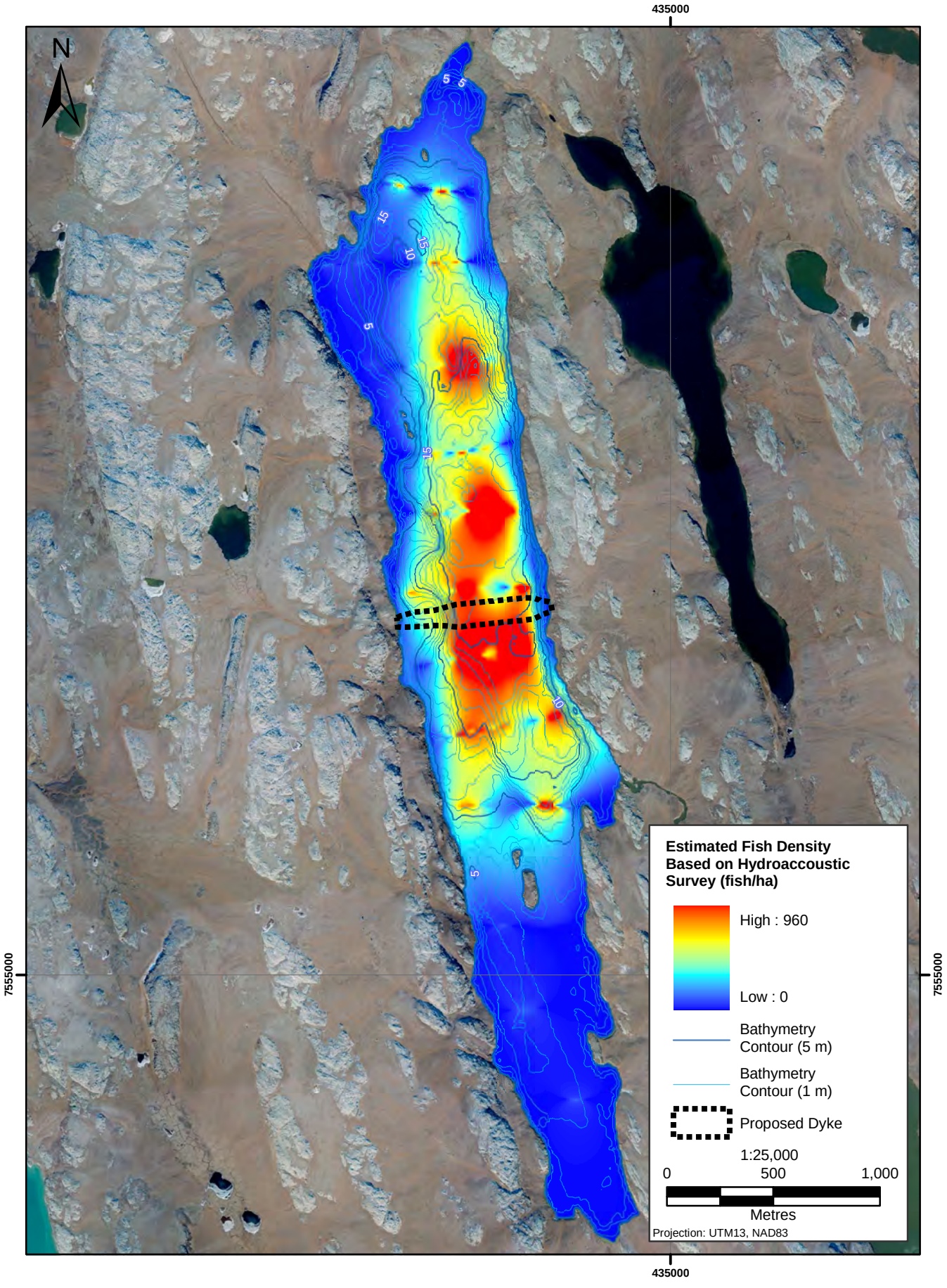

Estimated Fish Density Derived from Hydroacoustic Surveys for Doris Lake, Hope Bay Belt Project, 2009

Figure 3.2-5

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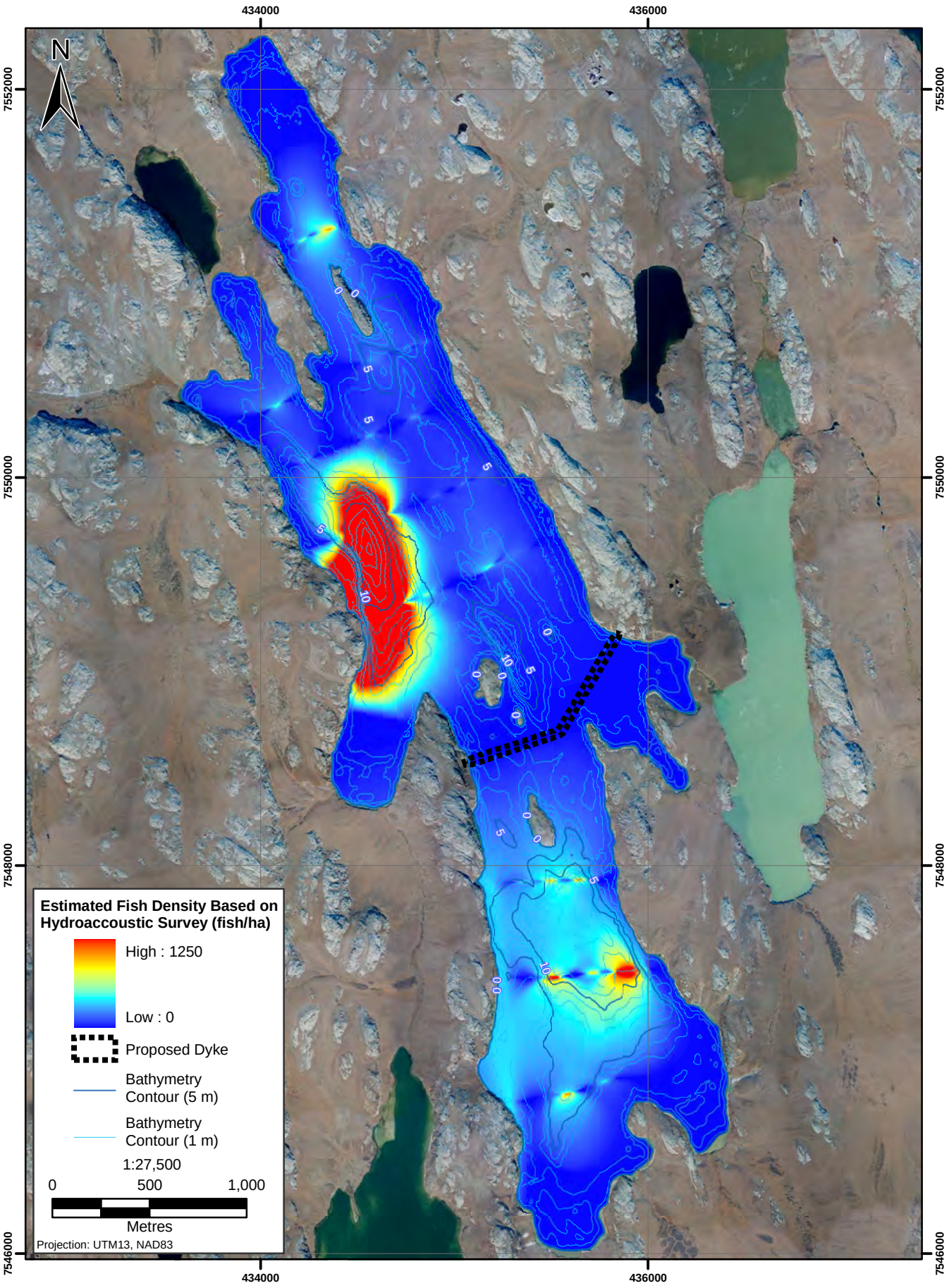

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Estimated Fish Density Derived from Hydroacoustic Surveys of Patch Lake, Hope Bay Belt Project, 2009

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

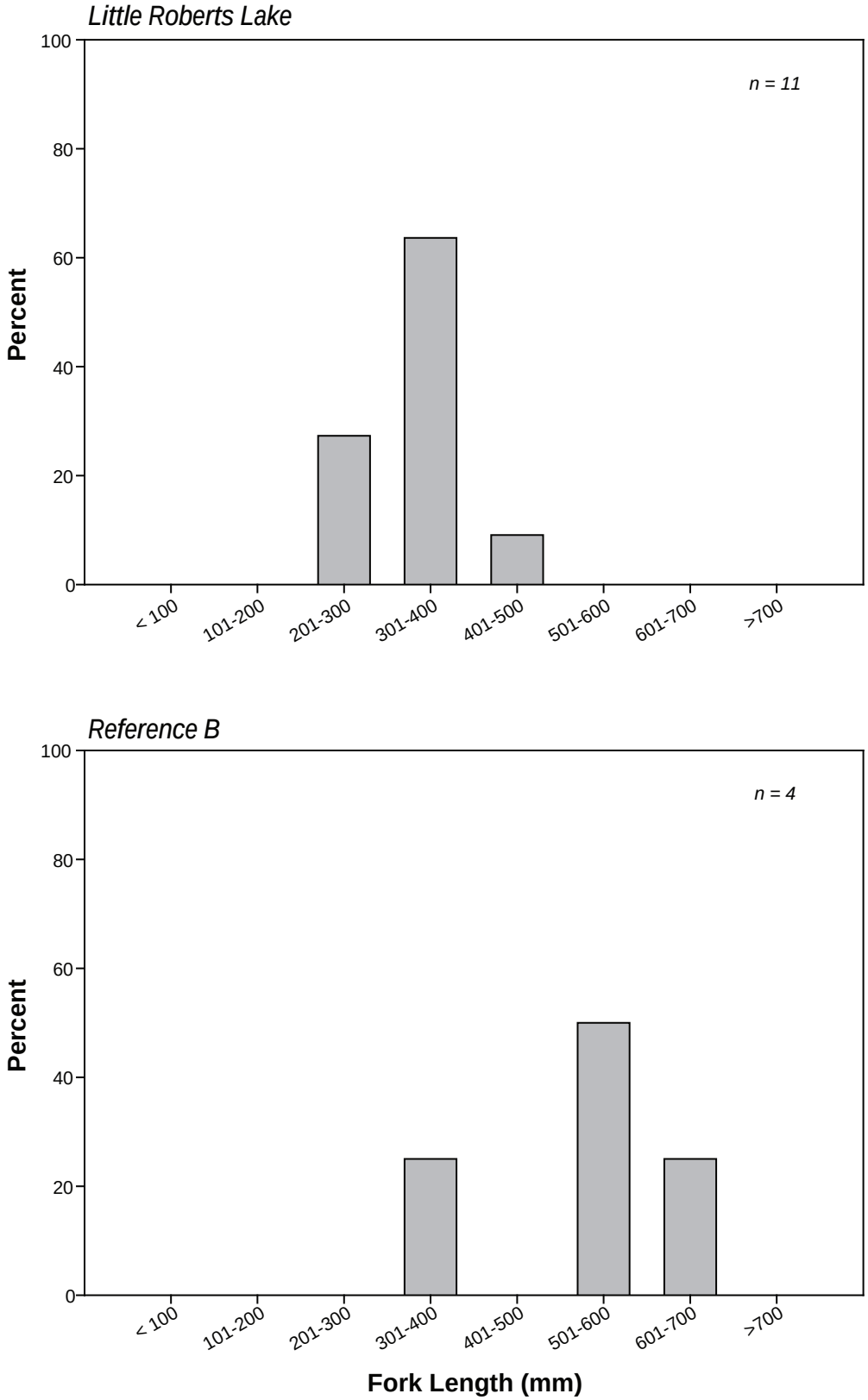
Length, weight and condition of fish captured in the Project area are summarized in Table 3.2-9. Figures 3.2-7 to 3.2-13 show the length-frequency distributions for Arctic char, lake trout, lake whitefish, and cisco sampled from lakes, respectively.

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

			Length (mm)				Weight (g)				Condition (g/mm^3)			
Lake	Watershed	Species	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



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

Figure 3.2-7

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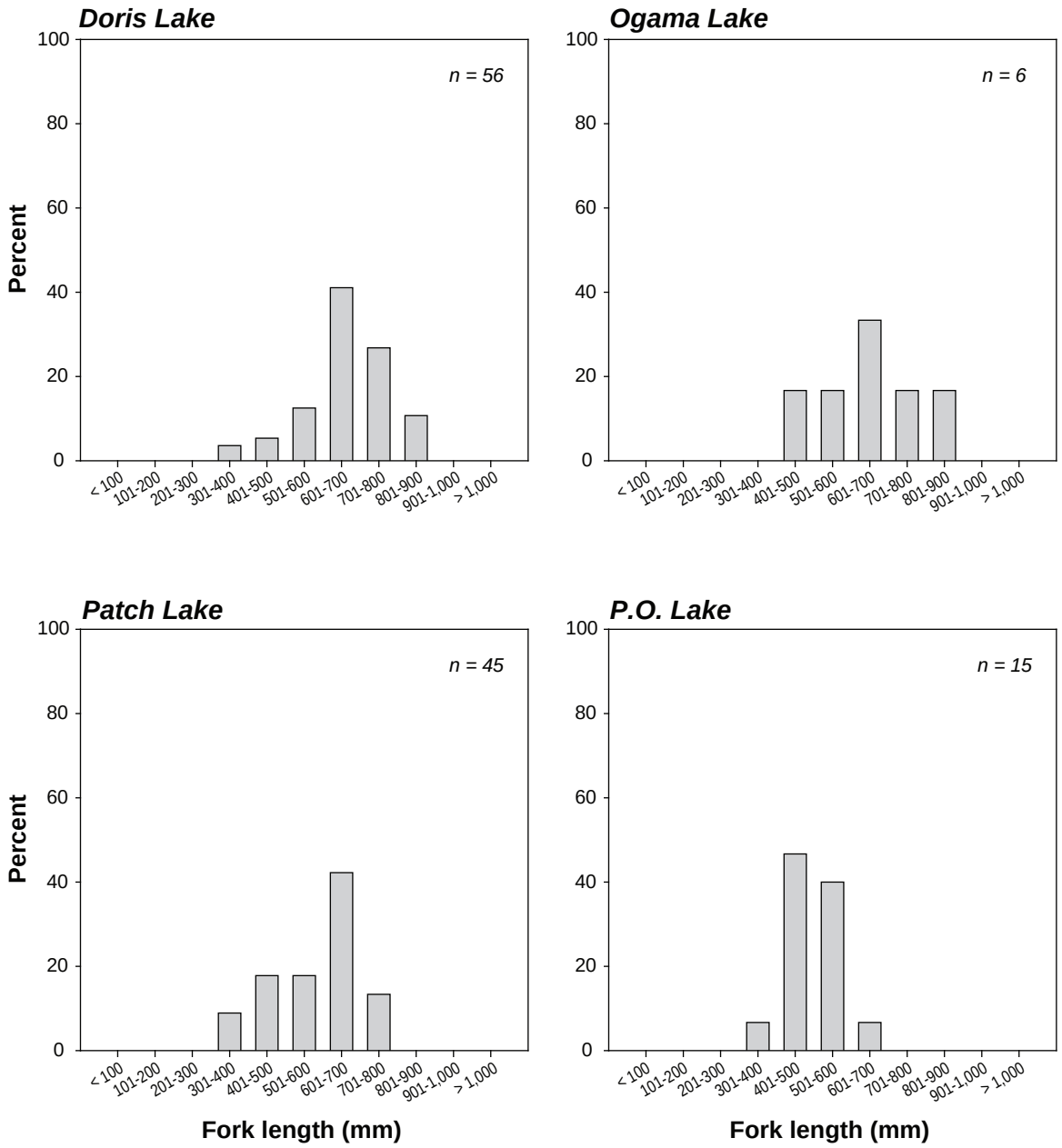

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Length-Frequency Distributions for Lake Trout Sampled from the Doris Watershed, Hope Bay Belt Project, 2009

Figure 3.2-8

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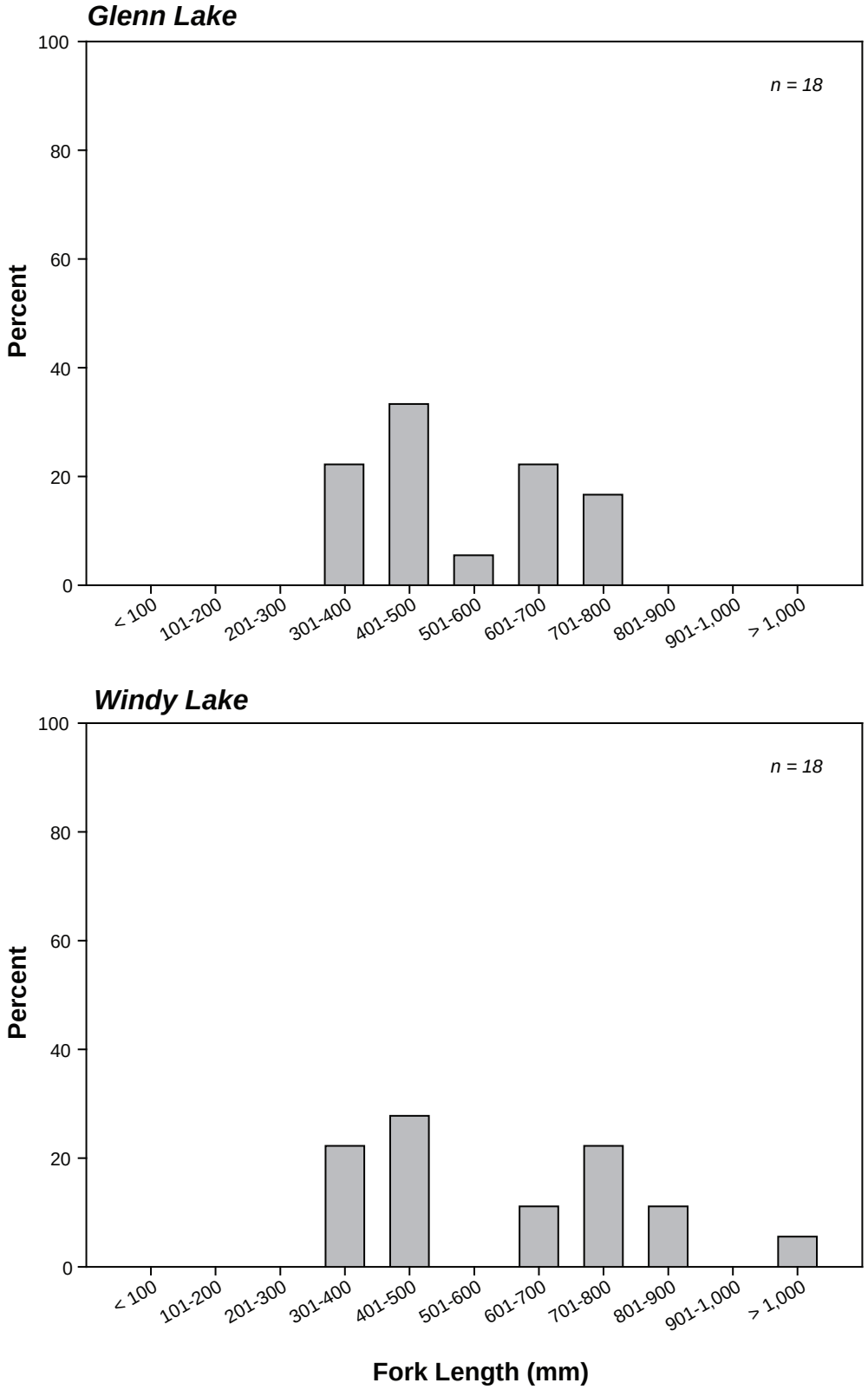

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Length-Frequency Distributions for Lake Trout Sampled from the Windy Watershed, Hope Bay Belt Project, 2009

Figure 3.2-9

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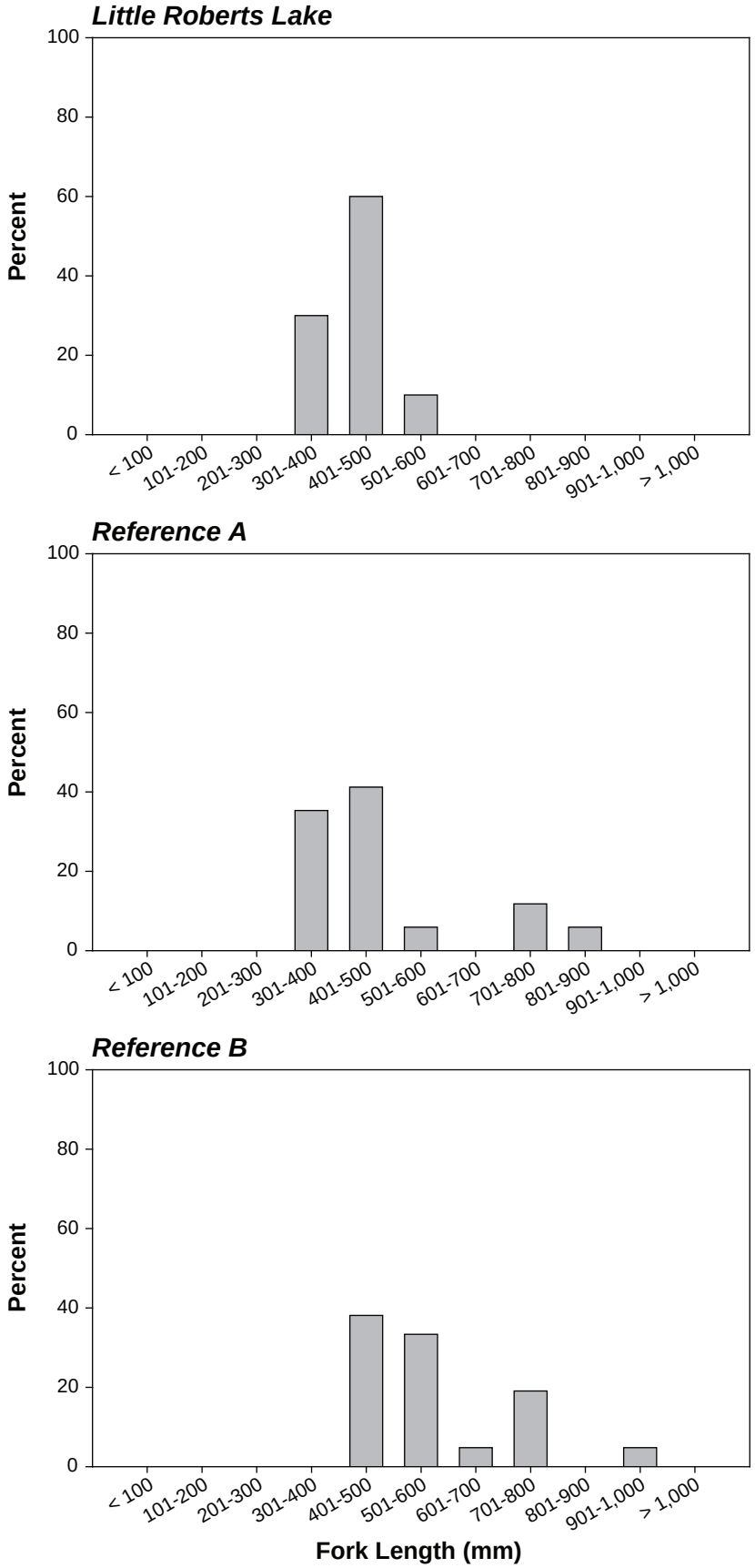

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Length-Frequency Distributions for Lake Trout Sampled from Little Roberts Lake and Reference Watersheds, Hope Bay Belt Project, 2009

Figure 3.2-10

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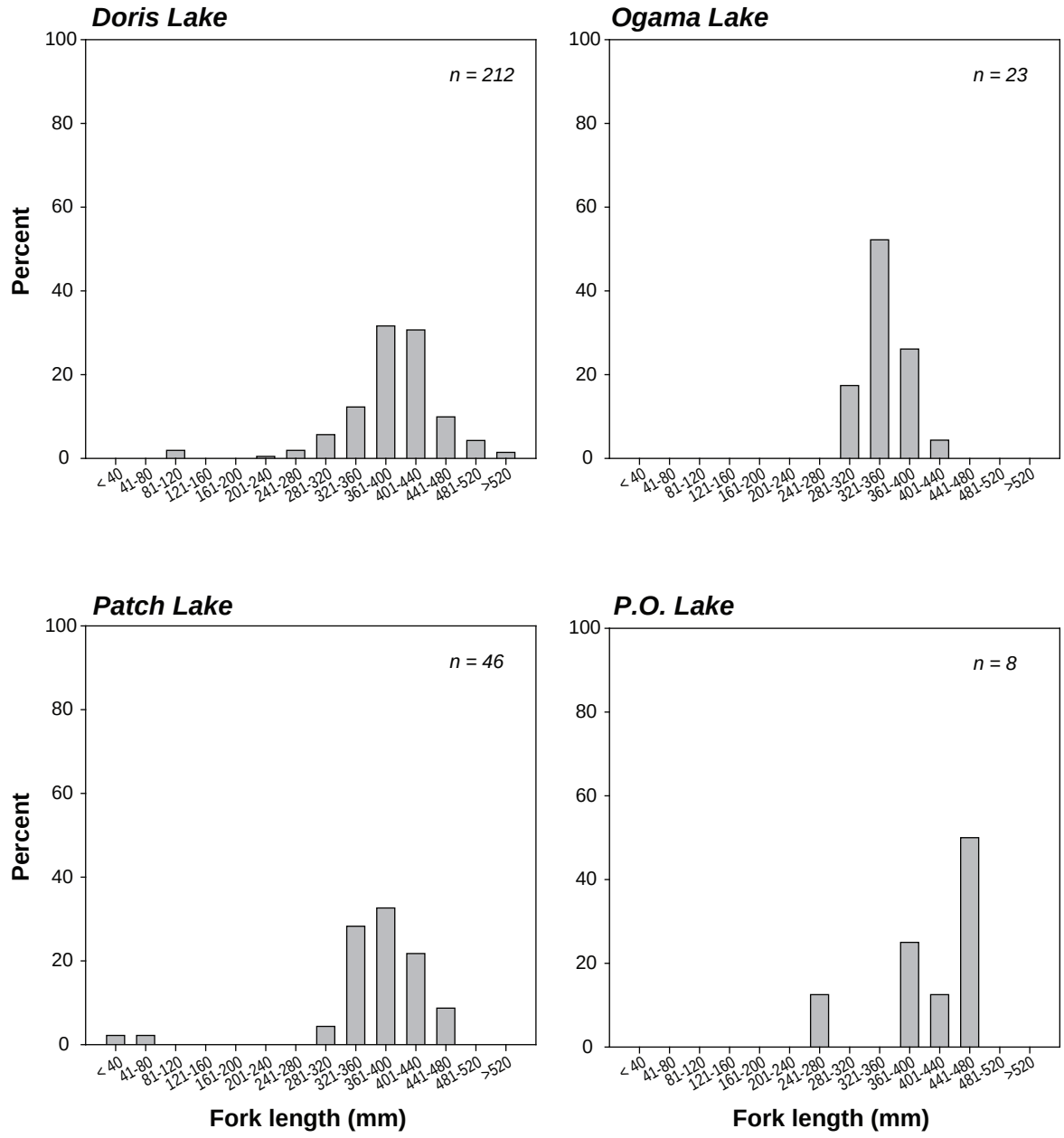

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Length-Frequency Distributions for Lake Whitefish Sampled from the Doris Watershed, Hope Bay Belt Project, 2009

Figure 3.2-11

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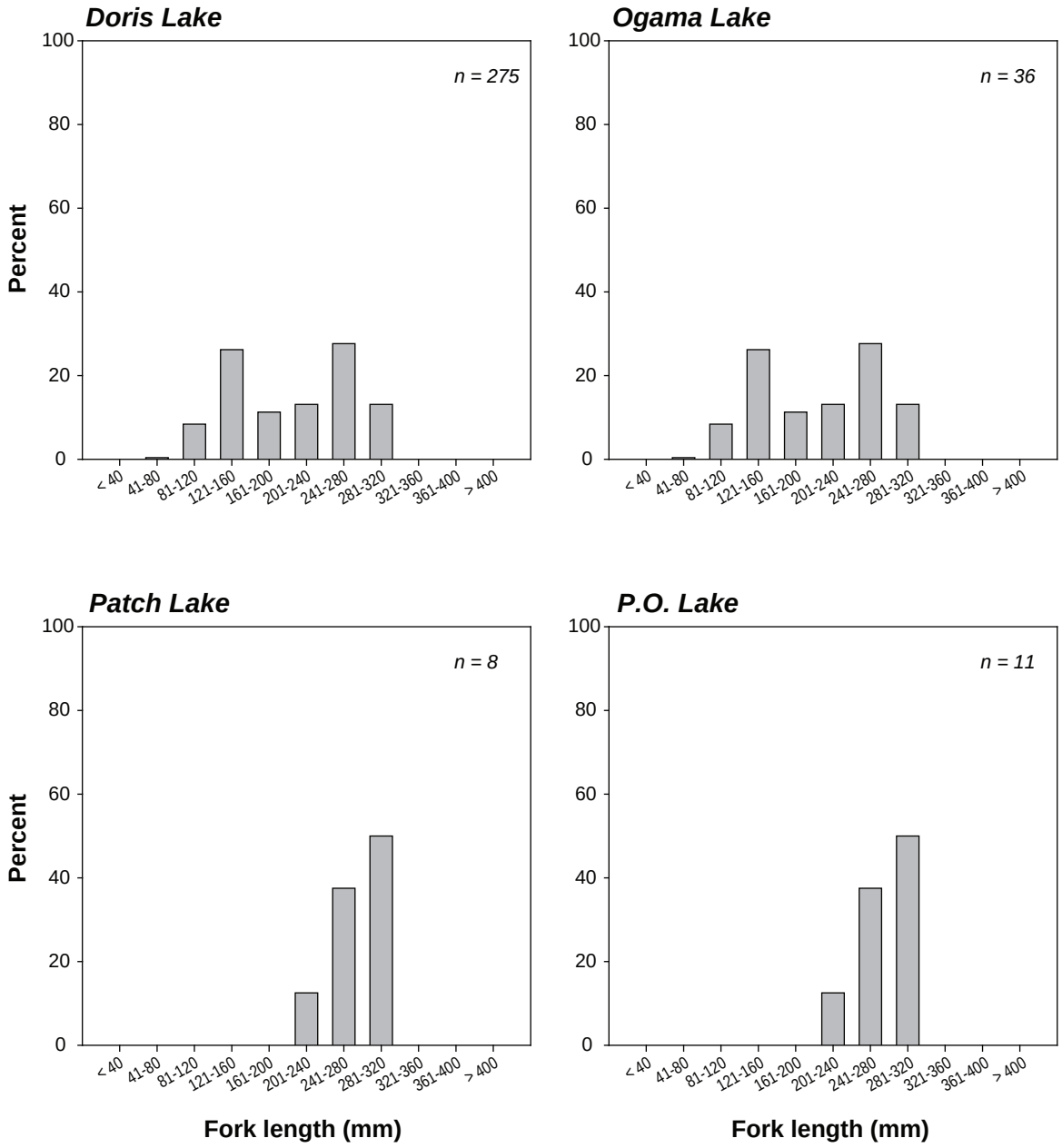

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Length-Frequency Distributions for Cisco Sampled from the Doris Watershed, Hope Bay Belt Project, 2009

Figure 3.2-12

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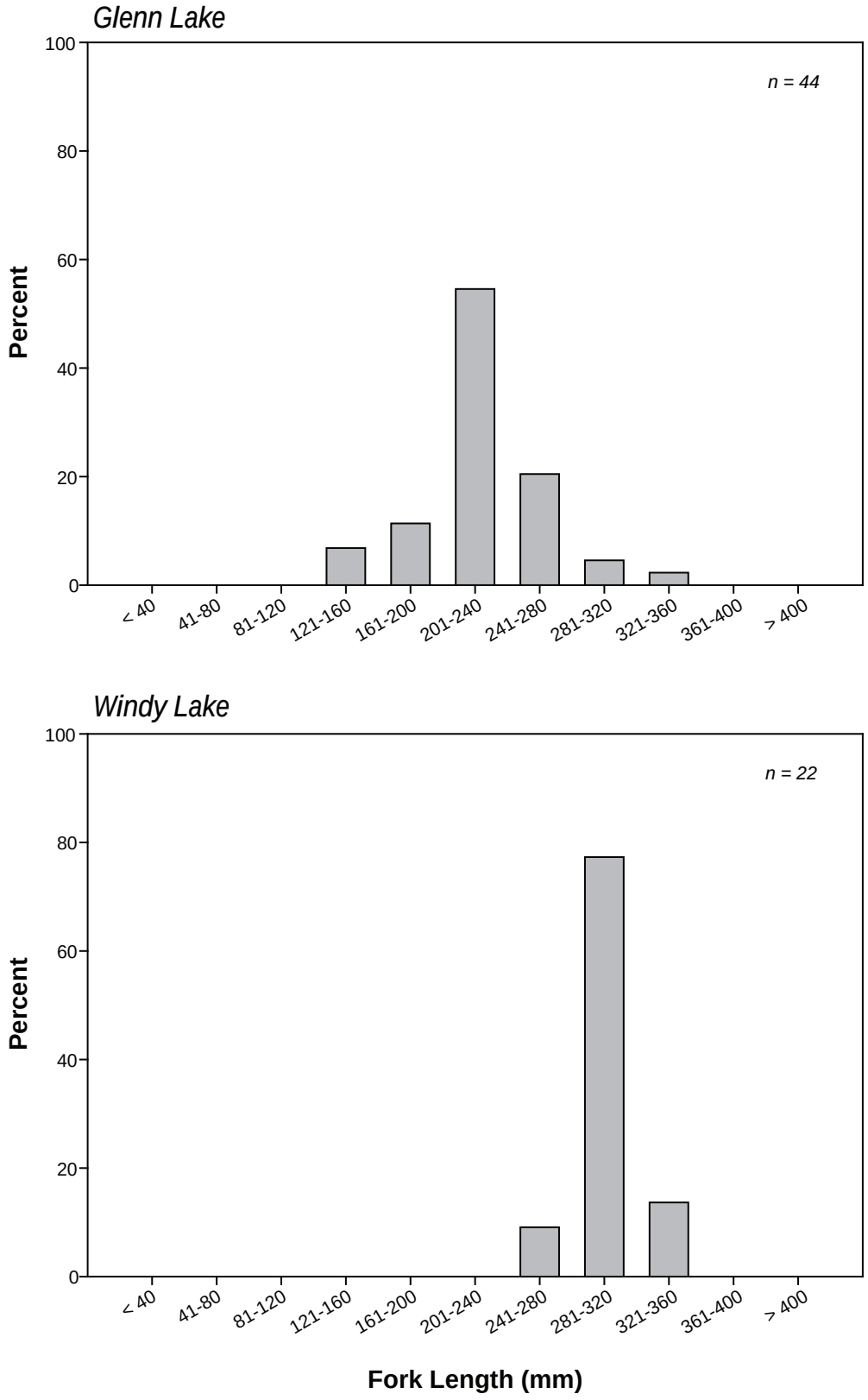

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Length-Frequency Distributions for Cisco Sampled from the Windy Watershed, Hope Bay Belt Project, 2009

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).

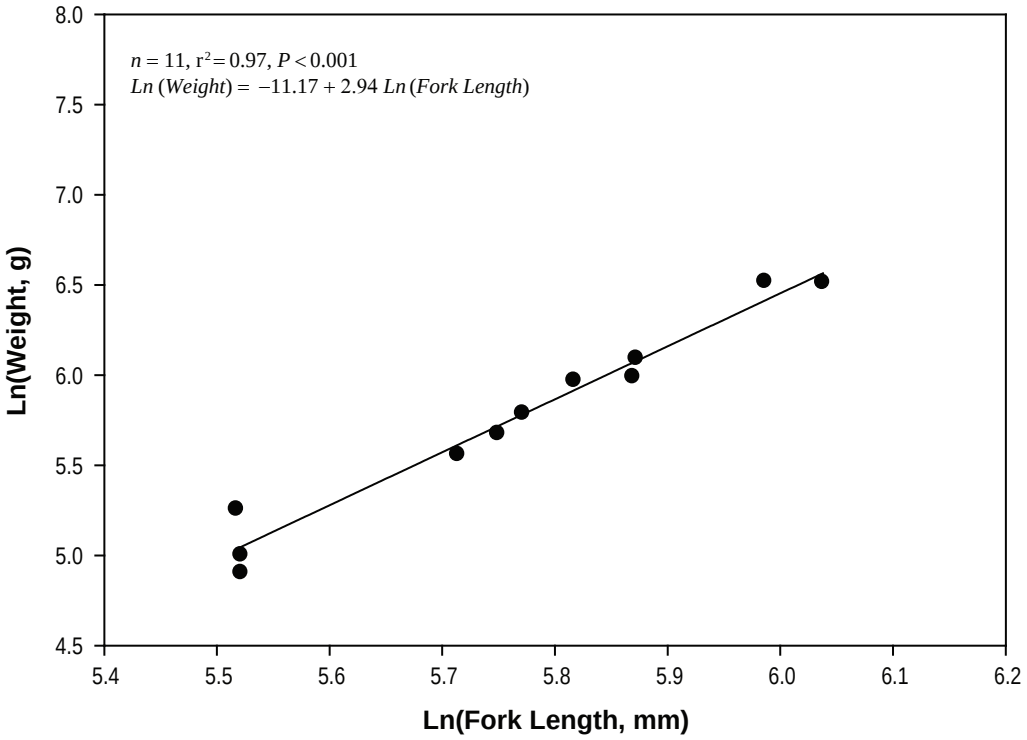
Figures 3.2-14 to 3.2-20 show weight-length regressions for all species for which more than six individuals were sampled from a lake. The weight-length regression of Arctic char sampled from Little Roberts Lake was highly significant ($P<0.001$) and explained 97% of the variation in ln(weight). A weight-length 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



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

Figure 3.2-14

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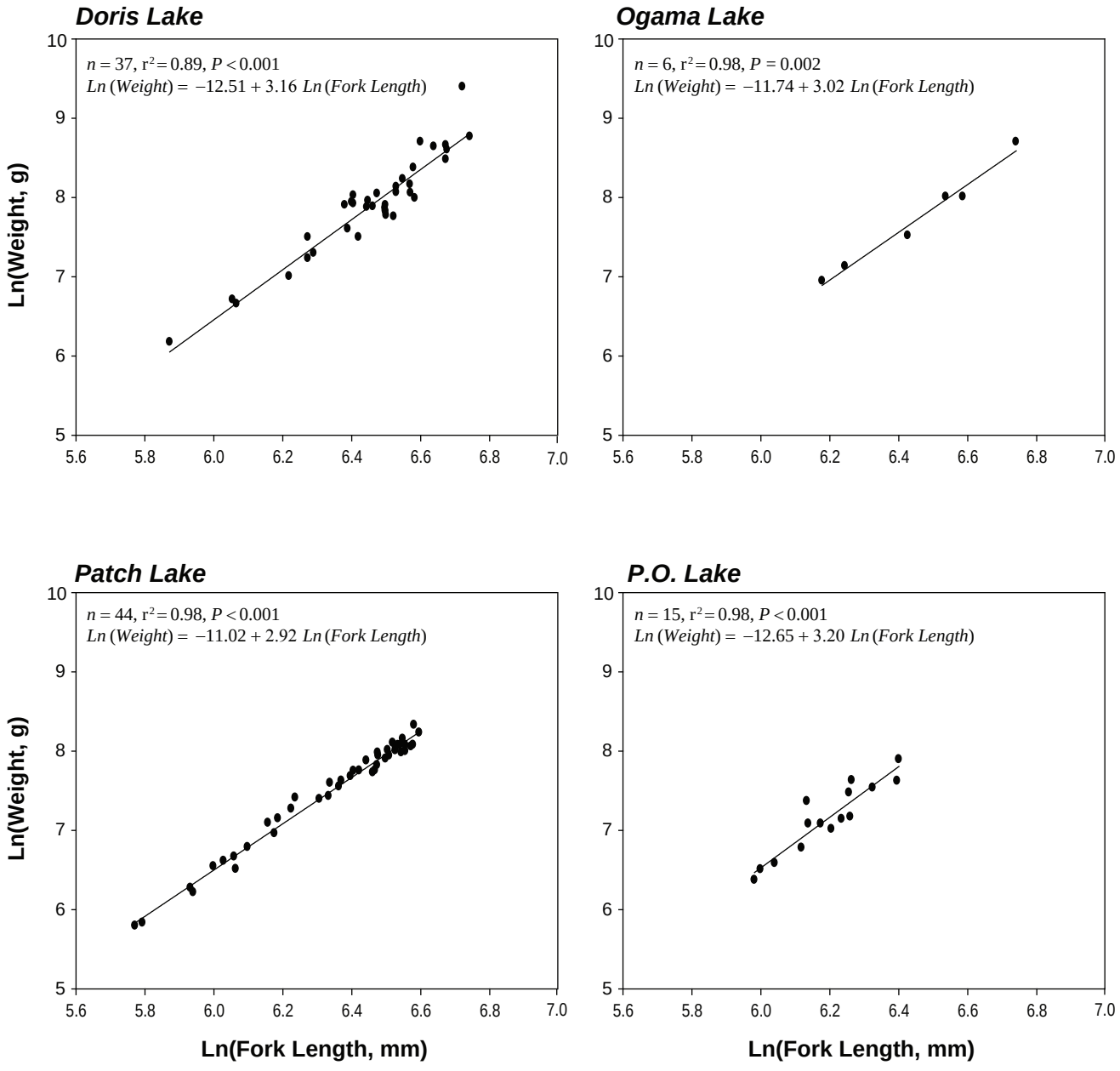

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Weight-Length Regressions for Lake Trout Sampled from Lakes in the Doris Watershed, Hope Bay Belt Project, 2009

Figure 3.2-15

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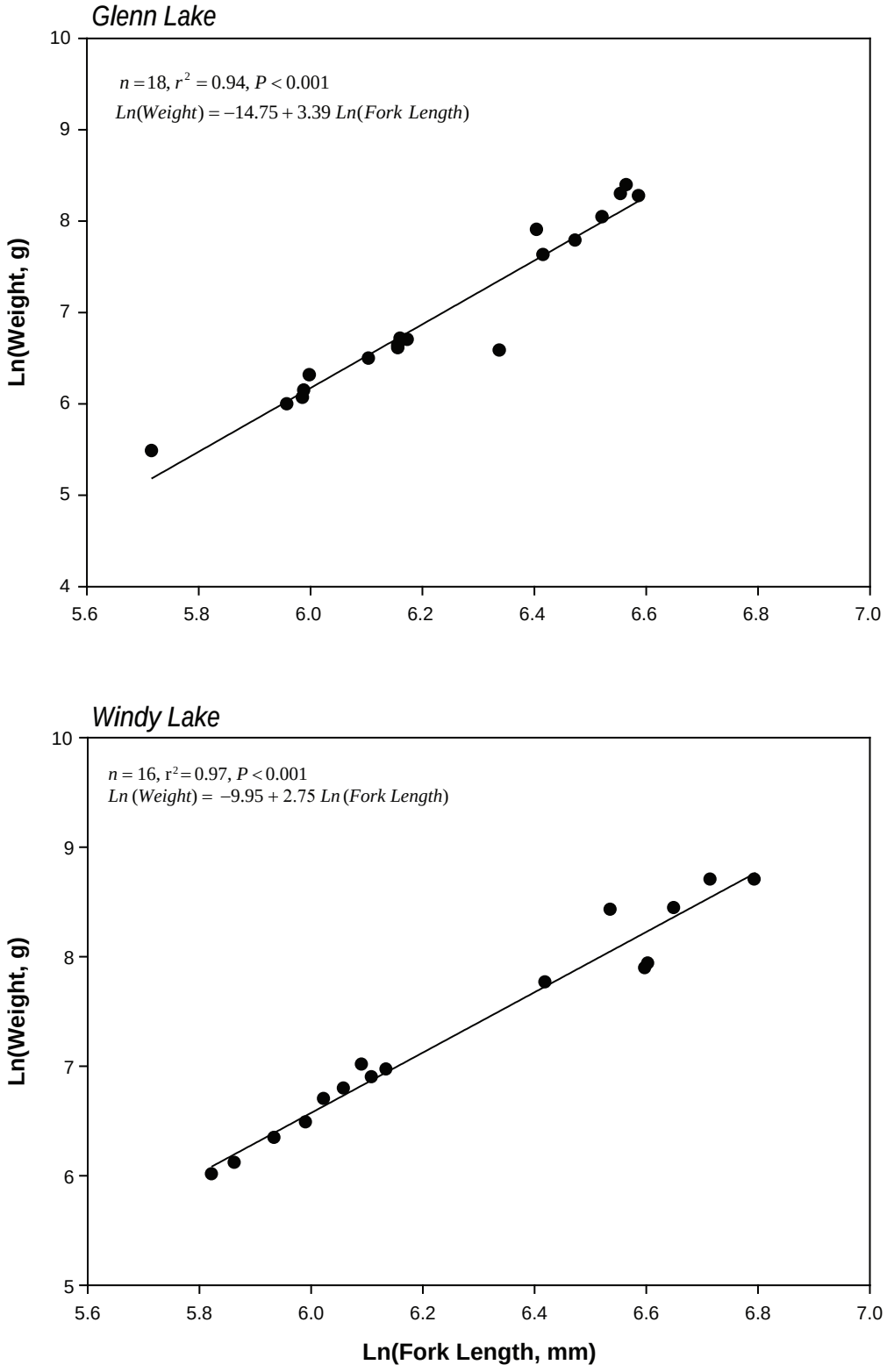

Weight-Length Regressions for Lake Trout Sampled from Lakes in the Windy Watershed, Hope Bay Belt Project, 2009

Figure 3.2-16

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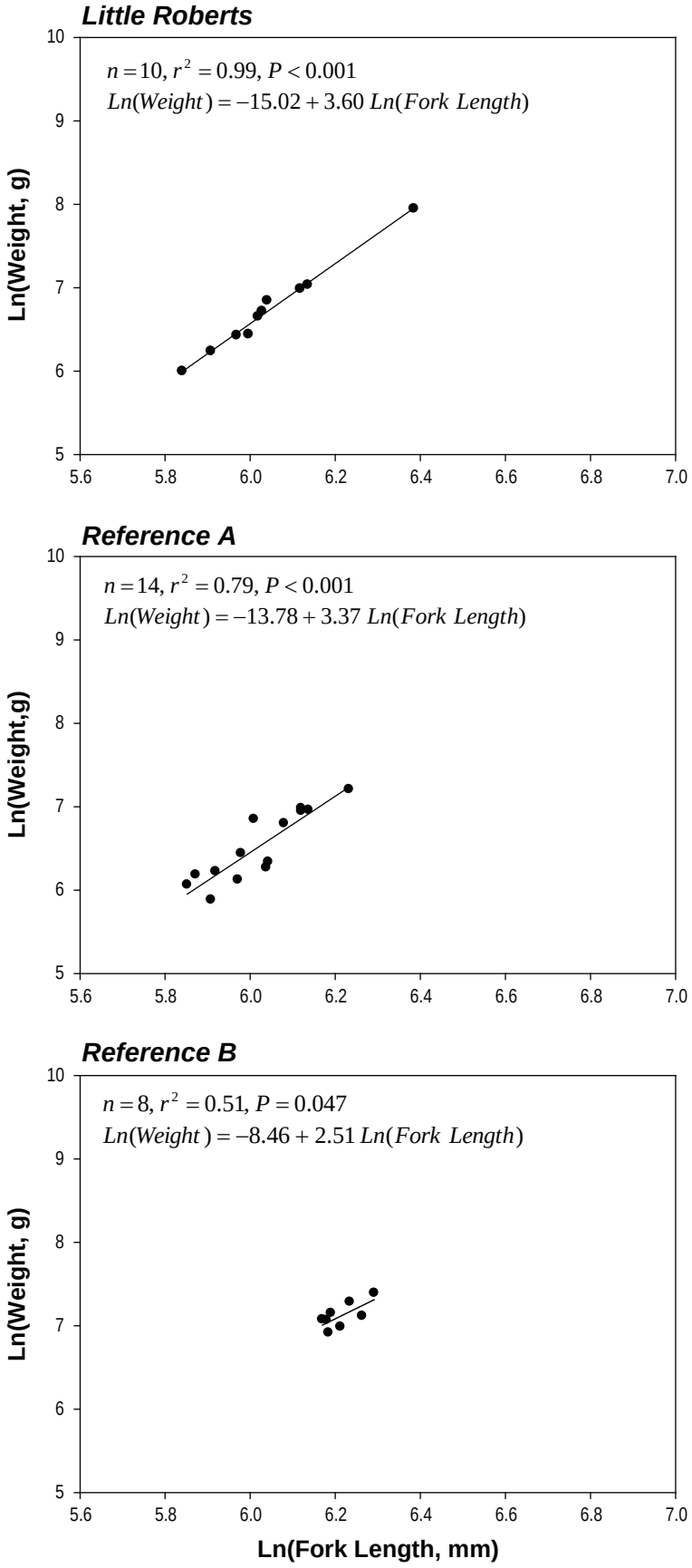

Weight-Length Regressions for Lake Trout Sampled from Little Roberts Lake and Reference Lakes, Hope Bay Belt Project, 2009

Figure 3.2-17

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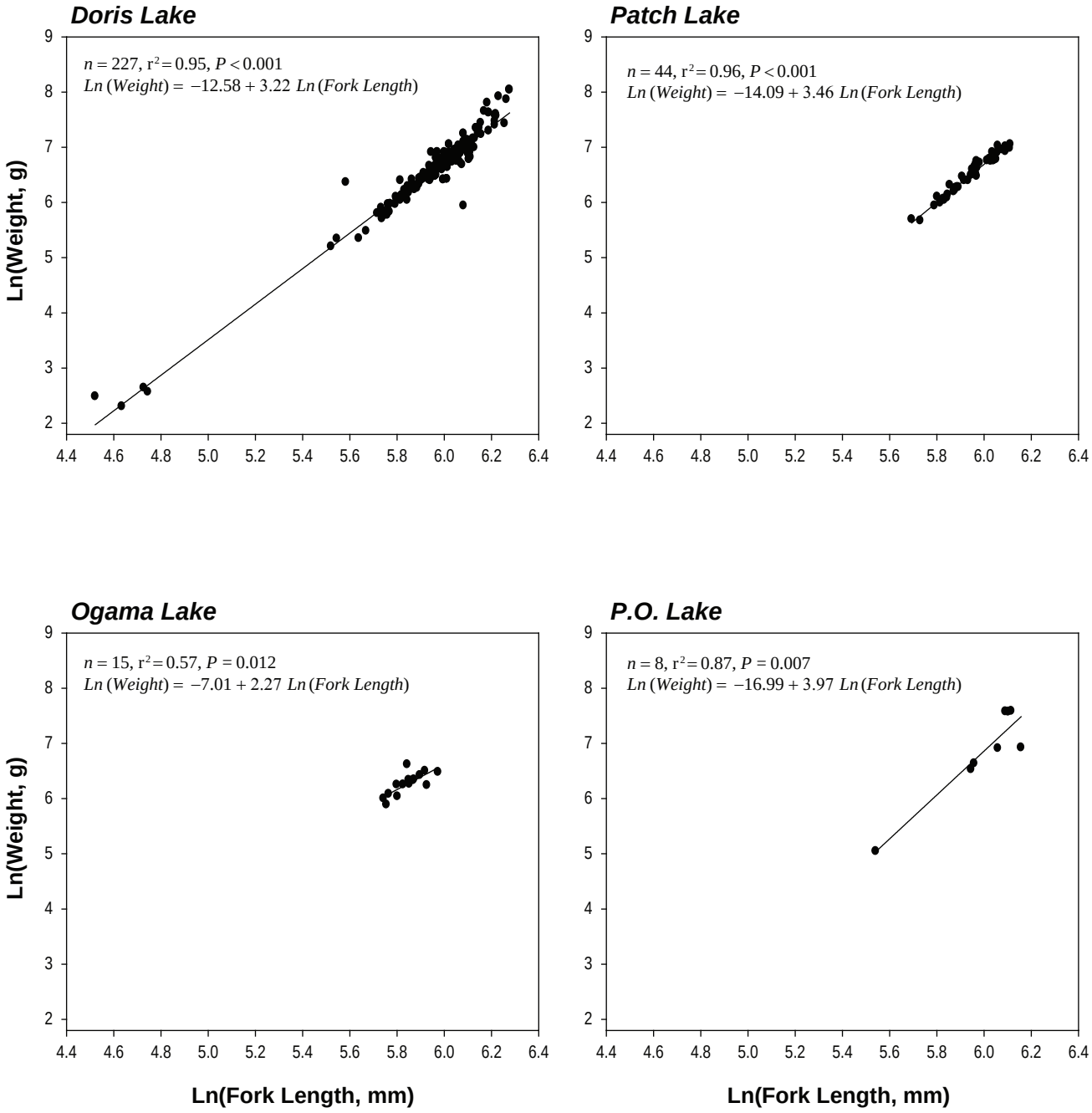

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Weight-Length Regressions for Lake Whitefish Sampled from Lakes in the Doris Watershed, Hope Bay Belt Project, 2009

Figure 3.2-18

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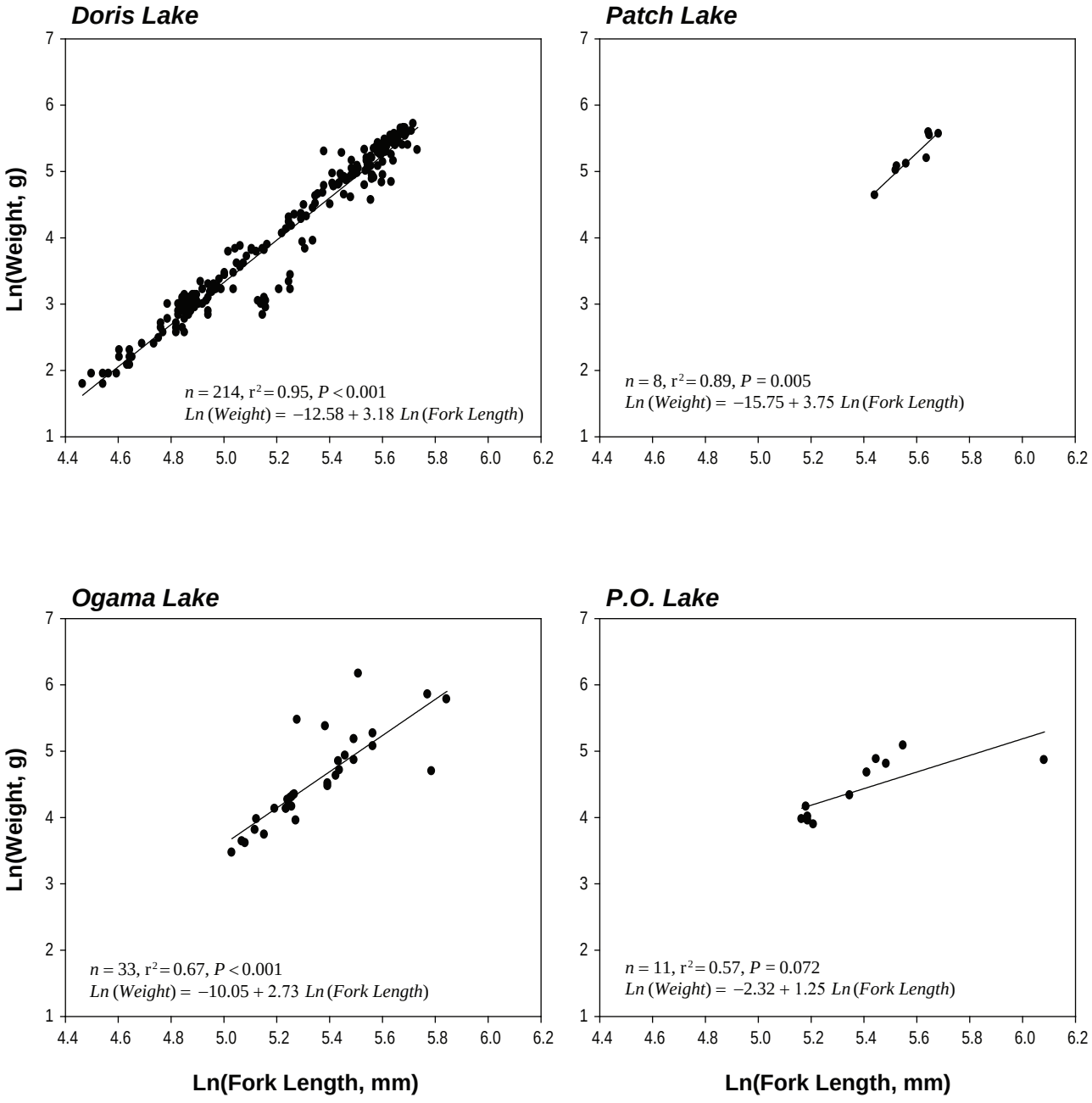

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Weight-Length Regressions for Cisco Sampled from Lakes in the Doris Watershed, Hope Bay Belt Ptoject, 2009

Figure 3.2-19

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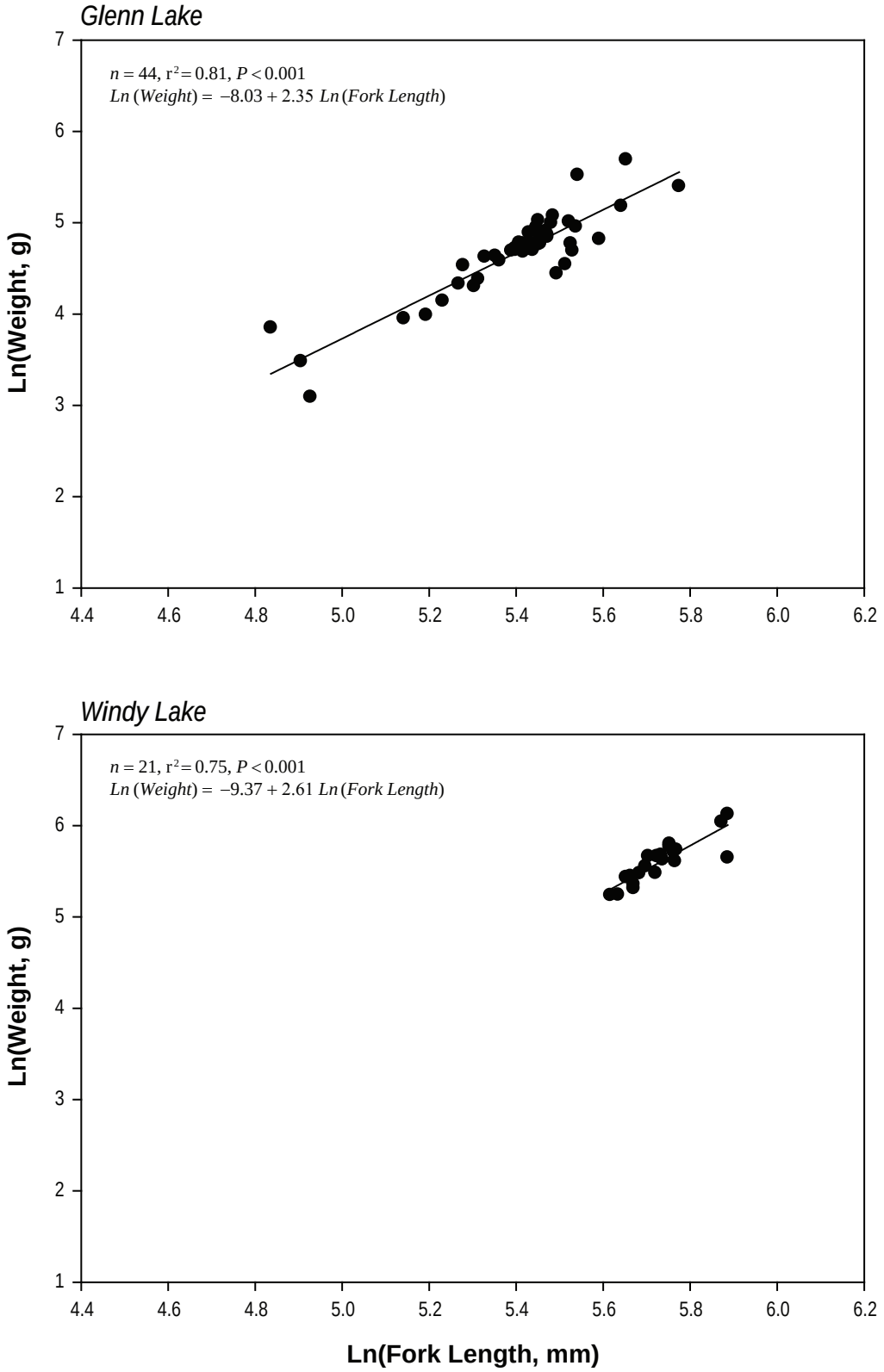

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Weight-Length Regressions for Cisco Sampled from Lakes in the Windy Watershed, Hope Bay Belt Project, 2009

Figure 3.2-20

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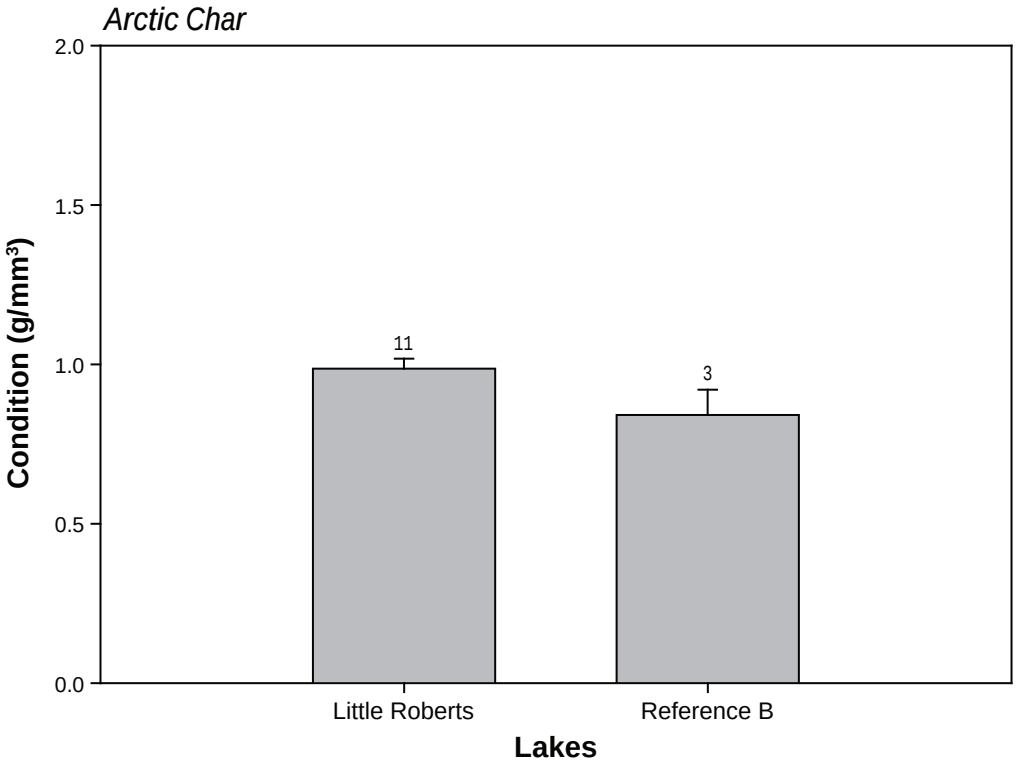
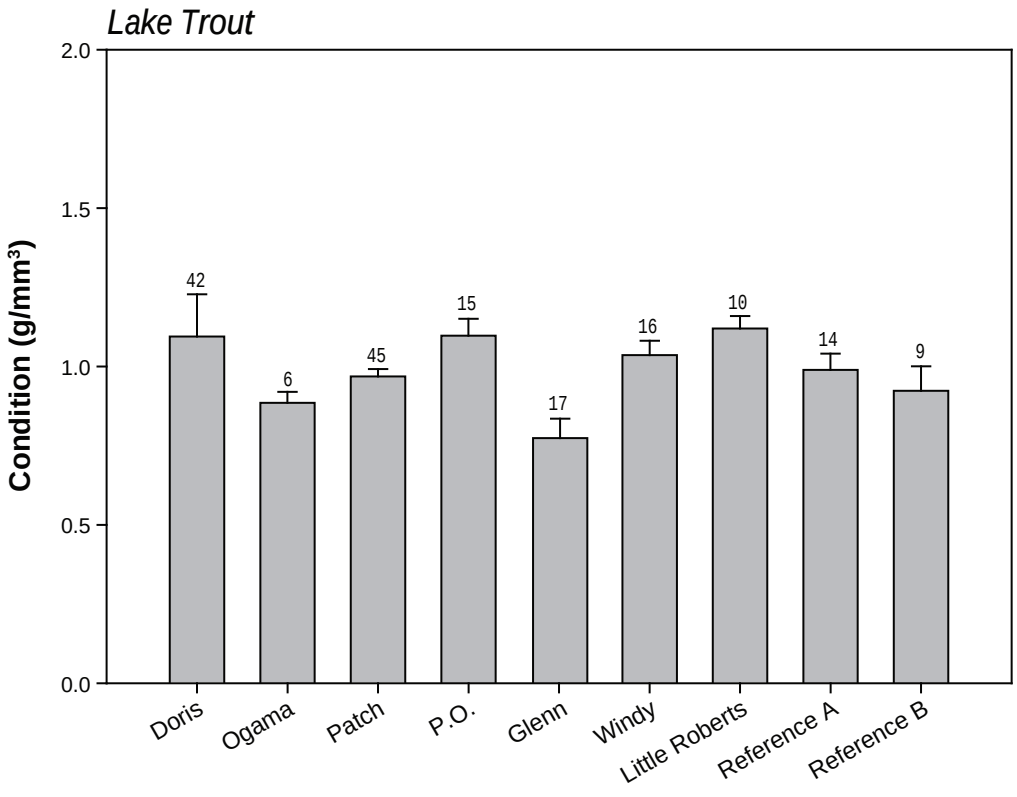




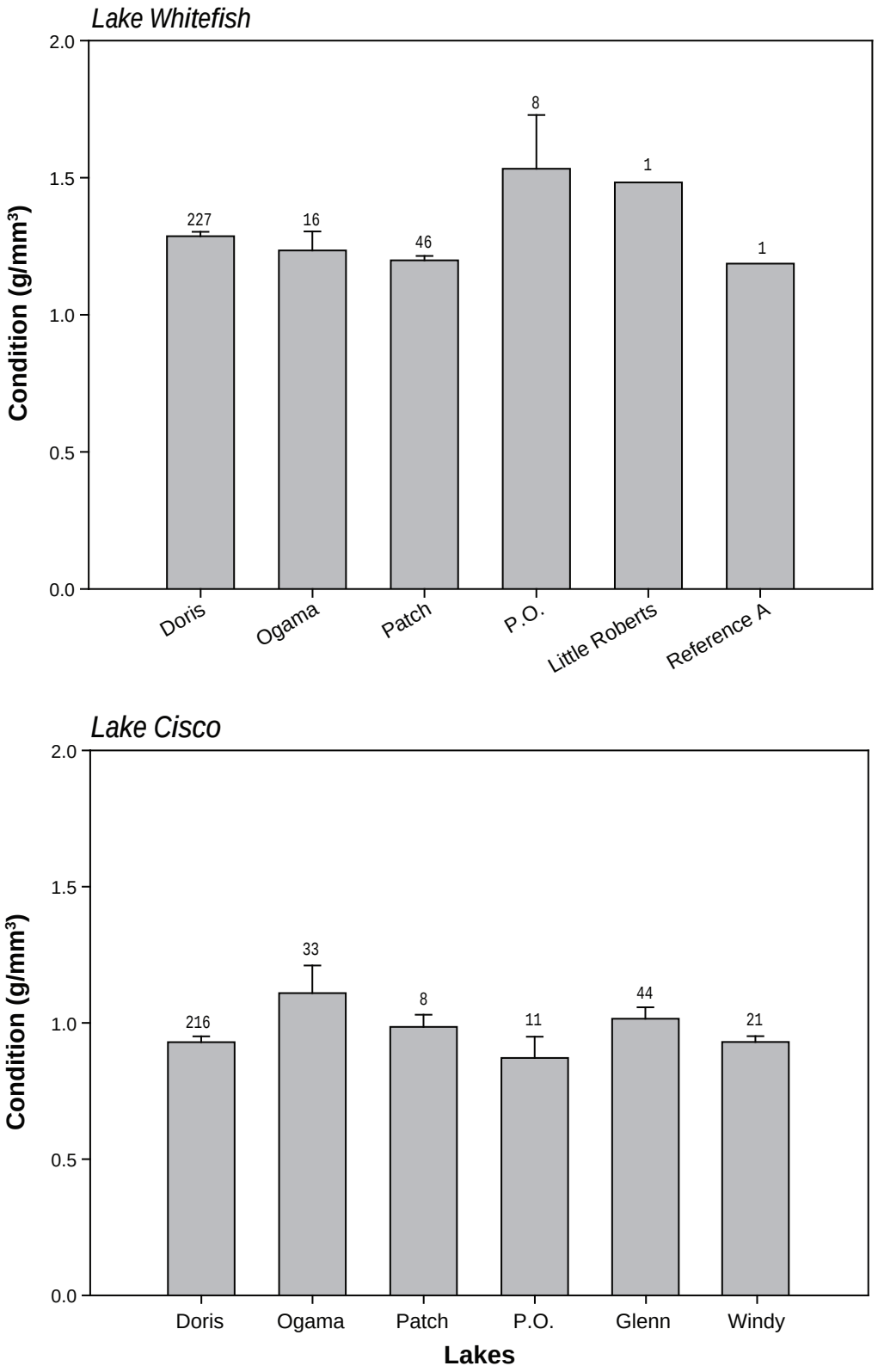
Note: Error bars represent one standard error of the mean.
Numbers represent sample size.

NEWMONT The Gold Company

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

Figure 3.2-21

Rescan Engineers & Scientists



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.

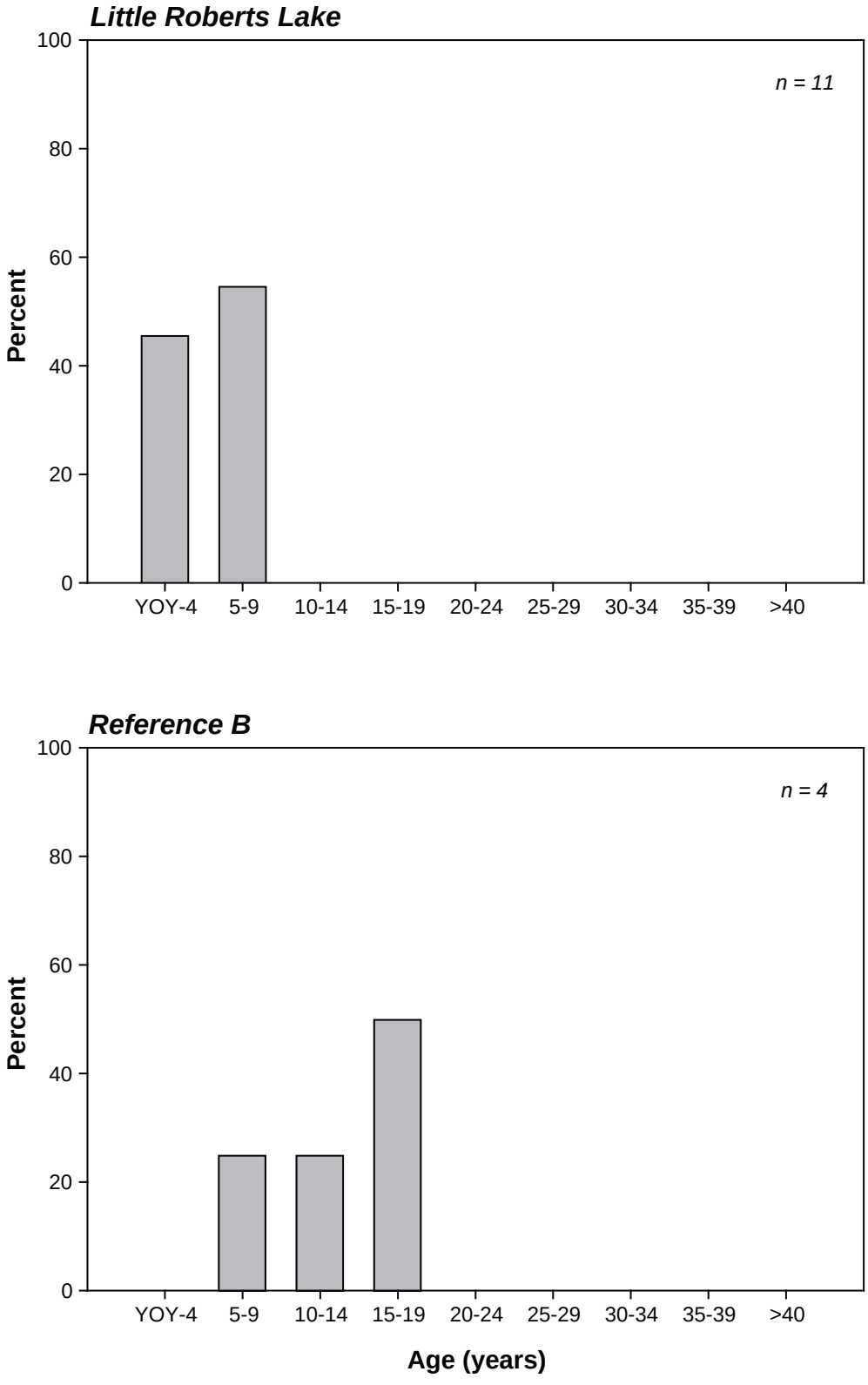
Doris Lake had the widest range of ages. The dominant age class for lake whitefish was 10 to 14 years. The von Bertalanffy growth models explained 73 to 85% of the variation in length-at-age for lake whitefish sampled from Doris and Patch lakes. Growth coefficients varied from 0.153 $year^{-1}$ (Doris 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.

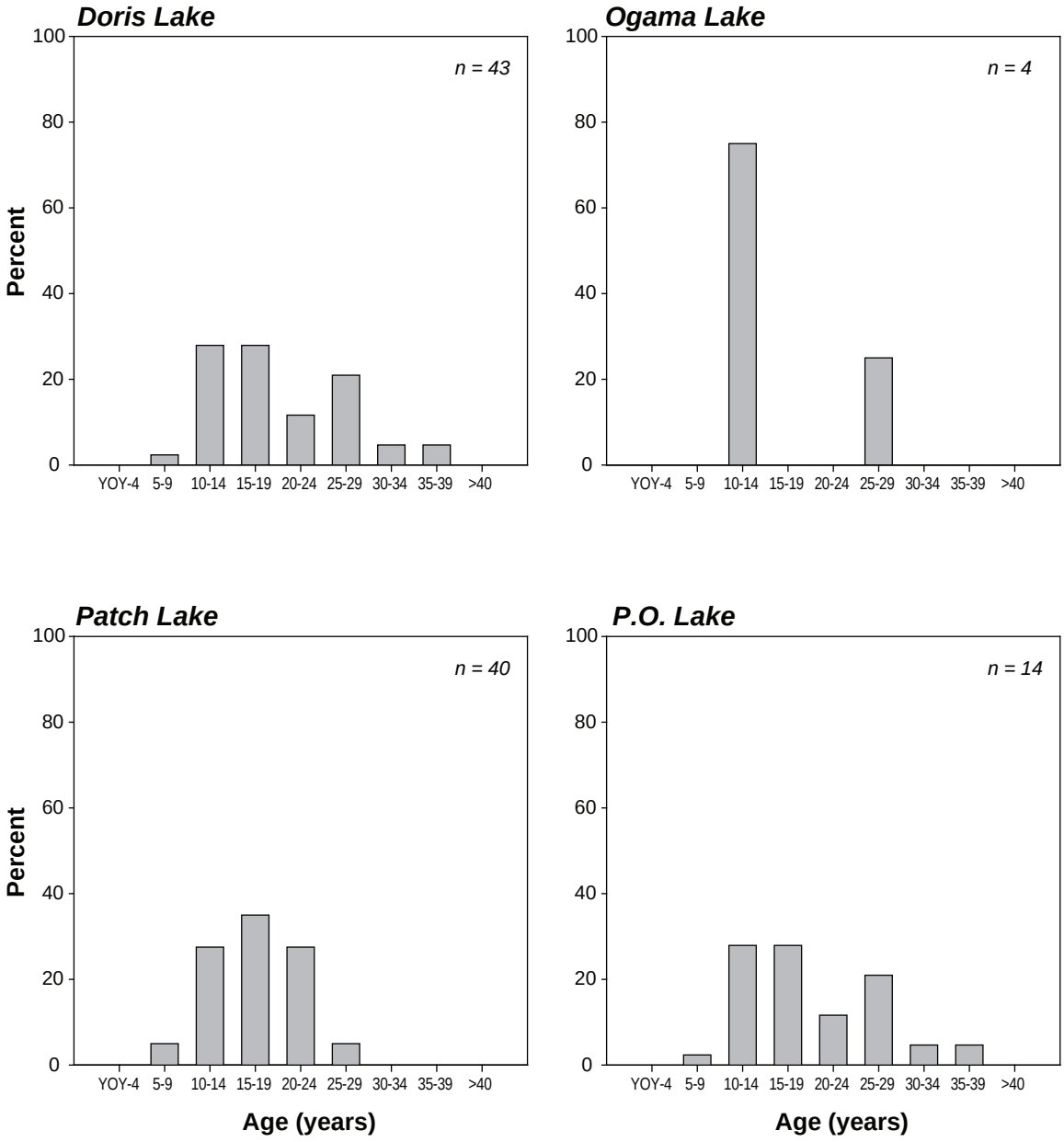


NEWMONT The Gold Company

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

Figure 3.2-23

Rescan Engineers & Scientists

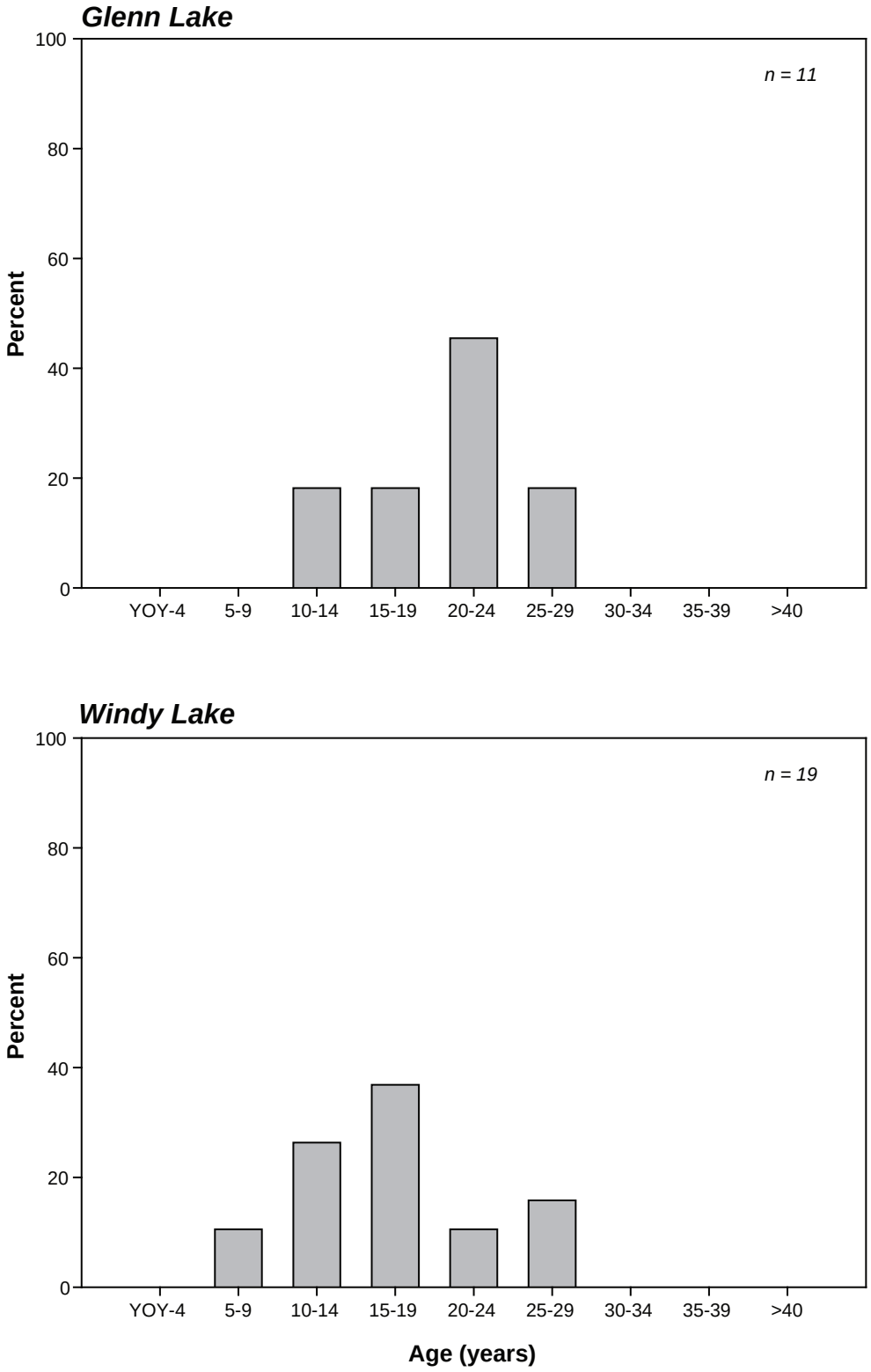


NEWMONT The Gold Company

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

Figure3.2-24

Rescan Engineers & Scientists

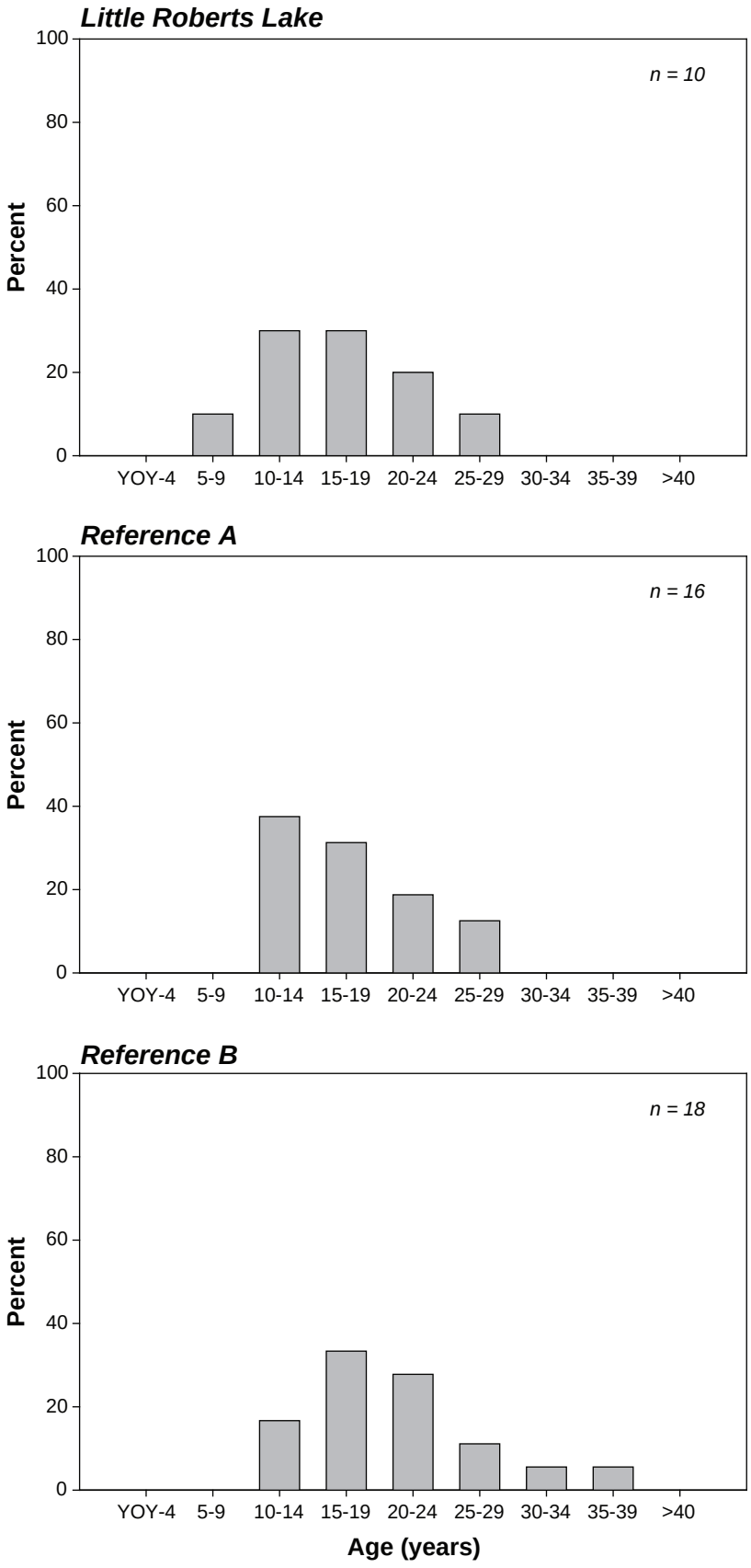


NEWMONT The Gold Company

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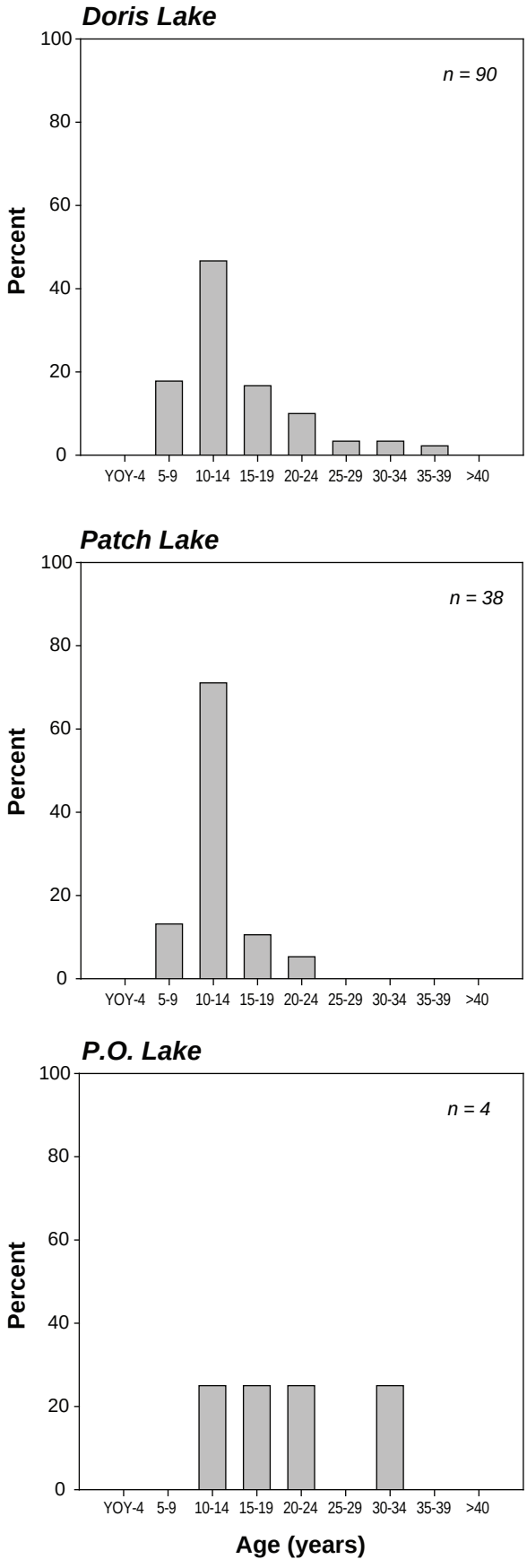
Age-Frequency Distributions for Lake Trout Sampled from Little Roberts Lake and Reference Lakes, Hope Bay Belt Project, 2009

Figure 3.2-26

Rescan™ Engineers & Scientists

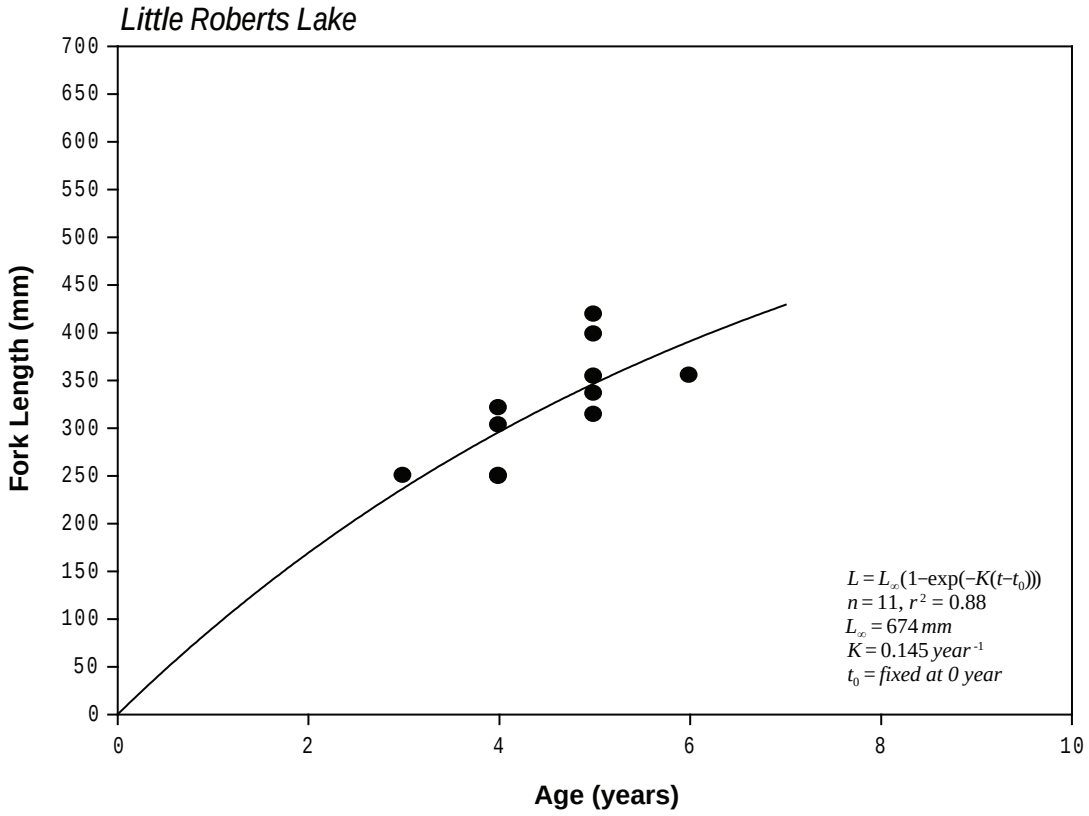


NEWMONT The Gold Company

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

Figure 3.2-27

Rescan Engineers & Scientists

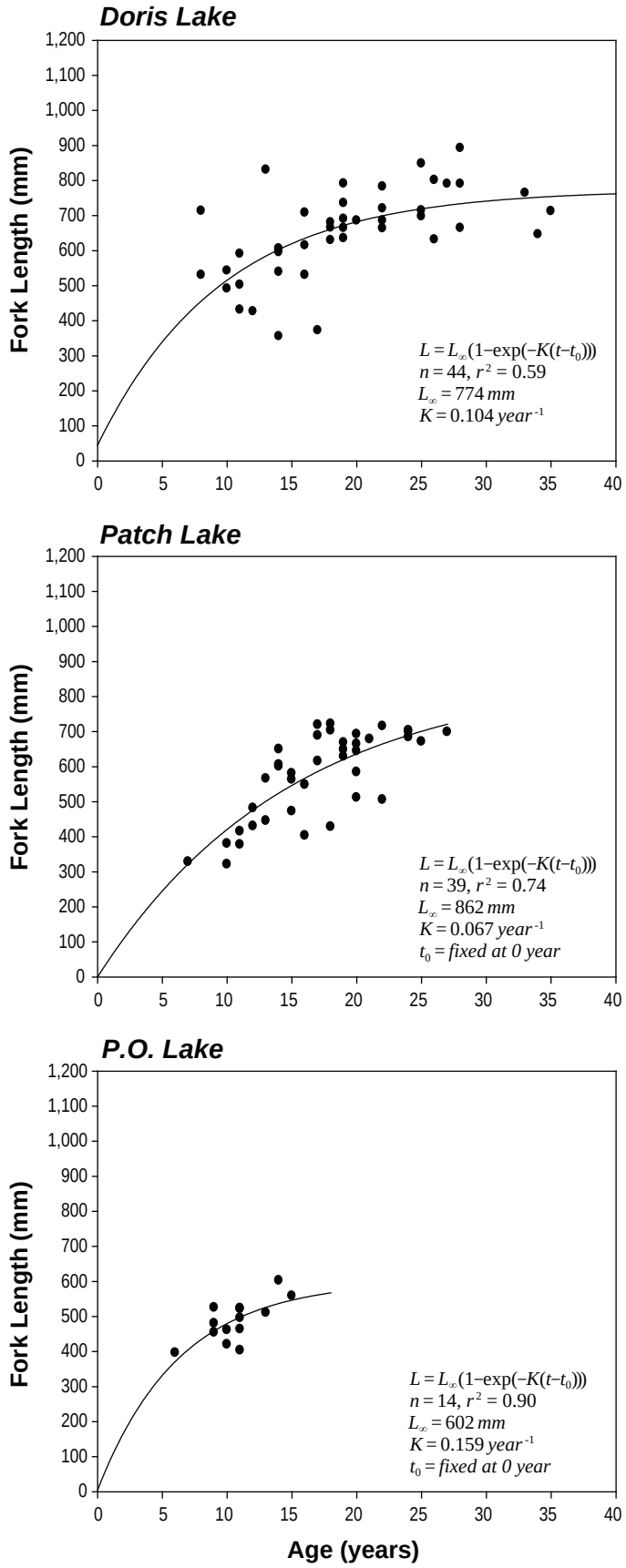


NEWMONT The Gold Company

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

Figure 3.2-28

Rescan™ Engineers & Scientists

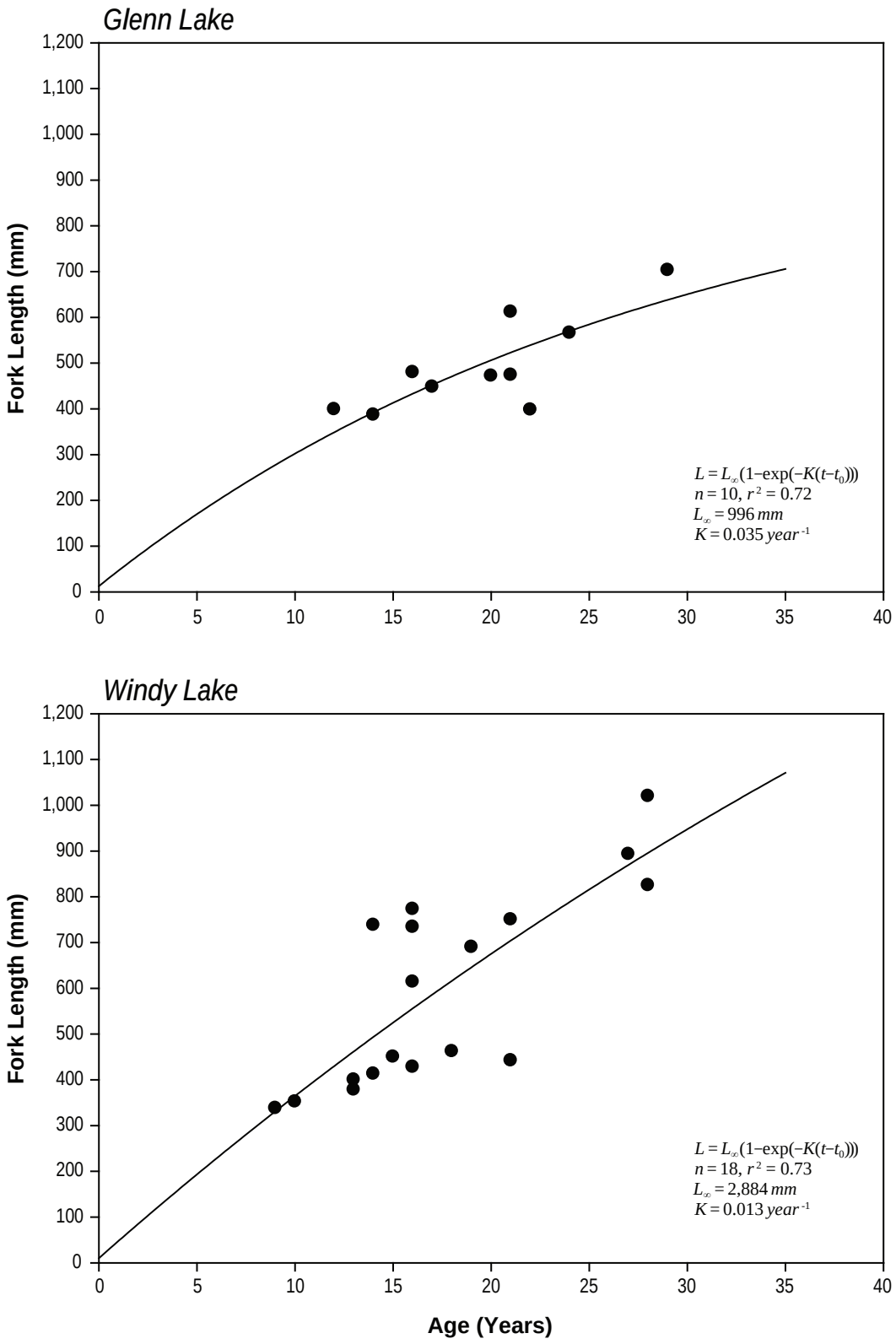


NEWMONT The Gold Company

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

Figure 3.2-29

Rescan™ Engineers & Scientists



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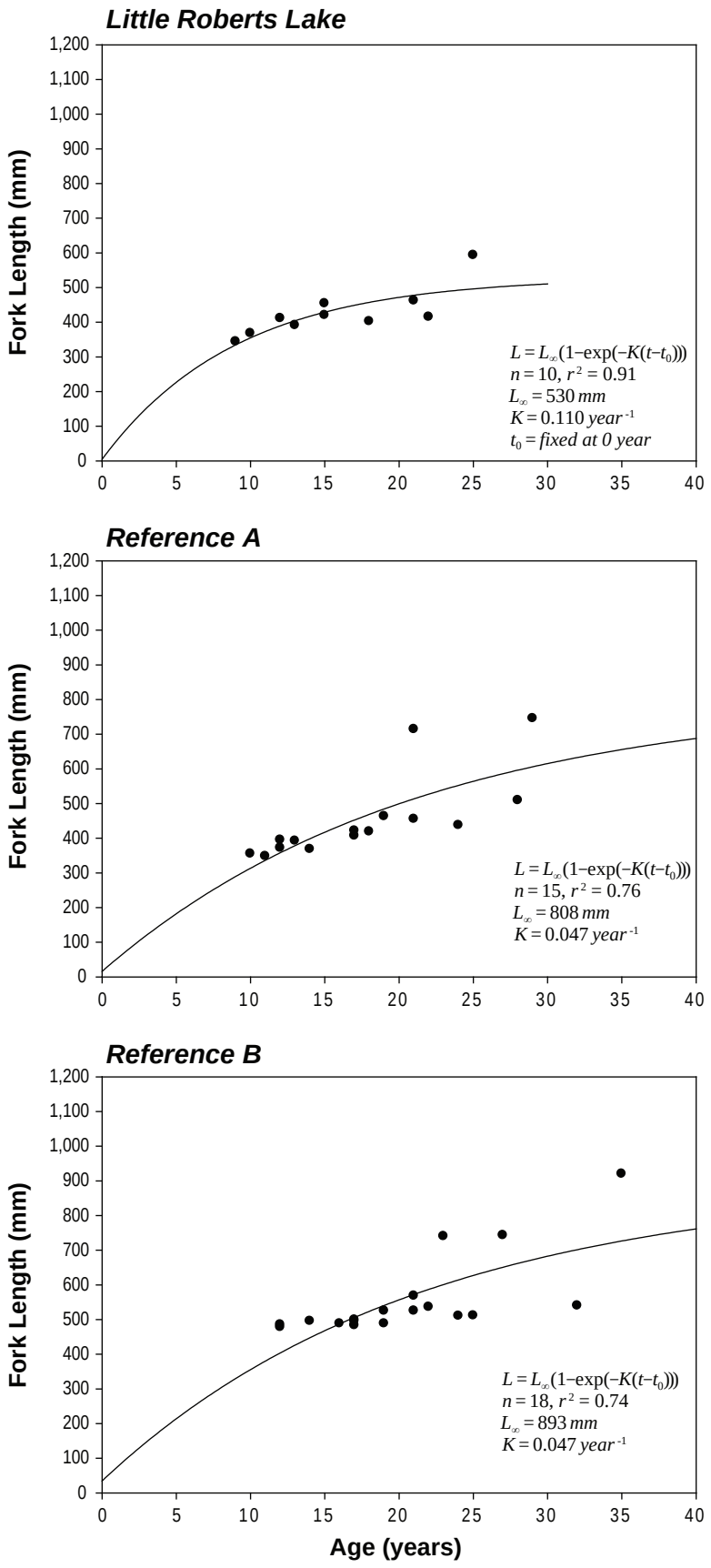
von Bertalanffy Growth Models for Lake Trout Sampled from Lakes in the Windy Watershed, Hope Bay Belt Project, 2009

Figure 3.2-30

Rescan™ Engineers & Scientists

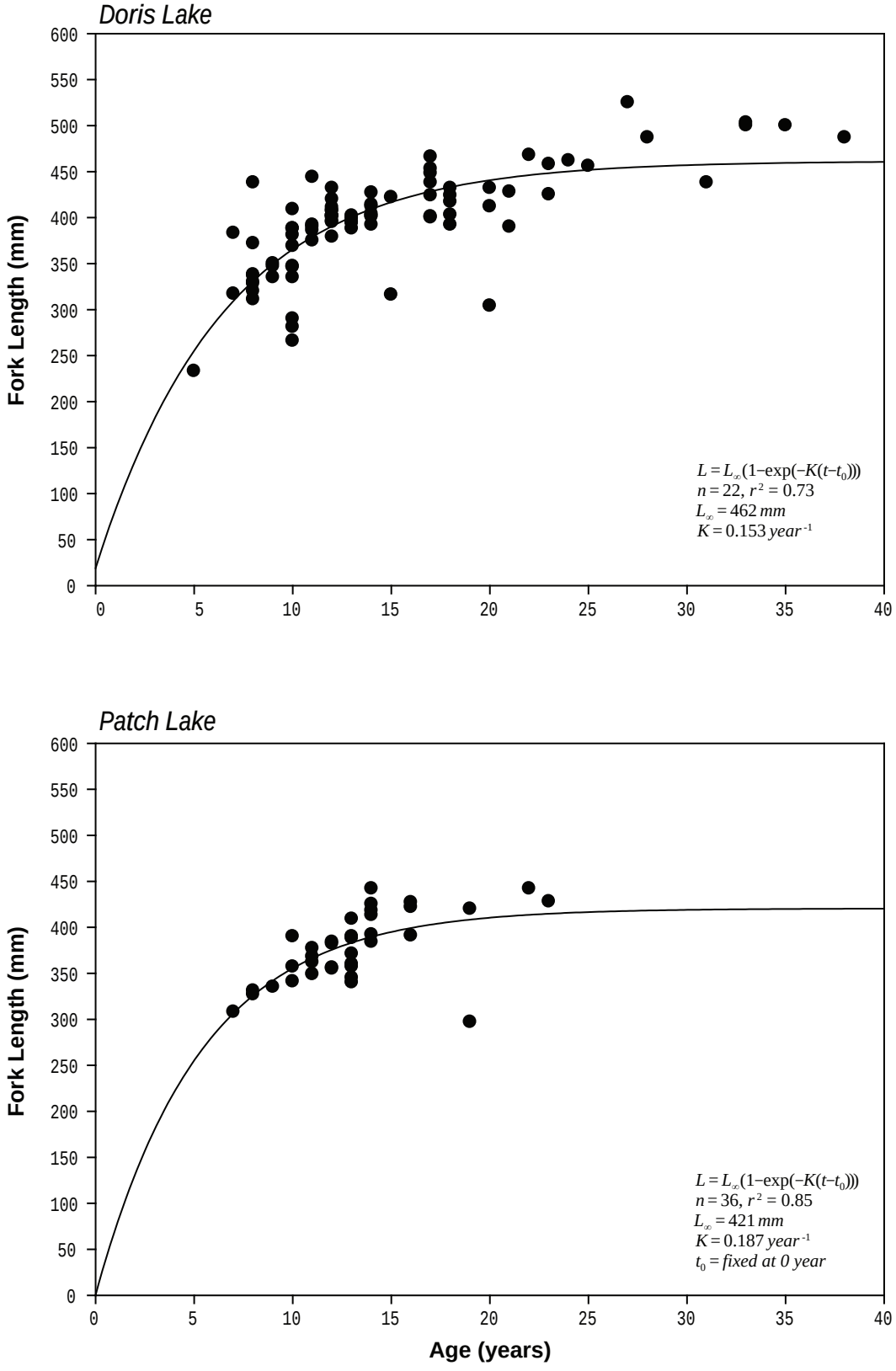


NEWMONT The Gold Company

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

Rescan Engineers & Scientists

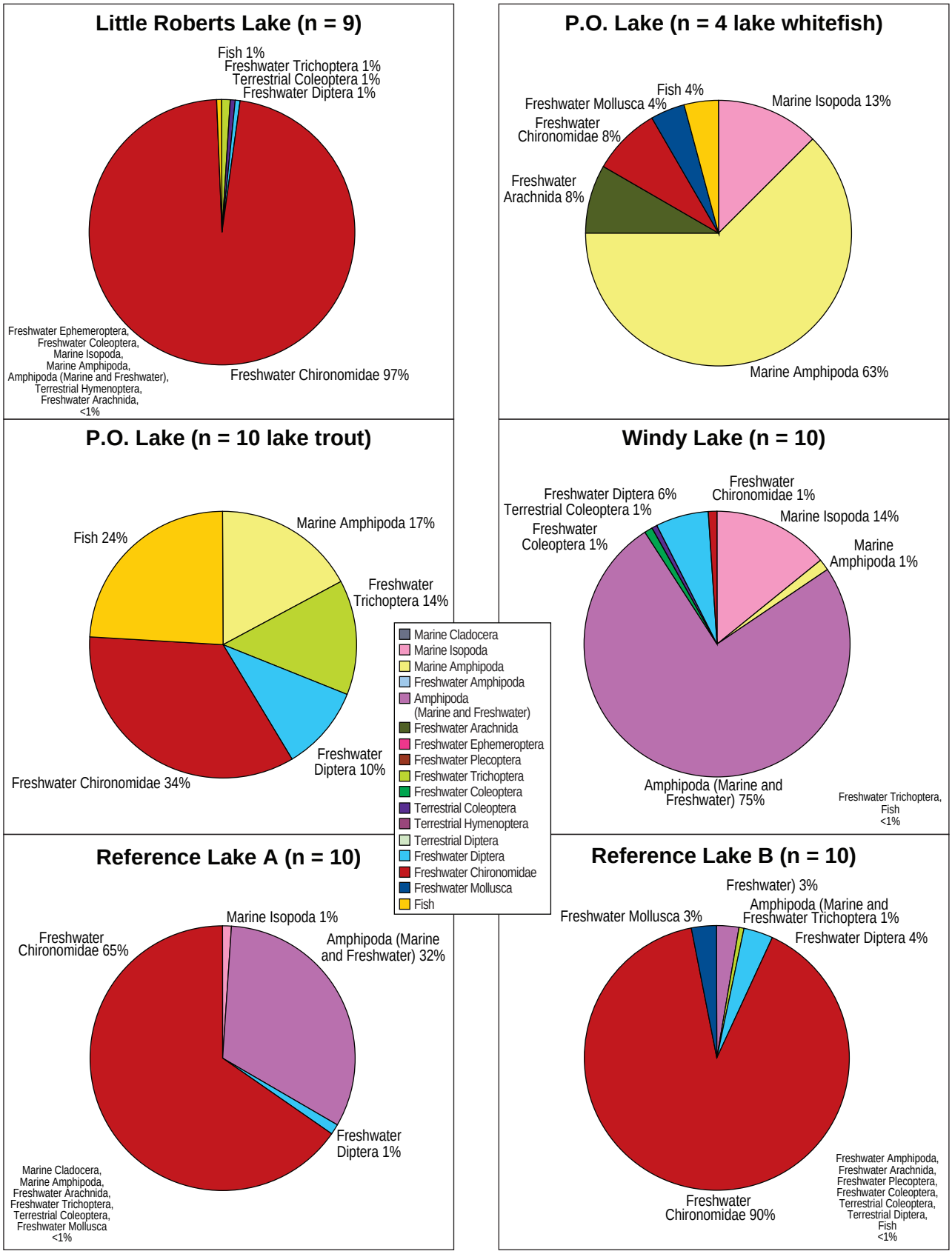


NEWMONT The Gold Company

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

Figure 3.2-32

Rescan Engineers & Scientists

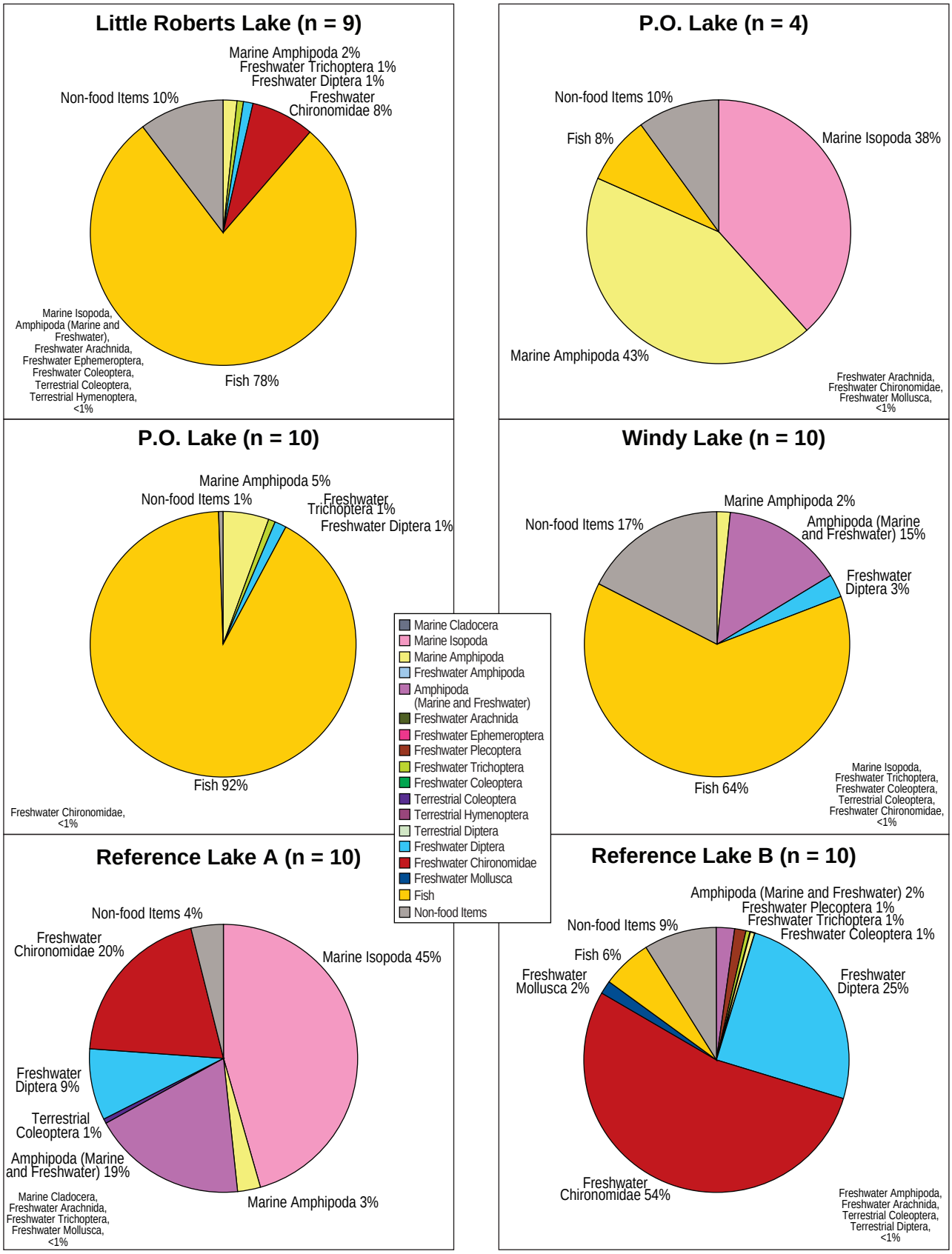


NEWMONT The Gold Company

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

Figure 3.2-33

Rescan Engineers & Scientists



NEWMONT The Gold Company

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.

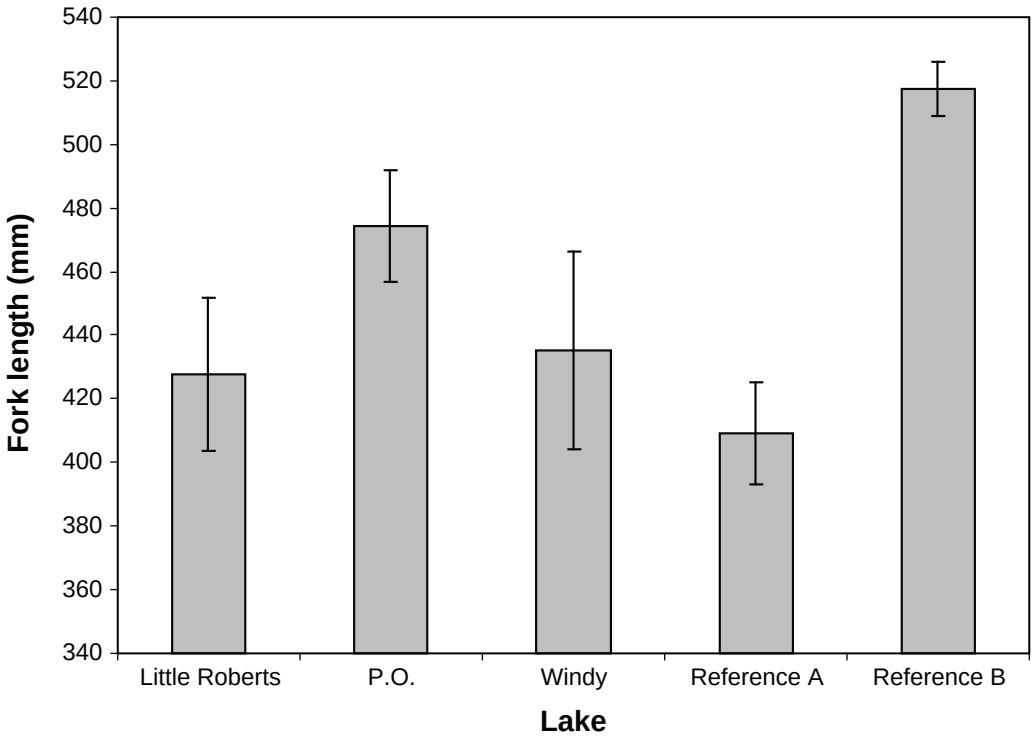
By number, the diet of lake trout sampled from Project area lakes were comprised predominantly of freshwater chironomids. Freshwater and marine amphipods were also present in relatively high percentages, especially in the diet of lake trout sampled from P.O. and Windy lakes. The diet of lake trout sampled 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.

NEWMONT The Gold Company

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

		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	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

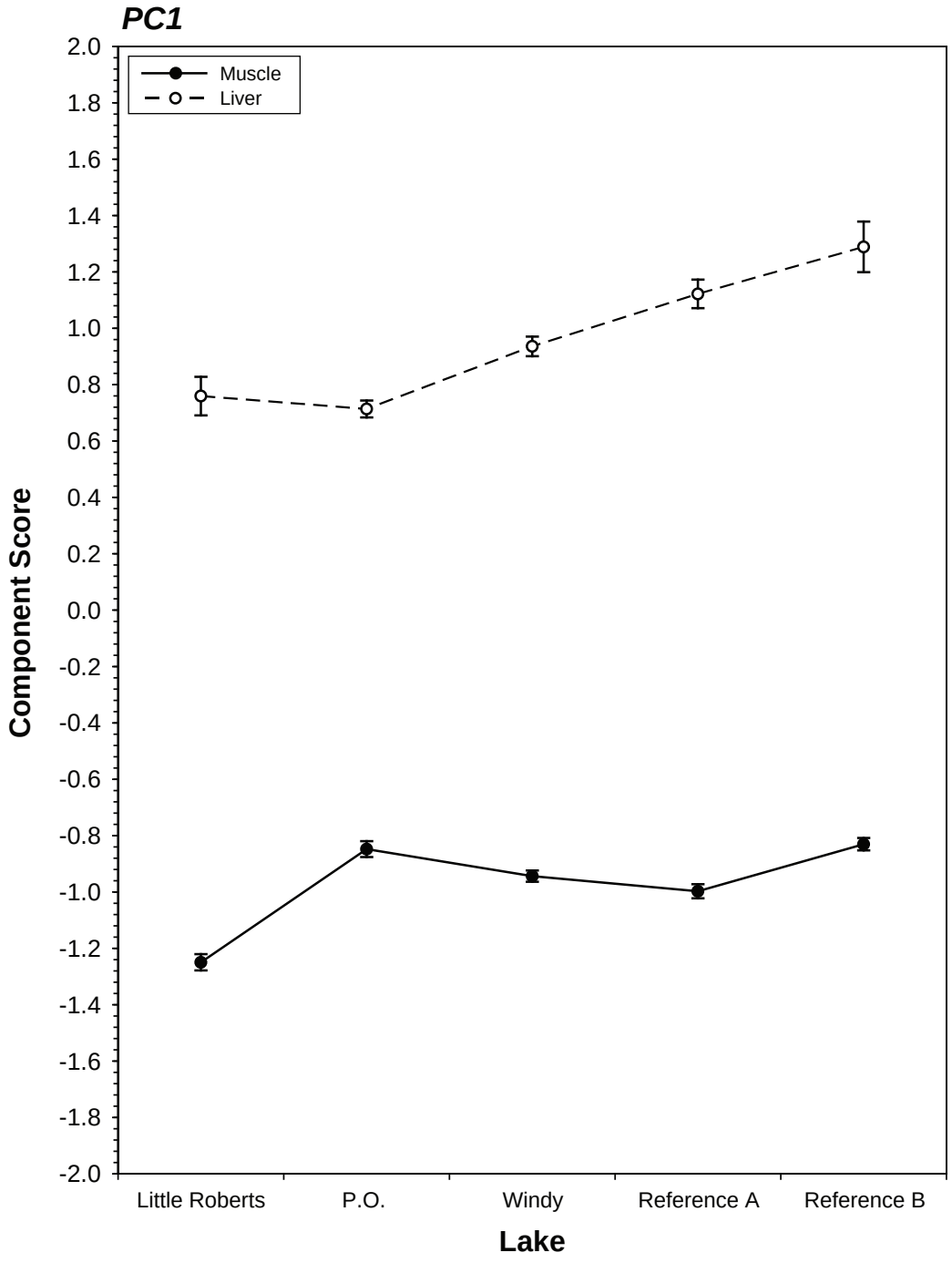
Table 3.2-13. Analysis of Variance of Lake Trout Tissue Metal Concentrations, Hope Bay Belt Project, 2009

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 ln-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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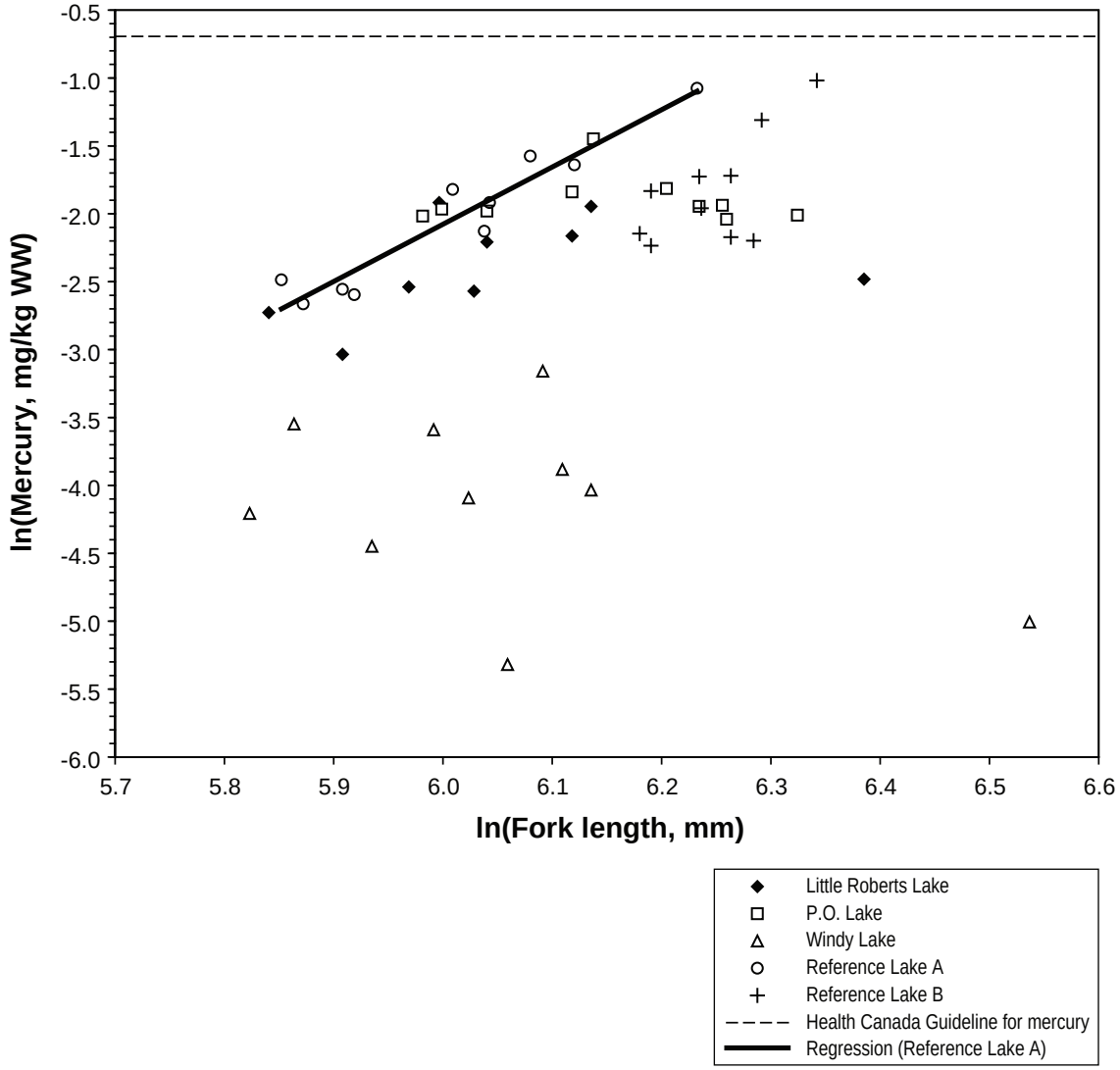
Table 3.2-14 Loadings of Metals on Principle Components

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

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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.

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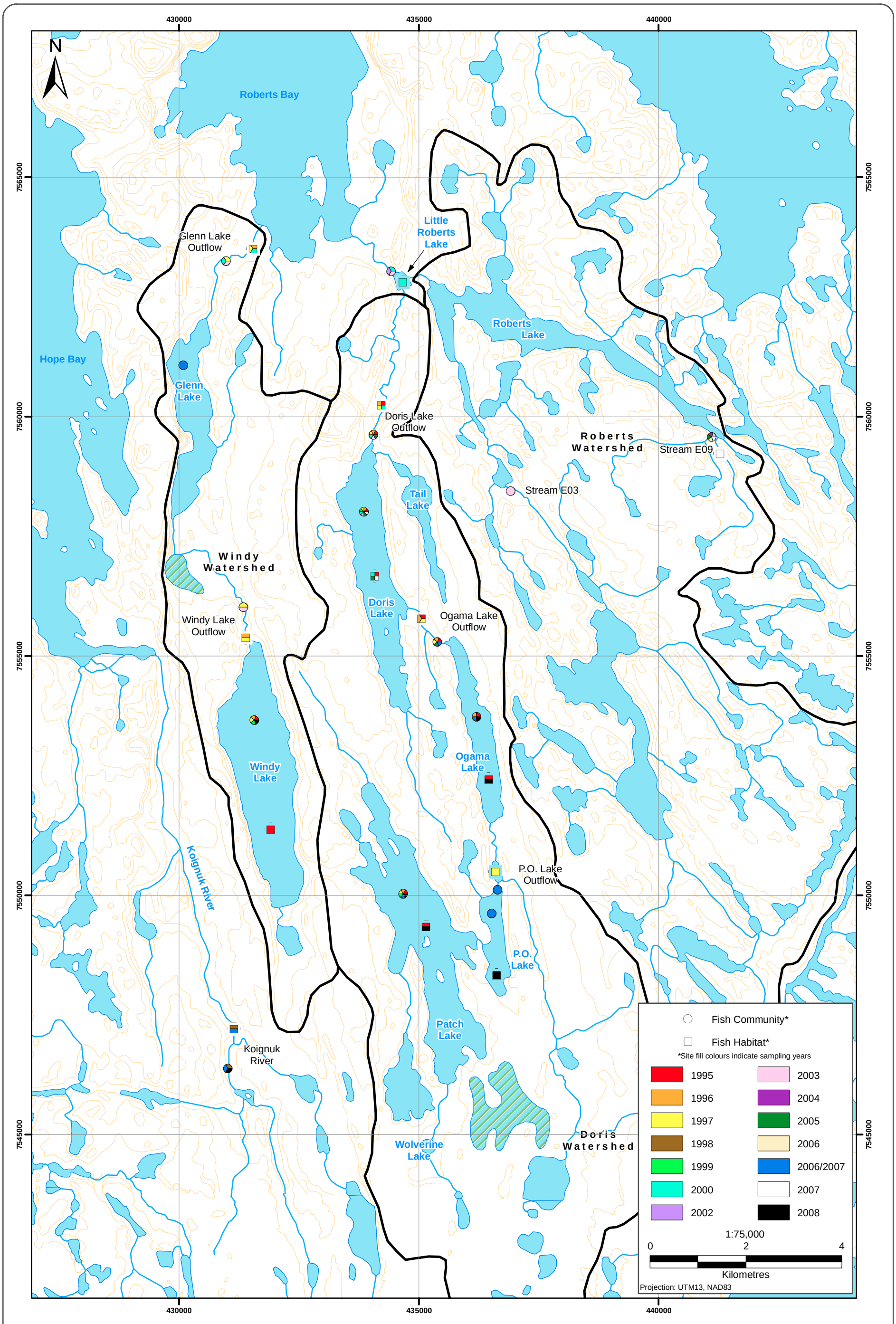

Figure 4.1-1

NEWMONT NORTH AMERICA

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

Figure 4.1-1

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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

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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

Station ID:	**Survey Date (d/m/y):**	**Coordinates:**	**Coordinates:**
Survey Distance (m):	**Survey Crew:**	**0m**	
	Time:		

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

Comments:

Weather:

Hab Unit No.	Hab Type	Dist. fr start (m)	Length (m)	Slope (%)	Depth (m)		Width (m)		Bed Material					Pool Info			Fish Passage Barriers	
					Mean	Bank-full	Mean	Bank-full	Sand (%)	Gravel (%)	Cobble (%)	Boulder (%)	Bedrock (%)	Type	Depth (m) Max	Depth (m) Crest	Type	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

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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

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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;
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Appendix 2.2-3

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

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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

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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
-106.5742283	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:
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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
-106.577865	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
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
-106.5888917	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
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
-106.587295	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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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
-106.57987	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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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
-106.5808017	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:
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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
-106.5882283	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
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
-106.5928633	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:
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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
-106.5886533	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
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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
-106.5986083	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
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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
-106.58426	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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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
-106.58816	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
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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
-106.5949033	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
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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
-106.6017583	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
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
-106.5574367	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
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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
-106.5439683	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

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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:		Coordinates:
Survey Distance (m): 200	Survey Crew: TR/KE	Start		
	Time: 12:20pm	434067	7559440	

		Comments:
Temperature (°C): 4.8	Transparency: Medium	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	Depth (m) Max	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				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	0.88	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 Date (d/m/y):		July 29/09		Coordinates:						Coordinates:							
		Survey Distance (m):	200		Survey Crew:		EG/WK															
					Time:				434044	7559575					434056	7559407						
		Temperature (°C):			Transparency:				Comments:													
		Channel Velocity (m/s):			Conductivity (µS/cm):				S4 - fish bearing (LKTR), <1.5m													
		Current Flow Conditions:			pH:				Weather:													
		Discharge estimate (m^3/s):							windy, sunny, clear, cool													

Hab Unit No.	Hab Type	Dist. fr start (m)	Length (m)	Slope (%)	Depth (m)		Width (m)		Bed Material						Pool Info			Fish Passage Barriers	
					Mean	Bank-full	Mean	Bank-full	Fines (%)	Sand (%)	Gravel (%)	Cobble (%)	Boulder (%)	Bedrock (%)	Type	Depth (m) Max	Depth (m) Crest	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 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:** 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				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	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

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 (d/m/y):	28-Jul-09	Coordinates:	Coordinates:
Survey Distance (m):	200m	Survey Crew:	EG/JK		
		Time:	13:30	434124 7559869	
				Comments:	
Temperature (°C):		Transparency:	clear	S5 (non fish bearing, >3m channel)	
Channel Velocity (m/s):		Conductivity (µS/cm):			
Current Flow Conditions:		pH:		Weather:	
Discharge estimate (m³/s):				overcast, cool, cloudy	

Hab Unit No.	Hab Type	Dist. fr start (m)	Length (m)	Slope (%)	Depth (m)		Width (m)		Bed Material						Pool Info			Fish Passage Barriers	
					Mean	Bank-full	Mean	Bank-full	Fines (%)	Sand (%)	Gravel (%)	Cobble (%)	Boulder (%)	Bedrock (%)	Type	Depth (m) Max	Depth (m) Crest	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																			
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:	Rearing:	Adult Feeding:	Over-wintering:	Migration:
poor	poor	none	na	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				Instream Cover							Riparian Cover (%)			Photos (Role #)
	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	(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 Date (d/m/y):	30-Jun-09	Coordinates:	Coordinates:
Survey Distance (m):	200+	Survey Crew:	KE/TR	Start	
		Time:	8:26	434901 7552300	
				Comments:	
Temperature (°C):	7.2	Transparency:	Clear		
Channel Velocity (m/s):	-	Conductivity (µS/cm):	54.7		
Current Flow Conditions:	Somewhat fast	pH:	8.14	Weather:	
Discharge estimate (m³/s):	-			Clear, wind form SE	

Hab		Dist. fr			Depth (m)		Width (m)		Bed Material						Pool Info			Fish Passage	
Unit	Hab	start	Length	Slope		Bank-		Bank-	Fines	Sand	Gravel	Cobble	Boulder	Bedrock		Depth (m)		Barriers	
No.	Type	(m)	(m)	(%)	Mean	full	Mean	full	(%)	(%)	(%)	(%)	(%)	(%)	Type	Max	Crest	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:	Rearing:	Adult Feeding:	Over-wintering:	Migration:
None	Poor	None	N/A	Poor
- No rock substrates	- Very shallow and			- Stream is poorly
- Streams completely terrestrial	no cover			connected to d/s of Windy
and aquatic vegetation				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				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	0.29	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:	Coordinates:
Survey Distance (m):	200	Survey Crew:	KE/TR		
		Time:	17:15	434906 7553648	
				Comments:	
Temperature (°C):	8.4	Transparency:	Clear	No Fish Habitat	
Channel Velocity (m/s):	-	Conductivity (µS/cm):	65.5		
Current Flow Conditions:	Freshet	pH:	7.42	Weather:	
Discharge estimate (m³/s):	-				

Hab		Dist. fr			Depth (m)		Width (m)		Bed Material						Pool Info			Fish Passage	
Unit	Hab	start	Length	Slope		Bank-		Bank-	Fines	Sand	Gravel	Cobble	Boulder	Bedrock		Depth (m)		Barriers	
No.	Type	(m)	(m)	(%)	Mean	full	Mean	full	(%)	(%)	(%)	(%)	(%)	(%)	Type	Max	Crest	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:	Rearing:	Adult Feeding:	Over-wintering:	Migration:
None	None	None	N/A	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				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					-	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