
Patch	-106.56286	68.0510841	69	1	7	7	2	pelagic	night
Patch	-106.56173	68.051243	140	1	7	8	2	pelagic	night
Patch	-106.56061	68.0514062	39	1	7	9	1	littoral	night
Patch	-106.5595	68.0515829	0	1	7	10	1	littoral	night
Patch	-106.5584	68.0517727	0	1	7	11	1	littoral	night
Patch	-106.55724	68.0519517	0	1	7	12	1	littoral	night
Patch	-106.55612	68.0520797	0	1	7	13	1	littoral	night
Patch	-106.55523	68.052226	0	1	7	14	1	littoral	night
Patch	-106.55423	68.0525671	139	1	7	15	1	littoral	night
Patch	-106.55324	68.0528264	0	1	7	16	1	littoral	night
Patch	-106.55214	68.0530168	43	1	7	17	1	littoral	night
Patch	-106.55105	68.0532049	34	1	7	18	1	littoral	night
Patch	-106.54996	68.0533917	32	1	7	19	1	littoral	night
Patch	-106.54886	68.0535907	0	1	7	20	1	littoral	night
Patch	-106.54782	68.0537948	0	1	7	21	1	littoral	night
Patch	-106.54659	68.0540319	0	1	7	22	1	littoral	night
Patch	-106.54607	68.0541183	0	1	7	23	1	littoral	night
Patch	-106.53746	68.0490303	0	1	8	1	1	littoral	night
Patch	-106.53788	68.0485506	0	1	8	2	1	littoral	night
Patch	-106.53822	68.048117	0	1	8	3	1	littoral	night
Patch	-106.53866	68.0477003	0	1	8	4	1	littoral	night
Patch	-106.53909	68.0472804	0	1	8	5	1	littoral	night
Patch	-106.53969	68.0468855	0	1	8	6	1	littoral	night
Patch	-106.54029	68.0464562	0	1	8	7	1	littoral	night
Patch	-106.54076	68.0460691	0	1	8	8	1	littoral	night
Patch	-106.54104	68.0458156	0	1	8	9	1	littoral	night

Notes:
Coordinates (lat, log) are NAD83
Lake Section: 1 = north of proposed dyke, 2 = south of proposed dyke
Intervals numbered every 50 m
Habitat Zone: 1 = littoral, 2 = pelagic
Habitat zones were defined for each transect interval by their mean water column depth: littoral <= 5 m, pelagic > 5 m

Appendix 3.2-3. Fish Density Data Derived from Hydroacoustic Surveys of Patch Lake, Hope Bay Belt Project, 2009

Lake	Longitude	Latitude	# of Fish/Hectare	LakeSection	Transect	Interval	Habitat Zone	Habitat Zone Category	Period
Patch	-106.54309	68.0454571	0	1	9	1	1	littoral	night
Patch	-106.54421	68.0451933	0	1	9	2	1	littoral	night
Patch	-106.54538	68.0449824	0	1	9	3	1	littoral	night
Patch	-106.5463	68.0447802	0	1	9	4	1	littoral	night
Patch	-106.54746	68.0445833	0	1	9	5	1	littoral	night
Patch	-106.54855	68.0444677	0	1	9	6	1	littoral	night
Patch	-106.54971	68.0443317	0	1	9	7	1	littoral	night
Patch	-106.55088	68.044224	0	1	9	8	1	littoral	night
Patch	-106.55206	68.0441217	0	1	9	9	1	littoral	night
Patch	-106.55325	68.0440284	0	1	9	10	1	littoral	night
Patch	-106.55442	68.0439106	0	1	9	11	1	littoral	night
Patch	-106.55562	68.0437642	0	1	9	12	1	littoral	night
Patch	-106.56374	68.0453333	0	1	10	1	1	littoral	night
Patch	-106.56505	68.0453943	0	1	10	2	1	littoral	night
Patch	-106.56623	68.0454337	0	1	10	3	1	littoral	night
Patch	-106.56741	68.0455317	0	1	10	4	1	littoral	night
Patch	-106.56858	68.0456295	0	1	10	5	1	littoral	night
Patch	-106.5698	68.045672	0	1	10	6	1	littoral	night
Patch	-106.57072	68.0457297	0	1	10	7	1	littoral	night
Patch	-106.55297	68.0378021	87	2	11	1	1	littoral	night
Patch	-106.5517	68.0379327	38	2	11	2	1	littoral	night
Patch	-106.5505	68.0380091	0	2	11	3	2	pelagic	night
Patch	-106.54931	68.0380538	89	2	11	4	2	pelagic	night
Patch	-106.54808	68.0380937	58	2	11	5	1	littoral	night
Patch	-106.54691	68.0381183	29	2	11	6	2	pelagic	night
Patch	-106.54572	68.0381582	239	2	11	7	2	pelagic	night
Patch	-106.5445	68.0381969	51	2	11	8	2	pelagic	night
Patch	-106.54331	68.0382088	0	2	11	9	2	pelagic	night
Patch	-106.54211	68.0382242	287	2	11	10	2	pelagic	night
Patch	-106.54091	68.0382191	0	2	11	11	2	pelagic	night
Patch	-106.53967	68.038225	0	2	11	12	1	littoral	night
Patch	-106.53858	68.0381979	0	2	11	13	1	littoral	night
Patch	-106.53298	68.0341771	0	2	12	1	1	littoral	night
Patch	-106.53404	68.0341595	255	2	12	2	2	pelagic	night
Patch	-106.53541	68.0341074	262	2	12	3	2	pelagic	night
Patch	-106.5366	68.0340503	525	2	12	4	2	pelagic	night
Patch	-106.5378	68.03403	45	2	12	5	2	pelagic	night
Patch	-106.539	68.0340101	23	2	12	6	2	pelagic	night
Patch	-106.54018	68.0339628	240	2	12	7	2	pelagic	night
Patch	-106.54138	68.0339024	0	2	12	8	2	pelagic	night
Patch	-106.54258	68.0338383	0	2	12	9	2	pelagic	night
Patch	-106.54376	68.0337592	0	2	12	10	2	pelagic	night
Patch	-106.54497	68.0336886	504	2	12	11	2	pelagic	night
Patch	-106.54615	68.0336659	71	2	12	12	2	pelagic	night
Patch	-106.54736	68.0336233	0	2	12	13	1	littoral	night
Patch	-106.54854	68.0336048	0	2	12	14	1	littoral	night
Patch	-106.54974	68.033625	0	2	12	15	1	littoral	night
Patch	-106.55107	68.0336213	82	2	12	16	1	littoral	night
Patch	-106.54996	68.0278741	94	2	13	1	1	littoral	night
Patch	-106.5487	68.0279216	0	2	13	2	1	littoral	night
Patch	-106.54753	68.0279857	0	2	13	3	1	littoral	night
Patch	-106.54625	68.0281238	0	2	13	4	1	littoral	night
Patch	-106.54522	68.0282006	28	2	13	5	1	littoral	night
Patch	-106.544	68.0282892	46	2	13	6	2	pelagic	night
Patch	-106.54281	68.0283417	296	2	13	7	2	pelagic	night

Notes:
Coordinates (lat, log) are NAD83
Lake Section: 1 = north of proposed dyke, 2 = south of proposed dyke
Intervals numbered every 50 m
Habitat Zone: 1 = littoral, 2 = pelagic
Habitat zones were defined for each transect interval by their mean water column depth: littoral <= 5 m, pelagic > 5 m

Appendix 3.2-3. Fish Density Data Derived from Hydroacoustic Surveys of Patch Lake, Hope Bay Belt Project, 2009

Lake	Longitude	Latitude	# of Fish/Hectare	LakeSection	Transect	Interval	Habitat Zone	Habitat Zone Category	Period
Patch	-106.54167	68.0284683	0	2	13	8	2	pelagic	night
Patch	-106.54053	68.0286175	0	2	13	9	2	pelagic	night
Patch	-106.5394	68.0287749	28	2	13	10	1	littoral	night
Patch	-106.53831	68.0289427	107	2	13	11	1	littoral	night
Patch	-106.53713	68.0290673	0	2	13	12	1	littoral	night
Patch	-106.53594	68.0291319	0	2	13	13	1	littoral	night
Patch	-106.53475	68.0291832	0	2	13	14	1	littoral	night
Patch	-106.53355	68.0292225	0	2	13	15	1	littoral	night
Patch	-106.53236	68.0292529	0	2	13	16	1	littoral	night
Patch	-106.53116	68.0293083	0	2	13	17	1	littoral	night
Patch	-106.52998	68.0293575	0	2	13	18	1	littoral	night
Patch	-106.52877	68.029407	0	2	13	19	1	littoral	night
Patch	-106.52757	68.0294632	0	2	13	20	1	littoral	night
Patch	-106.52638	68.0295266	0	2	13	21	1	littoral	night
Patch	-106.52512	68.0296345	0	2	13	22	1	littoral	night
Patch	-106.52407	68.0297538	0	2	13	23	1	littoral	night
Patch	-106.53802	68.0245874	0	2	14	1	1	littoral	night
Patch	-106.53926	68.0246637	0	2	14	2	1	littoral	night
Patch	-106.54047	68.0246794	0	2	14	3	1	littoral	night
Patch	-106.54168	68.0247195	0	2	14	4	1	littoral	night
Patch	-106.54286	68.0247677	0	2	14	5	1	littoral	night
Patch	-106.54407	68.024795	0	2	14	6	1	littoral	night
Patch	-106.54529	68.0248225	0	2	14	7	1	littoral	night
Patch	-106.54646	68.024865	0	2	14	8	1	littoral	night
Patch	-106.54739	68.0248548	0	2	14	9	1	littoral	night

Notes:
Coordinates (lat, log) are NAD83
Lake Section: 1 = north of proposed dyke, 2 = south of proposed dyke
Intervals numbered every 50 m
Habitat Zone: 1 = littoral, 2 = pelagic
Habitat zones were defined for each transect interval by their mean water column depth: littoral <= 5 m, pelagic > 5 m

Notes:
Coordinates (lat, log) are NAD83
Lake Section: 1 = north of proposed dyke, 2 = south of proposed dyke
Intervals numbered every 50 m
Habitat Zone: 1 = littoral, 2 = pelagic
Habitat zones were defined for each transect interval by their mean water column depth: littoral <= 5 m, pelagic > 5 m

Appendix 3.2-4

Fish Diet Data (Number), Hope Bay Belt Project, 2009

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Appendix 3.2-4. Fish Diet Data (Number), Hope Bay Belt Project, 2009

Location			Reference Lake A	Reference Lake A	Reference Lake A	Reference Lake A	Reference Lake A	Reference Lake A	Reference Lake A	Reference Lake A	Reference Lake A	Reference Lake A	Reference Lake B	Reference Lake B
Date			**21-Jul-09**	**21-Jul-09**	**22-Jul-09**	**22-Jul-09**	**22-Jul-09**	**22-Jul-09**	**22-Jul-09**	**22-Jul-09**	**22-Jul-09**	**22-Jul-09**	**23-Jul-09**	**23-Jul-09**
Fish Species			**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**
Fish Number			**2**	**3**	**4**	**7**	**8**	**9**	**10**	**14**	**15**	**16**	**9**	**10**
Stomach Number			**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**
Sample No.			**090350**	**090351**	**090352**	**090353**	**090354**	**090355**	**090356**	**090357**	**090358**	**090359**	**090360**	**090361**
Fullness (%)			**75**	**50**	**75**	**90**	**75**	**75**	**75**	**100**	**90**	**100**	**75**	**75**
Digestion (%)			**25**	**25**	**25**	**25**	**50**	**50**	**75**	**75**	**90**	**50**	**50**	**75**
Actual Weight (mg)			**8,557**	**2,053**	**6,921**	**8,385**	**7,517**	**5,432**	**3,727**	**24,455**	**17,675**	**50,630**	**15,245**	**20,747**
Comments														
Species/Group	**Stage**	**Origin**												
Cestodes (not included in data)			X	X	X	X	X	X	X					
Nematodes (not included in data)														
CRUSTACEA														
Cladocera														
Podocopidae		M					1							
Isopoda														
Saduria entomon	juv	M					2		3					
Saduria entomon	A	M			1					5	8	41		
Amphipoda														
Gammaridae		M												
Gammaracanthus loricatus		M		1	1		2	3		16				
Gammarus lacustris		FW												
Haustoridae														
Pontoporeia affinis		M/FW												
Mysidacea														
Mysis relicta		M/FW	650	151	442	320	250	250	11				16	
ARACHNIDA														
Hydracarina		FW					1							
EPHEMEROPTERA														
Ephemerellidae														
Ephemerella sp	N	FW												
PLECOPTERA	N*	FW												
Perlodidae	N	FW												
TRICHOPTERA	L	FW												
Trichoptera	P	FW				1	1							
Brachycentridae														
Brachycentrus	P	FW												
Limnephilidae	L	FW												
Grensia	L	FW												
COLEOPTERA	A	TERR			2									
Dytiscidae	A	FW												
Colymbetes	A	FW												
Hydroporus	A	FW												
Carabidae	A	TERR				4								
Cerambycidae	A	TERR												
Staphylinidae	A	TERR												
HYMENOPTERA	A	TERR												
DIPTERA	P	TERR												
Diptera	A	FW							1					
Ceratopogonidae														
Probezzia	L	FW												
Simulidae														
Simulium	L	FW												
Tipulidae	L	FW												
Tipulidae	A	FW				25								
Chironomidae	L*	FW												
Chironomidae	P	FW			1				280		485	400	65	
Tanypodinae														
Procladius	L	FW	100	27	1	70	7	25	2				3	1
Procladius	P	FW											55	1,340
Thiennemannimyia	L	FW												
Tanytarsini														
Paratanytarsus	L													
Paratanytarsus	P	FW				6								

Notes:
A = adult; cop = copepodite (juvenile copepod; dam = damaged; E = egg; F = female
juv = juvenile; L = larva (first juvenile of homometablolous insect); L = larva too small to be identified further*
M = male; N = nymph (juvenile of hemimetabolous insect); N = nymph too small to be identified further*
P = pupa (second juvenile of homoetabolous insect; I to V = first through fifth copepodite stages;
FW = freshwater; M = marine; TERR = terrestrial; X = present (in fish diet studies)
Estimated Weight = used when parts add up to more than the actual weight recorded, usually when the sample is heavily digested.

Appendix 3.2-4. Fish Diet Data (Number), Hope Bay Belt Project, 2009

Location			Reference Lake A	Reference Lake A	Reference Lake A	Reference Lake A	Reference Lake A	Reference Lake A	Reference Lake A	Reference Lake A	Reference Lake A	Reference Lake A	Reference Lake B	Reference Lake B
Date			**21-Jul-09**	**21-Jul-09**	**22-Jul-09**	**22-Jul-09**	**22-Jul-09**	**22-Jul-09**	**22-Jul-09**	**22-Jul-09**	**22-Jul-09**	**22-Jul-09**	**23-Jul-09**	**23-Jul-09**
Fish Species			**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**
Fish Number			**2**	**3**	**4**	**7**	**8**	**9**	**10**	**14**	**15**	**16**	**9**	**10**
Stomach Number			**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**
Sample No.			**090350**	**090351**	**090352**	**090353**	**090354**	**090355**	**090356**	**090357**	**090358**	**090359**	**090360**	**090361**
Fullness (%)			**75**	**50**	**75**	**90**	**75**	**75**	**75**	**100**	**90**	**100**	**75**	**75**
Digestion (%)			**25**	**25**	**25**	**25**	**50**	**50**	**75**	**75**	**90**	**50**	**50**	**75**
Actual Weight (mg)			**8,557**	**2,053**	**6,921**	**8,385**	**7,517**	**5,432**	**3,727**	**24,455**	**17,675**	**50,630**	**15,245**	**20,747**
Comments														
Species/Group	**Stage**	**Origin**												
Tanytarsus	P	FW											10	27
Chironomini	L*	FW											1	
Chironomini	P	FW							350	1,770	1,620	660	545	482
Chironomini	A													
Cryptochironomus	L	FW				6		1	1					
Glyptochironomus	L	FW			3									
Parachironomus	L	FW												
Phaenopsectra	L	FW												
Phaenopsectra	P	FW												
Orthocladiinae	L*	FW												
Orthocladiinae	P	FW												
Eukiefferiella	P	FW												
Heterotrissocladius	L	FW	58	6		6			2					
Heterotrissocladius	P	FW	7	9		108	3	1						
Psectrocladius	L	FW												
Psectrocladius	P	FW												
Diamesinae	P	FW												
Monodiamesa	L	FW												
Monodiamesa	P	FW												
Protanypus	L	FW												
Protanypus	P	FW												
MOLLUSCA														
Bivalvia														
Sphaeriidae														
Pisidium		FW	8		3	4	4	2					4	
Sphaerium		FW											6	
Gastropoda		FW												
Valvatidae														
Valvata sincera sincera		FW											4	
FISH	juv	FW												
Fish	bones	FW												
Salmonidae	juv	FW												
Gasterosteidae		FW												
Pungitius pungitius		FW												
NON-FOOD ITEMS														
Case Materials						X	X							
Plant			X	X	X	X	X	X	X		X	X	X	
Pebble			X	X	X	X	X	X	X					X
Mud/sand														
TOTAL			**823**	**194**	**454**	**550**	**271**	**282**	**650**	**1,791**	**2,113**	**1,101**	**709**	**1,850**

Notes:
A = adult; cop = copepodite (juvenile copepod; dam = damaged; E = egg; F = female
juv = juvenile; L = larva (first juvenile of homometablolous insect); L = larva too small to be identified further*
M = male; N = nymph (juvenile of hemimetabolous insect); N = nymph too small to be identified further*
P = pupa (second juvenile of homoetabolous insect; I to V = first through fifth copepodite stages;
FW = freshwater; M = marine; TERR = terrestrial; X = present (in fish diet studies)
Estimated Weight = used when parts add up to more than the actual weight recorded, usually when the sample is heavily digested.

Appendix 3.2-4. Fish Diet Data (Number), Hope Bay Belt Project, 2009

Location	Reference Lake B	Reference Lake B	Reference Lake B	Reference Lake B	Reference Lake B	Reference Lake B	Reference Lake B	Reference Lake B	Little Roberts Lake	Little Roberts Lake	Little Roberts Lake	Little Roberts Lake	Little Roberts Lake
Date	23-Jul-09	26-Jul-09	26-Jul-09	26-Jul-09	26-Jul-09	26-Jul-09	26-Jul-09	26-Jul-09	28-Jul-09	28-Jul-09	28-Jul-09	28-Jul-09	28-Jul-09
Fish Species	Lake trout	Lake trout	Lake trout	Lake trout	Lake trout	Lake trout	Lake trout	Lake trout	Lake trout	Lake trout	Lake trout	Lake trout	Lake trout
Fish Number	15	16	17	21	22	23	24	25	1	2	3	4	5
Stomach Number	3	4	5	6	7	8	9	10	1	2	3	4	5
Sample No.	090362	090363	090364	090365	090366	090367	090368	090369	090370	090371	090372	090373	090374
Fullness (%)	25	75	5	25	90	75	75	50	100	75	50	50	75
Digestion (%)	50	90	5	75	50	50	25	90	75	75	50	75	90
Actual Weight (mg)	5,276	22,708	1,083	4,554	16,859	13,718	16,419	7,930	155,670	4,809	11,316	3,329	8,169
Comments													
Species/Group													
Cestodes (not included in data)	X	X		X			X	X					
Nematodes (not included in data)													
CRUSTACEA													
Cladocera													
Podocopidae													
Isopoda													
Saduria entomon													
Saduria entomon													
Amphipoda													
Gammaridae													
Gammaracanthus loricatus										1	2	1	
Gammarus lacustris	1	3											
Haustoridae													
Pontoporeia affinis	12	72	1	2	1		1	2		1			
Mysidacea													
Mysis relicta	14	40	13		1			2					
ARACHNIDA													
Hydracarina							3				1	1	
EPHEMEROPTERA													
Ephemerellidae													
Ephemerella sp												1	
PLECOPTERA													
Perlodidae			1										
TRICHOPTERA	5			1	5		3						5
Trichoptera				4				6			1		
Brachycentridae													
Brachycentrus													
Limnephilidae													
Grensia						4							
COLEOPTERA		2								1	5	2	1
Dytiscidae				6							2		1
Colymbetes		1									1	3	
Hydroporus												1	1
Carabidae		1								1	2	1	8
Cerambycidae													
Staphylinidae				1							1	1	1
HYMENOPTERA										1			
DIPTERA		1											
Diptera										12			
Ceratopogonidae													
Probezzia													
Simulidae													
Simulium											2	1	
Tipulidae											1		
Tipulidae	3	134		1		9	1				1		1
Chironomidae				31									
Chironomidae	2										250	51	1,910
Tanypodinae													
Procladius	9	93		59			30	56		3	8	2	38
Procladius		31	1	7		4				427	62	10	38
Thiennemannimyia	1												
Tanytarsini													
Paratanytarsus													
Paratanytarsus											6		38

Notes:
A = adult; cop = copepodite (juvenile copepod; dam = damaged; E = egg; F = female
juv = juvenile; L = larva (first juvenile of homometablolous insect); L = larva too small to be identified further*
M = male; N = nymph (juvenile of hemimetabolous insect); N = nymph too small to be identified further*
P = pupa (second juvenile of homoetabolous insect; I to V = first through fifth copepodite stages;
FW = freshwater; M = marine; TERR = terrestrial; X = present (in fish diet studies)
Estimated Weight = used when parts add up to more than the actual weight recorded, usually when the sample is heavily digested.

Appendix 3.2-4. Fish Diet Data (Number), Hope Bay Belt Project, 2009

Location	**Reference Lake B**	**Reference Lake B**	**Reference Lake B**	**Reference Lake B**	**Reference Lake B**	**Reference Lake B**	**Reference Lake B**	**Reference Lake B**	**Little Roberts Lake**	**Little Roberts Lake**	**Little Roberts Lake**	**Little Roberts Lake**	**Little Roberts Lake**
Date	**23-Jul-09**	**26-Jul-09**	**26-Jul-09**	**26-Jul-09**	**26-Jul-09**	**26-Jul-09**	**26-Jul-09**	**26-Jul-09**	**28-Jul-09**	**28-Jul-09**	**28-Jul-09**	**28-Jul-09**	**28-Jul-09**
Fish Species	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**
Fish Number	**15**	**16**	**17**	**21**	**22**	**23**	**24**	**25**	**1**	**2**	**3**	**4**	**5**
Stomach Number	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**	**3**	**4**	**5**
Sample No.	**090362**	**090363**	**090364**	**090365**	**090366**	**090367**	**090368**	**090369**	**090370**	**090371**	**090372**	**090373**	**090374**
Fullness (%)	**25**	**75**	**5**	**25**	**90**	**75**	**75**	**50**	**100**	**75**	**50**	**50**	**75**
Digestion (%)	**50**	**90**	**5**	**75**	**50**	**50**	**25**	**90**	**75**	**75**	**50**	**75**	**90**
Actual Weight (mg)	**5,276**	**22,708**	**1,083**	**4,554**	**16,859**	**13,718**	**16,419**	**7,930**	**155,670**	**4,809**	**11,316**	**3,329**	**8,169**
Comments													
Species/Group													
Tanytarsus		21	1	1	6	2	74			12	6	3	
Chironomini													
Chironomini				32	1,150	812	1,240	575			21	5	
Chironomini											1		
Cryptochironomus													
Glyptochironomus					2			1					
Parachironomus	1												
Phaenopsectra	4	1	1	1		1	25	6			2	2	2
Phaenopsectra	4	350	5		2			1				1	
Orthocladiinae	1												
Orthocladiinae	1	41	1										
Eukiefferiella												2	
Heterotrissocladius					1								
Heterotrissocladius													
Psectrocladius							1			47	8	7	
Psectrocladius										474	1,035	17	115
Diamesinae													
Monodiamesa	3				1		4	6					
Monodiamesa													1
Protanypus		1	2	5			13	1					
Protanypus	6	62	2			5							
MOLLUSCA													
Bivalvia													
Sphaeriidae													
Pisidium	3	9	3	8	26		85	5					
Sphaerium	2	11	2	3			9	6					
Gastropoda													
Valvatidae													
Valvata sincera sincera	5		12										
FISH	2								26		1	1	
Fish													
Salmonidae													
Gasterosteidae													
Pungitius pungitius													2
NON-FOOD ITEMS													
Case Materials	X	X		X	X	X	X	X					X
Plant	X	X			X		X	X	X	X	X	X	X
Pebble	X			X	X				X	X	X	X	X
Mud/sand	X												
TOTAL	**79**	**874**	**45**	**162**	**1,195**	**837**	**1,489**	**667**	**26**	**980**	**1,419**	**113**	**2,162**

Notes:
A = adult; cop = copepodite (juvenile copepod; dam = damaged; E = egg; F = female
juv = juvenile; L = larva (first juvenile of homometablolous insect); L = larva too small to be identified further*
M = male; N = nymph (juvenile of hemimetabolous insect); N = nymph too small to be identified further*
P = pupa (second juvenile of homoetabolous insect; I to V = first through fifth copepodite stages;
FW = freshwater; M = marine; TERR = terrestrial; X = present (in fish diet studies)
Estimated Weight = used when parts add up to more than the actual weight recorded, usually when the sample is heavily digested.

Appendix 3.2-4. Fish Diet Data (Number), Hope Bay Belt Project, 2009

Location	**Little Roberts Lake**	**Little Roberts Lake**	**Little Roberts Lake**	**Little Roberts Lake**	**PO Lake**	**PO Lake**	**PO Lake**	**PO Lake**	**PO Lake**	**PO Lake**	**PO Lake**	**PO Lake**	**PO Lake**
Date	**28-Jul-09**	**28-Jul-09**	**28-Jul-09**	**28-Jul-09**	**23-Jul-09**	**23-Jul-09**	**27-Jul-09**	**27-Jul-09**	**27-Jul-09**	**27-Jul-09**	**28-Aug-09**	**28-Aug-09**	**28-Aug-09**
Fish Species	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**
Fish Number	**7**	**8**	**9**	**10**	**1**	**2**	**6**	**7**	**8**	**9**	**7**	**8**	**9**
Stomach Number	**6**	**7**	**8**	**9**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Sample No.	**090375**	**090376**	**090377**	**090378**	**090379**	**090380**	**090381**	**090382**	**090383**	**090384**	**090385**	**090386**	**090387**
Fullness (%)	**75**	**50**	**25**	**50**	**90**	**5**	**1**	**5**	**75**	**10**	**90**	**75**	**75**
Digestion (%)	**25**	**90**	**90**	**90**	**50**	**90**	**100**	**50**	**90**	**95**	**50**	**50**	**50**
Actual Weight (mg)	**2,513**	**2,703**	**4,377**	**5,252**	**35,160**	**716**	**0**	**2,325**	**13,518**	**4,710**	**6,158**	**8,865**	**2,470**
Comments							**EMPTY**						
Species/Group													
Cestodes (not included in data)													
Nematodes (not included in data)													
CRUSTACEA													
Cladocera													
Podocopidae													
Isopoda													
Saduria entomon			1										
Saduria entomon													
Amphipoda													
Gammaridae													
Gammaracanthus loricatus	1	1	4	2		2		5	2	5	1	1	3
Gammarus lacustris													
Haustoridae													
Pontoporeia affinis													
Mysidacea													
Mysis relicta			1										
ARACHNIDA													
Hydracarina													
EPHEMEROPTERA													
Ephemerellidae													
Ephemerella sp													
PLECOPTERA													
Perlodidae													
TRICHOPTERA			22										
Trichoptera								2					
Brachycentridae													
Brachycentrus													
Limnephilidae													
Grensia													
COLEOPTERA			1										
Dytiscidae			1										
Colymbetes													
Hydroporus													
Carabidae		1	2										
Cerambycidae	1												
Staphylinidae													
HYMENOPTERA		1											
DIPTERA													
Diptera													
Ceratopogonidae													
Probezzia		1											
Simulidae													
Simulium		2				1							
Tipulidae													
Tipulidae						1				1			
Chironomidae													
Chironomidae	530		38	44		3		5					
Tanypodinae													
Procladius	18	4	1										
Procladius	18	11	4										
Thiennemannimyia										1			
Tanytarsini													
Paratanytarsus													
Paratanytarsus	442			2									

Notes:
A = adult; cop = copepodite (juvenile copepod; dam = damaged; E = egg; F = female
juv = juvenile; L = larva (first juvenile of homometablolous insect); L = larva too small to be identified further*
M = male; N = nymph (juvenile of hemimetabolous insect); N = nymph too small to be identified further*
P = pupa (second juvenile of homoetabolous insect; I to V = first through fifth copepodite stages;
FW = freshwater; M = marine; TERR = terrestrial; X = present (in fish diet studies)
Estimated Weight = used when parts add up to more than the actual weight recorded, usually when the sample is heavily digested.

Appendix 3.2-4. Fish Diet Data (Number), Hope Bay Belt Project, 2009

Location	Little Roberts Lake	Little Roberts Lake	Little Roberts Lake	Little Roberts Lake	PO Lake	PO Lake	PO Lake	PO Lake	PO Lake	PO Lake	PO Lake	PO Lake	PO Lake
Date	**28-Jul-09**	**28-Jul-09**	**28-Jul-09**	**28-Jul-09**	**23-Jul-09**	**23-Jul-09**	**27-Jul-09**	**27-Jul-09**	**27-Jul-09**	**27-Jul-09**	**28-Aug-09**	**28-Aug-09**	**28-Aug-09**
Fish Species	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**
Fish Number	**7**	**8**	**9**	**10**	**1**	**2**	**6**	**7**	**8**	**9**	**7**	**8**	**9**
Stomach Number	**6**	**7**	**8**	**9**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Sample No.	**090375**	**090376**	**090377**	**090378**	**090379**	**090380**	**090381**	**090382**	**090383**	**090384**	**090385**	**090386**	**090387**
Fullness (%)	**75**	**50**	**25**	**50**	**90**	**5**	**1**	**5**	**75**	**10**	**90**	**75**	**75**
Digestion (%)	**25**	**90**	**90**	**90**	**50**	**90**	**100**	**50**	**90**	**95**	**50**	**50**	**50**
Actual Weight (mg)	**2,513**	**2,703**	**4,377**	**5,252**	**35,160**	**716**	**0**	**2,325**	**13,518**	**4,710**	**6,158**	**8,865**	**2,470**
Comments							**EMPTY**						
Species/Group													
Tanytarsus			1										
Chironomini													
Chironomini	10	232		2		5							
Chironomini													
Cryptochironomus													
Glyptochironomus													
Parachironomus													
Phaenopsectra		2	12										
Phaenopsectra			1										
Orthocladiinae													
Orthocladiinae						1							
Eukiefferiella													
Heterotrissocladius													
Heterotrissocladius													
Psectrocladius	35	2		1									
Psectrocladius	88	21	11	3									
Diamesinae													
Monodiamesa													
Monodiamesa													
Protanypus													
Protanypus													
MOLLUSCA													
Bivalvia													
Sphaeriidae													
Pisidium													
Sphaerium													
Gastropoda													
Valvatidae													
Valvata sincera sincera													
FISH	1	2	1	3					1				
Fish										1			
Salmonidae					1							3	
Gasterosteidae													
Pungitius pungitius								1			7	6	2
NON-FOOD ITEMS													
Case Materials			X										
Plant	X	X		X		X		X				X	
Pebble	X	X	X	X									
Mud/sand													
TOTAL	**1,144**	**280**	**101**	**57**	**1**	**13**	**0**	**13**	**3**	**8**	**8**	**10**	**5**

Notes:
A = adult; cop = copepodite (juvenile copepod; dam = damaged; E = egg; F = female
juv = juvenile; L = larva (first juvenile of homometablolous insect); L = larva too small to be identified further*
M = male; N = nymph (juvenile of hemimetabolous insect); N = nymph too small to be identified further*
P = pupa (second juvenile of homoetabolous insect; I to V = first through fifth copepodite stages;
FW = freshwater; M = marine; TERR = terrestrial; X = present (in fish diet studies)
Estimated Weight = used when parts add up to more than the actual weight recorded, usually when the sample is heavily digested.

Appendix 3.2-4. Fish Diet Data (Number), Hope Bay Belt Project, 2009

Location	**PO Lake**	**Windy Lake**	**Windy Lake**	**Windy Lake**	**Windy Lake**	**Windy Lake**	**Windy Lake**	**Windy Lake**	**Windy Lake**	**Windy Lake**	**Windy Lake**	**PO Lake**	**PO Lake**
Date	**28-Aug-09**	**28-Jul-09**	**28-Jul-09**	**28-Jul-09**	**28-Jul-09**	**29-Jul-09**	**29-Jul-09**	**29-Jul-09**	**29-Jul-09**	**30-Jul-09**	**30-Jul-09**	**27-Jul-09**	**27-Jul-09**
Fish Species	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake whitefish**	**Lake whitefish**
Fish Number	**10**	**1**	**5**	**21**	**31**	**49**	**62**	**66**	**78**	**79**	**80**	**1**	**2**
Stomach Number	**10**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**
Sample No.	**090388**	**090393**	**090394**	**090395**	**090396**	**090397**	**090398**	**090399**	**090400**	**090401**	**090402**	**090389**	**090390**
Fullness (%)	**75**	**75**	**90**	**75**	**75**	**90**	**100**	**90**	**75**	**90**	**75**	**60**	**60**
Digestion (%)	**25**	**75**	**50**	**50**	**50**	**25**	**25**	**90**	**50**	**50**	**50**	**50**	**50**
Actual Weight (mg)	**6,297**	**10,031**	**13,450**	**3,884**	**5,796**	**2,744**	**13,554**	**41,570**	**4,720**	**19,432**	**22,296**	**3,079**	**5,451**
Comments													
Species/Group													
Cestodes (not included in data)													
Nematodes (not included in data)		X	X	X	X	X	X		X	X	X		
CRUSTACEA													
Cladocera													
Podocopidae													
Isopoda													
Saduria entomon			10	1		17	205		1				1
Saduria entomon													1
Amphipoda													
Gammaridae													
Gammaracanthus loricatus	1	1	12	6					1	7	2	14	15
Gammarus lacustris													
Haustoridae													
Pontoporeia affinis													
Mysidacea													
Mysis relicta		235		45	26	72	660		110	506	332		
ARACHNIDA													
Hydracarina													
EPHEMEROPTERA													
Ephemerellidae													
Ephemerella sp													
PLECOPTERA													
Perlodidae													
TRICHOPTERA									1				
Trichoptera			2										
Brachycentridae													
Brachycentrus											1		
Limnephilidae													
Grensia													
COLEOPTERA										1			
Dytiscidae									4				
Colymbetes													
Hydroporus													
Carabidae		6							1				
Cerambycidae			1										
Staphylinidae													
HYMENOPTERA													
DIPTERA													
Diptera			26	4									
Ceratopogonidae													
Probezzia													
Simulidae													
Simulium													
Tipulidae													
Tipulidae			10	2									
Chironomidae													
Chironomidae				1	2	6							2
Tanypodinae													
Procladius													
Procladius													
Thiennemannimyia													
Tanytarsini													
Paratanytarsus									1				
Paratanytarsus													

Notes:
A = adult; cop = copepodite (juvenile copepod; dam = damaged; E = egg; F = female
juv = juvenile; L = larva (first juvenile of homometablolous insect); L = larva too small to be identified further*
M = male; N = nymph (juvenile of hemimetabolous insect); N = nymph too small to be identified further*
P = pupa (second juvenile of homoetabolous insect; I to V = first through fifth copepodite stages;
FW = freshwater; M = marine; TERR = terrestrial; X = present (in fish diet studies)
Estimated Weight = used when parts add up to more than the actual weight recorded, usually when the sample is heavily digested.

Appendix 3.2-4. Fish Diet Data (Number), Hope Bay Belt Project, 2009

Location	**PO Lake**	**Windy Lake**	**Windy Lake**	**Windy Lake**	**Windy Lake**	**Windy Lake**	**Windy Lake**	**Windy Lake**	**Windy Lake**	**Windy Lake**	**Windy Lake**	**PO Lake**	**PO Lake**
Date	**28-Aug-09**	**28-Jul-09**	**28-Jul-09**	**28-Jul-09**	**28-Jul-09**	**29-Jul-09**	**29-Jul-09**	**29-Jul-09**	**29-Jul-09**	**30-Jul-09**	**30-Jul-09**	**27-Jul-09**	**27-Jul-09**
Fish Species	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake whitefish**	**Lake whitefish**
Fish Number	**10**	**1**	**5**	**21**	**31**	**49**	**62**	**66**	**78**	**79**	**80**	**1**	**2**
Stomach Number	**10**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**
Sample No.	**090388**	**090393**	**090394**	**090395**	**090396**	**090397**	**090398**	**090399**	**090400**	**090401**	**090402**	**090389**	**090390**
Fullness (%)	**75**	**75**	**90**	**75**	**75**	**90**	**100**	**90**	**75**	**90**	**75**	**60**	**60**
Digestion (%)	**25**	**75**	**50**	**50**	**50**	**25**	**25**	**90**	**50**	**50**	**50**	**50**	**50**
Actual Weight (mg)	**6,297**	**10,031**	**13,450**	**3,884**	**5,796**	**2,744**	**13,554**	**41,570**	**4,720**	**19,432**	**22,296**	**3,079**	**5,451**
Comments													
Species/Group													
Tanytarsus													
Chironomini						2	1						
Chironomini													
Chironomini													
Cryptochironomus													
Glyptochironomus													
Parachironomus													
Phaenopsectra													
Phaenopsectra													
Orthocladiinae													
Orthocladiinae			6				2						
Eukiefferiella													
Heterotrissocladius													
Heterotrissocladius													
Psectrocladius													
Psectrocladius													
Diamesinae													
Monodiamesa													
Monodiamesa													
Protanypus													
Protanypus													
MOLLUSCA													
Bivalvia													
Sphaeriidae													
Pisidium												1	
Sphaerium													
Gastropoda													
Valvatidae													
Valvata sincera sincera													
FISH			1										
Fish								1					
Salmonidae													
Gasterosteidae													
Pungitius pungitius	6											1	
NON-FOOD ITEMS													
Case Materials									X				
Plant		X	X	X	X	X	X		X	X		X	X
Pebble		X	X	X	X	X	X		X	X	X		
Mud/sand													
TOTAL	**7**	**242**	**68**	**59**	**28**	**97**	**868**	**1**	**119**	**514**	**335**	**16**	**19**

Notes:
A = adult; cop = copepodite (juvenile copepod; dam = damaged; E = egg; F = female
juv = juvenile; L = larva (first juvenile of homometablolous insect); L = larva too small to be identified further*
M = male; N = nymph (juvenile of hemimetabolous insect); N = nymph too small to be identified further*
P = pupa (second juvenile of homoetabolous insect; I to V = first through fifth copepodite stages;
FW = freshwater; M = marine; TERR = terrestrial; X = present (in fish diet studies)
Estimated Weight = used when parts add up to more than the actual weight recorded, usually when the sample is heavily digested.

Appendix 3.2-4. Fish Diet Data (Number), Hope Bay Belt Project, 2009

Location	**PO Lake**	**PO Lake**
Date	**27-Jul-09**	**27-Jul-09**
Fish Species	**Lake whitefish**	**Lake whitefish**
Fish Number	**3**	**4**
Stomach Number	**3**	**4**
Sample No.	**090391**	**090392**
Fullness (%)	**60**	**75**
Digestion (%)	**25**	**50**
Actual Weight (mg)	**2,656**	**8,750**
Comments		
Species/Group		
Cestodes (not included in data)		
Nematodes (not included in data)		
CRUSTACEA		
Cladocera		
Podocopidae		
Isopoda		
Saduria entomon		
Saduria entomon		4
Amphipoda		
Gammaridae		
Gammaracanthus loricatus	5	26
Gammarus lacustris		
Haustoridae		
Pontoporeia affinis		
Mysidacea		
Mysis relicta		
ARACHNIDA		
Hydracarina	2	
EPHEMEROPTERA		
Ephemerellidae		
Ephemerella sp		
PLECOPTERA		
Perlodidae		
TRICHOPTERA		
Trichoptera		
Brachycentridae		
Brachycentrus		
Limnephilidae		
Grensia		
COLEOPTERA		
Dytiscidae		
Colymbetes		
Hydroporus		
Carabidae		
Cerambycidae		
Staphylinidae		
HYMENOPTERA		
DIPTERA		
Diptera		
Ceratopogonidae		
Probezzia		
Simulidae		
Simulium		
Tipulidae		
Tipulidae		
Chironomidae		
Chironomidae		
Tanypodinae		
Procladius		
Procladius		
Thiennemannimyia		
Tanytarsini		
Paratanytarsus		
Paratanytarsus		

Notes:
A = adult; cop = copepodite (juvenile copepod; dam = damaged; E = egg; F = female
juv = juvenile; L = larva (first juvenile of homometablolous insect); L = larva too small to be identified further*
M = male; N = nymph (juvenile of hemimetabolous insect); N = nymph too small to be identified further*
P = pupa (second juvenile of homoetabolous insect; I to V = first through fifth copepodite stages;
FW = freshwater; M = marine; TERR = terrestrial; X = present (in fish diet studies)
Estimated Weight = used when parts add up to more than the actual weight recorded, usually when the sample is heavily digested.

Appendix 3.2-4. Fish Diet Data (Number), Hope Bay Belt Project, 2009

Location	**PO Lake**	**PO Lake**
Date	**27-Jul-09**	**27-Jul-09**
Fish Species	**Lake whitefish**	**Lake whitefish**
Fish Number	**3**	**4**
Stomach Number	**3**	**4**
Sample No.	**090391**	**090392**
Fullness (%)	**60**	**75**
Digestion (%)	**25**	**50**
Actual Weight (mg)	**2,656**	**8,750**
Comments		
Species/Group		
Tanytarsus		
Chironomini		
Chironomini		
Chironomini		
Cryptochironomus		
Glyptochironomus		
Parachironomus		
Phaenopsectra		
Phaenopsectra		
Orthocladiinae		
Orthocladiinae		
Eukiefferiella		
Heterotrissocladius		
Heterotrissocladius		
Psectrocladius		
Psectrocladius		
Diamesinae		
Monodiamesa		
Monodiamesa		
Protanypus		
Protanypus		
MOLLUSCA		
Bivalvia		
Sphaeriidae		
Pisidium		
Sphaerium		
Gastropoda		
Valvatidae		
Valvata sincera sincera		
FISH		
Fish		
Salmonidae		
Gasterosteidae		
Pungitius pungitius		
NON-FOOD ITEMS		
Case Materials		
Plant	X	X
Pebble		
Mud/sand		
TOTAL	**7**	**30**

Notes:
A = adult; cop = copepodite (juvenile copepod; dam = damaged; E = egg; F = female
juv = juvenile; L = larva (first juvenile of homometablolous insect); L = larva too small to be identified further*
M = male; N = nymph (juvenile of hemimetabolous insect); N = nymph too small to be identified further*
P = pupa (second juvenile of homoetabolous insect; I to V = first through fifth copepodite stages;
FW = freshwater; M = marine; TERR = terrestrial; X = present (in fish diet studies)
Estimated Weight = used when parts add up to more than the actual weight recorded, usually when the sample is heavily digested.

Appendix 3.2-5
Fish Diet Data (Wet Weight), Hope Bay Belt Project, 2009

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Appendix 3.2-5. Fish Diet Data (Wet Weight), Hope Bay Belt Project, 2009

Location			**Reference Lake**	**Reference Lake**	**Reference Lake**	**Reference Lake**	**Reference Lake**	**Reference Lake**	**Reference Lake**	**Reference Lake**	**Reference Lake**	**Reference Lake**	**Reference Lake**	**Reference Lake**
Date			**21-Jul-09**	**21-Jul-09**	**22-Jul-09**	**22-Jul-09**	**22-Jul-09**	**22-Jul-09**	**22-Jul-09**	**22-Jul-09**	**22-Jul-09**	**22-Jul-09**	**23-Jul-09**	**23-Jul-09**
Fish Species			**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**
Fish Number			**2**	**3**	**4**	**7**	**8**	**9**	**10**	**14**	**15**	**16**	**9**	**10**
Stomach Number			**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**
Sample No.			**090350**	**090351**	**090352**	**090353**	**090354**	**090355**	**090356**	**090357**	**090358**	**090359**	**090360**	**090361**
Fullness (%)			**75**	**50**	**75**	**90**	**75**	**75**	**75**	**100**	**90**	**100**	**75**	**75**
Digestion (%)			**25**	**25**	**25**	**25**	**50**	**50**	**75**	**75**	**90**	**50**	**50**	**75**
Actual Weight (mg)			**8,557**	**2,053**	**6,921**	**8,385**	**7,517**	**5,432**	**3,727**	**24,455**	**17,675**	**50,630**	**15,245**	**20,747**
Comments														
Species/Group	**Stage**	**Origin**												
Cestodes (not included in data)			45	55	146	64	57	412	113					
Nematodes (not included in data)														
CRUSTACEA														
Cladocera														
Podocopidae		M					1							
Isopoda														
Saduria entomon	juv	M					5		8					
Saduria entomon	A	M			640					6,050	5,455	42,845		
Amphipoda														
Gammaridae		M												
Gammaracanthus loricatus		M		100	10		28	117		2,500				
Gammarus lacustris		FW												
Haustoridae														
Pontoporeia affinis		M/FW												
Mysidacea														
Mysis relicta		M/FW	8,163	1,873	5,980	3,980	3,787	2,757	95				520	
ARACHNIDA														
Hydracarina		FW					2							
EPHEMEROPTERA														
Ephemerellidae														
Ephemerella sp	N	FW												
PLECOPTERA	N*	FW												
Perlodidae	N	FW												
TRICHOPTERA	L	FW												
Trichoptera	P	FW				9	5							
Brachycentridae														
Brachycentrus	P	FW												
Limnephilidae	L	FW												
Grensia	L	FW												
COLEOPTERA	A	TERR			50									
Dytiscidae	A	FW												
Colymbetes	A	FW												
Hydroporus	A	FW												
Carabidae	A	TERR				155								
Cerambycidae	A	TERR												
Staphylinidae	A	TERR												
HYMENOPTERA	A	TERR												
DIPTERA	P	TERR												
Diptera	A	FW							50					
Ceratopogonidae														
Probezzia	L	FW												
Simulidae														
Simulium	L	FW												
Tipulidae	L	FW												
Tipulidae	A	FW				3,440								
Chironomidae	L*	FW												
Chironomidae	P	FW			5				493		849	793	131	
Tanypodinae														
Procladius	L	FW	214	48	2	204	20	42	2				28	5
Procladius	P	FW											218	5,308
Thiennemannimyia	L	FW												
Tanytarsini														
Paratanytarsus	L													

Notes:
A = adult; cop = copepodite (juvenile copepod; dam = damaged; E = egg; F = female
juv = juvenile; L = larva (first juvenile of homometablolous insect); L = larva too small to be identified further*
M = male; N = nymph (juvenile of hemimetabolous insect); N = nymph too small to be identified further*
P = pupa (second juvenile of homoetabolous insect; I to V = first through fifth copepodite stages;
FW = freshwater; M = marine; TERR = terrestrial; X = present (in fish diet studies)
Estimated Weight = used when parts add up to more than the actual weight recorded, usually when the sample is heavily digested.

Appendix 3.2-5. Fish Diet Data (Wet Weight), Hope Bay Belt Project, 2009

Location			**Reference Lake**	**Reference Lake**	**Reference Lake**	**Reference Lake**	**Reference Lake**	**Reference Lake**	**Reference Lake**	**Reference Lake**	**Reference Lake**	**Reference Lake**	**Reference Lake**	**Reference Lake**
Date			**21-Jul-09**	**21-Jul-09**	**22-Jul-09**	**22-Jul-09**	**22-Jul-09**	**22-Jul-09**	**22-Jul-09**	**22-Jul-09**	**22-Jul-09**	**22-Jul-09**	**23-Jul-09**	**23-Jul-09**
Fish Species			**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**
Fish Number			**2**	**3**	**4**	**7**	**8**	**9**	**10**	**14**	**15**	**16**	**9**	**10**
Stomach Number			**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**
Sample No.			**090350**	**090351**	**090352**	**090353**	**090354**	**090355**	**090356**	**090357**	**090358**	**090359**	**090360**	**090361**
Fullness (%)			**75**	**50**	**75**	**90**	**75**	**75**	**75**	**100**	**90**	**100**	**75**	**75**
Digestion (%)			**25**	**25**	**25**	**25**	**50**	**50**	**75**	**75**	**90**	**50**	**50**	**75**
Actual Weight (mg)			**8,557**	**2,053**	**6,921**	**8,385**	**7,517**	**5,432**	**3,727**	**24,455**	**17,675**	**50,630**	**15,245**	**20,747**
Comments														
Species/Group	**Stage**	**Origin**												
Paratanytarsus	P	FW				6								
Tanytarsus	P	FW											10	27
Chironomini	L*	FW											3	
Chironomini	P	FW							3,060	15,905	11,320	6,937	14,060	10,537
Chironomini	A													
Cryptochironomus	L	FW				6		1	1					
Glyptochironomus	L	FW			36									
Parachironomus	L	FW												
Phaenopsectra	L	FW												
Phaenopsectra	P	FW												
Orthocladiinae	L*	FW												
Orthocladiinae	P	FW												
Eukiefferiella	P	FW												
Heterotrissocladius	L	FW	58	6		12			3					
Heterotrissocladius	P	FW	9	12		204	5	2						
Psectrocladius	L	FW												
Psectrocladius	P	FW												
Diamesinae	P	FW												
Monodiamesa	L	FW												
Monodiamesa	P	FW												
Protanypus	L	FW												
Protanypus	P	FW												
MOLLUSCA														
Bivalvia														
Sphaeriidae														
Pisidium		FW	22		8	18	30	7					48	
Sphaerium		FW											84	
Gastropoda		FW												
Valvatidae														
Valvata sincera sincera		FW											94	
FISH	juv	FW												
Fish	bones	FW												
Salmonidae	juv	FW												
Gasterosteidae		FW												
Pungitius pungitius		FW												
NON-FOOD ITEMS														
Case Materials						13	7							
Plant			26	12	115	191	57	687	7		51	55	49	
Pebble			65	2	75	160	3,564	1,812	8					4,870
Mud/sand														
TOTAL			**8,557**	**2,053**	**6,921**	**8,385**	**7,517**	**5,432**	**3,727**	**24,455**	**17,675**	**50,630**	**15,245**	**20,747**

Notes:
A = adult; cop = copepodite (juvenile copepod; dam = damaged; E = egg; F = female
juv = juvenile; L = larva (first juvenile of homometablolous insect); L = larva too small to be identified further*
M = male; N = nymph (juvenile of hemimetabolous insect); N = nymph too small to be identified further*
P = pupa (second juvenile of homoetabolous insect; I to V = first through fifth copepodite stages;
FW = freshwater; M = marine; TERR = terrestrial; X = present (in fish diet studies)
Estimated Weight = used when parts add up to more than the actual weight recorded, usually when the sample is heavily digested.

Appendix 3.2-5. Fish Diet Data (Wet Weight), Hope Bay Belt Project, 2009

Location	**Reference Lake**	**Reference Lake**	**Reference Lake**	**Reference Lake**	**Reference Lake**	**Reference Lake**	**Reference Lake**	**Reference Lake**	**Little Roberts**	**Little Roberts**	**Little Roberts**	**Little Roberts**	**Little Roberts**
Date	**23-Jul-09**	**26-Jul-09**	**26-Jul-09**	**26-Jul-09**	**26-Jul-09**	**26-Jul-09**	**26-Jul-09**	**26-Jul-09**	**28-Jul-09**	**28-Jul-09**	**28-Jul-09**	**28-Jul-09**	**28-Jul-09**
Fish Species	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**
Fish Number	**15**	**16**	**17**	**21**	**22**	**23**	**24**	**25**	**1**	**2**	**3**	**4**	**5**
Stomach Number	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**	**3**	**4**	**5**
Sample No.	**090362**	**090363**	**090364**	**090365**	**090366**	**090367**	**090368**	**090369**	**090370**	**090371**	**090372**	**090373**	**090374**
Fullness (%)	**25**	**75**	**5**	**25**	**90**	**75**	**75**	**50**	**100**	**75**	**50**	**50**	**75**
Digestion (%)	**50**	**90**	**5**	**75**	**50**	**50**	**25**	**90**	**75**	**75**	**50**	**75**	**90**
Actual Weight (mg)	**5,276**	**22,708**	**1,083**	**4,554**	**16,859**	**13,718**	**16,419**	**7,930**	**155,670**	**4,809**	**11,316**	**3,329**	**8,169**
Comments													
Species/Group													
Cestodes (not included in data)	417	402		105			1,661	204					
Nematodes (not included in data)													
CRUSTACEA													
Cladocera													
Podocopidae													
Isopoda													
Saduria entomon													
Saduria entomon													
Amphipoda													
Gammaridae													
Gammaracanthus loricatus										352	424	234	
Gammarus lacustris	45	69											
Haustoridae													
Pontoporeia affinis	149	793	7	27	17		13	22		15			
Mysidacea													
Mysis relicta	384	258	385		28			74					
ARACHNIDA													
Hydracarina							7				1	1	
EPHEMEROPTERA													
Ephemerellidae													
Ephemerella sp												50	
PLECOPTERA													
Perlodidae			226										
TRICHOPTERA	125			5	25		15						125
Trichoptera				40				180			40		
Brachycentridae													
Brachycentrus													
Limnephilidae													
Grensia						120							
COLEOPTERA		30								25	100	50	40
Dytiscidae				120							40		33
Colymbetes		50									50	150	
Hydroporus												10	10
Carabidae		17								51	36	13	104
Cerambycidae													
Staphylinidae				1							3	4	4
HYMENOPTERA										10			
DIPTERA		10											
Diptera										1,067			
Ceratopogonidae													
Probezzia													
Simulidae													
Simulium											2	1	
Tipulidae											40		
Tipulidae	405	18,081		135		1,215	135				135		135
Chironomidae				117									
Chironomidae	2										497	100	3,819
Tanypodinae													
Procladius	53	402		59			126	362		18	21	10	190
Procladius		124	6	254		20				1,849	310	40	153
Thiennemannimyia	2												
Tanytarsini													
Paratanytarsus													

Notes:
A = adult; cop = copepodite (juvenile copepod; dam = damaged; E = egg; F = female
juv = juvenile; L = larva (first juvenile of homometablolous insect); L = larva too small to be identified further*
M = male; N = nymph (juvenile of hemimetabolous insect); N = nymph too small to be identified further*
P = pupa (second juvenile of homoetabolous insect; I to V = first through fifth copepodite stages;
FW = freshwater; M = marine; TERR = terrestrial; X = present (in fish diet studies)
Estimated Weight = used when parts add up to more than the actual weight recorded, usually when the sample is heavily digested.

Appendix 3.2-5. Fish Diet Data (Wet Weight), Hope Bay Belt Project, 2009

Location	**Reference Lake**	**Reference Lake**	**Reference Lake**	**Reference Lake**	**Reference Lake**	**Reference Lake**	**Reference Lake**	**Reference Lake**	**Little Roberts**	**Little Roberts**	**Little Roberts**	**Little Roberts**	**Little Roberts**
Date	**23-Jul-09**	**26-Jul-09**	**26-Jul-09**	**26-Jul-09**	**26-Jul-09**	**26-Jul-09**	**26-Jul-09**	**26-Jul-09**	**28-Jul-09**	**28-Jul-09**	**28-Jul-09**	**28-Jul-09**	**28-Jul-09**
Fish Species	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**
Fish Number	**15**	**16**	**17**	**21**	**22**	**23**	**24**	**25**	**1**	**2**	**3**	**4**	**5**
Stomach Number	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**	**3**	**4**	**5**
Sample No.	**090362**	**090363**	**090364**	**090365**	**090366**	**090367**	**090368**	**090369**	**090370**	**090371**	**090372**	**090373**	**090374**
Fullness (%)	**25**	**75**	**5**	**25**	**90**	**75**	**75**	**50**	**100**	**75**	**50**	**50**	**75**
Digestion (%)	**50**	**90**	**5**	**75**	**50**	**50**	**25**	**90**	**75**	**75**	**50**	**75**	**90**
Actual Weight (mg)	**5,276**	**22,708**	**1,083**	**4,554**	**16,859**	**13,718**	**16,419**	**7,930**	**155,670**	**4,809**	**11,316**	**3,329**	**8,169**
Comments													
Species/Group													
Paratanytarsus											6		38
Tanytarsus		21	1	2	12	3	74			12	6	3	
Chironomini													
Chironomini				480	15,671	12,139	14,972	6,959			269	55	
Chironomini											11		
Cryptochironomus													
Glyptochironomus					20			5					
Parachironomus	6												
Phaenopsectra	17	4	2	3		5	92	22			2	3	7
Phaenopsectra	20	1,751	35		10			4				5	
Orthocladiinae	1												
Orthocladiinae	1	82	1										
Eukiefferiella												2	
Heterotrissocladius					1								
Heterotrissocladius													
Psectrocladius							1			59	7	10	
Psectrocladius										1,328	3,331	41	267
Diamesinae													
Monodiamesa	21				5		33	50					
Monodiamesa													15
Protanypus		4	14	35			63	9					
Protanypus	54	566	14			40							
MOLLUSCA													
Bivalvia													
Sphaeriidae													
Pisidium	23	53	20	74	260		700	21					
Sphaerium	18	73	44	35			71	43					
Gastropoda													
Valvatidae													
Valvata sincera sincera	70		328										
FISH	1,000								145,517		500	500	
Fish													
Salmonidae													
Gasterosteidae													
Pungitius pungitius													1,000
NON-FOOD ITEMS													
Case Materials	91	124			210	176	100	110					166
Plant	35	196		3,145	14		17	69	5,776	17	14	1,223	1,299
Pebble	136			22	586				4,377	6	5,471	824	764
Mud/sand	2,618												
TOTAL	**5,276**	**22,708**	**1,083**	**4,554**	**16,859**	**13,718**	**16,419**	**7,930**	**155,670**	**4,809**	**11,316**	**3,329**	**8,169**

Notes:
A = adult; cop = copepodite (juvenile copepod; dam = damaged; E = egg; F = female
juv = juvenile; L = larva (first juvenile of homometablolous insect); L = larva too small to be identified further*
M = male; N = nymph (juvenile of hemimetabolous insect); N = nymph too small to be identified further*
P = pupa (second juvenile of homoetabolous insect; I to V = first through fifth copepodite stages;
FW = freshwater; M = marine; TERR = terrestrial; X = present (in fish diet studies)
Estimated Weight = used when parts add up to more than the actual weight recorded, usually when the sample is heavily digested.

Appendix 3.2-5. Fish Diet Data (Wet Weight), Hope Bay Belt Project, 2009

Location	**Little Roberts**	**Little Roberts**	**Little Roberts**	**Little Roberts**	**PO Lake**	**PO Lake**	**PO Lake**	**PO Lake**	**PO Lake**	**PO Lake**	**PO Lake**	**PO Lake**	**PO Lake**
Date	**28-Jul-09**	**28-Jul-09**	**28-Jul-09**	**28-Jul-09**	**23-Jul-09**	**23-Jul-09**	**27-Jul-09**	**27-Jul-09**	**27-Jul-09**	**27-Jul-09**	**28-Aug-09**	**28-Aug-09**	**28-Aug-09**
Fish Species	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**
Fish Number	**7**	**8**	**9**	**10**	**1**	**2**	**6**	**7**	**8**	**9**	**7**	**8**	**9**
Stomach Number	**6**	**7**	**8**	**9**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Sample No.	**090375**	**090376**	**090377**	**090378**	**090379**	**090380**	**090381**	**090382**	**090383**	**090384**	**090385**	**090386**	**090387**
Fullness (%)	**75**	**50**	**25**	**50**	**90**	**5**	**1**	**5**	**75**	**10**	**90**	**75**	**75**
Digestion (%)	**25**	**90**	**90**	**90**	**50**	**90**	**100**	**50**	**90**	**95**	**50**	**50**	**50**
Actual Weight (mg)	**2,513**	**2,703**	**4,377**	**5,252**	**35,160**	**716**	**0**	**2,325**	**13,518**	**4,710**	**6,158**	**8,865**	**2,470**
Comments							**EMPTY**						
Species/Group													
Cestodes (not included in data)													
Nematodes (not included in data)													
CRUSTACEA													
Cladocera													
Podocopidae													
Isopoda													
Saduria entomon			16										
Saduria entomon													
Amphipoda													
Gammaridae													
Gammaracanthus loricatus	161	195	1,126	510		435		1,410	460	710	209	128	941
Gammarus lacustris													
Haustoridae													
Pontoporeia affinis													
Mysidacea													
Mysis relicta			31										
ARACHNIDA													
Hydracarina													
EPHEMEROPTERA													
Ephemerellidae													
Ephemerella sp													
PLECOPTERA													
Perlodidae													
TRICHOPTERA			440										
Trichoptera								92					
Brachycentridae													
Brachycentrus													
Limnephilidae													
Grensia													
COLEOPTERA			40										
Dytiscidae			39										
Colymbetes													
Hydroporus													
Carabidae		22	30										
Cerambycidae	50												
Staphylinidae													
HYMENOPTERA		6											
DIPTERA													
Diptera													
Ceratopogonidae													
Probezzia		1											
Simulidae													
Simulium		4				3							
Tipulidae													
Tipulidae						135				135			
Chironomidae													
Chironomidae	796		76	88		9		20					
Tanypodinae													
Procladius	88	12	4										
Procladius	71	88	20										
Thiennemannimyia										2			
Tanytarsini													
Paratanytarsus													

Notes:
A = adult; cop = copepodite (juvenile copepod; dam = damaged; E = egg; F = female
juv = juvenile; L = larva (first juvenile of homometablolous insect); L = larva too small to be identified further*
M = male; N = nymph (juvenile of hemimetabolous insect); N = nymph too small to be identified further*
P = pupa (second juvenile of homoetabolous insect; I to V = first through fifth copepodite stages;
FW = freshwater; M = marine; TERR = terrestrial; X = present (in fish diet studies)
Estimated Weight = used when parts add up to more than the actual weight recorded, usually when the sample is heavily digested.

Appendix 3.2-5. Fish Diet Data (Wet Weight), Hope Bay Belt Project, 2009

Location	**Little Roberts**	**Little Roberts**	**Little Roberts**	**Little Roberts**	**PO Lake**	**PO Lake**	**PO Lake**	**PO Lake**	**PO Lake**	**PO Lake**	**PO Lake**	**PO Lake**	**PO Lake**
Date	**28-Jul-09**	**28-Jul-09**	**28-Jul-09**	**28-Jul-09**	**23-Jul-09**	**23-Jul-09**	**27-Jul-09**	**27-Jul-09**	**27-Jul-09**	**27-Jul-09**	**28-Aug-09**	**28-Aug-09**	**28-Aug-09**
Fish Species	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**
Fish Number	**7**	**8**	**9**	**10**	**1**	**2**	**6**	**7**	**8**	**9**	**7**	**8**	**9**
Stomach Number	**6**	**7**	**8**	**9**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Sample No.	**090375**	**090376**	**090377**	**090378**	**090379**	**090380**	**090381**	**090382**	**090383**	**090384**	**090385**	**090386**	**090387**
Fullness (%)	**75**	**50**	**25**	**50**	**90**	**5**	**1**	**5**	**75**	**10**	**90**	**75**	**75**
Digestion (%)	**25**	**90**	**90**	**90**	**50**	**90**	**100**	**50**	**90**	**95**	**50**	**50**	**50**
Actual Weight (mg)	**2,513**	**2,703**	**4,377**	**5,252**	**35,160**	**716**	**0**	**2,325**	**13,518**	**4,710**	**6,158**	**8,865**	**2,470**
Comments							**EMPTY**						
Species/Group													
Paratanytarsus	460			2									
Tanytarsus			1										
Chironomini													
Chironomini	120	464		26		70							
Chironomini													
Cryptochironomus													
Glyptochironomus													
Parachironomus													
Phaenopsectra		4	24										
Phaenopsectra			8										
Orthocladiinae													
Orthocladiinae						2							
Eukiefferiella													
Heterotrissocladius													
Heterotrissocladius													
Psectrocladius	71	2		1									
Psectrocladius	177	47	22	6									
Diamesinae													
Monodiamesa													
Monodiamesa													
Protanypus													
Protanypus													
MOLLUSCA													
Bivalvia													
Sphaeriidae													
Pisidium													
Sphaerium													
Gastropoda													
Valvatidae													
Valvata sincera sincera													
FISH	500	750	985	4,410					13,058				
Fish										3,863			
Salmonidae					35,160							4,423	
Gasterosteidae													
Pungitius pungitius								760			5,949	4,259	1,529
NON-FOOD ITEMS													
Case Materials			1,025										
Plant	7	149		130		62		43				55	
Pebble	12	959	490	79									
Mud/sand													
TOTAL	**2,513**	**2,703**	**4,377**	**5,252**	**35,160**	**716**	**0**	**2,325**	**13,518**	**4,710**	**6,158**	**8,865**	**2,470**

Notes:
A = adult; cop = copepodite (juvenile copepod; dam = damaged; E = egg; F = female
juv = juvenile; L = larva (first juvenile of homometablolous insect); L = larva too small to be identified further*
M = male; N = nymph (juvenile of hemimetabolous insect); N = nymph too small to be identified further*
P = pupa (second juvenile of homoetabolous insect; I to V = first through fifth copepodite stages;
FW = freshwater; M = marine; TERR = terrestrial; X = present (in fish diet studies)
Estimated Weight = used when parts add up to more than the actual weight recorded, usually when the sample is heavily digested.

Appendix 3.2-5. Fish Diet Data (Wet Weight), Hope Bay Belt Project, 2009

Location	**PO Lake**	**Windy Lake**	**Windy Lake**	**Windy Lake**	**Windy Lake**	**Windy Lake**	**Windy Lake**	**Windy Lake**	**Windy Lake**	**Windy Lake**	**Windy Lake**	**PO Lake**	**PO Lake**
Date	**28-Aug-09**	**28-Jul-09**	**28-Jul-09**	**28-Jul-09**	**28-Jul-09**	**29-Jul-09**	**29-Jul-09**	**29-Jul-09**	**29-Jul-09**	**30-Jul-09**	**30-Jul-09**	**27-Jul-09**	**27-Jul-09**
Fish Species	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake whitefish**	**Lake whitefish**
Fish Number	**10**	**1**	**5**	**21**	**31**	**49**	**62**	**66**	**78**	**79**	**80**	**1**	**2**
Stomach Number	**10**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**
Sample No.	**090388**	**090393**	**090394**	**090395**	**090396**	**090397**	**090398**	**090399**	**090400**	**090401**	**090402**	**090389**	**090390**
Fullness (%)	**75**	**75**	**90**	**75**	**75**	**90**	**100**	**90**	**75**	**90**	**75**	**60**	**60**
Digestion (%)	**25**	**75**	**50**	**50**	**50**	**25**	**25**	**90**	**50**	**50**	**50**	**50**	**50**
Actual Weight (mg)	**6,297**	**10,031**	**13,450**	**3,884**	**5,796**	**2,744**	**13,554**	**41,570**	**4,720**	**19,432**	**22,296**	**3,079**	**5,451**
Comments													
Species/Group													
Cestodes (not included in data)													
Nematodes (not included in data)		66	6,945	3,487	27	2,734	1,386		4,944	703	53		
CRUSTACEA													
Cladocera													
Podocopidae													
Isopoda													
Saduria entomon			60	2		49	456		11				18
Saduria entomon													2,513
Amphipoda													
Gammaridae													
Gammaracanthus loricatus	187	250	1,624	480					117	726	340	2,184	2,207
Gammarus lacustris													
Haustoridae													
Pontoporeia affinis													
Mysidacea													
Mysis relicta		3,880		1,046	605	1,358	12,794		2,411	9,929	6,221		
ARACHNIDA													
Hydracarina													
EPHEMEROPTERA													
Ephemerellidae													
Ephemerella sp													
PLECOPTERA													
Perlodidae													
TRICHOPTERA									20				
Trichoptera			48										
Brachycentridae													
Brachycentrus											22		
Limnephilidae													
Grensia													
COLEOPTERA										40			
Dytiscidae									60				
Colymbetes													
Hydroporus													
Carabidae		240							20				
Cerambycidae			8										
Staphylinidae													
HYMENOPTERA													
DIPTERA													
Diptera			520	40									
Ceratopogonidae													
Probezzia													
Simulidae													
Simulium													
Tipulidae													
Tipulidae			1,000	200									
Chironomidae													
Chironomidae				2	4	12							2
Tanypodinae													
Procladius													
Procladius													
Thiennemannimyia													
Tanytarsini													
Paratanytarsus									1				

Notes:
A = adult; cop = copepodite (juvenile copepod; dam = damaged; E = egg; F = female
juv = juvenile; L = larva (first juvenile of homometablolous insect); L = larva too small to be identified further*
M = male; N = nymph (juvenile of hemimetabolous insect); N = nymph too small to be identified further*
P = pupa (second juvenile of homoetabolous insect; I to V = first through fifth copepodite stages;
FW = freshwater; M = marine; TERR = terrestrial; X = present (in fish diet studies)
Estimated Weight = used when parts add up to more than the actual weight recorded, usually when the sample is heavily digested.

Appendix 3.2-5. Fish Diet Data (Wet Weight), Hope Bay Belt Project, 2009

Location	**PO Lake**	**Windy Lake**	**Windy Lake**	**Windy Lake**	**Windy Lake**	**Windy Lake**	**Windy Lake**	**Windy Lake**	**Windy Lake**	**Windy Lake**	**Windy Lake**	**PO Lake**	**PO Lake**
Date	**28-Aug-09**	**28-Jul-09**	**28-Jul-09**	**28-Jul-09**	**28-Jul-09**	**29-Jul-09**	**29-Jul-09**	**29-Jul-09**	**29-Jul-09**	**30-Jul-09**	**30-Jul-09**	**27-Jul-09**	**27-Jul-09**
Fish Species	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake trout**	**Lake whitefish**	**Lake whitefish**
Fish Number	**10**	**1**	**5**	**21**	**31**	**49**	**62**	**66**	**78**	**79**	**80**	**1**	**2**
Stomach Number	**10**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**1**	**2**
Sample No.	**090388**	**090393**	**090394**	**090395**	**090396**	**090397**	**090398**	**090399**	**090400**	**090401**	**090402**	**090389**	**090390**
Fullness (%)	**75**	**75**	**90**	**75**	**75**	**90**	**100**	**90**	**75**	**90**	**75**	**60**	**60**
Digestion (%)	**25**	**75**	**50**	**50**	**50**	**25**	**25**	**90**	**50**	**50**	**50**	**50**	**50**
Actual Weight (mg)	**6,297**	**10,031**	**13,450**	**3,884**	**5,796**	**2,744**	**13,554**	**41,570**	**4,720**	**19,432**	**22,296**	**3,079**	**5,451**
Comments													
Species/Group													
Paratanytarsus													
Tanytarsus													
Chironomini						4	1						
Chironomini													
Chironomini													
Cryptochironomus													
Glyptochironomus													
Parachironomus													
Phaenopsectra													
Phaenopsectra													
Orthocladiinae													
Orthocladiinae			12				2						
Eukiefferiella													
Heterotrissocladius													
Heterotrissocladius													
Psectrocladius													
Psectrocladius													
Diamesinae													
Monodiamesa													
Monodiamesa													
Protanypus													
Protanypus													
MOLLUSCA													
Bivalvia													
Sphaeriidae													
Pisidium												7	
Sphaerium													
Gastropoda													
Valvatidae													
Valvata sincera sincera													
FISH			24										
Fish								41,570					
Salmonidae													
Gasterosteidae													
Pungitius pungitius	6,110											555	
NON-FOOD ITEMS													
Case Materials									47				
Plant		5,461	1,808	1,743	2,615	40	218		596	121		333	711
Pebble		200	8,346	371	2,572	1,281	83		1,437	8,616	15,713		
Mud/sand													
TOTAL	**6,297**	**10,031**	**13,450**	**3,884**	**5,796**	**2,744**	**13,554**	**41,570**	**4,720**	**19,432**	**22,296**	**3,079**	**5,451**

Notes:
A = adult; cop = copepodite (juvenile copepod; dam = damaged; E = egg; F = female
juv = juvenile; L = larva (first juvenile of homometablolous insect); L = larva too small to be identified further*
M = male; N = nymph (juvenile of hemimetabolous insect); N = nymph too small to be identified further*
P = pupa (second juvenile of homoetabolous insect; I to V = first through fifth copepodite stages;
FW = freshwater; M = marine; TERR = terrestrial; X = present (in fish diet studies)
Estimated Weight = used when parts add up to more than the actual weight recorded, usually when the sample is heavily digested.

Appendix 3.2-5. Fish Diet Data (Wet Weight), Hope Bay Belt Project, 2009

Location	**PO Lake**	**PO Lake**
Date	**27-Jul-09**	**27-Jul-09**
Fish Species	**Lake whitefish**	**Lake whitefish**
Fish Number	**3**	**4**
Stomach Number	**3**	**4**
Sample No.	**090391**	**090392**
Fullness (%)	**60**	**75**
Digestion (%)	**25**	**50**
Actual Weight (mg)	**2,656**	**8,750**
Comments		
Species/Group		
Cestodes (not included in data)		
Nematodes (not included in data)		
CRUSTACEA		
Cladocera		
Podocopidae		
Isopoda		
Saduria entomon		
Saduria entomon		2,566
Amphipoda		
Gammaridae		
Gammaracanthus loricatus	2,533	4,653
Gammarus lacustris		
Haustoridae		
Pontoporeia affinis		
Mysidacea		
Mysis relicta		
ARACHNIDA		
Hydracarina	1	
EPHEMEROPTERA		
Ephemerellidae		
Ephemerella sp		
PLECOPTERA		
Perlodidae		
TRICHOPTERA		
Trichoptera		
Brachycentridae		
Brachycentrus		
Limnephilidae		
Grensia		
COLEOPTERA		
Dytiscidae		
Colymbetes		
Hydroporus		
Carabidae		
Cerambycidae		
Staphylinidae		
HYMENOPTERA		
DIPTERA		
Diptera		
Ceratopogonidae		
Probezzia		
Simulidae		
Simulium		
Tipulidae		
Tipulidae		
Chironomidae		
Chironomidae		
Tanypodinae		
Procladius		
Procladius		
Thiennemannimyia		
Tanytarsini		
Paratanytarsus		

Notes:
A = adult; cop = copepodite (juvenile copepod; dam = damaged; E = egg; F = female
juv = juvenile; L = larva (first juvenile of homometablolous insect); L = larva too small to be identified further*
M = male; N = nymph (juvenile of hemimetabolous insect); N = nymph too small to be identified further*
P = pupa (second juvenile of homoetabolous insect; I to V = first through fifth copepodite stages;
FW = freshwater; M = marine; TERR = terrestrial; X = present (in fish diet studies)
Estimated Weight = used when parts add up to more than the actual weight recorded, usually when the sample is heavily digested.

Appendix 3.2-5. Fish Diet Data (Wet Weight), Hope Bay Belt Project, 2009

Location	**PO Lake**	**PO Lake**
Date	**27-Jul-09**	**27-Jul-09**
Fish Species	**Lake whitefish**	**Lake whitefish**
Fish Number	**3**	**4**
Stomach Number	**3**	**4**
Sample No.	**090391**	**090392**
Fullness (%)	**60**	**75**
Digestion (%)	**25**	**50**
Actual Weight (mg)	**2,656**	**8,750**
Comments		
Species/Group		
Paratanytarsus		
Tanytarsus		
Chironomini		
Chironomini		
Chironomini		
Cryptochironomus		
Glyptochironomus		
Parachironomus		
Phaenopsectra		
Phaenopsectra		
Orthocladiinae		
Orthocladiinae		
Eukiefferiella		
Heterotrissocladius		
Heterotrissocladius		
Psectrocladius		
Psectrocladius		
Diamesinae		
Monodiamesa		
Monodiamesa		
Protanypus		
Protanypus		
MOLLUSCA		
Bivalvia		
Sphaeriidae		
Pisidium		
Sphaerium		
Gastropoda		
Valvatidae		
Valvata sincera sincera		
FISH		
Fish		
Salmonidae		
Gasterosteidae		
Pungitius pungitius		
NON-FOOD ITEMS		
Case Materials		
Plant	122	1,531
Pebble		
Mud/sand		
TOTAL	**2,656**	**8,750**

Notes:
A = adult; cop = copepodite (juvenile copepod; dam = damaged; E = egg; F = female
juv = juvenile; L = larva (first juvenile of homometablolous insect); L = larva too small to be identified further*
M = male; N = nymph (juvenile of hemimetabolous insect); N = nymph too small to be identified further*
P = pupa (second juvenile of homoetabolous insect; I to V = first through fifth copepodite stages;
FW = freshwater; M = marine; TERR = terrestrial; X = present (in fish diet studies)
Estimated Weight = used when parts add up to more than the actual weight recorded, usually when the sample is heavily digested.

Appendix 3.2-6

Fish Tissue Metals Concentrations of Lake Trout Sampled from Lakes, Hope Bay Belt Project, 2009

Engineers and Scientists

Appendix 3.2-6. Fish Tissue Metals Concentrations of Lake Trout Sampled from Lakes, Hope Bay Belt Project, 2009

Sample ID	LITTLE ROBERTS LAKE-LIVER-1	LITTLE ROBERTS LAKE-LIVER-2	LITTLE ROBERTS LAKE-LIVER-3	LITTLE ROBERTS LAKE-LIVER-4	LITTLE ROBERTS LAKE-LIVER-5	LITTLE ROBERTS LAKE-LIVER-6	LITTLE ROBERTS LAKE-LIVER-7	LITTLE ROBERTS LAKE-LIVER-8	LITTLE ROBERTS LAKE-LIVER-9
Date Sampled	05-AUG-09	05-AUG-09	05-AUG-09	05-AUG-09	05-AUG-09	05-AUG-09	05-AUG-09	05-AUG-09	05-AUG-09
ALS Sample ID	L806060-61	L806060-62	L806060-63	L806060-64	L806060-65	L806060-66	L806060-67	L806060-68	L806060-69
Matrix	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue
Biological Data									
Fork Length (mm)	593	402	420	462	415	368	391	454	344
Physical Tests									
% Moisture	75.2	73.2	79.4	74.4	77.4	76.6	76.6	73.2	74.7
Metals									
Aluminum (Al)	4.4	19.2	9.0	7.1	18.7	5.2	12.7	11.4	4.9
Antimony (Sb)	<0.010	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Arsenic (As)	2.11	0.058	0.054	0.069	0.036	0.308	0.047	0.088	0.092
Barium (Ba)	0.048	0.042	0.025	<0.020	<0.020	0.023	0.024	0.025	<0.020
Beryllium (Be)	<0.10	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Bismuth (Bi)	<0.030	<0.060	<0.060	<0.060	<0.060	<0.060	<0.060	<0.060	<0.060
Cadmium (Cd)	0.0731	0.066	0.024	0.059	0.027	0.020	0.031	0.036	0.016
Calcium (Ca)	115	56.5	145	71.8	76.0	86.5	51.8	61.2	81.2
Chromium (Cr)	0.16	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Cobalt (Co)	0.028	0.088	0.073	0.067	0.047	0.051	0.071	0.162	<0.040
Copper (Cu)	8.85	28.2	7.35	18.3	3.45	19.1	7.09	16.8	17.1
Lead (Pb)	<0.020	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Lithium (Li)	<0.10	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Magnesium (Mg)	184	219	227	193	256	210	211	212	229
Manganese (Mn)	1.70	1.95	2.79	1.60	2.65	2.13	1.83	2.19	2.13
Mercury (Hg)	0.0934	0.189	0.138	0.306	0.176	0.210	0.177	0.368	0.135
Molybdenum (Mo)	0.056	0.152	0.112	0.186	0.135	0.151	0.153	0.212	0.141
Nickel (Ni)	<0.10	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Selenium (Se)	2.98	1.53	0.86	1.39	0.92	1.37	1.07	1.75	1.05
Strontium (Sr)	0.328	0.125	0.188	0.108	0.092	0.133	0.083	0.095	0.144
Thallium (Tl)	<0.010	0.103	0.085	0.043	0.071	0.084	0.045	0.056	0.068
Tin (Sn)	<0.050	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Uranium (U)	<0.0020	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
Vanadium (V)	<0.10	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Zinc (Zn)	24.9	53.0	32.3	38.4	29.5	40.0	34.5	43.6	41.9

All metal concentrations in units of mg/kg wet weight (WW).

Appendix 3.2-6. Fish Tissue Metals Concentrations of Lake Trout Sampled from Lakes, Hope Bay Belt Project, 2009

Sample ID	LITTLE ROBERTS LAKE-MUSCLE-1	LITTLE ROBERTS LAKE-MUSCLE-2	LITTLE ROBERTS LAKE-MUSCLE-3	LITTLE ROBERTS LAKE-MUSCLE-4	LITTLE ROBERTS LAKE-MUSCLE-5	LITTLE ROBERTS LAKE-MUSCLE-6	LITTLE ROBERTS LAKE-MUSCLE-7	LITTLE ROBERTS LAKE-MUSCLE-8	LITTLE ROBERTS LAKE-MUSCLE-9
Date Sampled	05-AUG-09	05-AUG-09	05-AUG-09	05-AUG-09	05-AUG-09	05-AUG-09	05-AUG-09	05-AUG-09	05-AUG-09
ALS Sample ID	L806060-70	L806060-71	L806060-72	L806060-73	L806060-74	L806060-75	L806060-76	L806060-77	L806060-78
Matrix	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue
Biological Data									
Fork Length (mm)	593	402	420	462	415	368	391	454	344
Physical Tests									
% Moisture	74.5	79.9	75.4	77.6	76.6	76.2	78.3	77.5	74.9
Metals									
Aluminum (Al)	2.2	2.4	2.2	2.7	3.2	13.1	2.1	2.2	<2.0
Antimony (Sb)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Arsenic (As)	0.928	0.035	0.031	0.025	0.027	0.065	0.036	0.038	0.026
Barium (Ba)	0.017	0.214	0.034	0.018	0.029	0.115	<0.010	<0.010	0.012
Beryllium (Be)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Bismuth (Bi)	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Cadmium (Cd)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Calcium (Ca)	269	567	206	333	426	1080	123	111	246
Chromium (Cr)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Cobalt (Co)	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Copper (Cu)	0.256	0.328	0.282	0.261	0.181	0.243	0.222	0.222	0.265
Lead (Pb)	<0.020	<0.020	0.033	<0.020	<0.020	0.104	<0.020	<0.020	<0.020
Lithium (Li)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Magnesium (Mg)	305	284	334	284	311	337	320	302	333
Manganese (Mn)	0.126	0.251	0.173	0.194	0.205	0.407	0.176	0.169	0.181
Mercury (Hg)	0.0836	0.147	0.110	0.143	0.0766	0.0481	0.0790	0.115	0.0654
Molybdenum (Mo)	<0.010	<0.010	<0.010	<0.010	<0.010	0.044	<0.010	0.011	<0.010
Nickel (Ni)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Selenium (Se)	0.56	<0.20	0.20	<0.20	<0.20	<0.20	<0.20	0.23	<0.20
Strontium (Sr)	0.562	0.975	0.269	0.421	0.610	1.73	0.106	0.098	0.383
Thallium (Tl)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Tin (Sn)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Uranium (U)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Vanadium (V)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Zinc (Zn)	4.56	4.31	4.78	3.83	3.46	4.63	3.79	3.38	4.70

All metal concentrations in units of mg/kg wet weight (WW).

Appendix 3.2-6. Fish Tissue Metals Concentrations of Lake Trout Sampled from Lakes, Hope Bay Belt Project, 2009

Sample ID	P.O. LAKE-LIVER-LKTR-1	P.O. LAKE-LIVER-LKTR-2	P.O. LAKE-LIVER-LKTR-6	P.O. LAKE-LIVER-LKTR-7	P.O. LAKE-LIVER-LKTR-8	P.O. LAKE-LIVER-LKTR-9	P.O. LAKE-LIVER-WHITEFISH-1	P.O. LAKE-LIVER-WHITEFISH-2	P.O. LAKE-LIVER-WHITEFISH-3
Date Sampled	05-AUG-09	05-AUG-09	05-AUG-09	05-AUG-09	05-AUG-09	05-AUG-09	05-AUG-09	05-AUG-09	05-AUG-09
ALS Sample ID	L806060-79	L806060-80	L806060-81	L806060-82	L806060-83	L806060-84	L806060-85	L806060-86	L806060-87
Matrix	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue
Biological Data									
Fork Length (mm)	558	521	523	510	454	495	387	428	
Physical Tests									
% Moisture	74.7	67.8	72.1	75.1	78.0	80.0	76.8	80.3	76.1
Metals									
Aluminum (Al)	4.2	<4.0	5.7	7.3	<4.0	5.3	5.1	7.5	5.2
Antimony (Sb)	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Arsenic (As)	0.071	0.147	0.102	0.102	0.048	0.118	0.098	0.089	0.179
Barium (Ba)	<0.020	<0.020	0.029	<0.020	<0.020	<0.020	<0.020	0.043	0.027
Beryllium (Be)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Bismuth (Bi)	<0.060	<0.060	<0.060	<0.060	<0.060	<0.060	<0.060	<0.060	<0.060
Cadmium (Cd)	0.017	0.013	0.022	0.018	<0.010	0.012	0.049	0.067	0.055
Calcium (Ca)	60.2	53.9	55.8	76.4	112	108	86.1	111	55.7
Chromium (Cr)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Cobalt (Co)	0.125	0.065	0.101	0.107	0.075	0.083	0.046	0.042	0.041
Copper (Cu)	14.0	8.69	12.5	15.0	7.39	10.3	4.15	3.49	2.56
Lead (Pb)	<0.040	0.041	0.090	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Lithium (Li)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Magnesium (Mg)	183	179	185	185	171	168	183	176	199
Manganese (Mn)	1.50	1.62	1.76	1.87	1.72	1.71	2.09	1.45	1.99
Mercury (Hg)	0.262	0.210	0.175	0.230	0.169	0.181	0.127	0.726	0.101
Molybdenum (Mo)	0.119	0.129	0.137	0.159	0.124	0.106	0.153	0.136	0.145
Nickel (Ni)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Selenium (Se)	1.31	1.21	1.33	1.24	1.43	1.05	1.43	1.55	1.34
Strontium (Sr)	0.118	0.094	0.173	0.190	0.229	0.246	0.258	0.294	0.235
Thallium (Tl)	0.045	0.030	0.038	0.029	0.035	0.029	<0.020	0.027	0.038
Tin (Sn)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Uranium (U)	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
Vanadium (V)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.24	<0.20
Zinc (Zn)	40.7	32.9	40.7	41.1	32.6	34.3	28.3	23.3	29.2

All metal concentrations in units of mg/kg wet weight (WW).

Appendix 3.2-6. Fish Tissue Metals Concentrations of Lake Trout Sampled from Lakes, Hope Bay Belt Project, 2009

Sample ID	P.O. LAKE-LIVER-WHITEFISH-4	P.O. LAKE-MUSCLE-LKTR-1	P.O. LAKE-MUSCLE-LKTR-2	P.O. LAKE-MUSCLE-LKTR-6	P.O. LAKE-MUSCLE-LKTR-7	P.O. LAKE-MUSCLE-LKTR-8	P.O. LAKE-MUSCLE-LKTR-9	P.O. LAKE-MUSCLE-WHITEFISH-1	P.O. LAKE-MUSCLE-WHITEFISH-2
Date Sampled	05-AUG-09	05-AUG-09	05-AUG-09	05-AUG-09	05-AUG-09	05-AUG-09	05-AUG-09	05-AUG-09	05-AUG-09
ALS Sample ID	L806060-88	L806060-89	L806060-90	L806060-91	L806060-92	L806060-93	L806060-94	L806060-95	L806060-96
Matrix	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue
Biological Data									
Fork Length (mm)		558	521	523	510	454	495	387	428
Physical Tests									
% Moisture	78.8	77.2	72.7	79.2	78.8	77.0	77.5	80.1	78.9
Metals									
Aluminum (Al)	6.8	2.4	<2.0	14.9	<2.0	2.4	<2.0	2.7	<2.0
Antimony (Sb)	<0.020	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Arsenic (As)	0.123	0.031	0.034	0.031	0.025	0.018	0.022	0.031	0.023
Barium (Ba)	0.059	0.037	0.034	0.158	0.024	0.031	0.022	0.024	0.032
Beryllium (Be)	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Bismuth (Bi)	<0.060	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Cadmium (Cd)	0.048	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Calcium (Ca)	94.8	94.5	96.6	85.1	102	190	168	203	296
Chromium (Cr)	<0.20	0.35	<0.10	0.14	0.15	<0.10	0.10	<0.10	<0.10
Cobalt (Co)	0.044	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Copper (Cu)	3.60	0.268	0.307	0.260	0.252	0.310	0.271	0.202	0.140
Lead (Pb)	<0.040	0.032	0.031	0.115	<0.020	<0.020	<0.020	<0.020	0.161
Lithium (Li)	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Magnesium (Mg)	202	304	315	293	307	314	320	301	288
Manganese (Mn)	2.37	0.234	0.156	0.365	0.193	0.170	0.168	0.257	0.234
Mercury (Hg)	0.227	0.134	0.144	0.130	0.143	0.159	0.163	0.0680	0.247
Molybdenum (Mo)	0.172	0.044	<0.010	0.014	0.018	<0.010	0.012	<0.010	<0.010
Nickel (Ni)	<0.20	0.21	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Selenium (Se)	1.69	0.25	0.30	0.22	0.23	0.28	0.30	0.27	0.25
Strontium (Sr)	0.309	0.068	0.075	0.199	0.089	0.237	0.183	0.363	0.556
Thallium (Tl)	0.020	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Tin (Sn)	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Uranium (U)	0.0045	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Vanadium (V)	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Zinc (Zn)	29.0	4.06	4.42	3.59	4.04	4.18	3.71	3.72	3.24

All metal concentrations in units of mg/kg wet weight (WW).

Appendix 3.2-6. Fish Tissue Metals Concentrations of Lake Trout Sampled from Lakes, Hope Bay Belt Project, 2009

Sample ID	P.O. LAKE-MUSCLE-WHITEFISH-3	P.O. LAKE-MUSCLE-WHITEFISH-4	WINDY LAKE-LIVER-1	WINDY LAKE-LIVER-2	WINDY LAKE-LIVER-3	WINDY LAKE-LIVER-4	WINDY LAKE-LIVER-5	WINDY LAKE-LIVER-6	WINDY LAKE-LIVER-7
Date Sampled	05-AUG-09	05-AUG-09	05-AUG-09	05-AUG-09	05-AUG-09	05-AUG-09	05-AUG-09	05-AUG-09	05-AUG-09
ALS Sample ID	L806060-97	L806060-98	L806060-41	L806060-42	L806060-43	L806060-44	L806060-45	L806060-46	L806060-47
Matrix	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue
Biological Data									
Fork Length (mm)			400	450	338	378	352	413	690
Physical Tests									
% Moisture	78.1	78.2	73.9	76.6	72.0	75.5	70.6	72.1	73.1
Metals									
Aluminum (Al)	<2.0	<2.0	13.1	13.9	9.1	9.6	7.9	8.6	<4.0
Antimony (Sb)	<0.010	<0.010	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Arsenic (As)	0.065	0.020	0.541	0.502	0.496	0.724	0.826	0.545	0.226
Barium (Ba)	0.056	0.035	0.059	<0.020	<0.020	<0.020	0.031	0.044	<0.020
Beryllium (Be)	<0.10	<0.10	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Bismuth (Bi)	<0.030	<0.030	<0.060	<0.060	<0.060	<0.060	<0.060	<0.060	<0.060
Cadmium (Cd)	<0.0050	<0.0050	0.022	0.027	0.032	0.024	0.023	0.014	0.018
Calcium (Ca)	527	309	51.8	45.7	47.7	45.2	51.7	36.5	48.6
Chromium (Cr)	<0.10	<0.10	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Cobalt (Co)	<0.020	<0.020	0.069	0.056	0.079	0.079	0.103	0.062	0.050
Copper (Cu)	0.199	0.167	22.5	21.2	20.8	31.0	36.9	22.9	21.0
Lead (Pb)	<0.020	<0.020	<0.040	<0.040	<0.040	<0.040	0.041	<0.040	<0.040
Lithium (Li)	<0.10	<0.10	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Magnesium (Mg)	304	317	216	203	204	192	230	170	218
Manganese (Mn)	0.338	0.327	1.68	1.48	1.60	1.27	1.71	1.14	1.55
Mercury (Hg)	0.0422	0.130	0.0222	0.0138	0.0165	0.0120	0.0102	0.0072	0.0464
Molybdenum (Mo)	<0.010	<0.010	0.136	0.128	0.120	0.131	0.093	0.112	0.178
Nickel (Ni)	<0.10	<0.10	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Selenium (Se)	0.28	0.27	2.86	2.49	2.86	3.19	4.09	3.51	8.12
Strontium (Sr)	1.37	0.569	0.094	0.063	0.102	0.057	0.096	0.063	0.054
Thallium (Tl)	<0.010	<0.010	0.046	0.085	0.139	0.135	0.126	0.079	0.140
Tin (Sn)	<0.050	<0.050	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Uranium (U)	<0.0020	<0.0020	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
Vanadium (V)	<0.10	<0.10	0.22	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Zinc (Zn)	3.97	3.22	42.6	38.1	41.1	38.5	40.7	30.8	43.7

All metal concentrations in units of mg/kg wet weight (WW).

Appendix 3.2-6. Fish Tissue Metals Concentrations of Lake Trout Sampled from Lakes, Hope Bay Belt Project, 2009

Sample ID	WINDY LAKE-LIVER-8	WINDY LAKE-LIVER-9	WINDY LAKE-LIVER-10	WINDY LAKE-MUSCLE-1	WINDY LAKE-MUSCLE-2	WINDY LAKE-MUSCLE-3	WINDY LAKE-MUSCLE-4	WINDY LAKE-MUSCLE-5 'FISH 78'	WINDY LAKE-MUSCLE-5 'FISH 49'
Date Sampled	05-AUG-09	05-AUG-09	05-AUG-09	05-AUG-09	05-AUG-09	05-AUG-09	05-AUG-09	05-AUG-09	05-AUG-09
ALS Sample ID	L806060-48	L806060-49	L806060-50	L806060-51	L806060-52	L806060-53	L806060-54	L806060-55	L806060-56
Matrix	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue
Biological Data									
Fork Length (mm)	442	462	428	400	450	338	378	352	413
Physical Tests									
% Moisture	76.5	78.6	72.3	75.8	77.2	78.7	75.8	74.8	78.1
Metals									
Aluminum (Al)	6.1	8.1	7.0	<2.0	2.3	2.7	2.4	2.2	<2.0
Antimony (Sb)	<0.020	<0.020	<0.020	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Arsenic (As)	0.165	0.326	0.408	0.106	0.110	0.118	0.199	0.088	0.107
Barium (Ba)	<0.020	<0.020	<0.020	0.030	0.032	0.262	0.036	0.023	0.028
Beryllium (Be)	<0.20	<0.20	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Bismuth (Bi)	<0.060	<0.060	<0.060	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Cadmium (Cd)	0.013	0.019	0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Calcium (Ca)	62.4	36.6	34.8	217	160	126	139	278	205
Chromium (Cr)	<0.20	<0.20	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Cobalt (Co)	0.062	0.059	0.041	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Copper (Cu)	19.0	36.5	22.6	0.302	0.286	0.303	0.330	0.242	0.223
Lead (Pb)	<0.040	<0.040	<0.040	<0.020	0.025	<0.020	0.021	<0.020	<0.020
Lithium (Li)	<0.20	<0.20	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Magnesium (Mg)	268	196	196	310	313	307	326	298	329
Manganese (Mn)	2.64	1.26	1.22	0.132	0.113	0.139	0.146	0.142	0.161
Mercury (Hg)	0.0401	0.0186	0.0074	0.0276	0.0206	0.0149	0.0117	0.0288	0.0167
Molybdenum (Mo)	0.058	0.128	0.111	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Nickel (Ni)	<0.20	<0.20	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Selenium (Se)	1.17	2.32	2.75	0.64	0.59	0.45	0.62	0.60	0.53
Strontium (Sr)	0.066	0.078	0.052	0.239	0.156	0.152	0.141	0.301	0.241
Thallium (Tl)	0.100	0.074	0.060	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Tin (Sn)	<0.10	<0.10	<0.10	<0.050	<0.050	<0.050	<0.050	<0.050	0.054
Uranium (U)	<0.0040	<0.0040	<0.0040	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Vanadium (V)	<0.20	<0.20	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Zinc (Zn)	34.2	43.1	39.1	4.89	3.89	5.52	5.10	3.92	4.08

All metal concentrations in units of mg/kg wet weight (WW).

Appendix 3.2-6. Fish Tissue Metals Concentrations of Lake Trout Sampled from Lakes, Hope Bay Belt Project, 2009

Sample ID	WINDY LAKE-MUSCLE-6	WINDY LAKE-MUSCLE-7	WINDY LAKE-MUSCLE-9	WINDY LAKE-MUSCLE-10	REFERENCE LAKE A-LIVER-1	REFERENCE LAKE A-LIVER-2	REFERENCE LAKE A-LIVER-3	REFERENCE LAKE A-LIVER-4	REFERENCE LAKE A-LIVER-5
Date Sampled	**05-AUG-09**	**05-AUG-09**	**05-AUG-09**	**05-AUG-09**	**05-AUG-09**	**05-AUG-09**	**05-AUG-09**	**05-AUG-09**	**05-AUG-09**
ALS Sample ID	**L806060-57**	**L806060-58**	**L806060-59**	**L806060-60**	**L806060-1**	**L806060-2**	**L806060-3**	**L806060-4**	**L806060-5**
Matrix	**Tissue**	**Tissue**	**Tissue**	**Tissue**	**Tissue**	**Tissue**	**Tissue**	**Tissue**	**Tissue**
Biological Data									
Fork Length (mm)	690	442	462	428	372	348	407	368	419
Physical Tests									
% Moisture	77.1	75.5	75.5	74.4	77.1	77.0	75.2	78.6	74.8
Metals									
Aluminum (Al)	2.7	2.4	<2.0	4.0	8.0	8.6	9.8	13.2	18.2
Antimony (Sb)	<0.010	<0.010	<0.010	<0.010	<0.020	<0.020	<0.020	<0.020	<0.020
Arsenic (As)	0.116	0.249	0.096	0.135	0.194	0.263	0.274	0.341	0.309
Barium (Ba)	0.065	0.025	0.024	0.031	<0.020	0.066	<0.020	<0.020	0.026
Beryllium (Be)	<0.10	<0.10	<0.10	<0.10	<0.20	<0.20	<0.20	<0.20	<0.20
Bismuth (Bi)	<0.030	<0.030	<0.030	<0.030	<0.060	<0.060	<0.060	<0.060	<0.060
Cadmium (Cd)	<0.0050	<0.0050	<0.0050	<0.0050	0.044	0.043	0.090	0.023	0.048
Calcium (Ca)	318	150	119	400	52.2	69.3	48.5	47.0	65.4
Chromium (Cr)	0.14	<0.10	<0.10	<0.10	<0.20	<0.20	<0.20	<0.20	<0.20
Cobalt (Co)	<0.020	<0.020	<0.020	<0.020	0.065	0.107	0.068	0.150	0.121
Copper (Cu)	0.284	0.366	0.302	0.327	24.9	10.3	16.1	14.2	12.4
Lead (Pb)	<0.020	<0.020	<0.020	<0.020	0.043	0.082	0.047	<0.040	0.054
Lithium (Li)	<0.10	<0.10	<0.10	<0.10	<0.20	<0.20	<0.20	<0.20	<0.20
Magnesium (Mg)	321	314	307	314	203	210	198	197	202
Manganese (Mn)	0.148	0.093	0.148	0.136	2.07	2.12	1.81	1.60	1.79
Mercury (Hg)	0.0067	0.0425	0.0177	0.0049	0.0829	0.0614	0.0965	0.0443	0.0785
Molybdenum (Mo)	<0.010	<0.010	0.011	<0.010	0.153	0.161	0.231	0.147	0.185
Nickel (Ni)	<0.10	<0.10	<0.10	<0.10	<0.20	<0.20	<0.20	<0.20	<0.20
Selenium (Se)	0.55	0.63	0.60	0.58	2.22	2.35	2.86	2.37	2.03
Strontium (Sr)	0.372	0.111	0.102	0.456	0.074	0.162	0.056	0.092	0.098
Thallium (Tl)	<0.010	0.010	<0.010	<0.010	0.118	0.148	0.163	0.136	0.141
Tin (Sn)	<0.050	<0.050	<0.050	<0.050	<0.10	<0.10	<0.10	<0.10	<0.10
Uranium (U)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0040	<0.0040	<0.0040	<0.0040	0.0073
Vanadium (V)	<0.10	<0.10	<0.10	<0.10	<0.20	<0.20	<0.20	<0.20	0.27
Zinc (Zn)	3.65	4.46	4.25	4.14	41.6	39.4	39.2	35.7	34.1

All metal concentrations in units of mg/kg wet weight (WW).

Appendix 3.2-6. Fish Tissue Metals Concentrations of Lake Trout Sampled from Lakes, Hope Bay Belt Project, 2009

Sample ID	**REFERENCE LAKE A-LIVER-6**	**REFERENCE LAKE A-LIVER-7**	**REFERENCE LAKE A-LIVER-8**	**REFERENCE LAKE A-LIVER-9**	**REFERENCE LAKE A-LIVER-10**	**REFERENCE LAKE A-MUSCLE-1**	**REFERENCE LAKE A-MUSCLE-2**	**REFERENCE LAKE A-MUSCLE-3**	**REFERENCE LAKE A-MUSCLE-4**
Date Sampled	**05-AUG-09**	**05-AUG-09**	**05-AUG-09**	**05-AUG-09**	**05-AUG-09**	**05-AUG-09**	**05-AUG-09**	**05-AUG-09**	**05-AUG-09**
ALS Sample ID	**L806060-6**	**L806060-7**	**L806060-8**	**L806060-9**	**L806060-10**	**L806060-11**	**L806060-12**	**L806060-13**	**L806060-14**
Matrix	**Tissue**	**Tissue**	**Tissue**	**Tissue**	**Tissue**	**Tissue**	**Tissue**	**Tissue**	**Tissue**
Biological Data									
Fork Length (mm)	421	355	455	437	509	372	348	407	368
Physical Tests									
% Moisture	73.7	75.7	76.5	76.2	78.7	80.2	79.5	78.8	80.6
Metals									
Aluminum (Al)	32.3	7.1	7.6	17.8	8.7	2.2	<2.0	<2.0	5.7
Antimony (Sb)	<0.020	<0.020	<0.020	<0.020	<0.020	<0.010	<0.010	<0.010	<0.010
Arsenic (As)	0.443	0.359	0.052	0.164	0.047	0.053	0.088	0.071	0.074
Barium (Ba)	<0.020	0.025	<0.020	<0.020	<0.020	0.027	0.018	0.022	0.030
Beryllium (Be)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.10	<0.10	<0.10	<0.10
Bismuth (Bi)	<0.060	<0.060	<0.060	<0.060	<0.060	<0.030	<0.030	<0.030	<0.030
Cadmium (Cd)	0.047	0.024	0.214	0.105	0.077	<0.0050	<0.0050	<0.0050	<0.0050
Calcium (Ca)	66.0	68.9	51.0	63.1	77.1	254	126	219	92.6
Chromium (Cr)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.10	<0.10	<0.10	<0.10
Cobalt (Co)	0.142	0.080	0.193	0.245	0.184	<0.020	<0.020	<0.020	<0.020
Copper (Cu)	16.2	18.3	20.7	14.3	18.2	0.244	0.306	0.291	0.199
Lead (Pb)	<0.040	<0.040	<0.040	<0.040	<0.040	0.084	0.020	0.043	0.062
Lithium (Li)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.10	<0.10	<0.10	<0.10
Magnesium (Mg)	236	217	202	184	185	290	299	303	291
Manganese (Mn)	1.93	1.75	1.90	1.83	1.53	0.172	0.149	0.139	0.130
Mercury (Hg)	0.117	0.0567	0.242	0.193	0.490	0.0746	0.0832	0.162	0.0776
Molybdenum (Mo)	0.209	0.176	0.149	0.151	0.138	<0.010	<0.010	<0.010	<0.010
Nickel (Ni)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.10	<0.10	<0.10	<0.10
Selenium (Se)	3.60	2.34	1.36	2.05	1.71	0.34	0.34	0.36	0.36
Strontium (Sr)	0.107	0.124	0.060	0.110	0.211	0.333	0.125	0.238	0.088
Thallium (Tl)	0.211	0.154	0.051	0.073	0.069	<0.010	0.011	<0.010	<0.010
Tin (Sn)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.050	<0.050	<0.050	<0.050
Uranium (U)	0.0062	<0.0040	<0.0040	0.0048	<0.0040	<0.0020	<0.0020	<0.0020	<0.0020
Vanadium (V)	0.34	<0.20	<0.20	0.26	<0.20	<0.10	<0.10	<0.10	<0.10
Zinc (Zn)	43.2	45.6	43.3	41.4	36.6	3.27	3.73	3.47	3.58

All metal concentrations in units of mg/kg wet weight (WW).

Appendix 3.2-6. Fish Tissue Metals Concentrations of Lake Trout Sampled from Lakes, Hope Bay Belt Project, 2009

Sample ID	REFERENCE LAKE A-MUSCLE-5	REFERENCE LAKE A-MUSCLE-6	REFERENCE LAKE A-MUSCLE-7	REFERENCE LAKE A-MUSCLE-8	REFERENCE LAKE A-MUSCLE-9	REFERENCE LAKE A-MUSCLE-10	REFERENCE LAKE B-LIVER-1	REFERENCE LAKE B-LIVER-2	REFERENCE LAKE B-LIVER-3
Date Sampled	**05-AUG-09**	**05-AUG-09**	**05-AUG-09**	**05-AUG-09**	**05-AUG-09**	**05-AUG-09**	**05-AUG-09**	**05-AUG-09**	**05-AUG-09**
ALS Sample ID	**L806060-15**	**L806060-16**	**L806060-17**	**L806060-18**	**L806060-19**	**L806060-20**	**L806060-21**	**L806060-22**	**L806060-23**
Matrix	**Tissue**	**Tissue**	**Tissue**	**Tissue**	**Tissue**	**Tissue**	**Tissue**	**Tissue**	**Tissue**
Biological Data									
Fork Length (mm)	419	421	355	455	437	509	540	525	510
Physical Tests									
% Moisture	80.0	80.1	79.3	80.7	81.7	80.8	76.5	78.8	75.7
Metals									
Aluminum (Al)	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	25.7	16.5	8.9
Antimony (Sb)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.020	<0.020	<0.020
Arsenic (As)	0.084	0.081	0.062	0.038	0.054	0.098	0.071	0.042	0.109
Barium (Ba)	0.030	0.011	0.017	0.018	0.013	0.021	0.020	<0.020	0.138
Beryllium (Be)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.20	<0.20	<0.20
Bismuth (Bi)	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.060	<0.060	<0.060
Cadmium (Cd)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.409	0.239	0.188
Calcium (Ca)	75.7	75.0	115	122	229	179	49.6	68.1	58.4
Chromium (Cr)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.20	<0.20	<0.20
Cobalt (Co)	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.129	0.348	0.133
Copper (Cu)	0.247	0.221	0.202	0.193	0.169	0.148	26.6	23.3	27.1
Lead (Pb)	0.030	0.108	0.034	<0.020	<0.020	<0.020	0.054	<0.040	0.051
Lithium (Li)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.20	<0.20	<0.20
Magnesium (Mg)	308	306	323	297	284	291	196	197	208
Manganese (Mn)	0.124	0.127	0.145	0.119	0.116	0.149	1.96	1.80	2.14
Mercury (Hg)	0.119	0.147	0.0697	0.194	0.207	0.341	0.397	0.105	0.328
Molybdenum (Mo)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.247	0.166	0.280
Nickel (Ni)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.20	<0.20	<0.20
Selenium (Se)	0.37	0.39	0.35	0.26	0.29	0.30	5.03	2.37	3.12
Strontium (Sr)	0.047	0.034	0.114	0.111	0.317	0.260	0.072	0.119	0.096
Thallium (Tl)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.111	0.166	0.113
Tin (Sn)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.10	<0.10	<0.10
Uranium (U)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0285	0.0118	0.0080
Vanadium (V)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.33	<0.20	<0.20
Zinc (Zn)	3.52	3.01	3.40	3.26	2.93	3.28	40.0	40.0	44.5

All metal concentrations in units of mg/kg wet weight (WW).

Appendix 3.2-6. Fish Tissue Metals Concentrations of Lake Trout Sampled from Lakes, Hope Bay Belt Project, 2009

Sample ID	REFERENCE LAKE B-LIVER-4	REFERENCE LAKE B-LIVER-5	REFERENCE LAKE B-LIVER-6	REFERENCE LAKE B-LIVER-7	REFERENCE LAKE B-LIVER-8	REFERENCE LAKE B-LIVER-9	REFERENCE LAKE B-LIVER-10	REFERENCE LAKE B-MUSCLE-1	REFERENCE LAKE B-MUSCLE-2
Date Sampled	05-AUG-09	05-AUG-09	05-AUG-09	05-AUG-09	05-AUG-09	05-AUG-09	05-AUG-09	05-AUG-09	05-AUG-09
ALS Sample ID	L806060-24	L806060-25	L806060-26	L806060-27	L806060-28	L806060-29	L806060-30	L806060-31	L806060-32
Matrix	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue
Biological Data									
Fork Length (mm)	525	488	536	511	568	488	483	540	525
Physical Tests									
% Moisture	80.2	76.9	80.3	77.2	73.5	73.3	75.2	79.8	78.2
Metals									
Aluminum (Al)	5.7	10.4	25.7	8.9	<4.0	14.2	6.1	2.3	2.1
Antimony (Sb)	<0.010	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.010	<0.010
Arsenic (As)	0.031	0.028	0.045	0.046	0.052	0.050	0.056	0.046	0.049
Barium (Ba)	0.019	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.040	0.020
Beryllium (Be)	<0.10	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.10	<0.10
Bismuth (Bi)	<0.030	<0.060	<0.060	<0.060	<0.060	<0.060	<0.060	<0.030	<0.030
Cadmium (Cd)	0.112	0.163	0.267	0.150	0.072	0.247	0.195	<0.0050	<0.0050
Calcium (Ca)	80.4	64.2	86.3	68.7	50.3	56.2	65.6	147	211
Chromium (Cr)	<0.10	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.14	0.11
Cobalt (Co)	0.066	0.068	0.134	0.057	0.076	0.125	0.163	<0.020	<0.020
Copper (Cu)	16.7	16.0	30.5	3.70	8.28	27.8	13.8	0.261	0.201
Lead (Pb)	0.031	<0.040	<0.040	<0.040	<0.040	0.081	<0.040	0.026	0.033
Lithium (Li)	<0.10	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.10	<0.10
Magnesium (Mg)	177	282	182	272	178	205	240	256	259
Manganese (Mn)	2.02	2.45	1.52	3.14	1.55	2.16	2.63	0.123	0.092
Mercury (Hg)	0.244	0.215	0.164	0.150	0.442	0.0767	0.102	0.270	0.114
Molybdenum (Mo)	0.105	1.14	0.168	0.101	0.196	0.248	0.161	<0.010	<0.010
Nickel (Ni)	<0.10	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.10	<0.10
Selenium (Se)	2.18	1.74	2.40	1.64	3.18	3.29	2.11	0.48	0.43
Strontium (Sr)	0.125	0.055	0.116	0.071	0.093	0.086	0.069	0.166	0.241
Thallium (Tl)	0.062	0.179	0.116	0.218	0.176	0.152	0.121	0.011	0.011
Tin (Sn)	<0.050	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.050	<0.050
Uranium (U)	0.0034	0.0068	0.0124	0.0053	<0.0040	0.0096	0.0070	<0.0020	<0.0020
Vanadium (V)	<0.10	<0.20	0.21	<0.20	<0.20	<0.20	<0.20	<0.10	<0.10
Zinc (Zn)	29.4	39.0	42.5	25.7	34.0	43.3	38.9	3.53	3.29

All metal concentrations in units of mg/kg wet weight (WW).

Appendix 3.2-6. Fish Tissue Metals Concentrations of Lake Trout Sampled from Lakes, Hope Bay Belt Project, 2009

Sample ID	REFERENCE LAKE B-MUSCLE-3	REFERENCE LAKE B-MUSCLE-4	REFERENCE LAKE B-MUSCLE-5	REFERENCE LAKE B-MUSCLE-6	REFERENCE LAKE B-MUSCLE-7	REFERENCE LAKE B-MUSCLE-8	REFERENCE LAKE B-MUSCLE-9	REFERENCE LAKE B-MUSCLE-10
Date Sampled	**05-AUG-09**	**05-AUG-09**	**05-AUG-09**	**05-AUG-09**	**05-AUG-09**	**05-AUG-09**	**05-AUG-09**	**05-AUG-09**
ALS Sample ID	**L806060-33**	**L806060-34**	**L806060-35**	**L806060-36**	**L806060-37**	**L806060-38**	**L806060-39**	**L806060-40**
Matrix	**Tissue**	**Tissue**	**Tissue**	**Tissue**	**Tissue**	**Tissue**	**Tissue**	**Tissue**
Biological Data								
Fork Length (mm)	510	525	488	536	511	568	488	483
Physical Tests								
% Moisture	79.5	79.1	79.1	78.9	78.8	78.4	78.3	79.1
Metals								
Aluminum (Al)	<2.0	2.0	2.4	2.8	<2.0	2.1	<2.0	<2.0
Antimony (Sb)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Arsenic (As)	0.041	0.043	0.050	0.046	0.048	0.112	0.057	0.045
Barium (Ba)	0.026	0.025	0.028	0.040	0.023	0.030	0.025	0.024
Beryllium (Be)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Bismuth (Bi)	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Cadmium (Cd)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Calcium (Ca)	81.7	79.6	94.0	93.2	97.7	106	109	158
Chromium (Cr)	0.10	0.12	0.13	0.13	0.12	0.18	0.12	0.13
Cobalt (Co)	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Copper (Cu)	0.287	0.333	0.315	0.264	0.266	0.252	0.302	0.264
Lead (Pb)	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Lithium (Li)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Magnesium (Mg)	246	252	267	245	253	264	274	266
Manganese (Mn)	0.121	0.174	0.116	0.108	0.109	0.128	0.138	0.126
Mercury (Hg)	0.178	0.179	0.160	0.111	0.141	0.361	0.107	0.117
Molybdenum (Mo)	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	<0.010	<0.010
Nickel (Ni)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Selenium (Se)	0.43	0.53	0.53	0.49	0.49	0.47	0.47	0.52
Strontium (Sr)	0.059	0.066	0.059	0.078	0.087	0.083	0.096	0.161
Thallium (Tl)	<0.010	<0.010	<0.010	0.013	0.011	0.010	0.014	<0.010
Tin (Sn)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Uranium (U)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Vanadium (V)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Zinc (Zn)	3.48	3.16	3.52	4.54	3.46	4.19	4.16	3.67

All metal concentrations in units of mg/kg wet weight (WW).

Appendix 3.2-7

Biological Data for Fish Sampled from Streams, Hope Bay Belt Project, 2009

Appendix 3.2-7. Biological Data for Fish Sampled from Streams and Rivers, Hope Bay Belt Project, 2009

Site ID	Date	Sample Number	Species Code	Method #	Pass Number	Length (mm)	Weight (g)	Condition (g/mm^3)	Aging Structure	Age	Photos #	Comments
Streams												
P.O. O/F2	27-Aug-09	1	NSSB	EF	-	45	0.7	0.77	-	-	-	
P.O. O/F2	27-Aug-09	2	NSSB	EF	-	46	0.7	0.72	-	-	-	
P.O. O/F2	27-Aug-09	3	NSSB	EF	-	65	1.9	0.69	-	-	-	
P.O. O/F2	27-Aug-09	4	NSSB	EF	-	44	0.7	0.82	-	-	-	
P.O. O/F2	27-Aug-09	5	NSSB	EF	-	44	0.8	0.94	-	-	-	
P.O. O/F2	27-Aug-09	6	NSSB	EF	-	63	1.8	0.72	-	-	-	
P.O. O/F2	27-Aug-09	7	NSSB	EF	-	52	1.3	0.92	-	-	-	
P.O. O/F2	27-Aug-09	8	NSSB	EF	-	47	1.2	1.16	-	-	-	
P.O. O/F2	27-Aug-09	9	NSSB	EF	-	36	0.7	1.50	-	-	-	
P.O. O/F2	27-Aug-09	10	NSSB	EF	-	37	0.8	1.58	-	-	-	
P.O. O/F2	27-Aug-09	11	NSSB	EF	-	46	0.8	0.82	-	-	-	
Ogama O/F1	29-Jul-09	2	LCIS	EF	1	304	-	-	-	-	-	
Ogama O/F1	29-Jul-09	3	LCIS	EF	1	61	-	-	-	-	-	
Ogama O/F1	29-Jul-09	1	LKWH	EF	1	414	-	-	-	-	-	
Glenn O/F2	31-Jul-09	2	LKTR	EF	1	199	-	-	-	-	-	
Glenn O/F2	31-Jul-09	3	NSSB	EF	1	42	-	-	-	-	-	
Glenn O/F2	31-Jul-09	4	NSSB	EF	1	47	-	-	-	-	-	
Glenn O/F2	31-Jul-09	5	NSSB	EF	1	44	-	-	-	-	-	
Glenn O/F2	31-Jul-09	6	NSSB	EF	1	49	-	-	-	-	-	
Glenn O/F2	31-Jul-09	7	NSSB	EF	1	45	-	-	-	-	-	
Glenn O/F2	31-Jul-09	8	SLSC	EF	1	58	-	-	-	-	-	
Glenn O/F2	31-Jul-09	1	STFL	EF	1	202	-	-	-	-	-	
Windy O/F1	28-Jul-09	1	LKTR	EF	1	506	-	-	2,3	-	-	
Windy O/F1	28-Jul-09	2	LKTR	EF	1	461	-	-	2,3	-	-	
Roberts I/F1	6-Aug-09	1	NSSB	EF	-	60	0.9	0.42	-	-	-	
Roberts I/F1	6-Aug-09	2	NSSB	EF	-	75	2.0	0.47	-	-	-	
Roberts I/F1	6-Aug-09	3	NSSB	EF	-	73	2.5	0.64	-	-	-	
Roberts I/F1	6-Aug-09	4	NSSB	EF	-	65	2.0	0.73	-	-	-	
Roberts I/F1	6-Aug-09	5	NSSB	EF	-	69	2.0	0.61	-	-	-	
Roberts I/F1	6-Aug-09	6	NSSB	EF	-	61	1.5	0.66	-	-	-	
Roberts I/F1	6-Aug-09	7	NSSB	EF	-	47	1.0	0.96	-	-	-	
Roberts I/F1	6-Aug-09	8	NSSB	EF	-	44	0.4	0.47	-	-	-	
Roberts I/F1	6-Aug-09	9	NSSB	EF	-	53	0.9	0.60	-	-	-	
Roberts I/F1	6-Aug-09	10	NSSB	EF	-	52	1.3	0.92	-	-	-	fish too large for weigh scale
Roberts I/F1	6-Aug-09	11	NSSB	EF	-	59	1.5	0.73	-	-	-	fish too large for weigh scale
Roberts I/F2	6-Aug-09	1	NSSB	EF	-	48	0.7	0.63	-	-	-	
Roberts I/F2	6-Aug-09	2	NSSB	EF	-	68	1.9	0.60	-	-	-	
Roberts I/F2	6-Aug-09	3	NSSB	EF	-	50	0.8	0.64	-	-	-	
Roberts I/F2	6-Aug-09	4	NSSB	EF	-	55	0.9	0.54	-	-	-	
Roberts I/F2	6-Aug-09	5	NSSB	EF	-	45	0.5	0.55	-	-	-	
Roberts I/F2	6-Aug-09	6	NSSB	EF	-	55	1.0	0.60	-	-	-	
Stream E09	25-Aug-09	3	ARCH	EF	1	123	16.9	0.91	3	2	photo 3469	
Stream E09	25-Aug-09	4	ARCH	EF	1	140	30.9	1.13	3	3	photo 3470	
Stream E09	25-Aug-09	5	ARCH	EF	1	97	11.0	1.21	3	2	photo 3472	
Stream E09	25-Aug-09	1	LKTR	EF	1	217	93.0	0.91	3	6	photo 3466	
Stream E09	25-Aug-09	2	LKTR	EF	1	168	41.7	0.88	3	3	photo 3467	retained for voucher specimen
Roberts Bay I/F1	1-Aug-09	1	NSSB	EF	1	42	-	-	-	-	-	
Roberts Bay I/F1	1-Aug-09	2	NSSB	EF	1	46	-	-	-	-	-	
Roberts Bay I/F1	1-Aug-09	3	NSSB	EF	1	53	-	-	-	-	-	
Roberts Bay I/F1	1-Aug-09	4	NSSB	EF	1	57	-	-	-	-	-	
Roberts Bay I/F1	1-Aug-09	5	NSSB	EF	1	41	-	-	-	-	-	
Roberts Bay I/F1	1-Aug-09	6	NSSB	EF	1	53	-	-	-	-	-	
Roberts Bay I/F1	1-Aug-09	7	NSSB	EF	1	48	-	-	-	-	-	
Roberts Bay I/F1	1-Aug-09	8	NSSB	EF	1	43	-	-	-	-	-	
Roberts Bay I/F1	1-Aug-09	9	NSSB	EF	1	52	-	-	-	-	-	
Roberts Bay I/F1	1-Aug-09	10	NSSB	EF	1	47	-	-	-	-	-	
Roberts Bay I/F1	1-Aug-09	11	NSSB	EF	1	49	-	-	-	-	-	
Roberts Bay I/F1	1-Aug-09	12	NSSB	EF	1	53	-	-	-	-	-	
Ref A O/F	28-Jul-09	1	LKTR	EF	1	311	-	-	2,3	9	-	
Ref A O/F	28-Jul-09	2	LKTR	EF	1	362	-	-	2,3	10	-	
Ref A O/F	28-Jul-09	3	LKTR	EF	1	135	-	-	2,3	1	-	
Ref A O/F	28-Jul-09	4	LKTR	EF	1	137	-	-	2,3	2	-	
Ref A O/F	28-Jul-09	5	LKTR	EF	1	110	-	-	-	-	-	
Ref A O/F	28-Jul-09	6	LKTR	EF	1	80	-	-	-	-	-	
Ref A O/F	28-Jul-09	9	LKTR	EF	2	72	-	-	-	-	-	
Ref A O/F	28-Jul-09	7	SLSC	EF	1	109	-	-	-	-	-	
Ref A O/F	28-Jul-09	8	SLSC	EF	1	50	-	-	-	-	-	
Ref B O/F	25-Jul-09	1	ARGR	EF	1	180	-	-	-	-	-	
Ref B O/F	25-Jul-09	2	ARGR	EF	1	175	-	-	-	-	-	
Ref B O/F	25-Jul-09	3	ARGR	EF	2	198	-	-	-	-	-	
Rivers												
Koignuk D/S	5-Aug-09	1	SLSC	EF	1	61	3.0	1.32	-	-	-	
Koignuk D/S	5-Aug-09	2	SLSC	EF	1	43	2.0	2.52	-	-	-	
Koignuk D/S	5-Aug-09	3	SLSC	EF	1	51	1.0	0.75	-	-	-	
Koignuk D/S	5-Aug-09	4	SLSC	EF	1	48	1.0	0.90	-	-	-	
Koignuk M/S	29-Aug	2	LKTR	GN1	-	382	665.0	1.19	2,3	8	-	

Species Code: ARCH = Arctic char, ARGR = Arctic grayling, LCIS = cisco, LKTR = lake trout, LKWH = lake whitefish, NSSB = ninespine stickleback, SLSC = slimy sculpin, STFL = starry flounder
Sampling Method: EF = electrofisher, GN = gillnet, MT = minnow trap
Aging structure: 1=otolith, 2 = scales, 3 = fin ray
Dash (-) indicates data not collected

Appendix 3.2-7. Biological Data for Fish Sampled from Streams and Rivers, Hope Bay Belt Project, 2009

Site ID	Date	Sample Number	Species Code	Method #	Pass Number	Length (mm)	Weight (g)	Condition (g/mm^3)	Aging Structure	Age	Photos #	Comments
Koignuk M/S	29-Aug	7	LKTR	GN2	-	295	273.0	1.06	1,2,3	6	-	
Koignuk M/S	29-Aug	8	LKTR	GN4	-	812	5066.0	0.95	2,3	26	-	fish too large for weigh scale
Koignuk M/S	29-Aug	9	LKTR	GN4	-	489	1197.0	1.02	2,3	16	-	fish too large for weigh scale
Koignuk M/S	29-Aug	10	LKTR	GN4	-	493	1175.0	0.98	2,3	14	-	
Koignuk M/S	6-Aug	1	LKTR	GN1	-	753	4600.0	1.08	2,3	21	-	
Koignuk M/S	29-Aug	1	LKWH	GN1	-	430	1286.0	1.62	2,3	13	-	
Koignuk M/S	29-Aug	3	LKWH	GN2	-	422	1178.0	1.57	2,3	12	-	
Koignuk M/S	29-Aug	4	LKWH	GN2	-	545	2320.0	1.43	2,3	29	-	
Koignuk M/S	29-Aug	5	LKWH	GN2	-	459	166.0	0.17	2,3	14	-	
Koignuk M/S	29-Aug	6	LKWH	GN2	-	484	1551.0	1.37	2,3	14	-	
Koignuk M/S	29-Aug	11	LKWH	GN4	-	451	1375.0	1.50	2,3	15	-	
Koignuk M/S	6-Aug	3	NSSB	MT	-	61	<1	-	-	-	-	
Koignuk M/S	6-Aug	4	NSSB	MT	-	46	<1	-	-	-	-	
Koignuk M/S	6-Aug	5	NSSB	MT	-	32	<1	-	-	-	-	
Koignuk M/S	6-Aug	6	NSSB	MT	-	52	<1	-	-	-	-	
Koignuk M/S	6-Aug	7	NSSB	MT	-	46	<1	-	-	-	-	
Koignuk M/S	6-Aug	8	NSSB	MT	-	45	<1	-	-	-	-	
Koignuk M/S	6-Aug	9	NSSB	MT	-	41	<1	-	-	-	-	
Koignuk M/S	6-Aug	10	NSSB	MT	-	29	<1	-	-	-	-	
Koignuk M/S	6-Aug	2	SLSC	MT	-	82	5.0	-	-	-	-	

Species Code: ARCH = Arctic char, ARGR = Arctic grayling, LCIS = cisco, LKTR = lake trout, LKWH = lake whitefish, NSSB = ninespine stickleback, SLSC = slimy sculpin, STFL = starry flounder

Sampling Method: EF = electrofisher, GN = gillnet, MT = minnow trap

Aging structure: 1=otolith, 2 = scales, 3 = fin ray

Dash (-) indicates data not collected

Species Code: ARCH = Arctic char, ARGR = Arctic grayling, LCIS = cisco, LKTR = lake trout, LKWH = lake whitefish,
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