Appendix V5-10D

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

TMAC RESOURCES

Hope Bay Mining Limited

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

NEWMONT™ NORTH AMERICA

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March 2010

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

March 2010
Project #1009-002-08

Prepared for:

NEWMONT™
NORTH AMERICA

Hope Bay Mining Limited

Prepared by:

Rescan™
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Executive Summary

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Executive Summary

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

The purpose of the 2009 overall environmental program was to conduct compliance monitoring for the Doris North Project, as well as to conduct baseline work to support potential future development in the belt.

The primary objective of the 2009 marine fish and fish habitat work was to collect baseline marine data on the nearshore fish community, macrobenthos community and fish habitat at two potential marine infrastructure sites: a dry cargo/module dock (Barge Site) and a deep water/unloading dock (Port Site) in Roberts Bay. Nearshore fish and macrobenthos communities were also sampled at a reference site located in a bay east of Roberts Bay.

Shoreline habitat was assessed at the proposed barge site and the proposed port site in Roberts Bay. Cobble and boulder dominated the littoral substrate at the proposed barge site. The proposed port site was dominated by cobble, gravel and fines but bedrock was the dominant substrate type at the proposed site of infrastructure development. The reference site was chosen to have similar substrates to both the proposed barge and port sites.

Biological sampling occurred during two periods: early August and late August/early September. Floating and sinking gillnets, long lines, beach seines and minnow traps were used to capture pelagic and demersal fish of a wide range of body sizes. Crab traps were used to sample large-bodied invertebrates (e.g., crabs, isopods), but they also captured fish. A total of eleven fish species were captured in Roberts Bay, including Arctic char, Arctic flounder, Arctic shanny, capelin, Greenland cod, longhead dab, ninespine stickleback, Pacific herring, saffron cod, starry flounder and sculpins of the genus *Myoxocephalus*. Six of those species were captured at the reference site. Saffron cod and Pacific herring were the dominant species at the proposed barge and port sites, and sculpins dominated the reference site.

Taxonomic analysis of Pacific herring stomach contents produced similar results for Roberts Bay and the Reference Bay. At both locations, the numerically dominant prey item was Decapoda. Prey taxa of secondary importance in Roberts Bay included Mysidacea, Amphipoda and Copepoda, in decreasing order of importance. In the Reference Bay, prey taxa of secondary importance were Amphipoda, Mysidacea and fish eggs.

The macrobenthos community of Roberts Bay and the Reference Bay were sampled concurrently with the fish community. Macrobenthos belonging to six different taxa were captured in the Project area including: Asteroidea (sea stars); Bivalvia (clams and mussels); Isopoda (isopods); Echinoidea (sea urchins); Gatropoda (snails) and Decapoda (crabs). The proposed port site had the most diverse macrobenthos community, followed by the reference site. Macrobenthos were sparse at the proposed barge site, most likely due to its shallow waters and greater amounts of fine substrate. Jellyfish were observed at all three sites, but only in the late sampling period.

A review of available historical fish and fish habitat data for Roberts Bay was also conducted. Comparisons of the 2009 results with results from Roberts Bay from 2000 to 2007 were largely qualitative due to differences among years in gear types and sampling locations. A total of 18 species of fish have been captured over the last decade; the additional species captured prior to 2009 included banded gunnel, Arctic cisco, least cisco, lake trout, lake whitefish and an unknown species of flounder. Saffron cod was the most abundant species in most years. Relatively high numbers of capelin and Pacific herring were caught in 2003 and 2007 due to a focus in those two years on intercepting along-shore fish migrations. Sampling in 2009 caught more pelagic and bentho-pelagic species because more sampling effort was expended with gillnets in offshore areas than in previous years.

Acknowledgements

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Acknowledgements

This report was prepared for Hope Bay Mining Ltd. by Rescan Environmental Services Ltd. The 2009 marine fish and fish habitat fieldwork was conducted by Maria Sotiropoulos (M.Sc.), Glenn Wagner (Ph.D., R.P.Bio.), Kirsten MacKenzie (M.Sc., R.P.Bio.) and François Landry (M.Sc., R.P.Bio.). Bathymetry surveys were conducted by Brock Stables (M.Sc.) with the assistance of Maria Sotiropoulos. The report was written by Maria Sotiropoulos with support from Kirsten MacKenzie, and reviewed by François Landry, Michael McGurk (Ph.D., R.P.Bio.) and Deborah Muggli (M.Sc., Ph.D., R.P.Bio.). The Hope Bay Belt Project was managed by Deborah Muggli.

Rescan staff were assisted in the field by Tannis Bolt, Aaron Halushka, Janet Kadlun, Darcy Kanayok, Stephen Kuhoktak, Wynter Kuliktana, Irvin Kuptana, Ben Putuquq and Clarence Klengenberg. Brian Coad of the Canadian Museum of Nature provided identification and verification of two fish species captured in the Project area.

Extensive support was provided by the Newmont Environment and Social Responsibility (ESR), Health, Safety and Loss Prevention (HSLP) Department, and camp management, as well as Great Slave Helicopters, Braden Burry Expediting, and Nuna Logistics.

Citation:

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

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1. Introduction

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1. Introduction

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

The property consists of a greenstone belt running in a north/south direction, approximately 80 km long, with 3 main gold deposit areas. The Doris and Madrid deposits are located in the northern portion of the belt, and the Boston deposit is located in the southern end. The northern portion of the property consists of several watershed systems that drain into Roberts Bay, and a large river (Koignuk River) that drains into Hope Bay. Watersheds in the southern portion of the belt ultimately drain into the upper Koignuk, which drains into Hope Bay.

Newmont Mining Corporation (Newmont) acquired the property in 2008, and initially decided to consider the property as a whole to evaluate various options for responsible, long-term development of the belt. However, as of the fall of 2009, Hope Bay Mining Ltd. (HBML), a fully owned subsidiary of Newmont, has decided to proceed with developing the already-permitted Doris North Project, which consists of a 2 year underground gold mine in the north end of the belt.

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

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

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

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

Figure 1-1

Hope Bay Belt Project Location

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

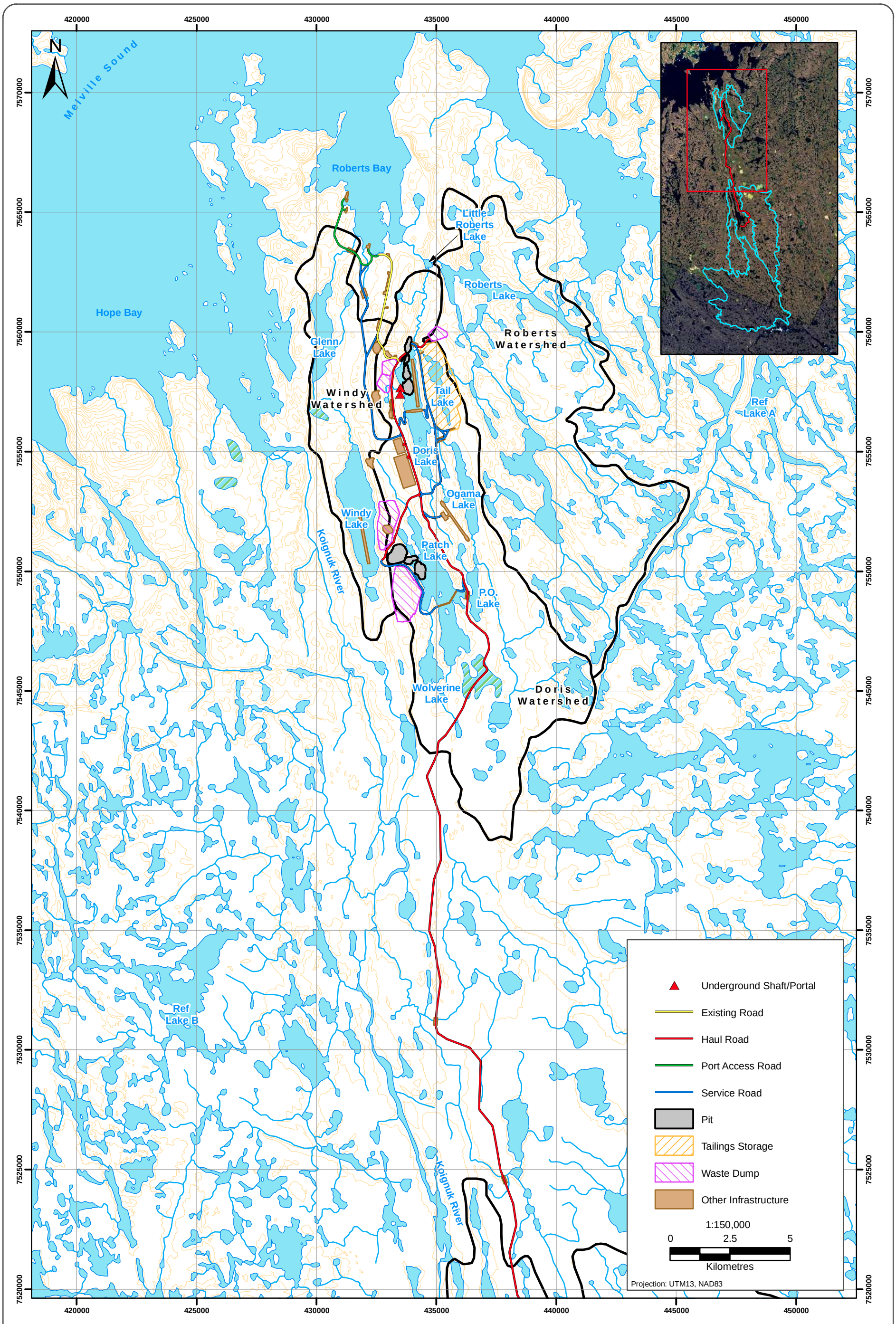

Figure 1-2

NEWMONT The Gold Company

Site Layout Options Considered for 2009 Baseline Program

Figure 1-2

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The objective of the 2009 marine fish and fish habitat work was to collect baseline marine data on the nearshore fish community, macrobenthos community and fish habitat at two potential marine infrastructure sites: a dry cargo/module dock (Barge Site) and a deep water/unloading dock (Port Site) in Roberts Bay. Nearshore fish and macrobenthos communities were also sampled at a reference site located in a bay east of Roberts Bay. This report also includes a brief review of historical data on fish and fish habitat collected in Roberts Bay since baseline studies began in 2000.

2. Methods

2. Methods

2.1 SAMPLING LOCATIONS

Sampling in Roberts Bay was conducted at two potential marine infrastructure sites. The proposed sites include a dry cargo/module dock (Barge Site) and a deep water/unloading dock (Port Site) (Figure 2.1-1). In addition, a reference site was established in Reference Bay based on two criteria: (1) the site has similar habitat as the two potential infrastructure sites (i.e., similar substrate and depth); and (2) the site will not be impacted by future mining activities.

2.2 FISH HABITAT

Habitat surveys of the three sites were conducted by walking along the shoreline and delineating habitat units based on the dominant type of littoral zone substrate. Substrate types were divided into the following size classes: bedrock (>4,000 mm), boulder (256 to 4,000 mm), cobble (64 to 256 mm), gravel (2 to 64 mm), fines (0 to 2 mm). Within each habitat unit, substrate composition was recorded as a percent coverage (e.g., 70% cobble, 20% gravel and 10% fines) and the length of each unit was measured. Ground and aerial photographs were taken to illustrate various types of habitat units. In the office, a combination of field notes and photographs were used to create habitat maps.

2.3 FISH COMMUNITY

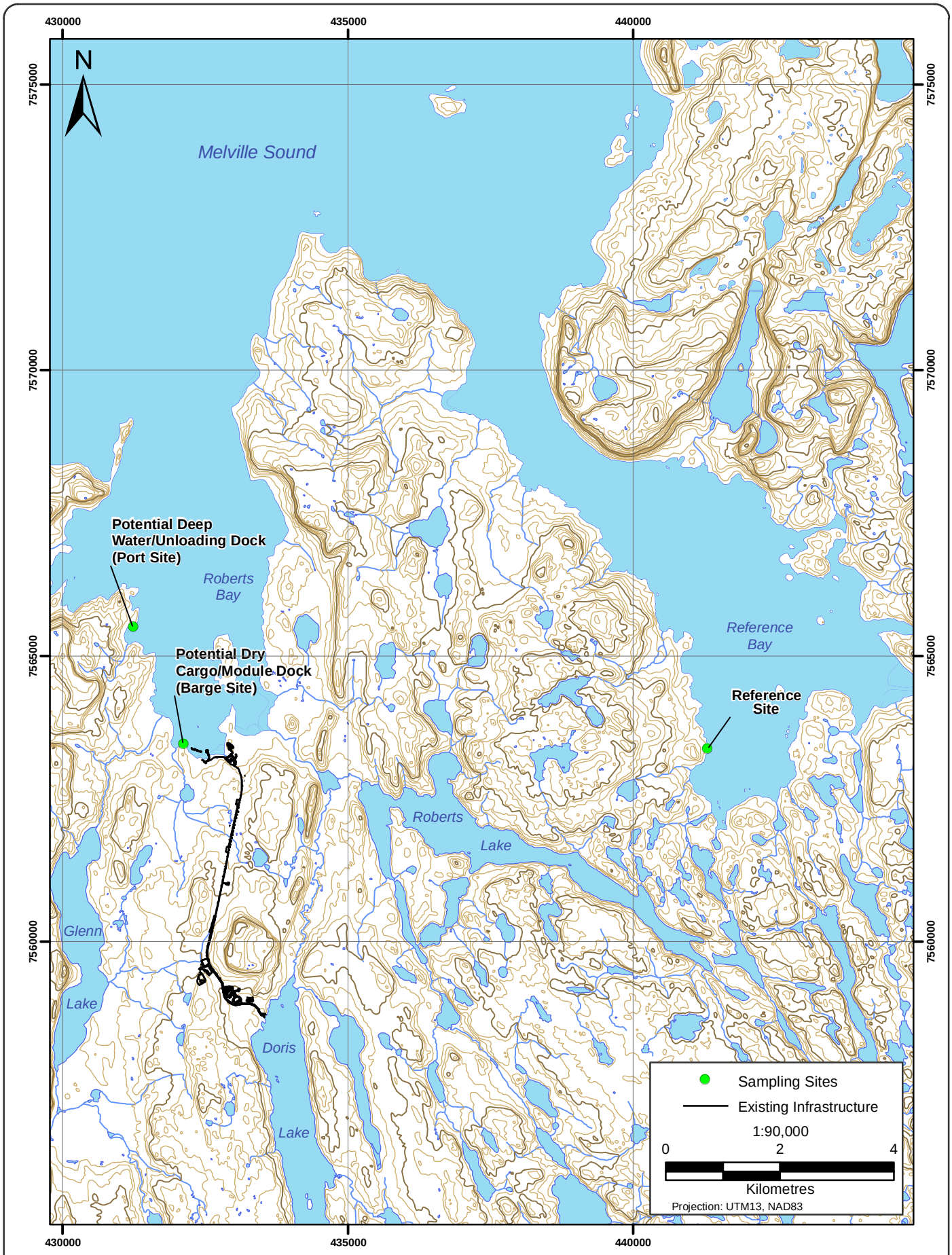
2.3.1 Sampling Frequency

The potential marine infrastructure sites in Roberts Bay and the reference site in Reference Bay were sampled for 2 to 4 days during two sampling periods: early-August and late-August/early-September (referred to as Early and Late sampling, respectively). Each site was sampled using a combination of six different types of fishing gear to cover a wide range of fish sizes, life history stages and water depths. Table 2.3-1 shows the sampling dates and effort for the three sites.

Table 2.3-1. Sampling Dates and Effort for Fish Community Surveys in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

Location	Site	Set Dates	Number of GNF	Number of GNS	Number of LL	Number of BS	Number of MT	Number of CT
Roberts Bay	Proposed Barge Site	July 29 to 31, August 11	10	6	4	8	24	11
Roberts Bay	Proposed Barge Site	August 21, 23 and 26	6	9	3	7	29	15
Roberts Bay	Proposed Port Site	August 1 to 3	3	6	3	7	20	15
Roberts Bay	Proposed Port Site	August 22 and 29, September 3	6	9	4	9	20	10
Reference Bay	Reference Site	August 8 to 10	6	6	6	8	36	10
Reference Bay	Reference Site	September 4 to 5	3	6	2	3	20	10

Note:
GNF = Floating Gillnet; GNS = Sinking Gillnet; LL = Long line; BS = Beach Seine; MT = Minnow Trap; CT = Crab Trap.



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Sampling Sites for Fish and Fish Habitat Studies, Hope Bay Belt Project, 2009

Figure 2.1-1

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2.3.2 Sampling Gear

2.3.2.1 General

All sampling was done from an aluminum 5.8 m-long boat with a 70-horsepower outboard engine. The UTM of each gear set was recorded with a handheld GPS. Depths at which gear was fished were recorded with a depth sounder. The times of installation and retrieval of each gear were recorded.

2.3.2.2 Gillnets

A combination of floating and sinking gillnets were used to capture fish of a wide range of body sizes that move along the water surface (i.e., pelagic) and sea bottom (i.e., demersal), respectively.

Each monofilament index gillnet gang consisted of six panels, ranging from 25 mm to 89 mm stretched mesh. Each gillnet gang was tied in the following order: Panel 1 – 25 mm; Panel 2 – 76 mm; Panel 3 – 51 mm; Panel 4 – 89 mm; Panel 5 – 38 mm; and Panel 6 – 64 mm. Each panel measured 15.2 m long by 2.4 m deep for an area of 36.6 m^2 and a total area of 218.88 m^2 per gang.

Sinking index gillnets consisted of an upper (or "float") line with small buoys that allowed the net to float in the water column. The lower (or "lead") line was weighted and rested along the bottom. Floating index gillnets were similar to sinking gillnets but the lead line lacked weight, allowing the net to float at the surface.

Gillnets were randomly set perpendicular and parallel to shore for approximately one hour to minimize mortality of fish. Set times were extended if initial catches were low. Figures 2.3-1 to 2.3-6 display the position of floating and sinking gillnets.

2.3.2.3 Long Lines

A long line was used to capture actively-feeding fish. It was 17 m long and rigged with 7 hooks clipped onto the line at 2.5 m intervals. Each hook was attached to the main line with a short, secondary line and buoy. Hooks were baited with pieces of raw fish. At both ends, the main line was weighted with lead weights. Once set, the long line sat in the water column in a concave position. Hooks closer to the weighted ends sat lower in the water column than those in the middle, which floated near the surface. Floats were attached by rope to both weighted ends of the long line to mark the location of the gear.

Long lines were randomly set perpendicular and parallel to shore for an initial period of two hours, set times were extended if catch was low. Figures 2.3-1 to 2.3-6 display the position of long line sets in Roberts Bay and Reference Bay.

2.3.2.4 Beach Seines

The beach seine was used to capture fish of small and medium sizes that live in shallow water near the shore. The seine was 12 m long, 2 m deep with 2 mm-wide mesh. One end of the seine was held on the shoreline while the other end was walked out and drawn in a horseshoe shape so that it enveloped a portion of the shoreline (Plate 2.3-1). The two ends were then quickly drawn onto the beach keeping the lead line on the sea bottom and forcing fish into the bunt of the seine. A series of 2 to 3 seine hauls were conducted at each site. Figures 2.3-7 to 2.3-12 show the locations of beach seines in Roberts Bay and Reference Bay.

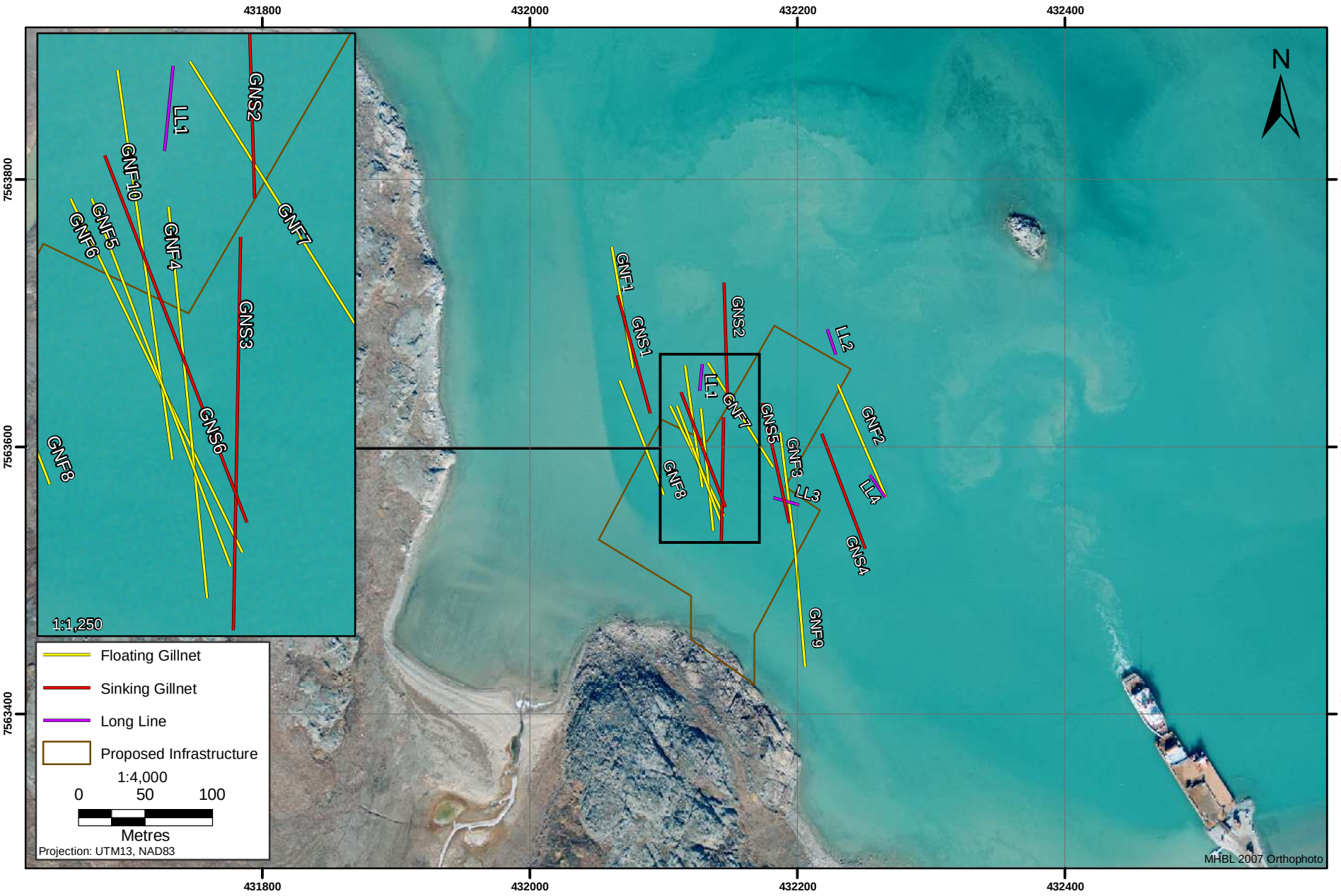

Figure 2.3-1

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Gillnet and Long Line Locations During the Early Sampling Survey of the Fish Community at the Proposed Barge Site in Roberts Bay, Hope Bay Belt Project, 2009

Figure 2.3-1

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PROJECT # 1009-002-08 GIS # HB-06-032a January 17, 2010

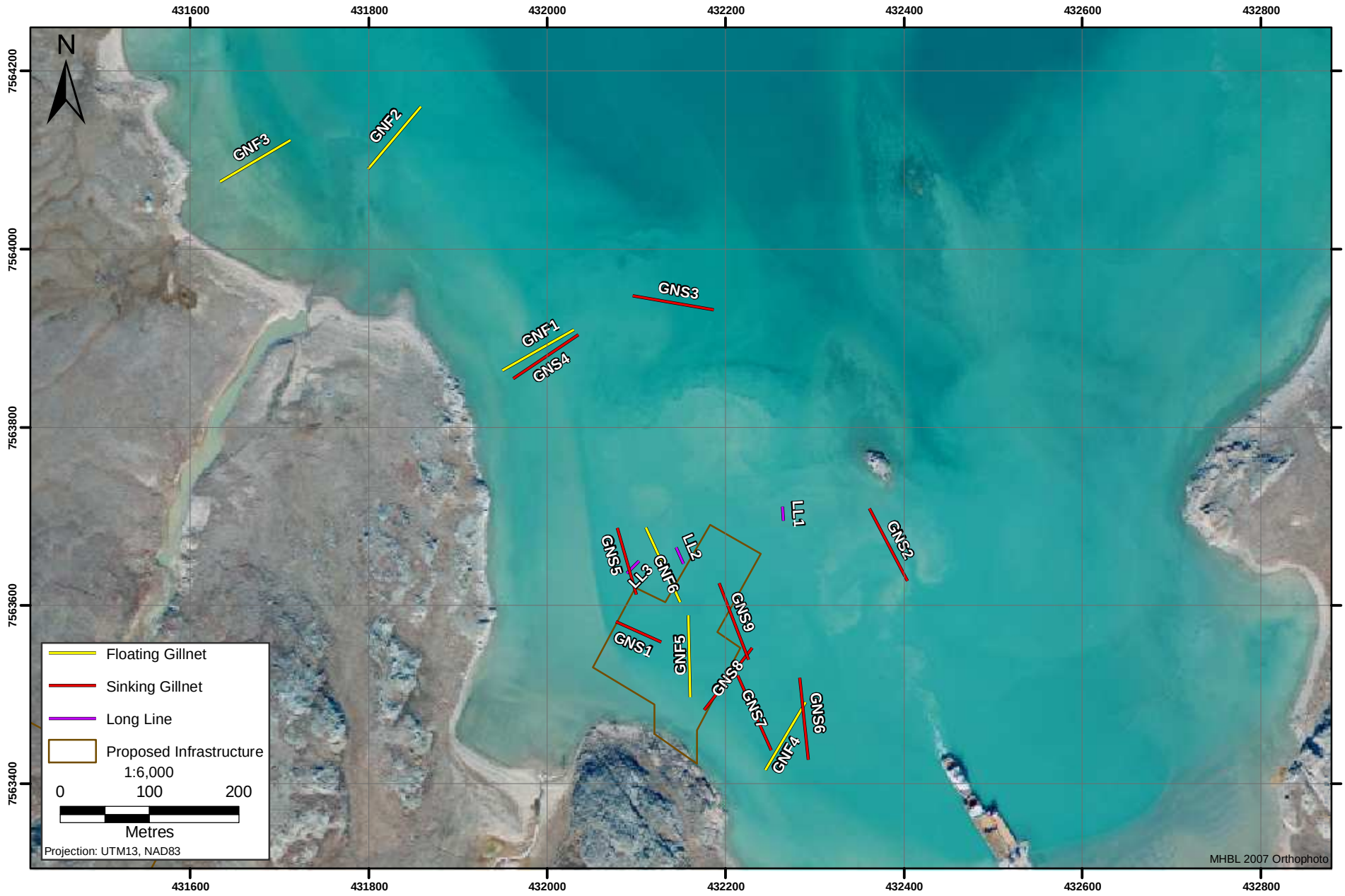

Figure 2.3-2

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Gillnet and Long Line Locations During the Late Sampling Survey of the Fish Community at the Proposed Barge Site in Roberts Bay, Hope Bay Belt Project, 2009

Figure 2.3-2

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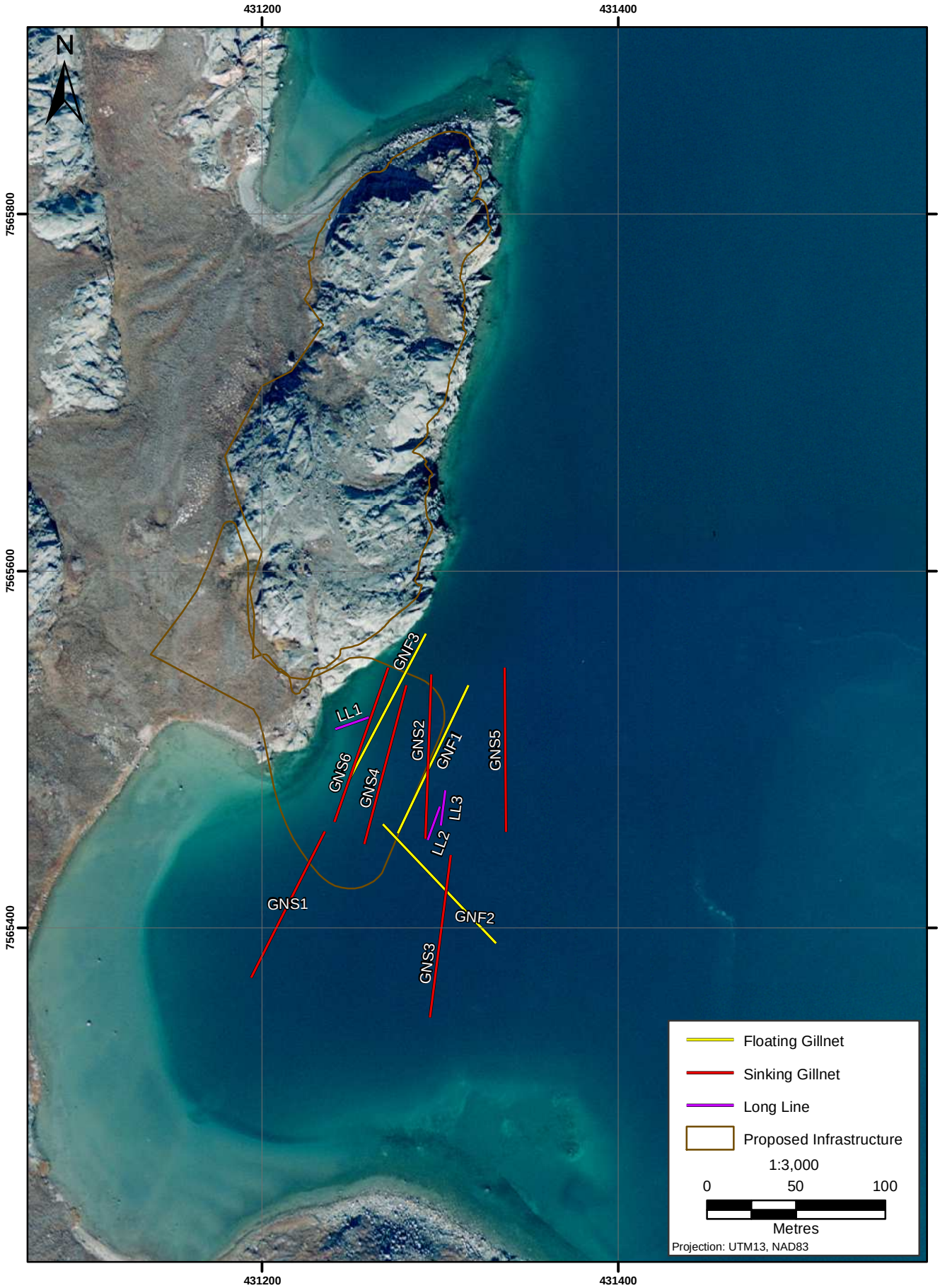

Gillnet and Long Line Locations During the Early Sampling Survey of the Fish Community at the Proposed Port Site in Roberts Bay, Hope Bay Belt Project, 2009

Figure 2.3-3

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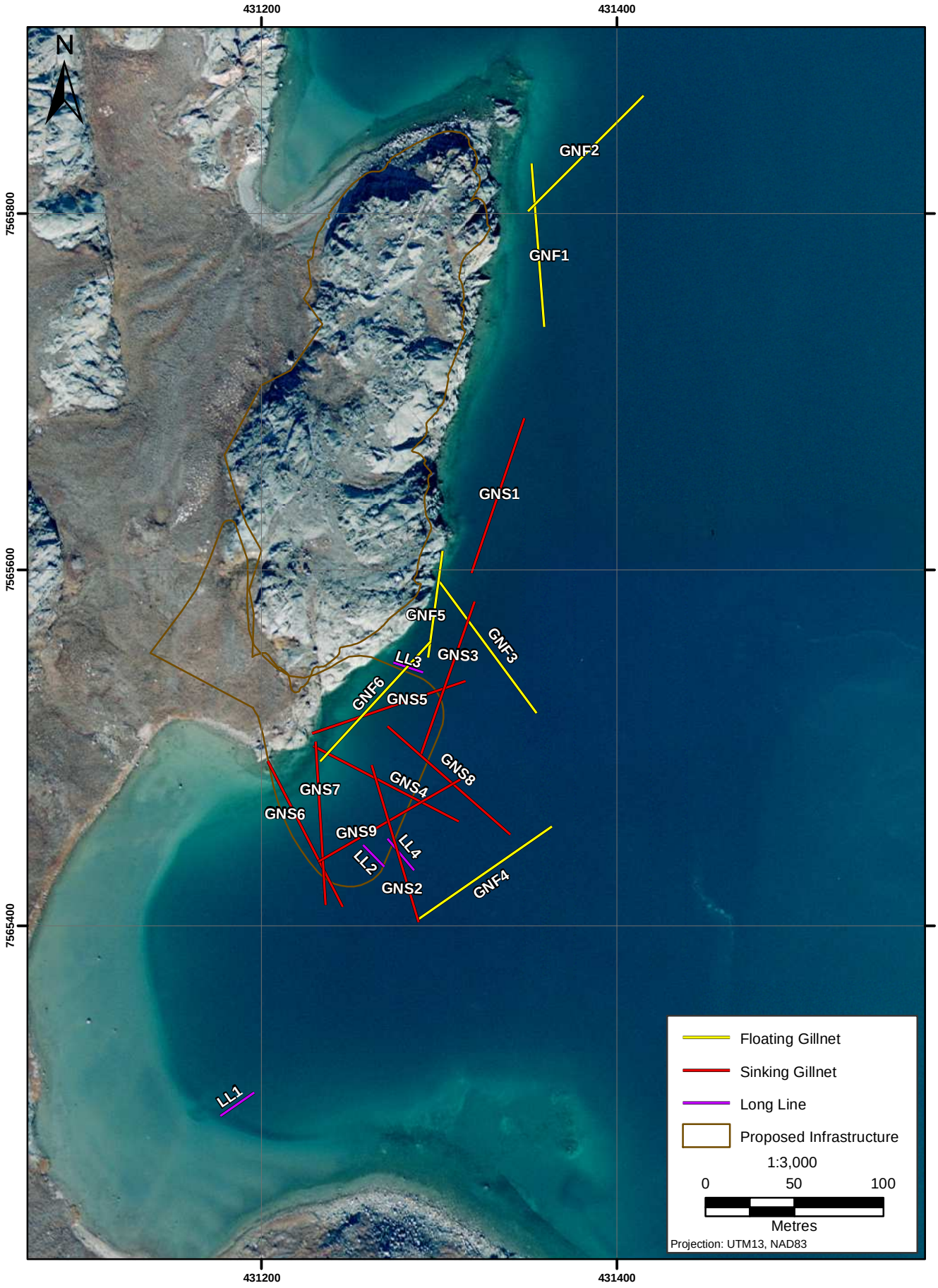

Gillnet and Long Line Locations During the Late Sampling Survey of the Fish Community at the Proposed Port Site in Roberts Bay, Hope Bay Belt Project, 2009

Figure 2.3-4

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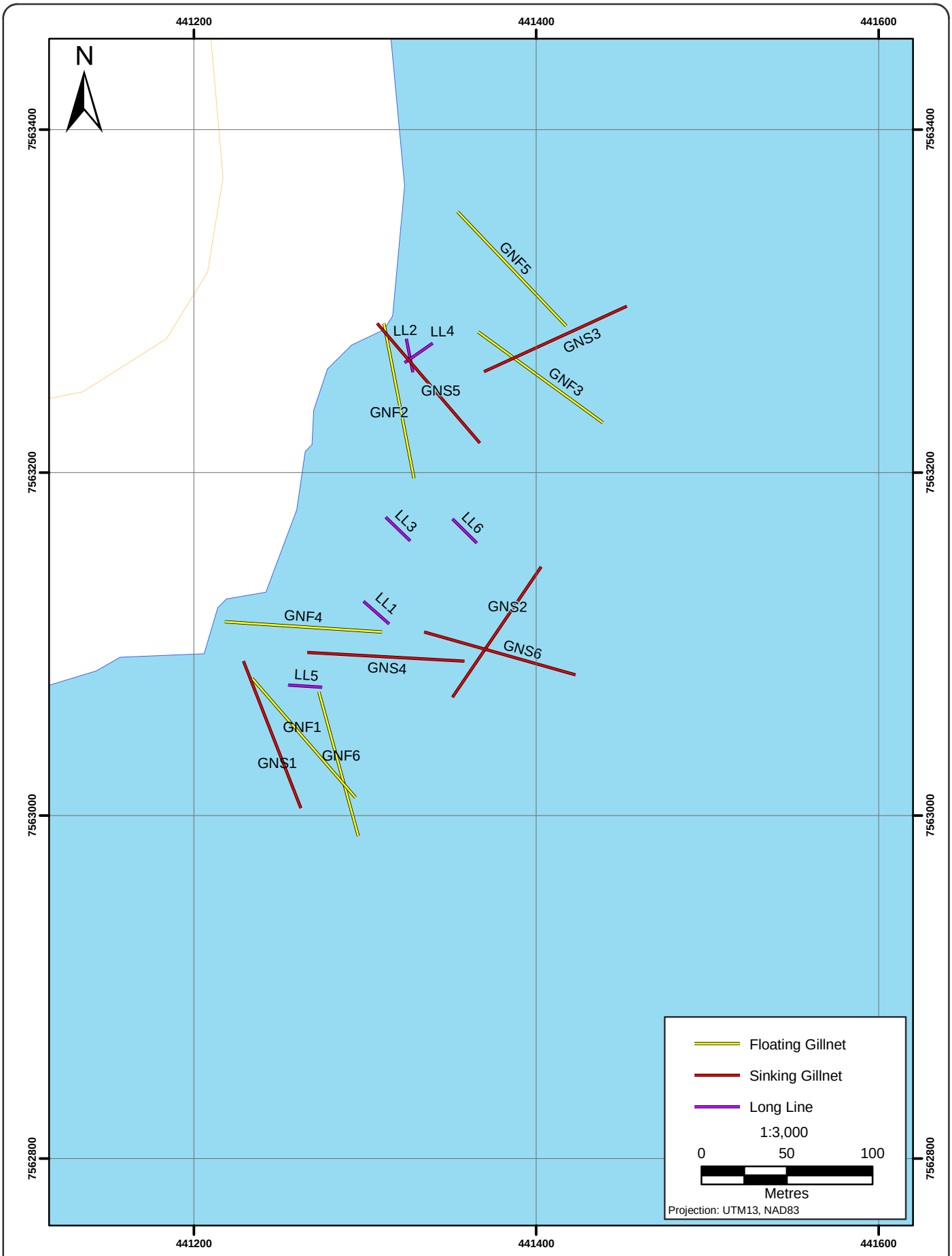

Gillnet and Long Line Locations During the Early Sampling Survey of the Fish Community at the Reference Site in Reference Bay, Hope Bay Belt Project, 2009

Figure 2.3-5

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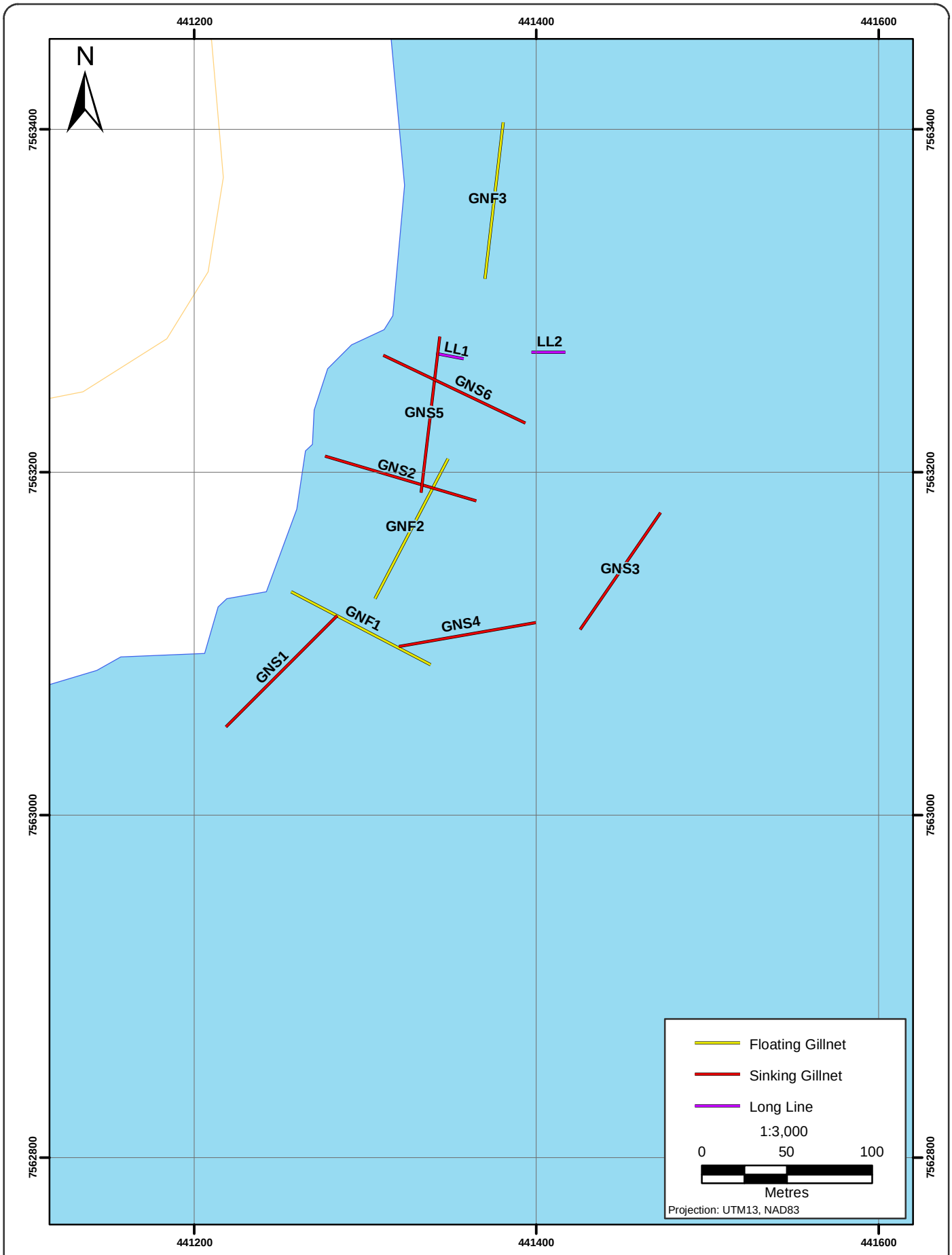

Gillnet and Long Line Locations During the Late Sampling Survey of the Fish Community at the Reference Site in Reference Bay, Hope Bay Belt Project, 2009

Figure 2.3-6

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Plate 2.3-1. A beach seine set at the reference site in Reference Bay, Hope Bay Belt Project, 2009.

2.3.2.5 Minnow Traps

Minnow traps were used to sample juvenile fish and small adult fish. They consisted of two 6.3 mm galvanized metal mesh cylinders measuring 42 cm long and 23 cm in diameter. The cylinders were locked together using a clip attached to a rope and buoy. Each minnow trap was baited with a small amount of dry, commercial crab bait.

Minnow traps were placed along the shoreline of each port site in Roberts Bay and at the reference site in Reference Bay (Figures 2.3-7 to 2.3-12). Traps were left to soak overnight and retrieved the following day.

2.3.2.6 Crab Traps

Crab traps were used to sample large-bodied invertebrates (e.g., crabs, isopods), but they also captured fish. A crab trap consisted of a collapsible, spring-loaded rectangular stainless steel frame with mesh netting and two gate style entrances. When open, the trap measured 30 cm by 42 cm by 80 cm. A bait box was attached within the interior of the trap. Each trap was attached to a rope and buoy and baited with a piece of raw fish and a small amount of dry crab bait.

Traps were placed in the deeper waters of each site in Roberts Bay and Reference Bay (Figures 2.3-7 to 2.3-12). Traps were left to soak overnight and retrieved the following day.

2.3.3 Sample Processing

Captured fish were immediately placed in a water-filled plastic tub to keep them alive until they could be processed and released.

All fish were assigned a unique sample number, identified to species, measured for fork length to the nearest 1 mm, with a measuring board and weighed to the nearest 0.1 g with an electronic balance. A photograph of at least one member of each fish species was taken. Fish were also sampled for ageing structures. Scales were collected with forceps below the posterior margin of the dorsal fin on the left side of the fish. Two to three rays of the left pelvic fin were collected with clippers. Otoliths were only collected from incidental mortalities. Aging structures were placed in envelopes, labelled with the site, date, species and sample number and shipped to North Shore Environmental Services of Thunder Bay, ON, for analysis.

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

Pacific herring was the fish species selected during the early sampling period for detailed diet analysis. A subset of stomach samples were collected from each of the three sampling sites, preserved in formalin and sent to Applied Technical Services of Victoria, BC, for detailed taxonomic analysis of their contents.

Live fish were immediately released back into the water.

2.4 MACROBENTHOS COMMUNITY

Macrobenthos were sampled concurrently with the fish community. Refer to Section 2.3 for sampling dates, locations and descriptions of sampling gear. Captured macrobenthos were immediately placed in a water-filled plastic tub to keep them alive until they could be processed and released. Macrobenthos were identified to species or the next lowest taxon, measured for length to the nearest 1 mm with a ruler and weighed to the nearest 0.1 g with an electronic balance. Due to differences in body morphology, length measurements were different between groups (Table 2.4-1). Once processed, a photograph of at least one representative of each group was taken. All macrobenthos were immediately released back into the water.

Table 2.4-1. Measurements Taken of Macrobenthos Collected in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

Macrobenthos	Measurements
Crabs	Carapace width
Isopods	Total length
Sea Stars	Maximum length -from one arm tip to another
Sea Urchins	Diameter of test

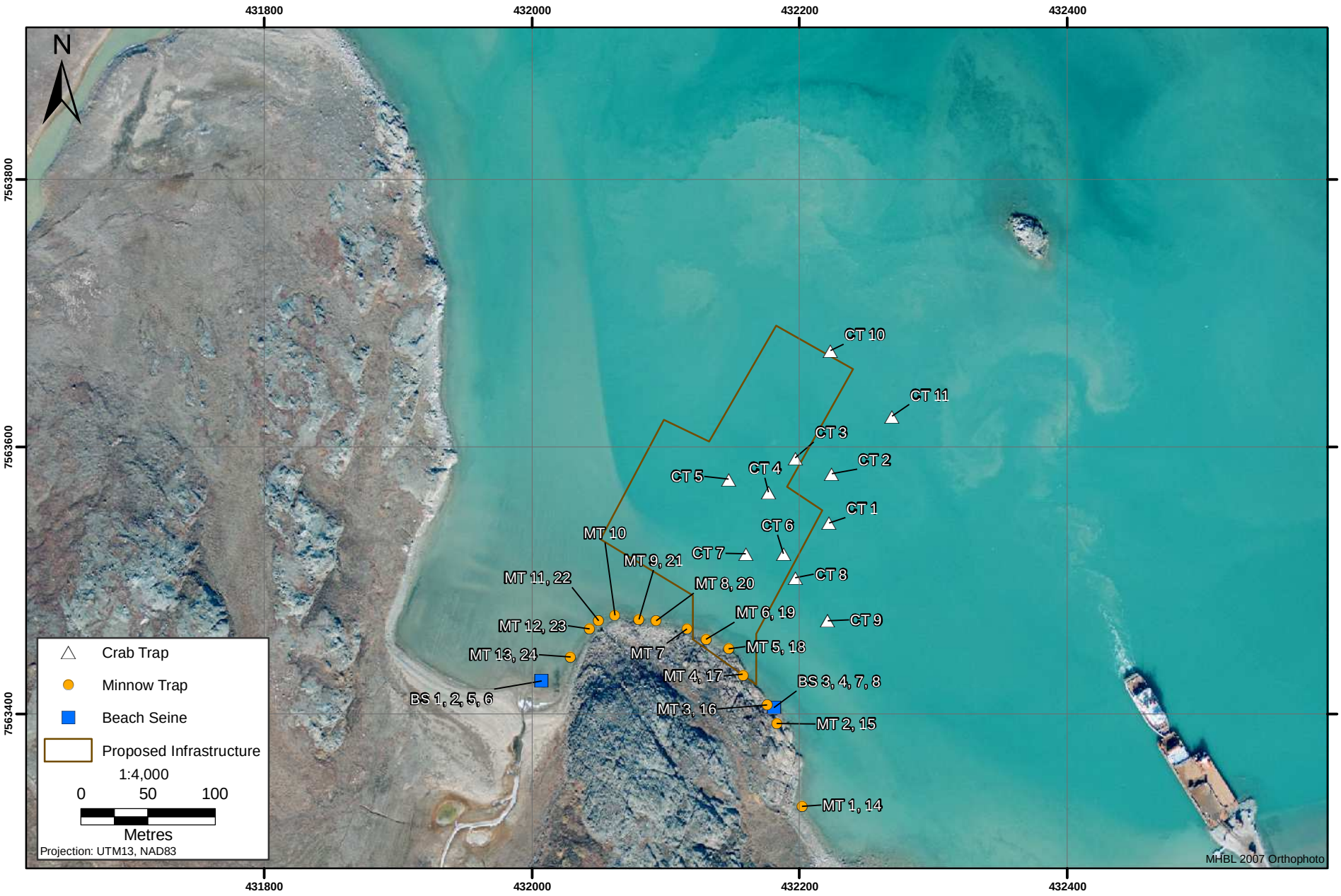

Figure 2.3-7

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Beach Seine, Minnow Trap and Crab Trap Locations During the Early Sampling Survey of the Fish Community at the Proposed Barge Site in Roberts Bay, Hope Bay Belt Project, 2009

Figure 2.3-7

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PROJECT # 1009-002-08 GIS # HB-06-032b January 17, 2010

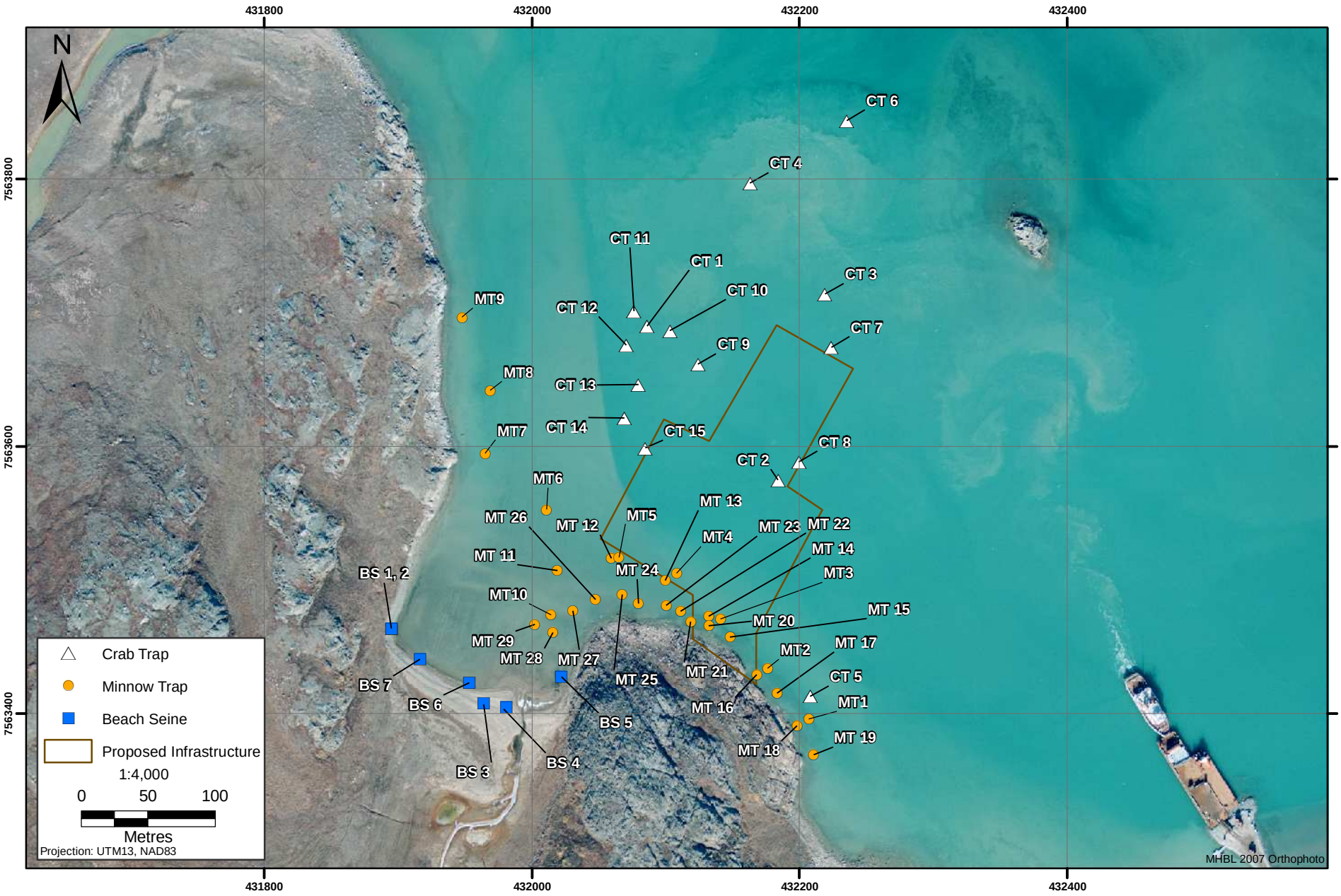

Figure 2.3-8

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Beach Seine, Minnow Trap and Crab Trap Locations During the Late Sampling Survey of the Fish Community at the Proposed Barge Site in Roberts Bay, Hope Bay Belt Project, 2009

Figure 2.3-8

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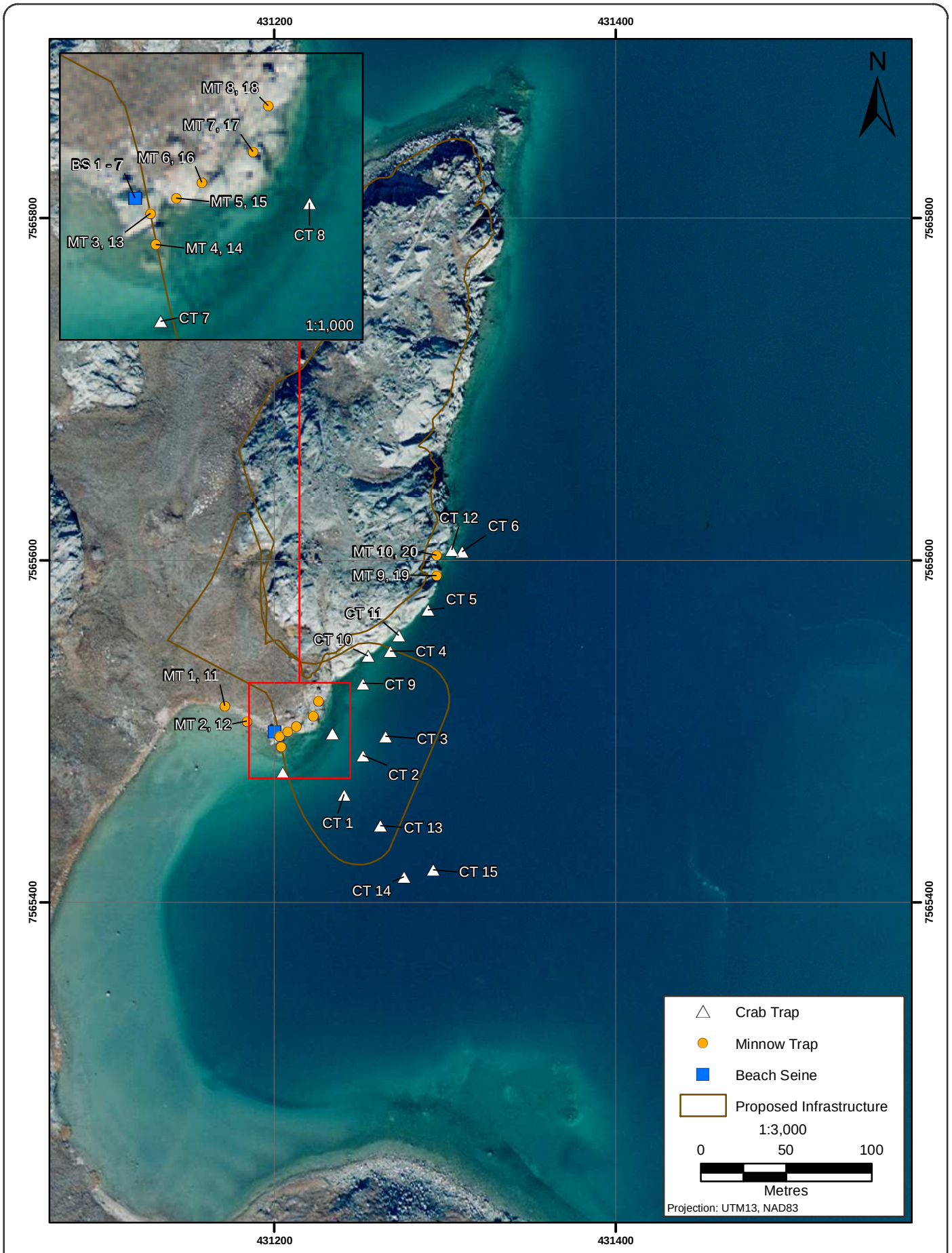

Beach Seine, Minnow Trap and Crab Trap Locations During the Early Sampling Survey of the Fish Community at the Proposed Port Site in Roberts Bay, Hope Bay Belt Project, 2009

Figure 2.3-9

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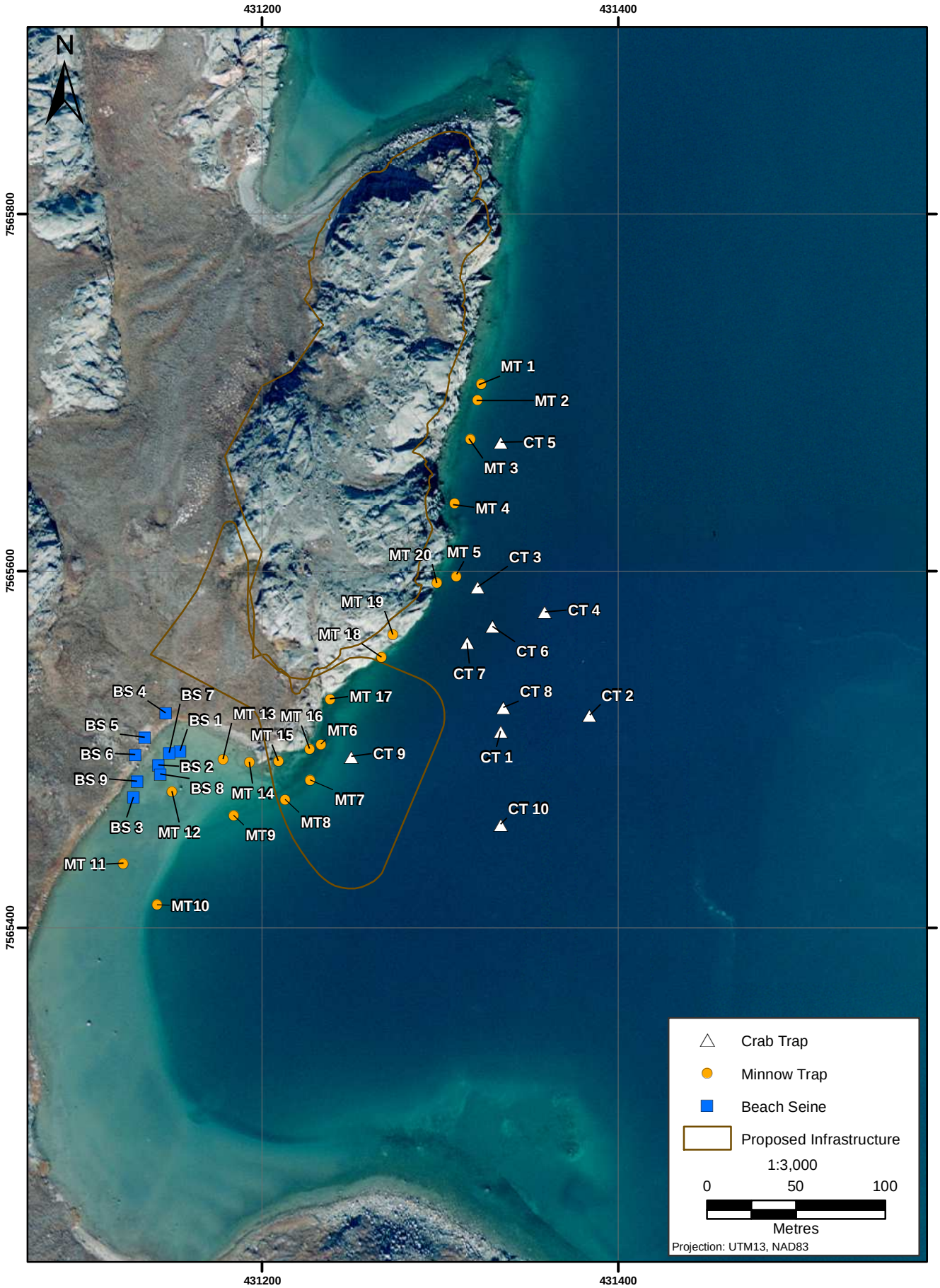

Beach Seine, Minnow Trap and Crab Trap Locations During the Late Sampling Survey of the Fish Community at the Proposed Port Site in Roberts Bay, Hope Bay Belt Project, 2009

Figure 2.3-10

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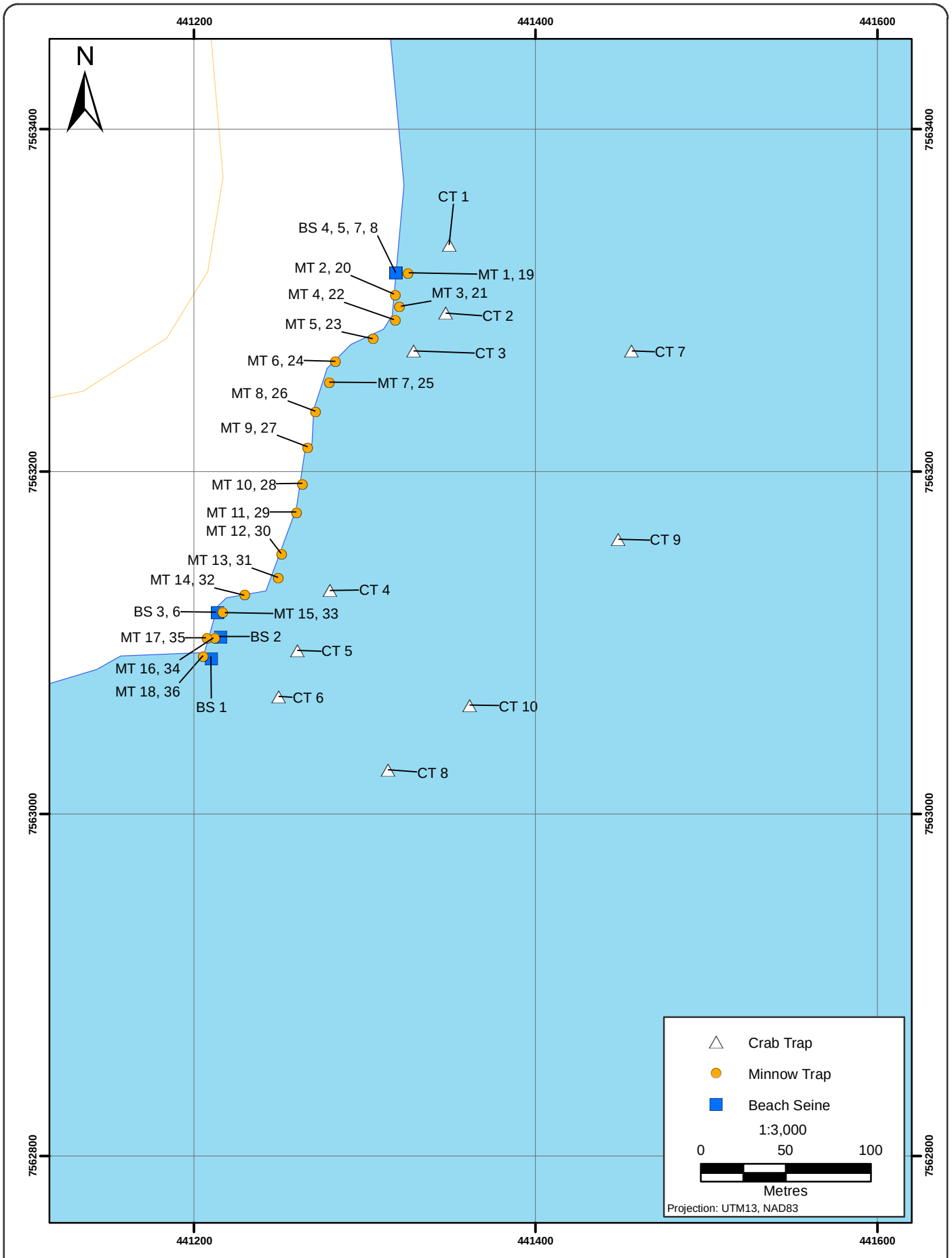

Beach Seine, Minnow Trap and Crab Trap Locations during the Early Sampling Survey of the Fish Community at the Reference Site in Reference Bay, Hope Bay Belt Project, 2009

Figure 2.3-11

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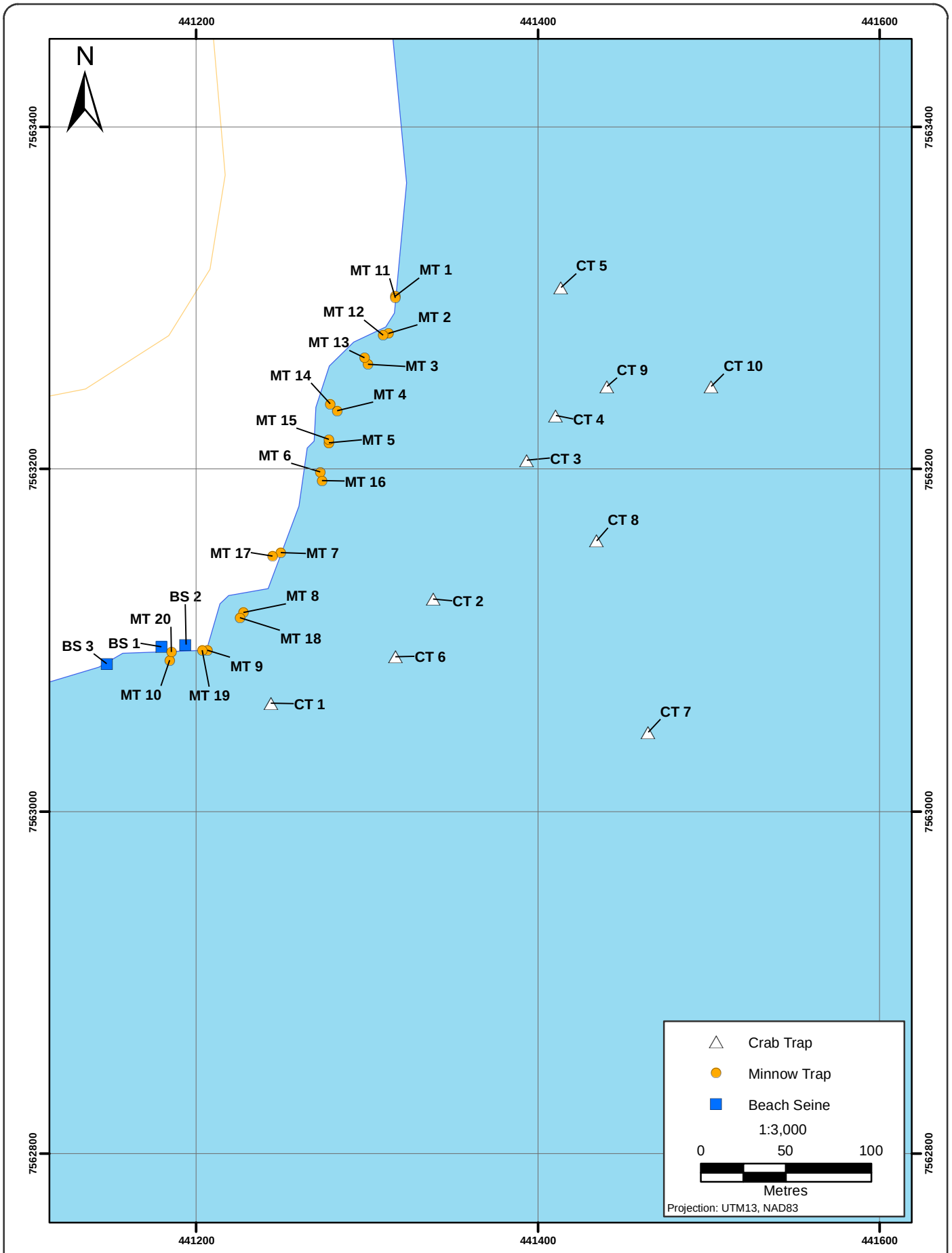

Beach Seine, Minnow Trap and Crab Trap Locations During the Late Sampling Survey of the Fish Community at the Reference Site in Reference Bay, Hope Bay Belt Project, 2009

Figure 2.3-12

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2.5 DATA ANALYSIS

Fish communities were characterized using catch-per-unit-effort (CPUE), relative abundance, lengths, weights and ages.

CPUE was defined as the number of fish captured per sampling device per unit time. For gillnets, CPUE was the number of fish caught per 100 m^2 of net per hour or

CPUE = number of fish caught per net x (100 m^2/ total net area) / set time (hr)

For long lines, CPUE was the number of fish caught per hook per hour or

CPUE = number of fish caught per long line / number of hooks / set time (hr)

For beach seines, CPUE was the number of fish caught per area seined or

CPUE = number of fish caught / total area seined (m^2)

For minnow traps and crap traps, CPUE was the number of fish caught per trap per 24 hours or

CPUE = number of fish x [24 (hrs)/ set time (hrs)]

Length-frequency distributions of fish were used to show the distribution of fish among size classes. Length-frequencies were shown only for sample sizes greater than eight (Johnson et al. 2007).

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

Condition (g/mm^3) = weight (g) x 10^5 / $length^3$ (mm)

Weight was multiplied by a factor of 10^5 to avoid fractional values, and a weight-length exponent of 3 was assumed to apply to all species of fish.

Weight-length relationships were calculated for fish species captured in significant numbers (i.e., ≥9). Logarithmic transformations were performed on the data prior to conducting the regression in order to normalize the data and homogenize the variances – the two prerequisites of parametric statistics.

$$ln(weight) = ln(a) + b[ln(length)]$$

where *a* is a coefficient and *b* is the slope of the regression.

Length-age relationships were described with the von Bertalanffy growth model (Ricker 1975):

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

where L_t = length (mm) at age t (years), L_∞ = asymptotic length (mm) (i.e., length at infinite age), K = growth rate ($year^{-1}$) and t_0 = age (years) at L = 0 mm. For some species, the age ranges were too narrow to allow estimation of a realistic value of t_0; in those cases t_0 was fixed at zero years and only L_∞ and K were estimated.

Statistics were conducted according to Zar (1984) using the SYSTAT library of computer programs (SYSTAT 2006).

All linear regressions were reported with the appropriate sample size (n), coefficient of determination (r^2, the fraction of variation in the independent parameter that was explained by the dependent parameter) and probability (P) of Type I error. All r^2 for linear or non-linear regressions were not adjusted for the degrees of freedom of the regression.

2.6 QA/QC

A quality assurance and quality control program (QA/QC) was included in the design of this study. The program included the use of chain of custody forms, taxonomic and laboratory QA/QC procedures and data review. Field notes were transcribed onto electronic spreadsheets and all transcriptions were compared with field notes to correct transcription errors. Some length, weight and age data were plotted against each other (e.g., weight-length regressions and length-age plots) to identify outliers that may have resulted from transcription errors. If errors could not be corrected, then those data were excluded from analysis.

3. Results and Discussion

3. Results and Discussion

3.1 FISH HABITAT

Shoreline habitat of the potential marine infrastructure sites in Roberts Bay was assessed in late August. Detailed habitat data for each site are presented in Appendices 3.1-1 and 3.1-2. Shoreline habitat at the site in the Reference Bay was not surveyed do to logistic constraints, but observations were made during fish community surveys.

A total of 686 m of shoreline littoral habitat was surveyed at the proposed barge site in Roberts Bay (Plate 3.1-1). Of this distance, 51% was composed of cobble, 15% of boulder, 15% of gravel, 14% fines and 5% bedrock (Figure 3.1-1). An outlet to a stream was present within the surveyed area. The dominant substrate was sand and gravel, likely carried down by the stream. At the proposed area for infrastructure development (habitat units 8 to 10), cobble and boulder dominated the shoreline. Substrate offshore of the littoral zone was dominated by fines with small patches of cobble and/or boulder. Water depths at the area of potential infrastructure development ranged from 0.2 m (near shore) to 10.0 m in open water.

Plate 3.1-1. Aerial view of shoreline habitat at the proposed barge site in Roberts Bay, Hope Bay Belt Project, 2009.

At the proposed port site in Roberts Bay, a total of 985 m of shoreline habitat was surveyed, including the bay area to the southwest of the site (Plate 3.1-2). Of this distance, 46% was composed of bedrock, 27% of cobble, 12% of gravel, 12% of fines and 2% of boulder (Figure 3.1-2). At the proposed location for infrastructure development (habitat units 15 and 16), all shoreline substrate was composed of bedrock. Offshore substrate (Habitat Unit 17) was dominated by fines, similar to the proposed barge site. Water depths at the site of potential infrastructure development ranged from 0.4 m near shore to 26.0 m in open water.

Plate 3.1-2. Aerial view of shoreline habitat at the proposed port site in Roberts Bay, Hope Bay Belt Project, 2009.

Shoreline habitat at the reference site in Reference Bay was predominantly cobble and bedrock with fines dominant offshore. Water depths ranged from 0.3 m near shore to 30.0 m off shore.

3.2 FISH COMMUNITY

3.2.1 Community Composition

Data on the location, setting and retrieval times, and summary catch for all gear used are shown in Appendices 3.2-1 to 3.2-6. Biological data for fish are shown in Appendix 3.2-7.

The Roberts Bay sites showed a more diverse fish community than the Reference Bay site. Eleven fish species were captured in Roberts Bay and six species in Reference Bay (Table 3.2-1 and Plates 3.2-1 to 3.2-10). A few flounder were not identified to species in the field. This group, labelled as unknown flounder (FL) in this report, was comprised of Arctic flounder and longhead dab. Sculpin were not identified to species and therefore grouped under their genus name, *Myoxocephalus* sp.

The majority of the 11 fish species are marine in habitat preference, but some, like the Arctic flounder and starry flounder, are known to enter low-salinity habitats (Walters 1955). Others, which are known to be strictly marine fish species have been captured in freshwater systems, likely a result of the fish remaining in areas of tidal influence (i.e., in the salt wedge underneath the surface freshwater layer). Two species are exceptions to this rule. Arctic char are anadromous, meaning they spawn and rear in freshwater but migrate to the sea to forage (Scott and Crossman 1973). Ninespine stickleback have three life-history types: freshwater, brackish and anadromous (Arai and Goto 2005). The sticklebacks captured in this study followed either an anadromous or brackish water life history.

PROJECT # 1009-002-08 GIS # HB-06-034 January 29, 2010

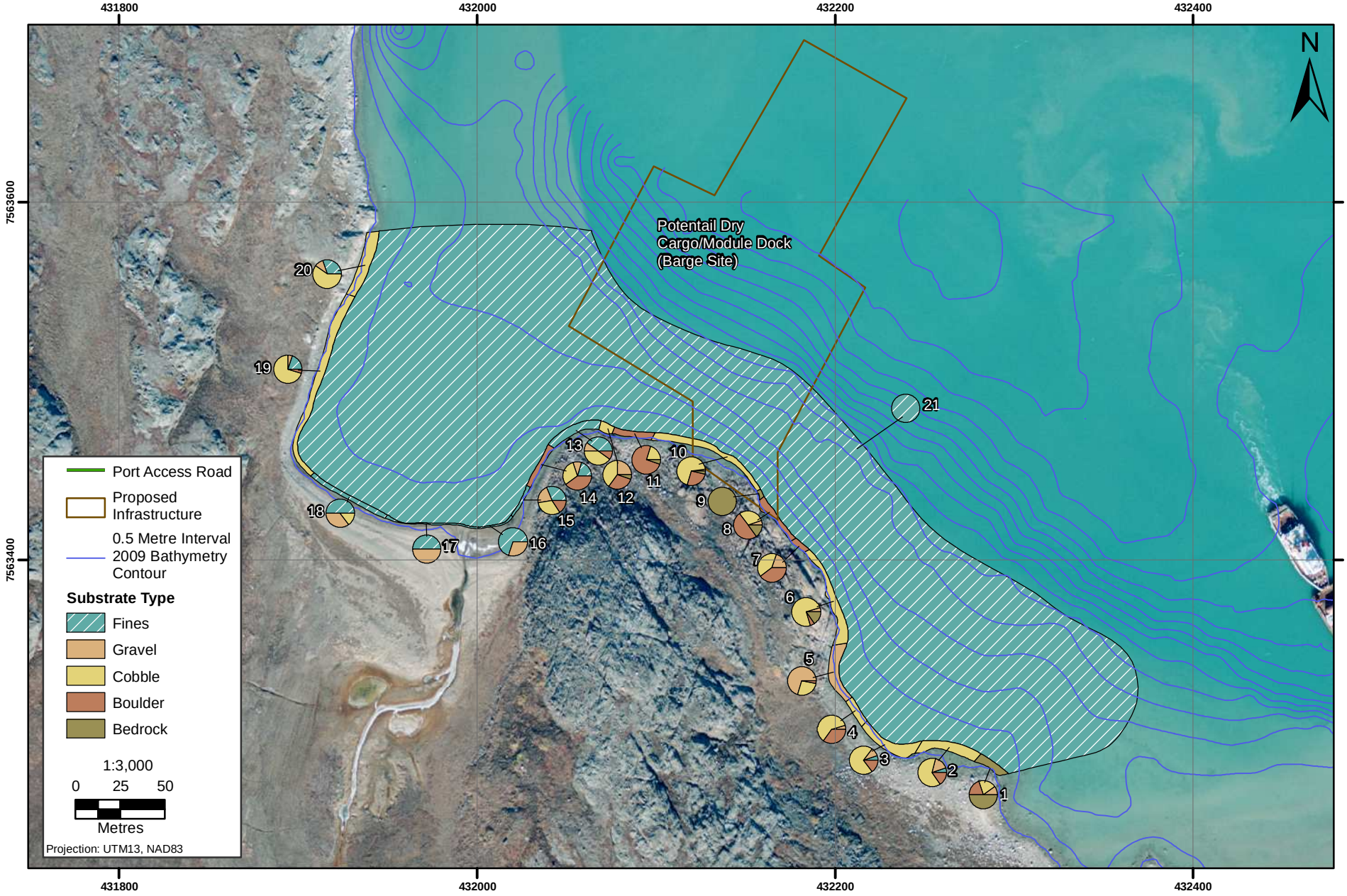

Figure 3.1-1

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Fish Habitat Assessment for the Proposed Barge Site in Roberts Bay, Hope Bay Belt Project, 2009

Figure 3.1-1

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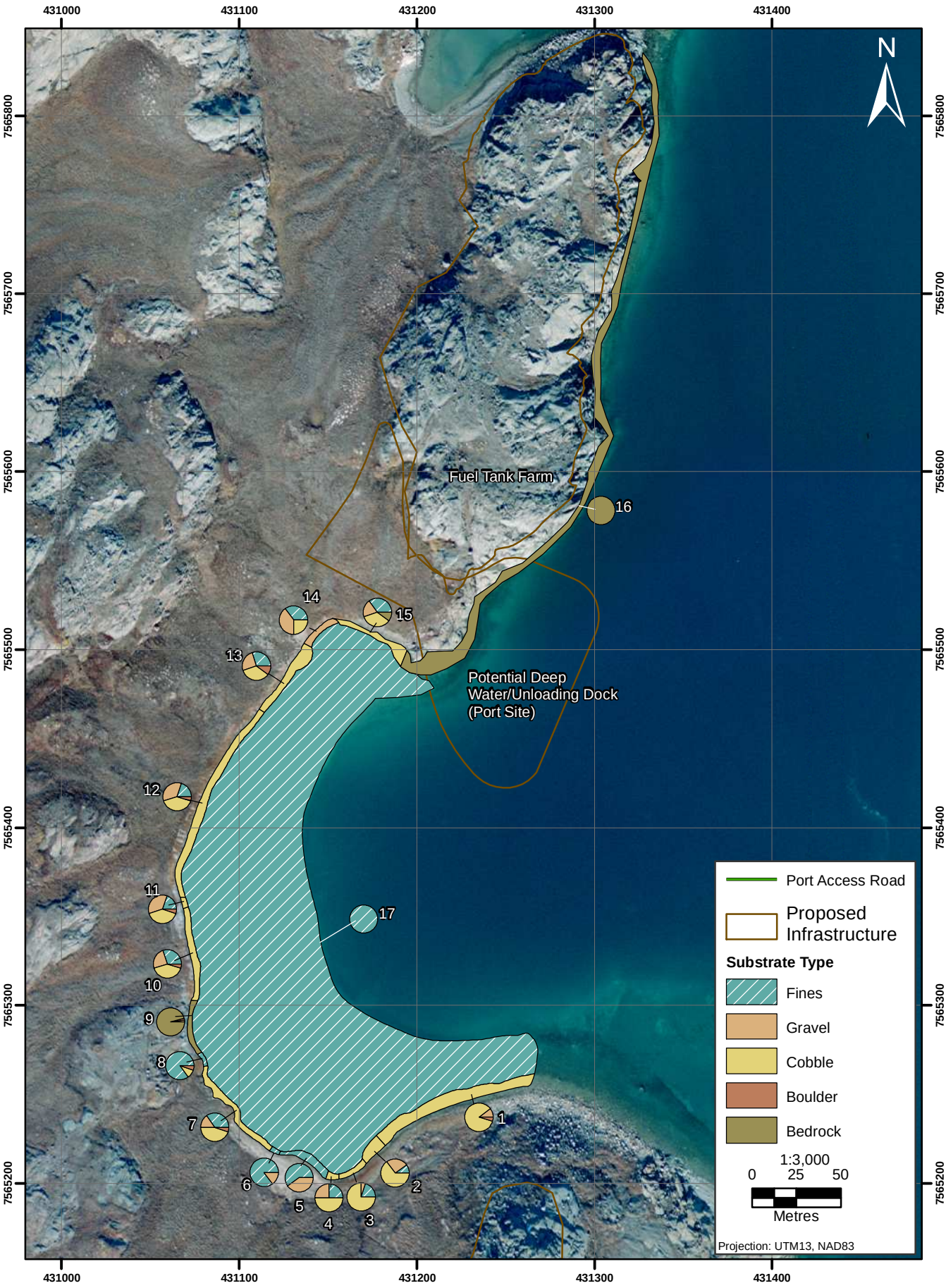

Figure 3.1-2

Fish Habitat Assessment for the Proposed Port Site in Roberts Bay, Hope Bay Belt Project, 2009

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Table 3.2-1. Fish Species Captured in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

Common Name	Abbreviation	Scientific Name	Primary Habitat	Depth Range	Species Presence	
					Roberts Bay	Reference Bay
Arctic Char	AC	*Salvelinus alpinus*	Anadromous	Benthopelagic	X	X
Arctic Flounder	AF	*Liopsetta glacialis*	Marine	Demersal	X	X
Arctic Shanny	AS	*Stichaeus punctatus*	Marine	Demersal	X	-
Capelin	CP	*Mallotus villosus*	Marine	Pelagic	X	-
Greenland Cod	GC	*Gadus ogac*	Marine	Demersal	X	-
Longhead Dab	LD	*Limanda proboscidea*	Marine	Demersal	X	-
Ninespine Stickleback	NS	*Pungitius pungitius*	Brackish/ Anadromous	Benthopelagic	X	X
Pacific Herring	PH	*Clupea pallasii*	Marine	Pelagic	X	X
Saffron Cod	SC	*Eleginus gracilis*	Marine/Brackish	Demersal	X	-
Starry Flounder	*SF*	*Platichthys stellatus*	Marine/Brackish	Demersal	X	X
Sculpin	SP	*Myoxocephalus* sp.	Marine/Brackish	Demersal	X	X

Note: Habitat type and depth ranges from Froese and Pauly (2009) and FAO (2010).
Dashes indicate species not present.

Plate 3.2-1. An Arctic char captured in Reference Bay, Hope Bay Belt Project, 2009.

Plate 3.2-2. An Arctic flounder captured in Roberts Bay, Hope Bay Belt Project, 2009.

Plate 3.2-3. An Arctic shanny captured in Roberts Bay, Hope Bay Belt Project, 2009.

Plate 3.2-4. A capelin captured in Roberts Bay, Hope Bay Belt Project, 2009.

Plate 3.2-5. A Greenland cod captured in Roberts Bay, Hope Bay Belt Project, 2009.

Plate 3.2-6. A longhead dab captured in Roberts Bay, Hope Bay Belt Project, 2009.

Plate 3.2-7. A Pacific herring captured in Roberts Bay, Hope Bay Belt Project, 2009.

Plate 3.2-8. A saffron cod captured in Roberts Bay, Hope Bay Belt Project, 2009.

Plate 3.2-9. A starry flounder captured in Roberts Bay, Hope Bay Belt Project, 2009.

Plate 3.2-10. A sculpin captured in Roberts Bay, Hope Bay Belt Project, 2009.

Arctic flounder, Arctic shanny, Greenland cod, longhead dab, saffron cod, starry flounder and sculpin are demersal fish, meaning they forage primarily along the sea bottom. Capelin and Pacific herring are pelagic fish that forage in open water, usually in the upper and middle water column. Benthopelagic fish, including the ninespine stickleback and Arctic char, forage in both the benthic and pelagic zones of either freshwater or marine habitats.

None of the fish species listed in Table 3.2-1 are endangered or threatened (COSEWIC 2009).

A total of 520 fish from eleven species (not including the unknown species of flounder) were captured in Roberts Bay (Table 3.2-2). Both locations within Roberts Bay contained 10 species of fish, although capelin and Arctic shanny were only found at one of two locations. Fish species present only in Roberts Bay include Arctic shanny, capelin, Greenland cod, longhead dab and saffron cod. In Reference Bay, a total of 96 fish from six species were captured.

Saffron cod was the dominant species by number at the proposed barge site in Roberts Bay, making up 42% of the catch. Species of secondary importance included sculpin (26%) and Pacific herring (17%). At the proposed port site in Roberts Bay, Pacific herring (45%) dominated the catch followed by sculpin (30%), Arctic char (14%) and Greenland cod (6%). In Reference Bay, the dominant fish species captured was sculpin (74%) followed by Pacific herring (15%).

Catch differed between sampling periods in Roberts Bay and the Reference Bay. At the proposed barge site in Roberts Bay, a total of 104 fish from seven species were captured during the early sampling period (Figure 3.2-1). Pacific herring (40%) and sculpin (38%) were the dominant catch. During the late sampling period, a total of 180 fish from 10 species were captured with saffron cod (64%) being the dominant catch. The majority of the saffron cod (91%) were captured on August 26, 2009 (Appendix 3.2-6).

Table 3.2-2. Total Number of Fish Captured from Roberts Bay and the Reference Bay during Early and Late Fisheries Surveys, 2009

Fish Species	Roberts Bay		Reference Bay	Total
	Proposed Barge Site	Proposed Port Site	Reference Site	
Arctic Char	6	32	3	41
Arctic Flounder	9	1	1	11
Arctic Shanny	0	5	0	5
Capelin	9	0	0	9
Flounder (unknown)	8	0	0	8
Greenland Cod	1	14	0	15
Longhead Dab	3	2	0	5
Ninespine Stickleback	2	1	3	6
Pacific Herring	49	105	14	168
Saffron Cod	118	1	0	119
Starry Flounder	4	4	4	12
Sculpin	75	71	71	217
Total	**284**	**236**	**96**	**616**

Note: Unknown flounder includes Arctic flounder and longhead dab.

At the proposed port site in Roberts Bay, a total of 125 fish from five species were captured during the early sampling period with Pacific herring (82%) dominating the catch (Figure 3.2-1). During the late sampling period, a total of 111 fish from 10 species were captured. Sculpin (56%) and Arctic char (22%) dominated the catch.

At the site in Reference Bay, a total of 70 fish from four species were captured during the early sampling period and 26 fish from five species were captured during the late sampling period (Figure 3.2-1). Sculpin was the dominant species captured in both sampling periods.

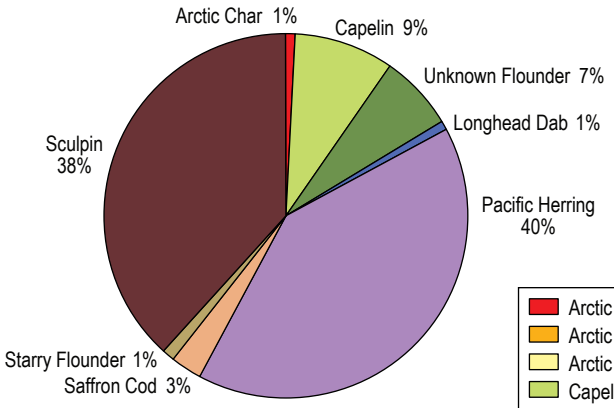
3.2.2 Catch-per-Unit-Effort (CPUE)

3.2.2.1 Floating Gillnets

The total number of floating gillnet sets at each site in 2009 ranged from three to ten sets with total effort ranging from 3.0 hours to 10.4 hours, depending on the sampling period (Appendix 3.2-8). Nets set at the proposed port site in Roberts Bay during the early sampling period captured the most fish in total with the least amount of effort due to a the high numbers of Pacific herring captured in each of the three floating gill net sets.

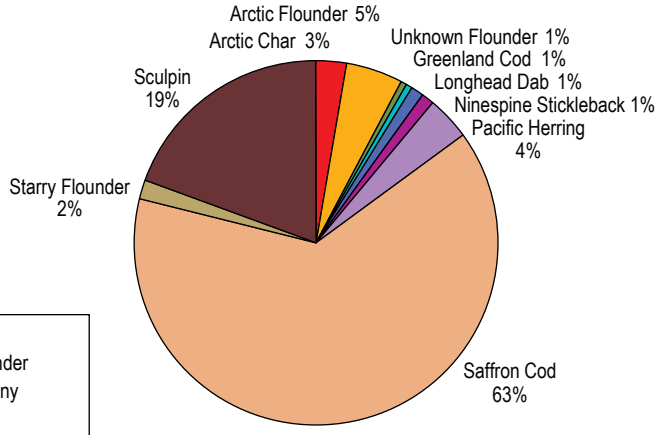
Mean floating gillnet CPUE varied between sites and season. Pacific herring had the highest mean floating gillnet CPUE during the early sampling period (1.70 fish/100 m^2 of net/hr for the proposed barge site and 15.06 fish/100 m^2 of net/hr for the proposed port site) (Figure 3.2-2). During the late sampling period, the highest mean CPUE was Pacific herring at the proposed barge site in Roberts Bay (0.23 fish/100 m^2 of net/hr) and Arctic char at the proposed port site in Roberts Bay (0.98 fish/100 m^2 of net/hr). Much of the variation observed with floating gillnet CPUE reflect life history events of fish (i.e., seasonal use of near shore habitat) and sampling variability (i.e., low fishing effort and low catch numbers).

Roberts Bay - Proposed Barge Site Early Sampling



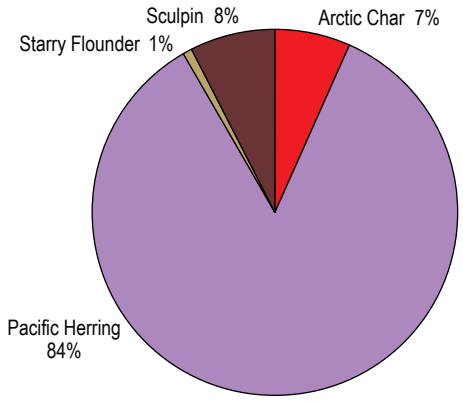
n = 104

Roberts Bay - Proposed Barge Site Late Sampling



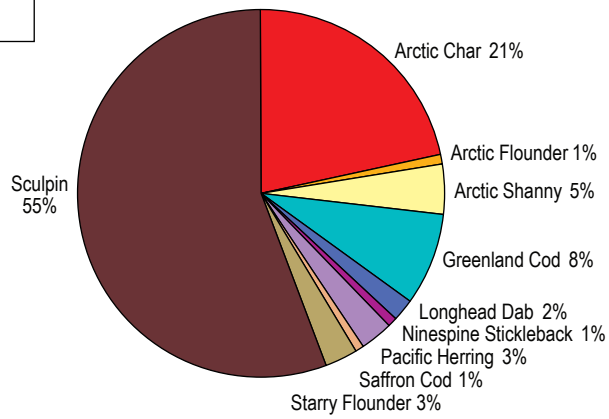
n = 180

Roberts Bay - Proposed Port Site Early Sampling



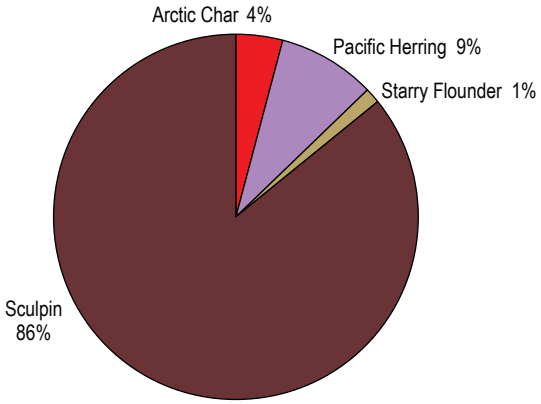
n = 125

Roberts Bay - Proposed Port Site Late Sampling



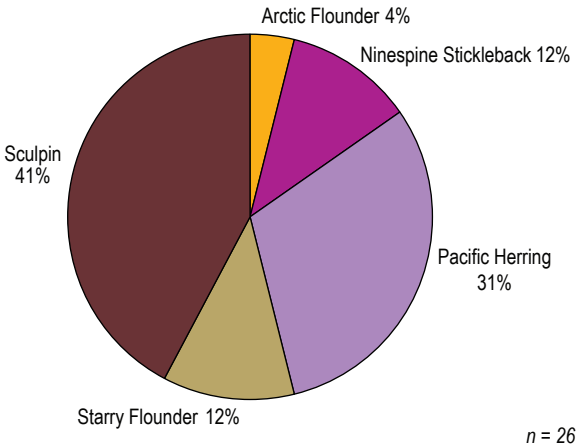
n = 111

Reference Bay Early Sampling



n = 70

Reference Bay Late Sampling



n = 26

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Percent Composition of Individual Fish Species Captured in Roberts Bay, Hope Bay Belt Project, 2009

Figure 3.2-1

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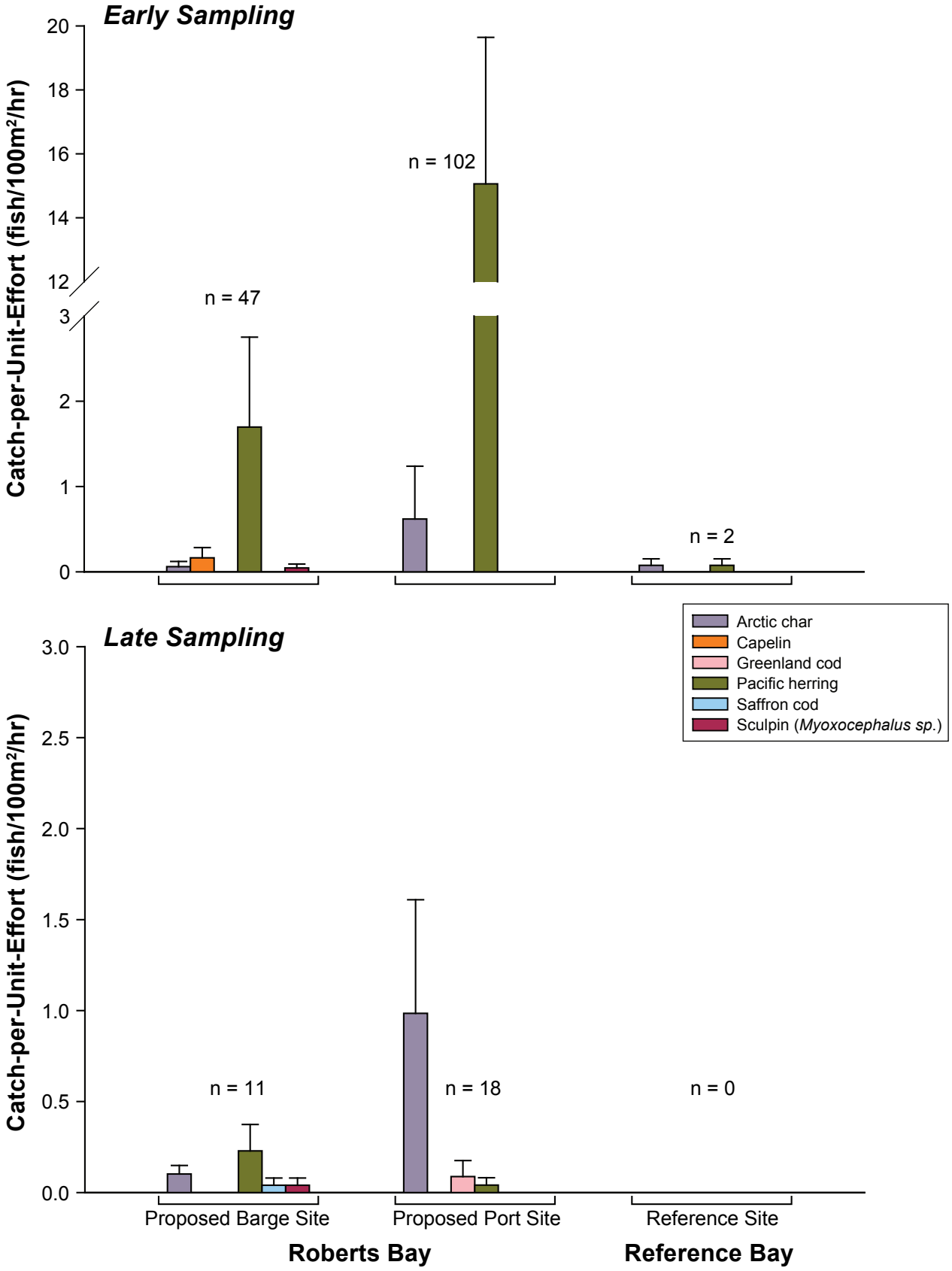

Note: Error bars represent one standard error of the mean.
n = Total number of fish captured.

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Mean Catch-per-Unit-Effort of Fish Captured in Floating Gillnets in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

Figure 3.2-2

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3.2.2.2 Sinking Gillnets

The total number of sinking gillnets set at each site in 2009 ranged from six to nine with a total effort ranging from six to 92.5 hours, depending on the sampling period.

Sinking gillnet CPUE varied between sites and sampling periods, likely a result of life history events and sampling variability as discussed with floating gillnet CPUE. During the early sampling period, capelin (0.38 fish/100 m^2 of net/hr) and Pacific herring (0.30 fish/100 m^2 of net/hr) dominated the sinking gillnet catch at the proposed barge and port sites in Roberts Bay, respectively (Figure 3.2-3). In Reference Bay, the highest mean sinking gillnet CPUE during the early sampling period were due to Pacific herring and sculpin (0.38 fish/100 m^2 of net/hr). During the late sampling period, the extremely high mean CPUE observed for saffron cod (3.59 fish/100 m^2 of net/hr) at the proposed barge site in Roberts Bay was due to a school of saffron cod (n = 105) that were captured in two consecutive net sets (Appendix 3.2-2). Pacific herring had the highest mean CPUE for both the proposed port site in Roberts Bay (0.09 fish/100 m^2 of net/hr) and Reference Bay (0.35 fish/100 m^2 of net/hr).

3.2.2.3 Long Lines

The total number of long lines set at each site ranged from two to six lines with total effort ranging from 5.5 hours to 16.6 hours, depending on the sampling period.

Few fish were captured using long lines. Greenland cod (0.95 fish/hook/hr at the proposed port site) and saffron cod (0.69 fish/hook/hr) were the only fish species captured during the early and late sampling periods, respectively (Figure 3.2-4).

3.2.2.4 Beach Seines

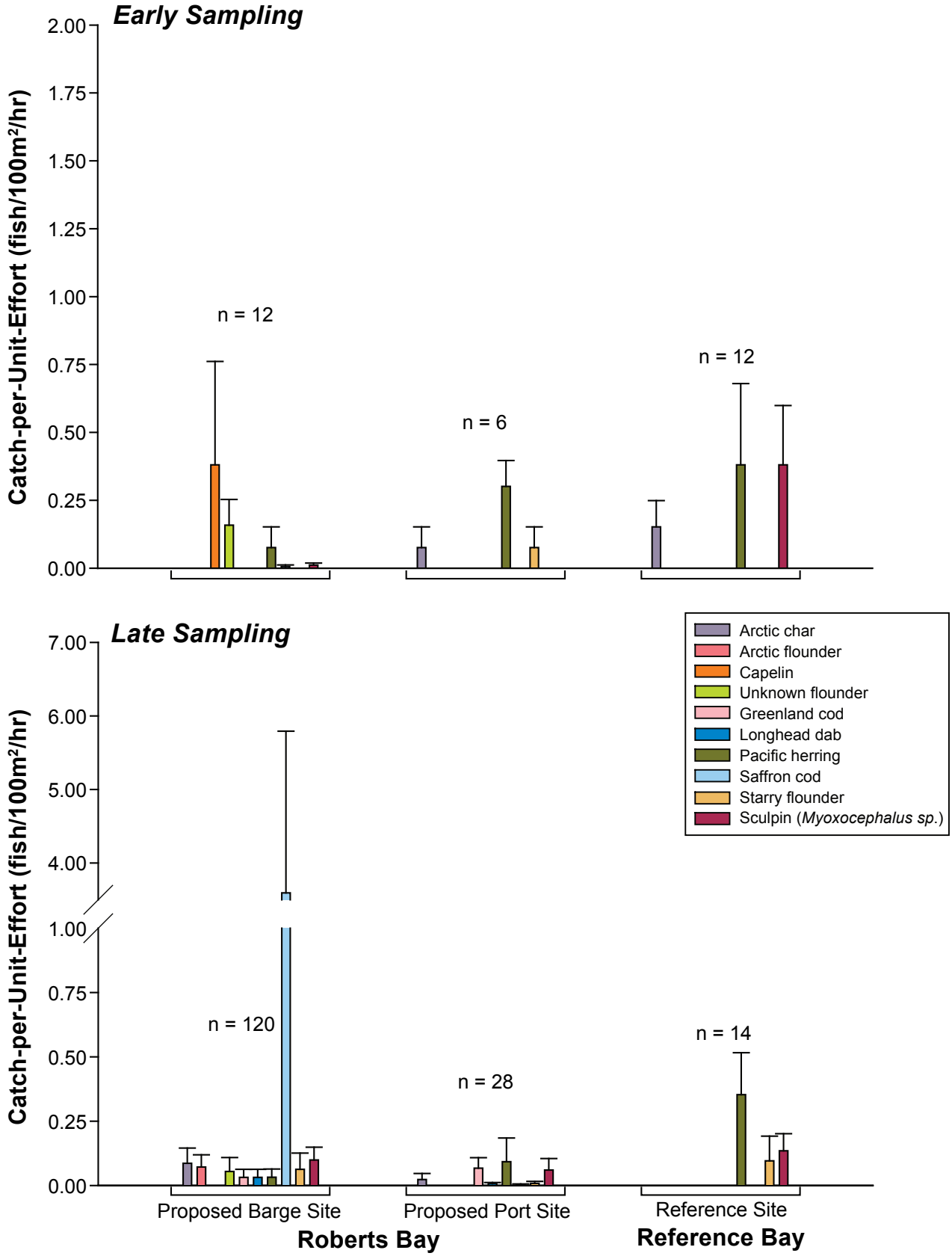
The total number of beach seines preformed at each site in 2009 ranged from three to nine with total sampling areas ranging from 432 m^2 to 1,620 m^2, depending on the sampling period.

Beach seine CPUE showed slight variation between sampling locations and sampling periods for both Roberts Bay and the Reference Bay (Figure 3.2-5). During the early sampling period, sculpin had the highest mean CPUE at both the proposed barge site (3.04 fish /100 m^2) and the Reference Bay site (4.08 fish/100 m^2). At the proposed port site in Roberts Bay, mean CPUE was low and included Arctic char (0.30 fish/100 m^2) and sculpin (0.10 fish/100 m^2). During the late sampling period, sculpin dominated the beach seine catch for all three sites with a mean CPUE of 2.67 fish/100 m^2, 4.09 fish/100 m^2 and 1.85 fish/100 m^2 for the proposed barge and port sites in Roberts Bay and the Reference Bay site, respectively. The majority of sculpin captured in beach seines were young-of-the-year (Appendix 3.2-7).

3.2.2.5 Minnow Traps

Total number of minnow traps set at each site ranged from 20 to 36 with total effort ranging from 455 hours to 729 hours.

During the early sampling period, scuplin were the only fish species captured using minnow traps in Roberts Bay (0.09 fish/trap/24 hours for the proposed barge site and 0.38 fish/trap/24 hours for the proposed port site) and Reference Bay (0.17 fish/trap/24 hours) (Figure 3.2-6). During the late sampling period, fish were only captured at the proposed port site in Roberts Bay. Arctic shanny and sculpin had a mean CPUE of 0.14 fish/trap/24 hours.



Note: Error bars represent one standard error of the mean.
n = total number of fish captured.

Mean Catch-per-Unit-Effort of Fish Captured in Sinking Gillnets in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

Figure 3.2-3

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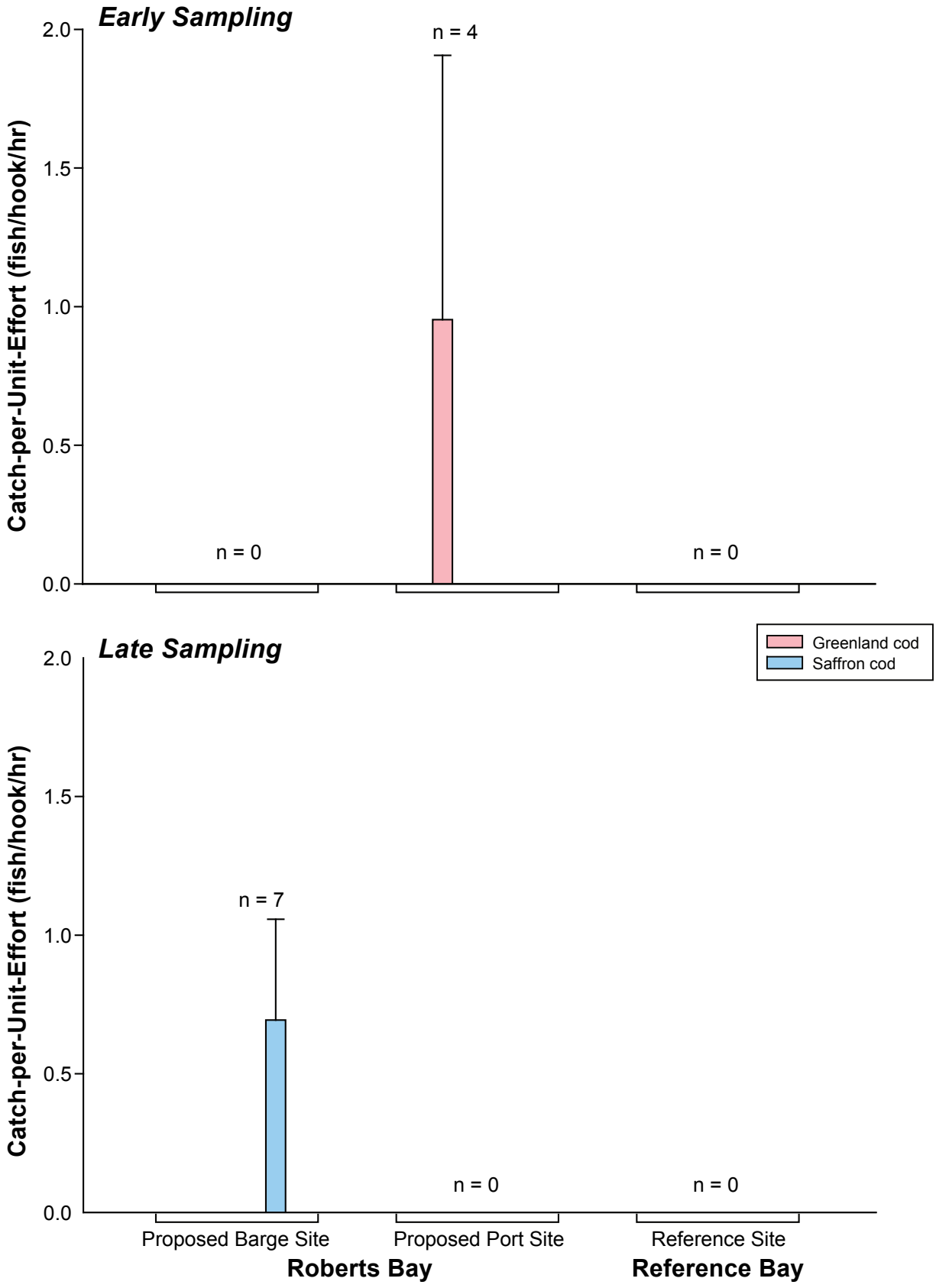

Note: Error bars represent one standard error of the mean.
n = total number of fish captured.

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Mean Catch-per-Unit-Effort of Fish Captured on Long Lines in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

Figure 3.2-4

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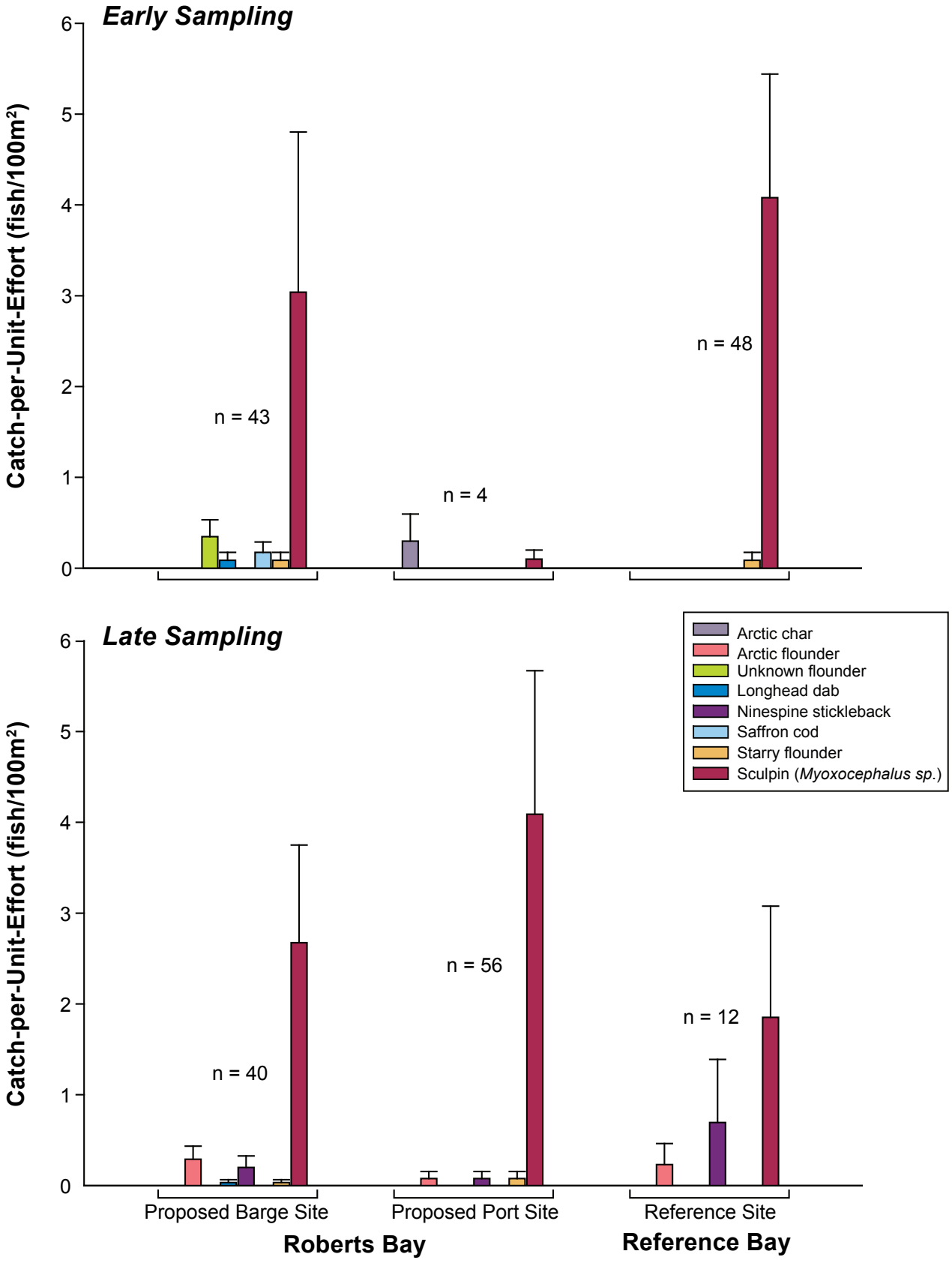

Note: Error bars represent one standard error of the mean.
n = total number of fish captured.

Mean Catch-per-Unit-Effort of Fish Captured in Beach Seines in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

Figure 3.2-5

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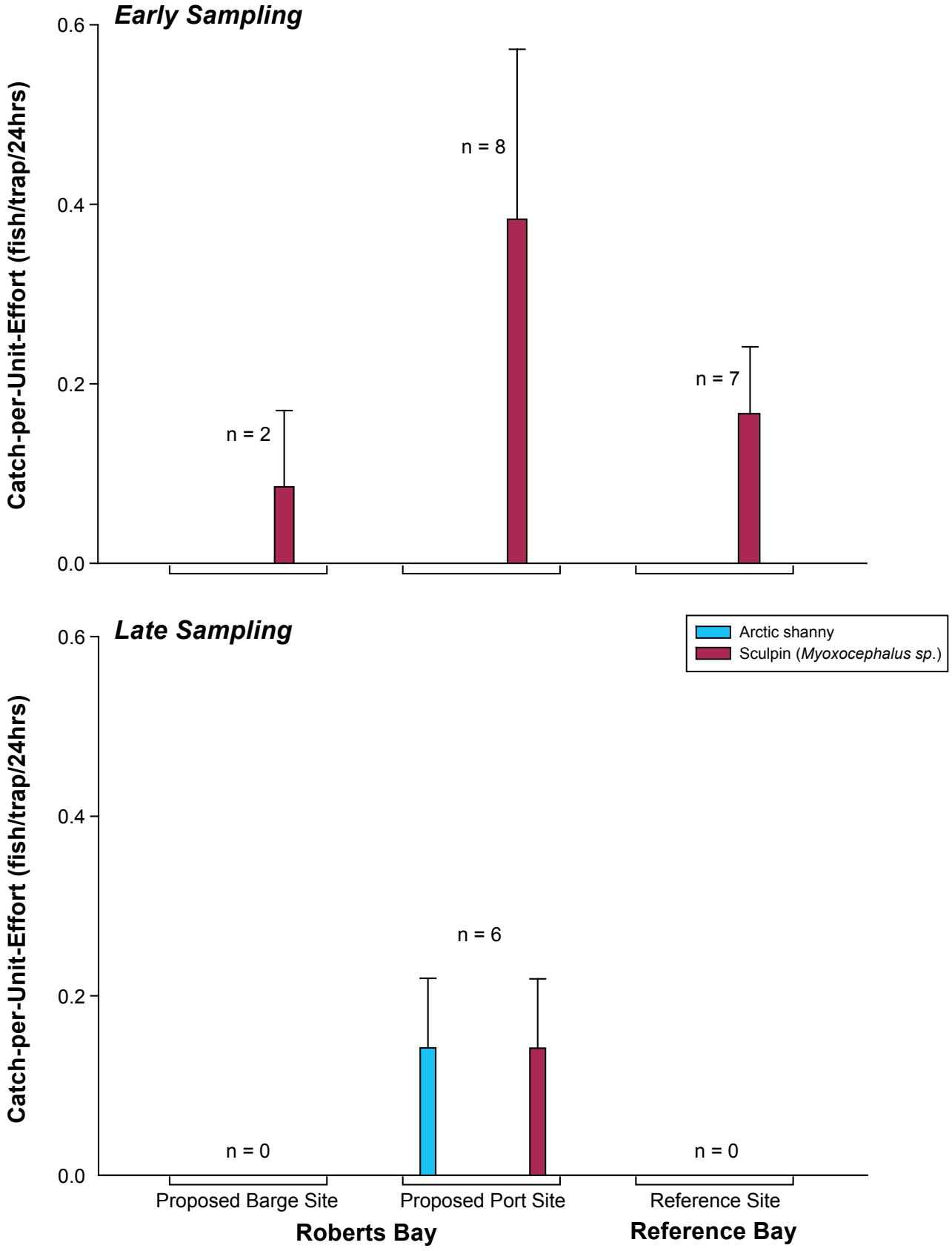

Note: Error bars represent one standard error of the mean.
n = total number of fish captured.

Mean Catch-per-Unit-Effort of Fish Captured in Minnow Traps in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

Figure 3.2-6

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3.2.2.6 Crab Traps

The total number of crab traps set at each site ranged from 10 to 15 with total effort ranging from 203.3 hours to 358.1 hours.

Few fish were captured using crab traps which was to be expected given crab traps were set primarily to capture macrobenthos in the area. During the early sampling period, an individual specimen of Greenland cod (0.07 fish/trap/24 hours) and sculpin (0.08 fish/trap/24 hours) were captured in crab traps set at the proposed port site in Roberts Bay and Reference Bay, respectively (Figure 3.2-7). During the late sampling period, Arctic shanny (0.23 fish/trap/24 hours) captured at the proposed port site in Roberts Bay had the highest mean CPUE followed by sculpin (0.14 fish/trap/24 hours at the proposed barge site and 0.11 fish/trap/24 hours at the proposed port site). No fish were captured in crab traps set at Reference Bay.

3.2.3 Length, Weight and Condition

Morphometric data collected for floating and sinking gillnets were combined for each fish species captured at each sampling location. Three sculpin captured at the proposed barge site in Roberts Bay were removed from further analysis because they were identified as outliers, likely due to a transcription error. In addition, two capelin were removed from weight-related calculations due to transcription error (Appendix 3.2-7).

Tables 3.2-3 to 3.2-5 summarize the length, weight and condition of all fish captured from Roberts Bay and Reference Bay. At the proposed barge site in Roberts Bay, the largest fish were captured in gillnets and included Greenland cod (645 mm) and starry flounder (456 mm) (Table 3.2-3). Sculpin were the smallest fish (45 mm) and most abundant fish species captured (n = 106).

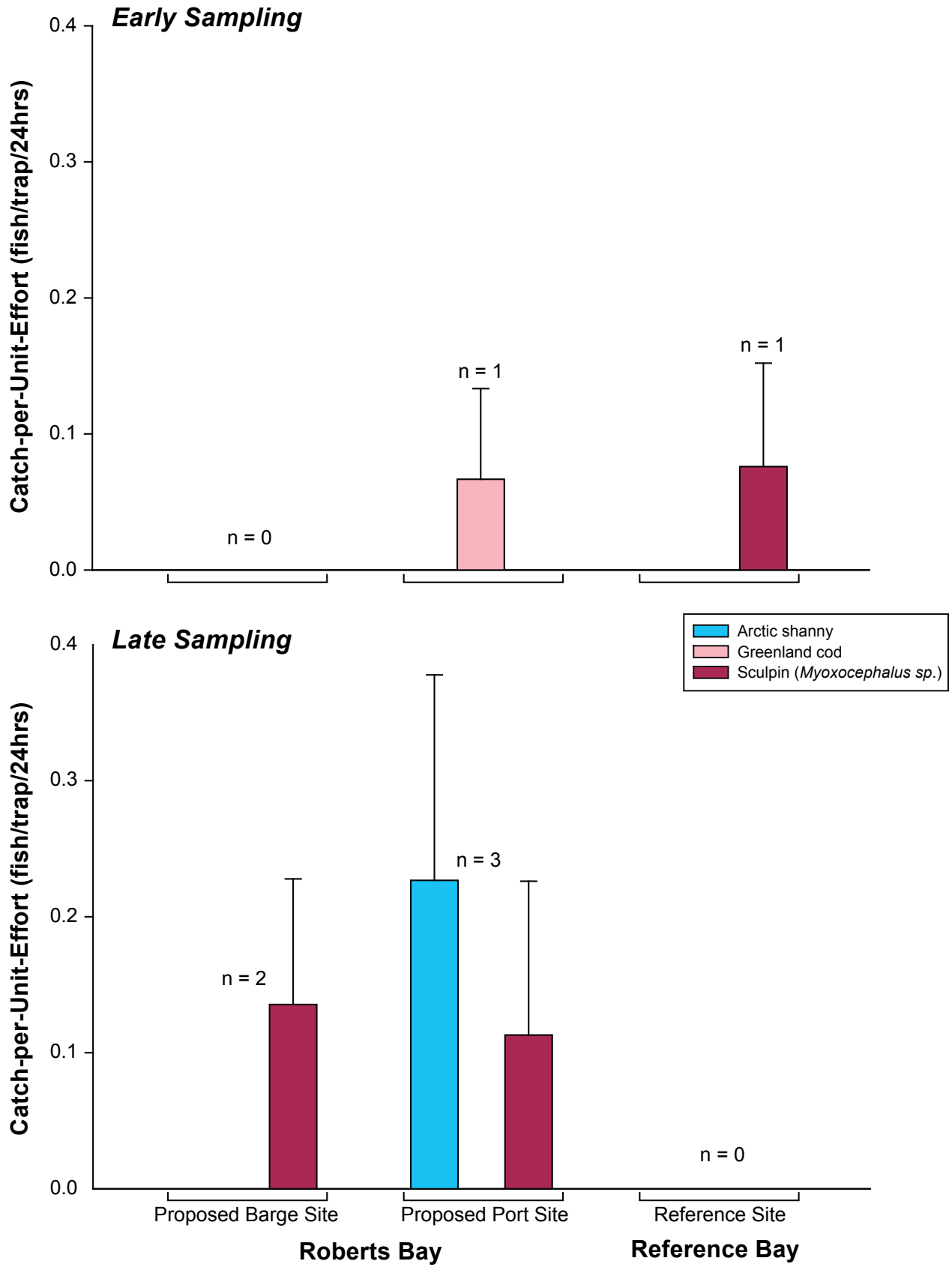
Similar to the proposed barge site, Greenland cod (492 mm) and starry flounder (473 mm) captured in gillnets were the largest fish species at the proposed port site in Roberts Bay (Table 3.2-4). The smallest fish species were sculpin (35 mm) captured in crab traps.

In Reference Bay, Arctic char captured in gillnets was the largest of all fish species, with a mean length of 396 mm (Table 3.2-5). Sculpin (25 mm) and ninespine stickleback (27 mm) were the smallest fish species, both captured in beach seines.

Length-frequency distributions were plotted for each gear type for fish species with sufficient sample size (Figures 3.2-8 to 3.2-11).

Pacific herring captured in gillnets from Roberts Bay and the Reference Bay showed a similar range in length class (101 to 300 mm), but dominant length class modes varied among sites likely a result of a small sample size (Figure 3.2-8). Sculpin captured in gillnets ranged in length from 101 to 400 mm at the proposed barge site in Roberts Bay and from 201 to 350 mm at Reference Bay

Figure 3.2-9 shows the length-frequency distributions of capelin, saffron cod, Arctic char and Greenland cod captured in Roberts Bay. All capelin captured at the proposed barge site were of one size class (101 to 150 mm). Saffron cod and Greenland cod captured in Roberts Bay ranged in length class from 151 to 400 mm and 351 to 550 mm, respectively. Arctic char captured at the proposed port site in Roberts Bay had a wide range of length classes (201 to 750 mm).



Note: Error bars represent one standard error of the mean.
n = total number of fish captured.

Mean Catch-per-Unit-Effort of Fish Captured in Crab Traps in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

Figure 3.2-7

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Table 3.2-3. Mean Length, Weight and Condition of Fish Captured at the Proposed Barge Site in Roberts Bay, Hope Bay Belt Project, 2009

Species	Gear Type	Length (mm)					Weight (g)					Condition (g/mm³)				
		n	Mean	Min	Max	SE	n	Mean	Min	Max	SE	n	Mean	Min	Max	SE
AC	GN	6	441	265	502	36.38	6	1,120	201	1,520	198.63	6	1.18	1.08	1.33	0.04
AF	GN	2	127	114	139	12.50	2	22	10	34	12.00	2	0.97	0.67	1.27	0.30
CP	GN	9	144	141	148	0.80	7	22	19	24	0.70	7	0.73	0.66	0.82	0.02
FL	GN	3	144	128	158	8.69	3	34	23	47	7.06	3	1.10	1.02	1.19	0.05
GC	GN	1	645	-	-	-	1	3,300	-	-	-	1	1.23	-	-	-
LD	GN	1	259	-	-	-	1	182	-	-	-	1	1.05	-	-	-
PH	GN	49	145	124	292	5.58	49	35	10	223	6.76	49	0.90	0.44	1.11	0.02
SC	GN	106	263	190	373	3.81	106	136	40	452	6.92	106	0.68	0.48	0.90	0.01
SF	GN	2	456	430	481	25.50	2	1,336	1,189	1,483	147.00	2	1.41	1.33	1.50	0.08
SP	GN	7	292	150	372	26.84	7	318	25	600	70.01	7	1.06	0.74	1.28	0.07
SC	LL	7	339	274	440	21.98	7	318	139	653	67.21	7	0.75	0.67	0.82	0.02
AF	BS	7	151	117	186	8.57	7	52	23	102	10.05	7	1.40	1.22	1.59	0.05
FL	BS	4	143	121	171	10.69	4	42	24	67	9.61	4	1.37	1.28	1.51	0.05
LD	BS	2	129	123	134	5.50	2	25	15	34	9.50	2	1.11	0.81	1.41	0.30
NS	BS	2	49	41	57	8.00	-	-	-	-	-	-	-	-	-	-
SC	BS	2	82	79	85	3.00	2	4	3	4	0.50	2	0.63	0.61	0.65	0.02
SF	BS	2	123	111	135	12.00	2	25	17	33	8.00	2	1.29	1.24	1.34	0.05
SP	BS	59	45	17	125	3.98	16	7	1	18	1.28	16	1.40	0.51	9.39	0.54
SP	MT	2	114	112	115	1.50	2	11	10	12	1.00	2	0.75	0.71	0.79	0.04
SP	CT	2	338	330	345	10.61	2	450	450	450	0.00	2	1.17	1.10	1.25	0.11

Note:
Species: AC = Arctic char; AF = Arctic flounder; CP = Capelin; FL = Flounder (unknown); GC = Greenland cod; LD = Longhead dab; NS = Ninespine stickleback; PH = Pacific herring; SC = Saffron cod; SF = Starry flounder; SP = Sculpin (Myoxocephalus sp.).
Gear Type: GN = Gillnet; LL = Long line; BS = Beach seine; MT = Minnow trap; CT = Crab trap.
SE = Standard error of the mean.

Table 3.2-4. Mean Length, Weight and Condition of Fish Captured at the Proposed Port Site in Roberts Bay, Hope Bay Belt Project, 2009

Species	Gear Type	Length (mm)					Weight (g)					Condition (g/mm³)				
		n	Mean	Min	Max	SE	n	Mean	Min	Max	SE	n	Mean	Min	Max	SE
AC	GN	28	370	219	702	22.70	28	792	104	3,600	155.13	28	1.11	0.94	1.29	0.02
GC	GN	8	424	391	501	12.81	8	867	519	1,418	96.02	8	1.11	0.84	1.28	0.04
LD	GN	2	168	157	178	10.50	2	49	42	56	7.00	2	1.04	0.99	1.09	0.05
PH	GN	100	207	120	292	6.56	46	175	19	258	6.53	46	0.97	0.85	1.16	0.01
SC	GN	1	299	-	-	-	1	175	-	-	-	1	0.65	-	-	-
SF	GN	2	473	455	490	17.50	2	1,364	1,138	1,589	225.50	2	1.28	1.21	1.35	0.07
SP	GN	5	285	185	340	26.70	5	270	47	450	64.87	5	1.01	0.74	1.14	0.07
GC	LL	4	432	389	469	21.24	4	925	620	1,174	130.00	4	1.13	1.05	1.23	0.04
AC	BS	3	225	206	253	14.40	3	107	78	142	18.67	3	0.93	0.88	1.03	0.05
AF	BS	1	151	-	-	-	1	45	-	-	-	1	1.31	-	-	-
NS	BS	1	32	-	-	-	-	-	-	-	-	-	-	-	-	-
SF	BS	1	115	-	-	-	1	20	-	-	-	1	1.32	-	-	-
SP	BS	36	40	26	52	0.97	11	0	0	1	0.07	11	0.70	0.56	1.14	0.05
AS	MT	3	111	102	119	4.93	3	8	6	9	0.88	3	0.56	0.53	0.57	0.01
SP	MT	11	110	67	152	8.55	11	14	3	31	3.21	11	0.85	0.47	1.40	0.08
AS	CT	2	106	104	108	2.00	2	8	8	8	0.00	2	0.67	0.64	0.71	0.04
GC	CT	1	492	-	-	-	1	1,290	-	-	-	1	1.08	-	-	-
SP	CT	1	35	-	-	-	1	1	-	-	-	1	2.33	-	-	-

Note:
Species: AC = Arctic char; AF = Arctic flounder; AS = Arctic shanny; GC = Greenland cod; LD = Longhead dab; NS = Ninespine stickleback; PH = Pacific herring; SC = Saffron cod; SF = Starry flounder; SP = Sculpin (Myoxocephalus sp.).
Gear Type: GN = Gillnet; LL = Long line; BS = Beach seine; MT = Minnow trap; CT = Crab trap.
SE = Standard error of the mean.

Table 3.2-5. Mean Length, Weight and Condition of Fish Captured at the Reference Bay Site, Hope Bay Belt Project, 2009

Species	Gear Type	Length (mm)					Weight (g)					Condition (g/mm^3)				
		n	Mean	Min	Max	SE	n	Mean	Min	Max	SE	n	Mean	Min	Max	SE
AC	GN	3	396	238	484	79.17	3	788	119	1,147	334.80	3	0.99	0.88	1.09	0.06
PH	GN	14	251	133	285	9.87	14	174	19	237	15.31	14	1.03	0.81	1.24	0.03
SF	GN	3	81	59	109	14.68	3	14	3	28	7.45	3	1.97	1.46	2.28	0.26
SP	GN	7	300	239	347	12.95	7	292	120	366	32.61	7	1.05	0.82	1.30	0.06
AF	BS	1	61	-	-	-	1	2	-	-	-	1	0.88	-	-	-
NS	BS	3	27	22	30	2.40	-	-	-	-	-	-	-	-	-	-
SF	BS	1	139	-	-	-	1	125	-	-	-	1	4.65	-	-	-
SP	BS	55	25	16	81	1.65	2	4	3	4	0.50	2	0.76	0.75	0.77	0.01
SP	MT	7	99	73	130	9.51	7	7	2	16	2.16	7	0.62	0.51	0.73	0.03
SP	CT	1	108	-	-	-	1	10	-	-	-	1	0.79	-	-	-

Note:
Species: AC = Arctic char; AF = Arctic flounder; NS = Ninespine stickleback; PH = Pacific herring; SF = Starry flounder; SP = Sculpin (Myoxocephalus sp.).
Gear Type: GN = Gillnet; BS = Beach seine; MT = Minnow trap; CT = Crab trap.
SE = Standard error of the mean.

Figure 3.2-10 shows the length-frequency distributions of Arctic flounder and sculpin captured with beach seines. Arctic flounder captured at the proposed barge site in Roberts Bay ranged in length class from 101 to 200 mm. Sculpin captured in beach seines from Roberts Bay and the Reference Bay showed similar length-frequency distributions with a dominant length class of 0 to 50 mm for all three sampling locations.

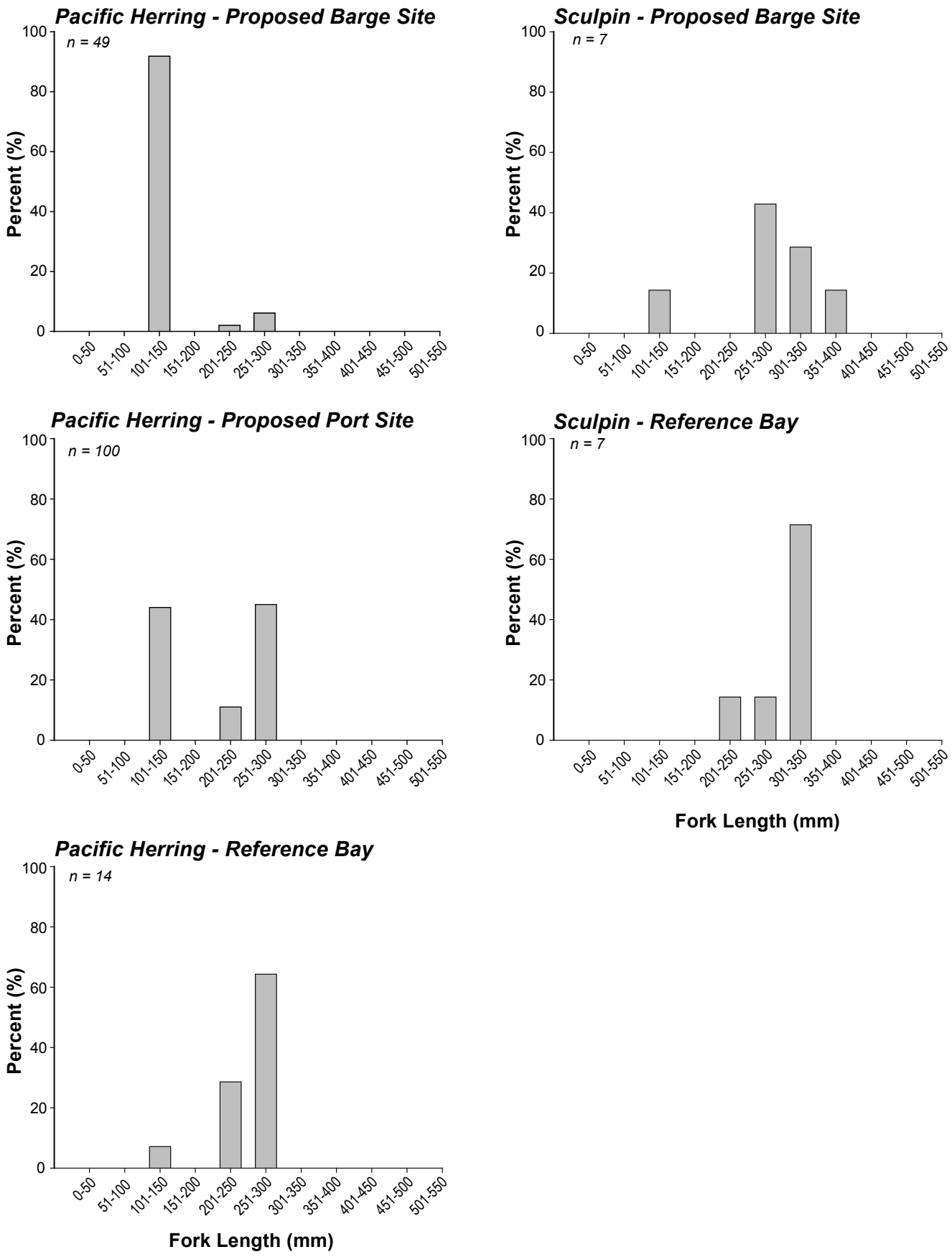
Saffron cod captured on long lines at the proposed barge site in Roberts Bay showed a unimodal distribution, ranging from 251 to 450 mm (Figure 3.2-11). Sculpin captured in minnow traps from the proposed port site in Roberts Bay and the Reference Bay ranged in length class from 51 to 200 mm and 51 to 150 mm, respectively.

Weight-length regressions were calculated for seven fish species captured in sufficient numbers from Roberts Bay and Reference Bay. Data from all gear types were combined for analysis (Figures 3.2-12 to 3.2-15). The regressions were highly significant ($P \leq 0.001$) for Pacific herring and sculpin. The regressions explained 95 to 98% and 93 to 99% of the variation in ln(weight) for Pacific herring and saffron cod, respectively. The slope of the regression (b) was close to the expected isometric value of 3.0 for each species, typical for fish that maintain a torpedo body form.

Weight-length regressions for Arctic flounder and saffron cod captured at the proposed barge site in Roberts Bay were highly significant ($P \leq 0.001$), but regressions for capelin were not ($P = 0.242$) (Figure 3.2-14). The regressions explained 91% and 99% of the variance in ln(weight) for Arctic flounder and saffron cod, respectively. The slopes of the regression for capelin and saffron cod deviated from the expected value of 3.0 but was within the normal range of 2.5 and 3.5 (Vaslet et al. 2008). The slope of the regression for Arctic flounder ($b = 3.97$) captured at the proposed barge site in Roberts Bay was higher that the range typically observed for ray fishes.

Arctic char and Greenland cod captured at the proposed port site in Roberts Bay showed highly significant ($P \leq 0.001$) regressions of weight on length (Figure 3.2-15). The regression explained 99% and 89% of the variation in ln(weight), respectively. The slopes of the regression for both species of fish were close to the expected value of 3.0.

Mean condition of fish captured in Roberts Bay and Reference Bay was close to the expected value of 1.0 g/mm^3 (Tables 3.2-3 to 3.2-5).



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Length-Frequency Distributions of Pacific Herring and Sculpin Captured in Gillnets from Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

Figure 3.2-8

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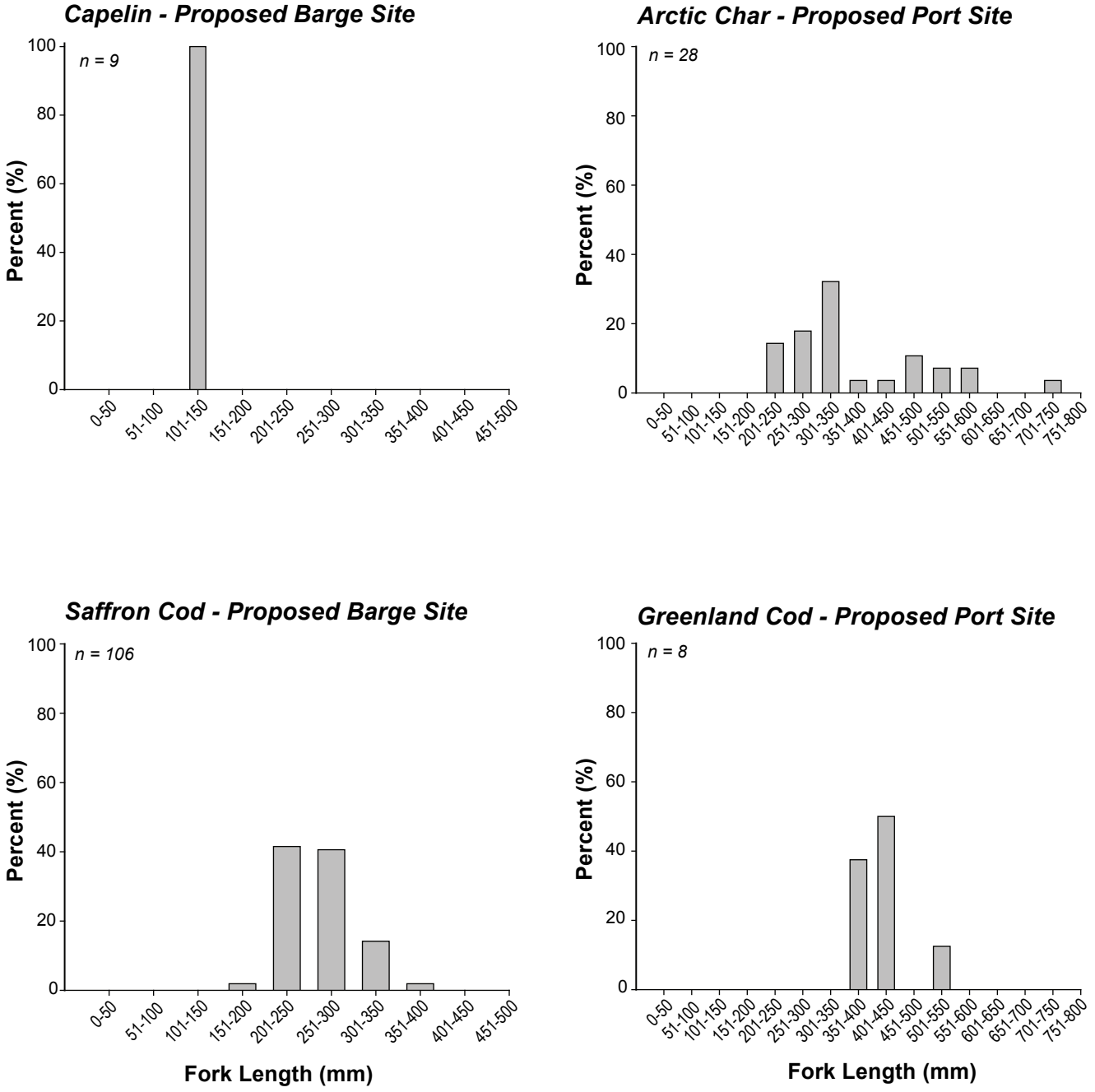

Length-Frequency Distributions of Fish Species Captured in Gillnets from Roberts Bay, Hope Bay Belt Project, 2009

Figure 3.2-9

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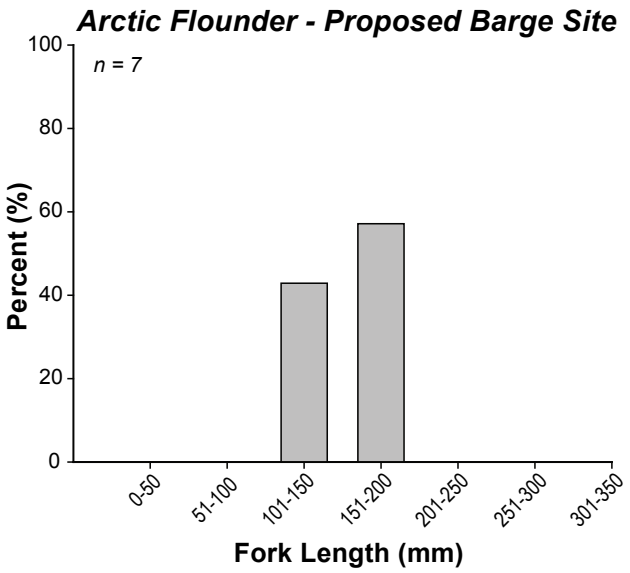

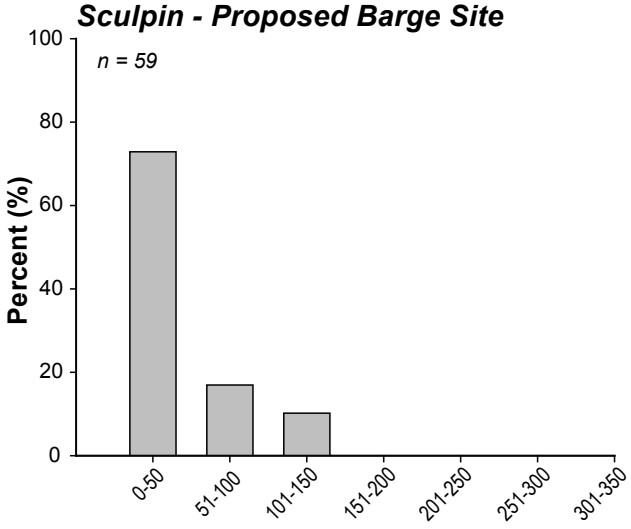

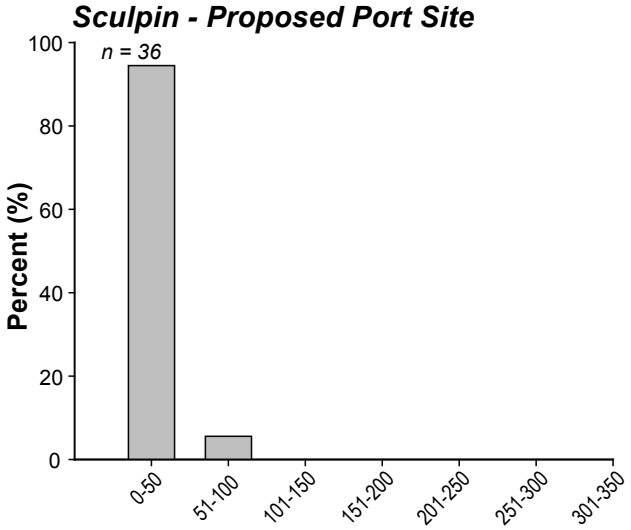

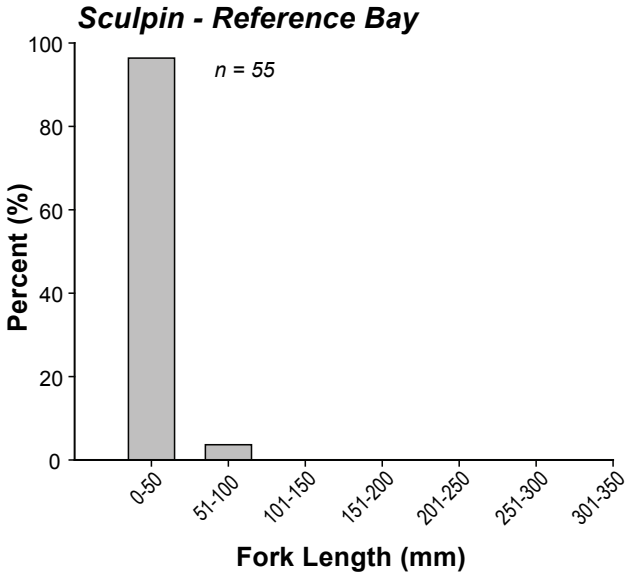

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Length-Frequency Distributions of Arctic Flounder and Sculpin Captured in Beach Seines from Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

Figure 3.2-10

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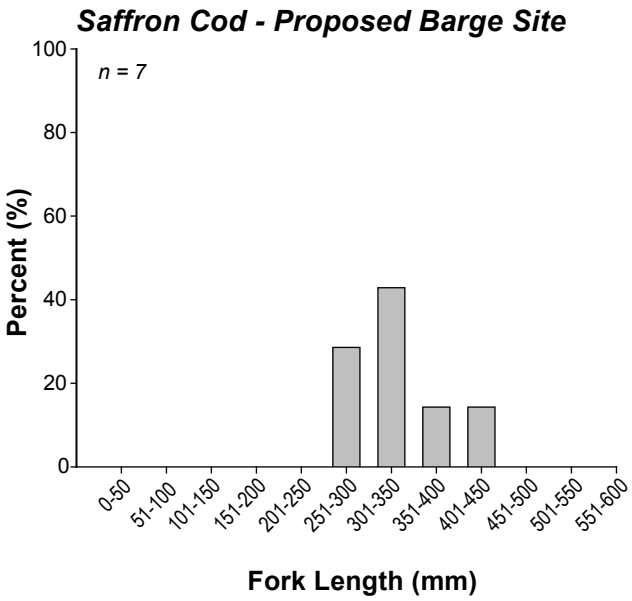
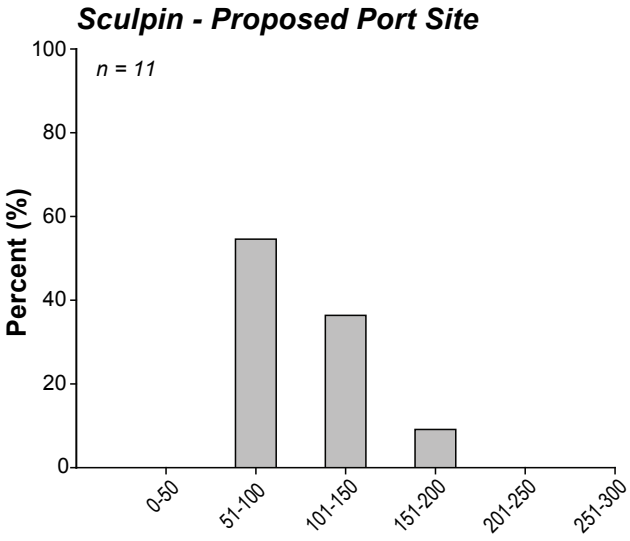
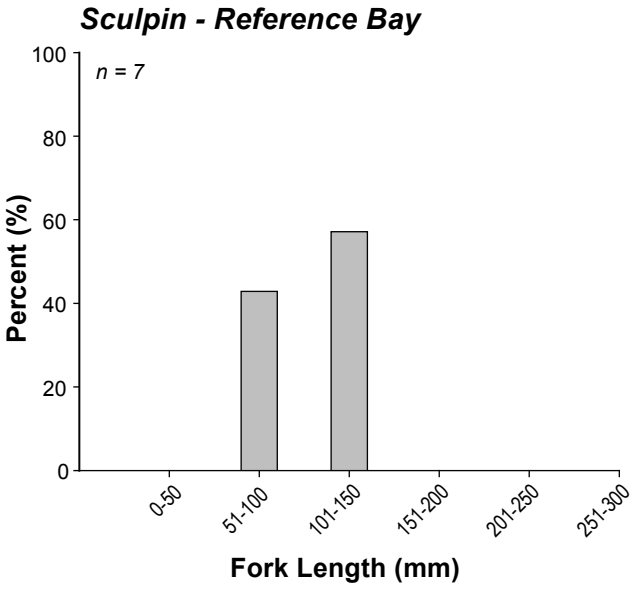
Long Lines



Minnow Traps





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Length-Frequency Distribution of Saffron Cod Captured on Long Lines and Sculpin Captured in Minnow Traps from Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

Figure 3.2-11

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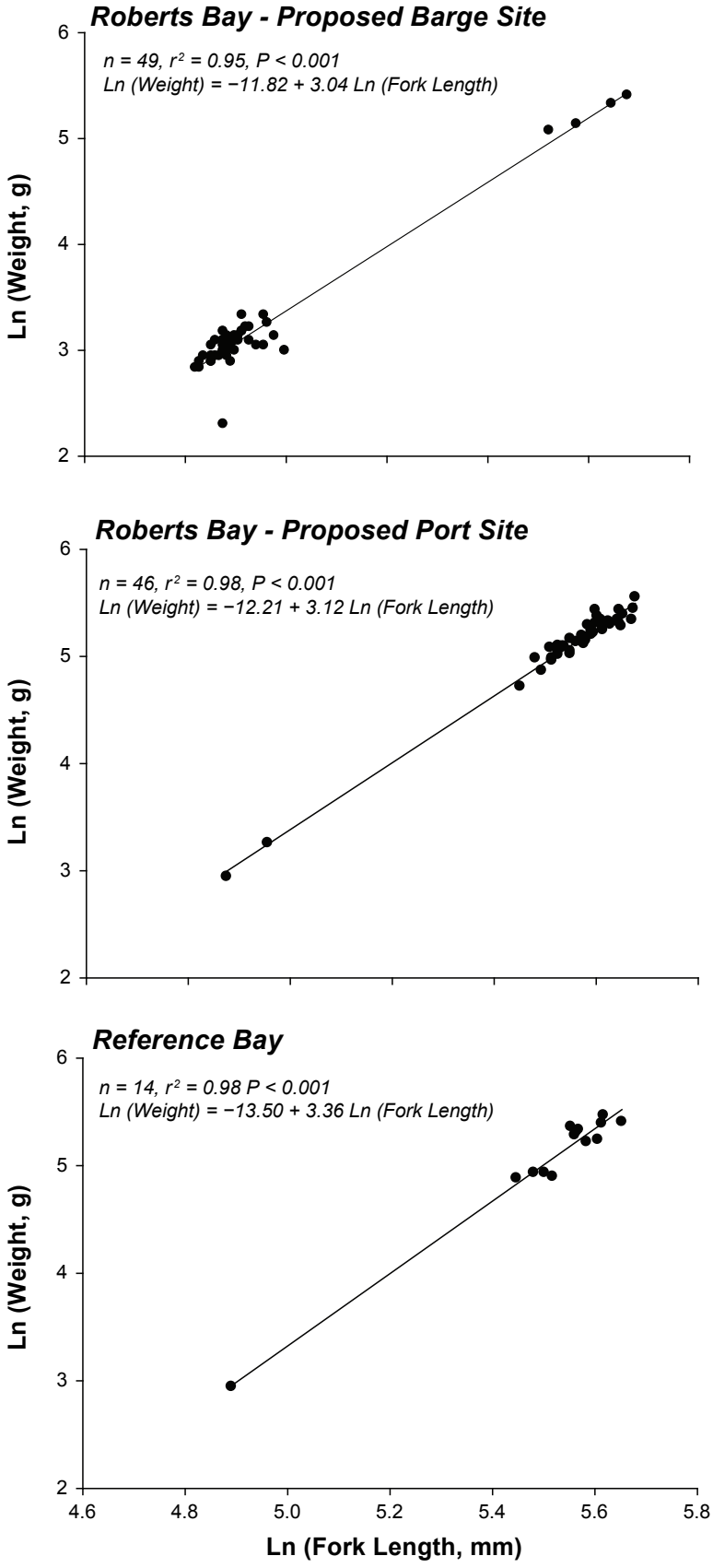

Weight-Length Regressions for Pacific Herring Captured in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

Figure 3.2-12

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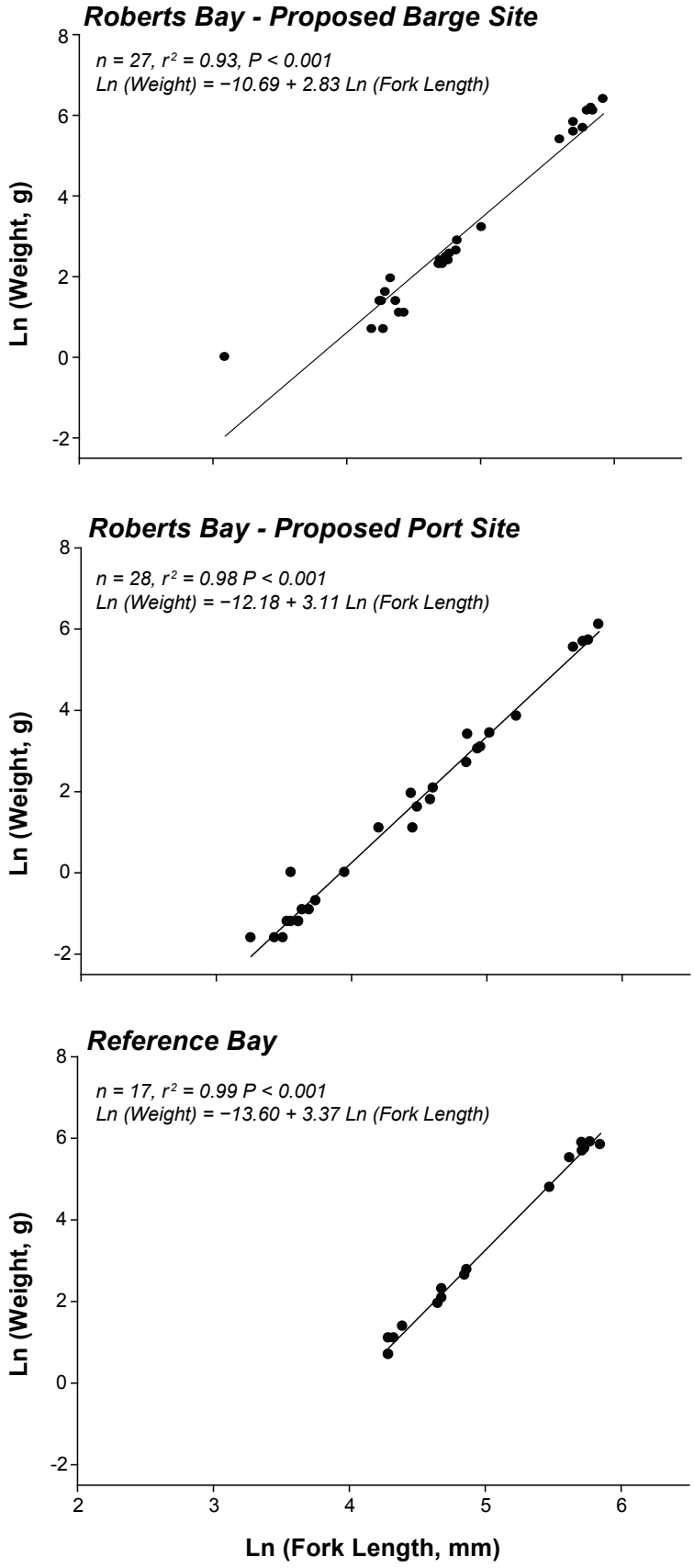

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Weight-Length Regressions for Sculpin Captured in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

Figure 3.2-13

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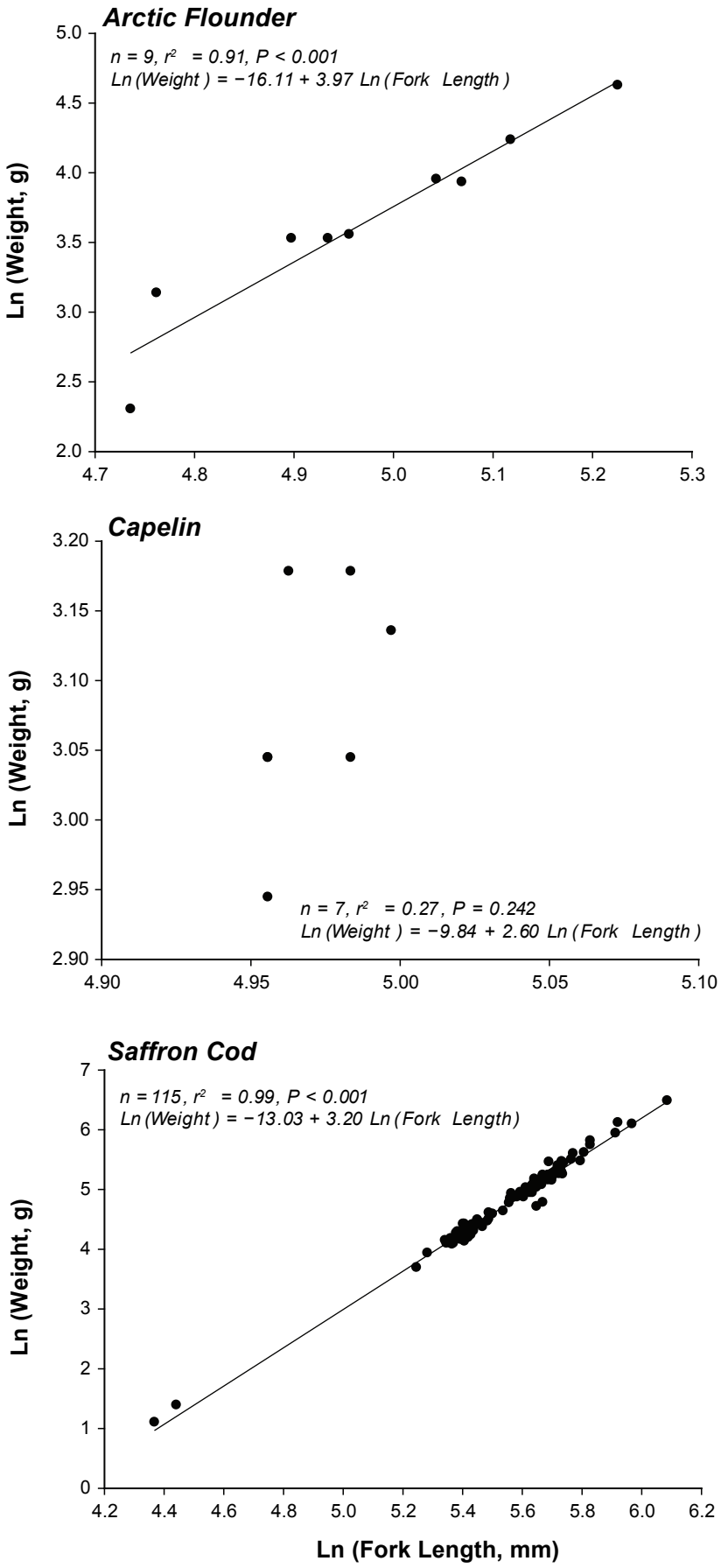

Weight-Length Regressions for Arctic Flounder, Capelin and Saffron Cod Captured at the Proposed Barge Site in Roberts Bay, Hope Bay Belt Project, 2009

Figure 3.2-14

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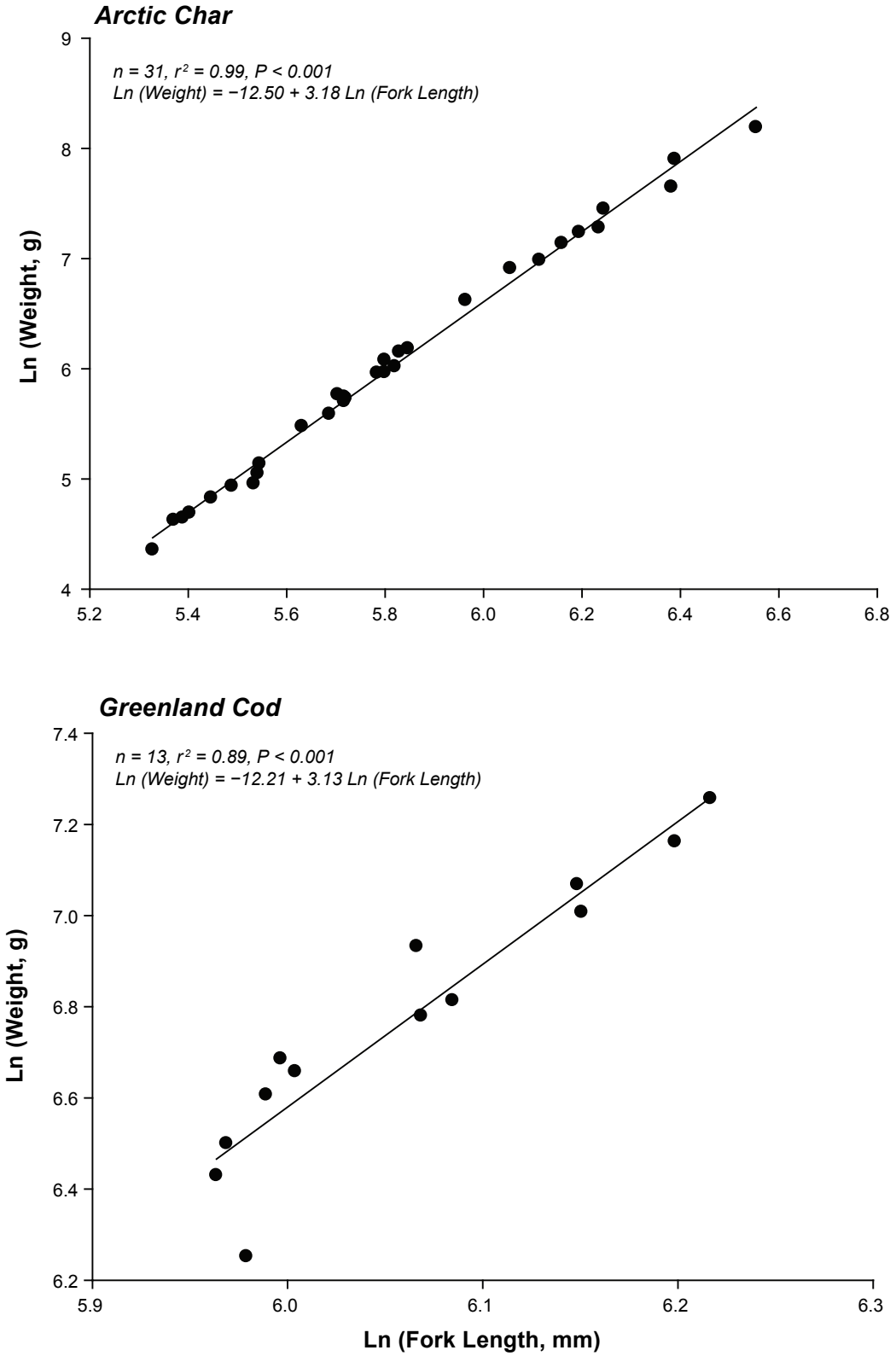

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Weight-Length Regressions for Arctic Char and Greenland Cod Captured at the Proposed Port Site in Roberts Bay, Hope Bay Belt Project, 2009

Figure 3.2-15

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3.2.4 Age and Growth

Age data for all fish sampled for age analysis in Roberts Bay and Reference Bay are presented in Appendix 3.2-7 and summarized in Table 3.2-6. Age frequency distributions were only generated for fish species of sufficient sample size (n≥7).

Table 3.2-6. Age of Fish Captured in Roberts Bay and the Reference Bay, Hope Bay Belt Project, 2009

Species	Location	Site	n	Age (years)			
				Mean	SE	Min	Max
Arctic Char	Roberts Bay	Proposed Barge Site	4	6	1	5	7
	Roberts Bay	Proposed Port Site	31	5	0	3	12
	Reference Bay	Reference Site	3	7	2	3	11
Greenland Cod	Roberts Bay	Proposed Barge Site	-	-	-	-	-
	Roberts Bay	Proposed Port Site	7	4	1	3	8
	Reference Bay	Reference Site	-	-	-	-	-
Pacific Herring	Roberts Bay	Proposed Barge Site	2	11	1	10	11
	Roberts Bay	Proposed Port Site	35	9	0	5	12
	Reference Bay	Reference Site	14	9	1	2	13

Note: SE = Standard error of the mean.

Arctic char sampled at the proposed barge site in Roberts Bay had a narrow age range of 5 to 7 years compared to the age range observed at the proposed port site in Roberts Bay (3 to 12 years) and Reference Bay (3 to 11 years) (Table 3.2-6). An age-frequency distribution of Arctic char captured at the proposed port site showed a single mode at 4 years (Figure 3.2-16).

Greenland cod were only sampled for age analysis at the proposed port site in Roberts Bay. Greenland cod averaged 4 years and ranged in age from 3 to 8 years (Table 3.2-6). An age-frequency distribution of Greenland cod captured at the proposed port site in Roberts Bay showed a dominant age class of 3 years (Figure 3.2-16).

Pacific herring were the oldest fish species sampled in both Roberts Bay and Reference Bay. At the proposed barge site, Pacific herring were 10 and 11 years of age (Table 3.2-6). Pacific herring sampled for age analysis at the proposed port site in Roberts Bay and Reference Bay had an average age of 9 years and both demonstrated a unimodal distribution (Figure 3.2-17). Age ranged from 5 to 12 years at the proposed port site in Roberts Bay and 2 to 13 years the Reference Bay.

Von Bertalanffy growth models were fit to the age and length data of Arctic char and Greenland cod captured at the proposed port site and Pacific herring captured at the proposed port site and Reference Bay (Figures 3.2-18 and 3.2-19). Age explained 80% and 89% of the variation in fish length for Arctic char and Greenland cod captured at the proposed port site, respectively (Figure 3.2-18).

Arctic char and Greenland cod had asymptotic lengths of 979 mm and 496 mm and a growth coefficient of 0.10 years^{-1} and 0.50 years^{-1}, respectively.

For Pacific herring captured at the proposed port site in Roberts Bay and the Reference Bay, age explained 39% and 88% of the variation in fish length, respectively (Figure 3.2-19). Asymptotic lengths for Pacific herring were 280 mm for the proposed port site and 276 mm for Reference Bay. Growth coefficients were similar for the proposed port site in Roberts Bay (0.33 years^{-1}) and Reference Bay (0.32 years^{-1}). The similarities in coefficients may suggest that it is a single population of Pacific herring using habitat in both Roberts Bay and the Reference Bay.

3.2.5 Diet

Taxonomic analysis of stomach contents was conducted on a subset of Pacific herring captured in Roberts Bay and Reference Bay. Data from all sampling sites within each bay were combined for analysis. Included in the analysis are stomach samples of Pacific herring captured as part of the Doris North Fisheries Authorization Monitoring Program (Rescan 2009). Biological data of these fish are presented in Appendix 3.2-9.

A total of 48 preserved Pacific herring stomachs were assessed for diet: 22 from Roberts Bay and 26 from Reference Bay. Taxonomic results are presented in Appendices 3.2-10 (by number) and 3.2-11 (by wet weight). Average stomach contents are presented by number in Figure 3.2-20 and by weight in Figure 3.2-21.

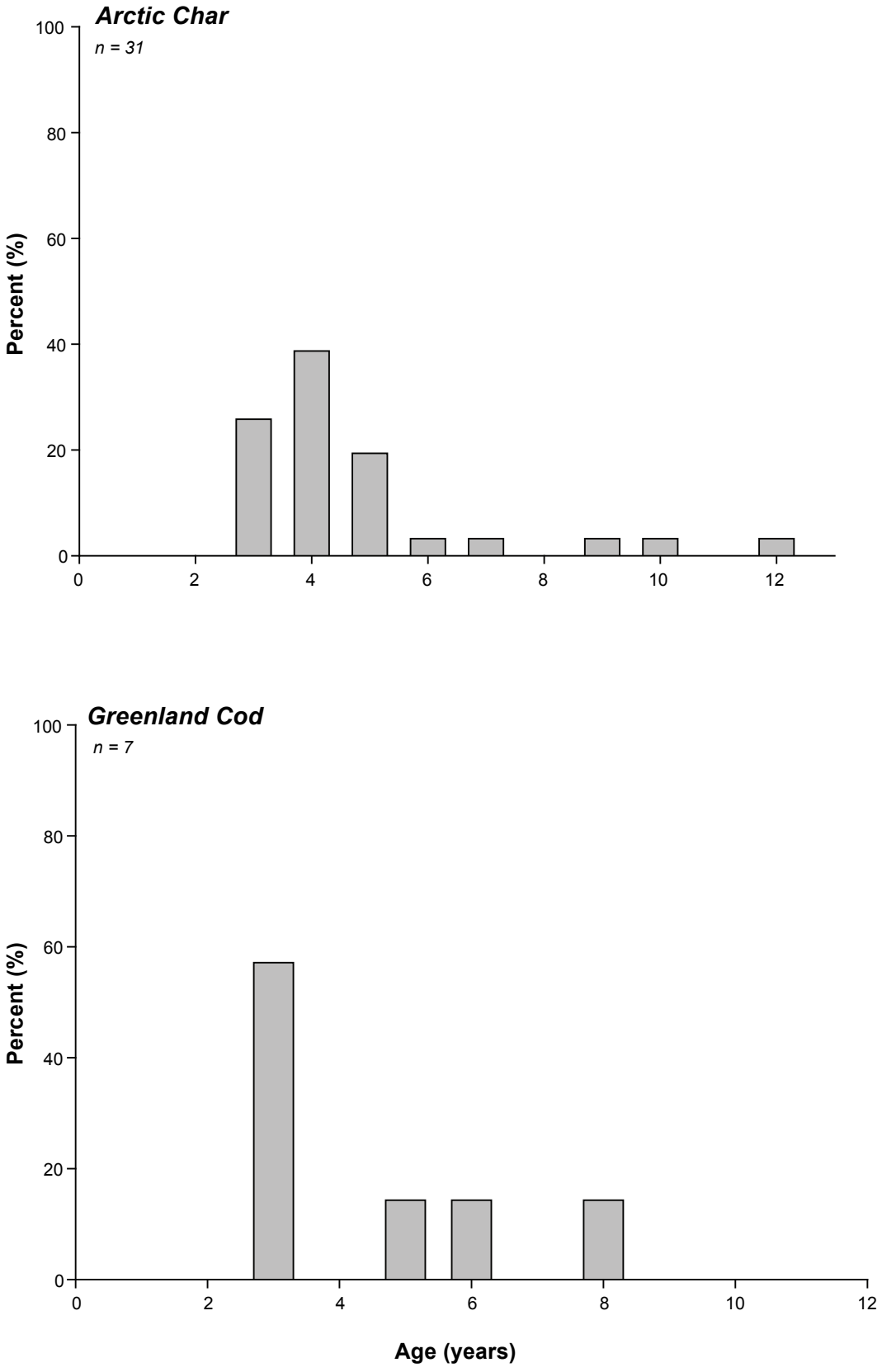
Mean Pacific herring stomach fullness and digestion in Roberts Bay was 49% and 63%, respectively (Table 3.2-7). Similarly, mean fullness and digestion of Pacific herring stomach samples collected from Reference Bay were 52% and 59%, respectively.

Table 3.2-7. Fullness, Digestion and Stomach Content Weight of Pacific Herring in Roberts Bay and the Reference Bay, Hope Bay Belt Project, 2009

Parameter	Roberts Bay					Reference Bay				
	n	Mean	SE	Min	Max	n	Mean	SE	Min	Max
Fullness (%)	22	49	7.29	0	100	26	52	7.02	0	100
Digestion (%)	22	63	5.72	25	100	26	59	6.11	10	100
Actual Weight (mg)	22	898	224	0	3,712	26	795	133	0	2,617

Note: SE = Standard error of the mean.

The diet of Pacific herring was similar among sites sampled in the Project area. In both Roberts Bay and Reference Bay, the numerically dominant prey item was Decapoda (Figure 3.2-20). Those decapods, an order of crustaceans, were comprised entirely of brachyurans or true crabs. Prey taxa of secondary importance in Roberts Bay included Mysidacea, Amphipoda and Copepoda, in decreasing order of importance. Mysidacea were solely comprised of the species *Mysis litoralis* while amphipods were predominantly comprised of the Family Hyperiidae and copepods of the littoral species *Tisbe furcata* from the Family Harpacticoida. In Reference Bay, prey taxa of secondary importance were Amphipoda, Mysidacea and fish eggs. Amphipods were mainly comprised of the species *Gammarus setosus* from the Family Gammaridae. Similar to Roberts Bay, Mysidacea were solely comprised of the species *Mysis litoralis*. Fish eggs found in the stomachs of Pacific herring captured in Reference Bay could not be identified to greater detail. For both Roberts Bay and Reference Bay, a small proportion (<1%) of fish, aquatic insects and non-food items comprised the remainder of the diet.



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Age-Frequency Distributions of Arctic Char and Greenland Cod Captured at the Proposed Port Site in Roberts Bay, Hope Bay Belt Project, 2009

Figure 3.2-16

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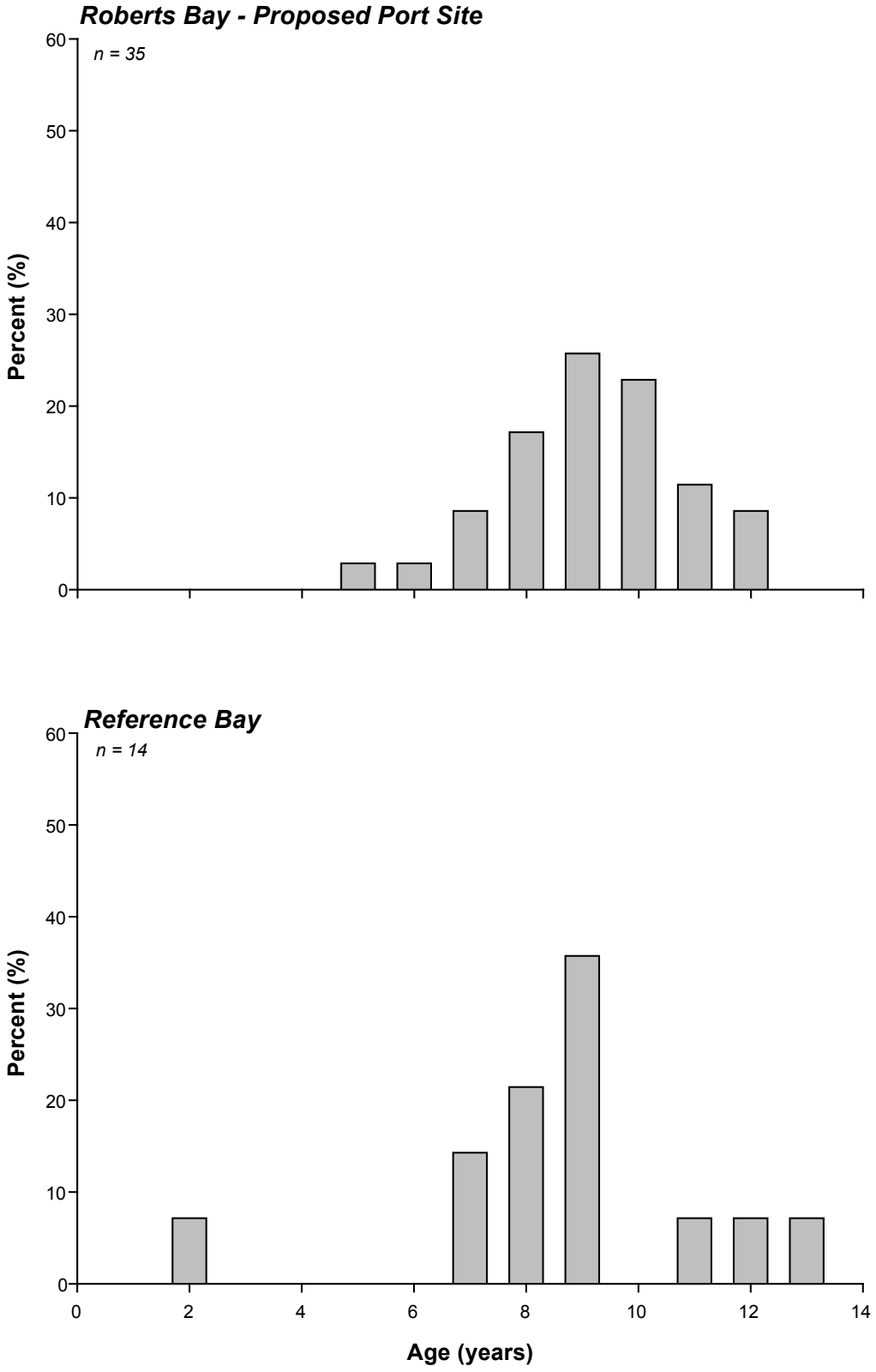

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Age-Frequency Distributions of Pacific Herring Captured in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

Figure 3.2-17

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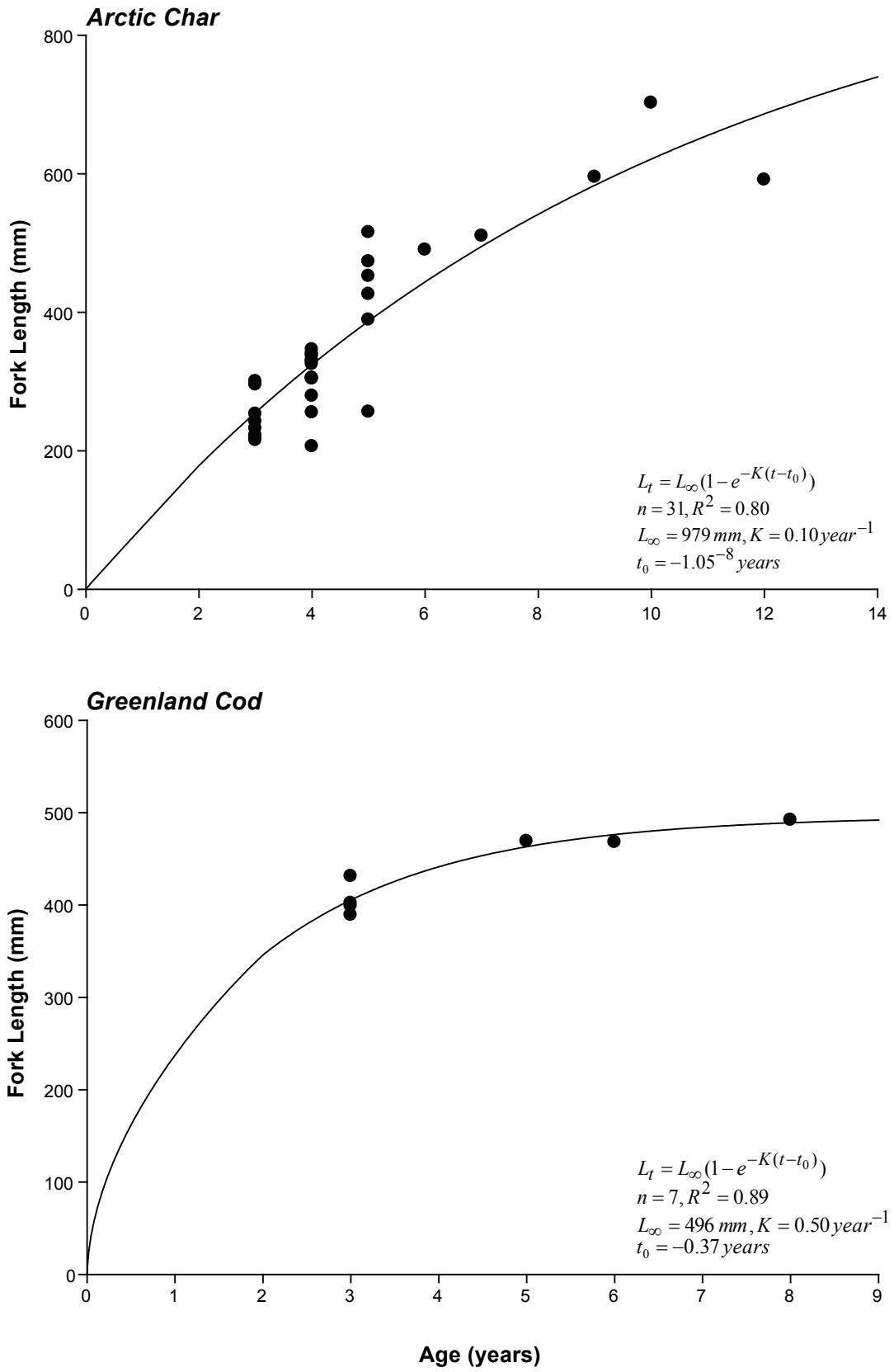

Von Bertalanffy Growth Models for Arctic Char and Greenland Cod Sampled at the Proposed Port Site in Roberts Bay, Hope Bay Belt Project, 2009

Figure 3.2-18

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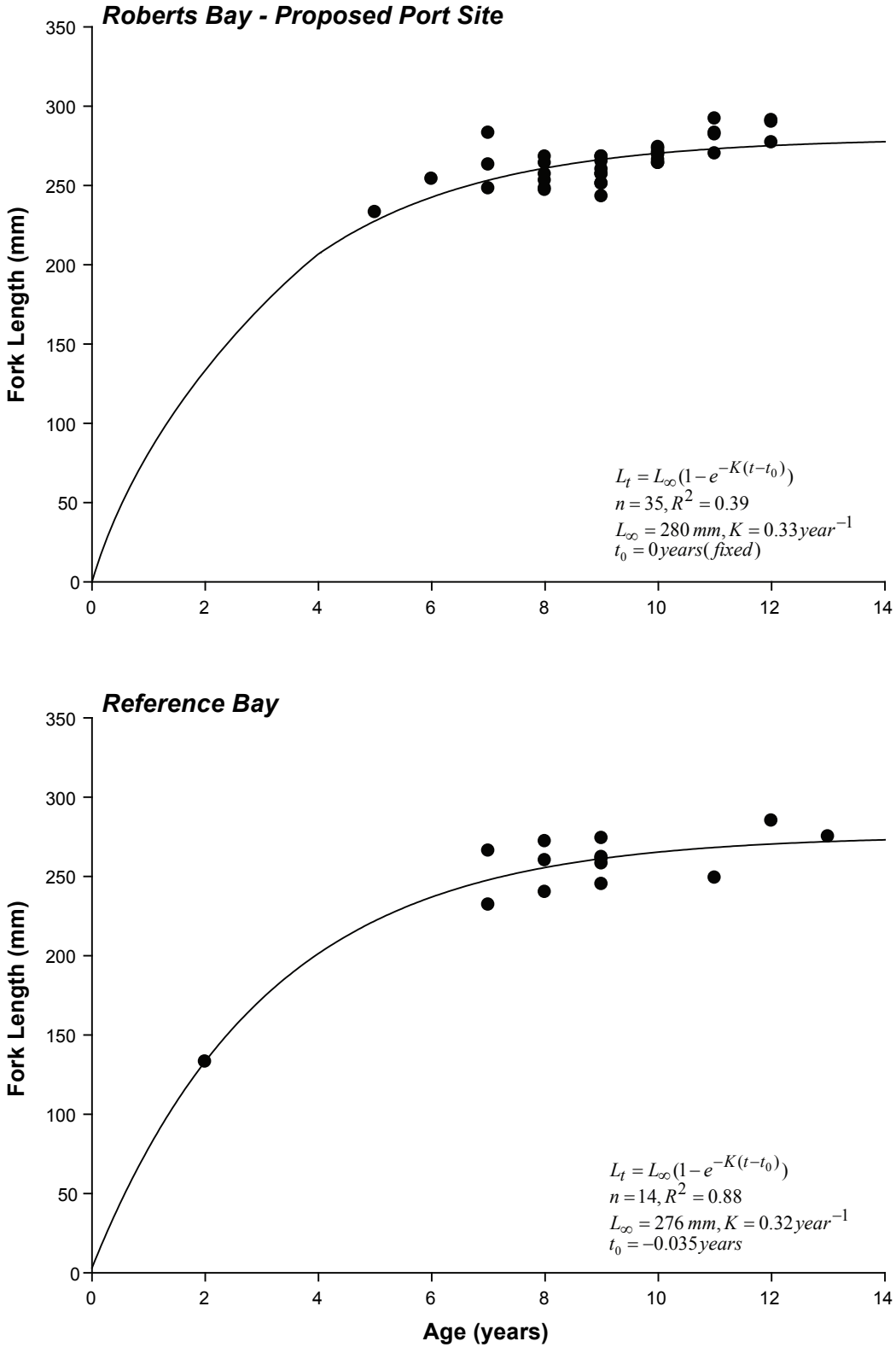

Von Bertalanffy Growth Models for Pacific Herring Sampled in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

Figure 3.2-19

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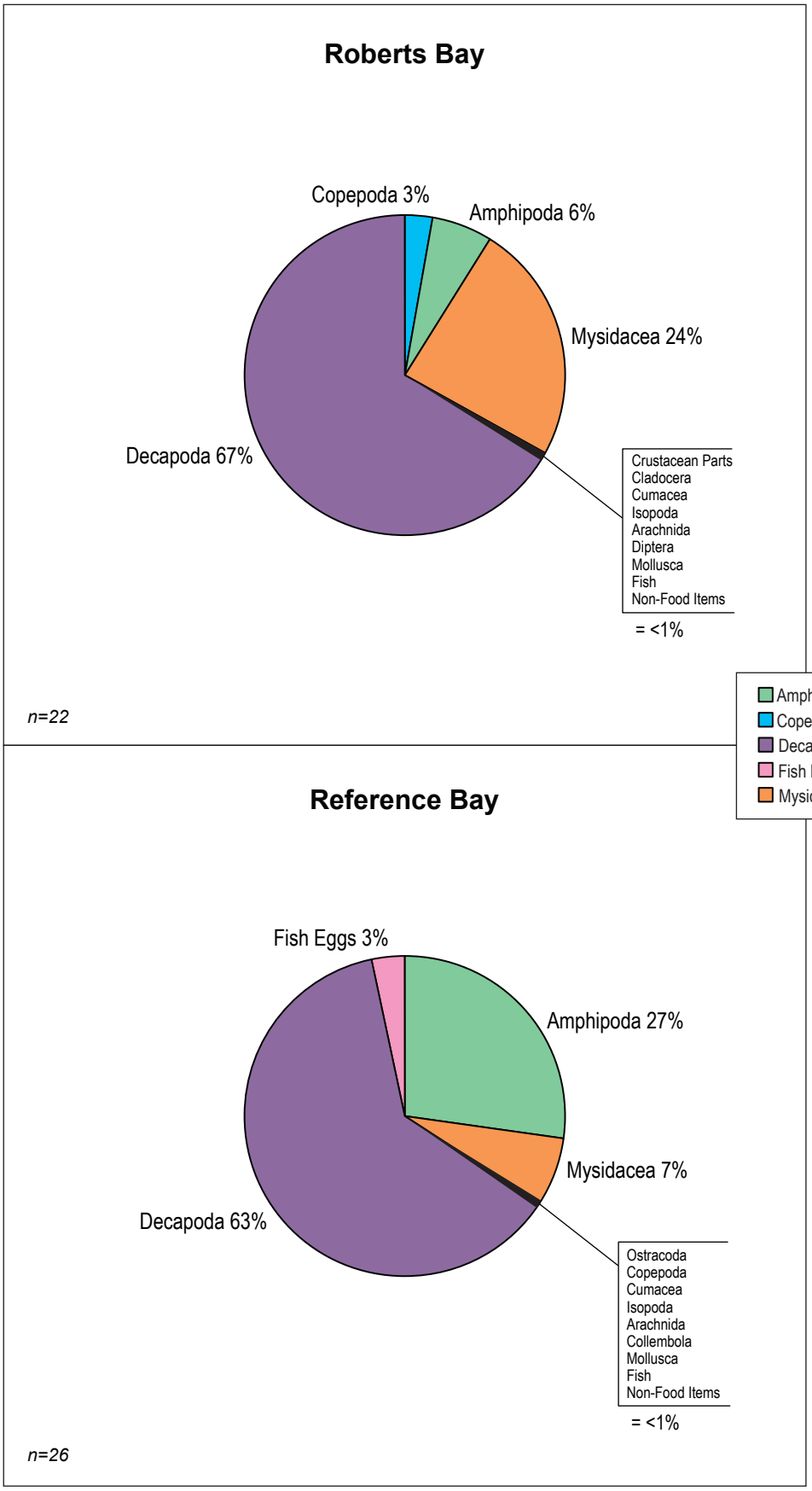

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Mean Taxonomic Composition of Pacific Herring Stomach Contents by Number for Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

Figure 3.2-20

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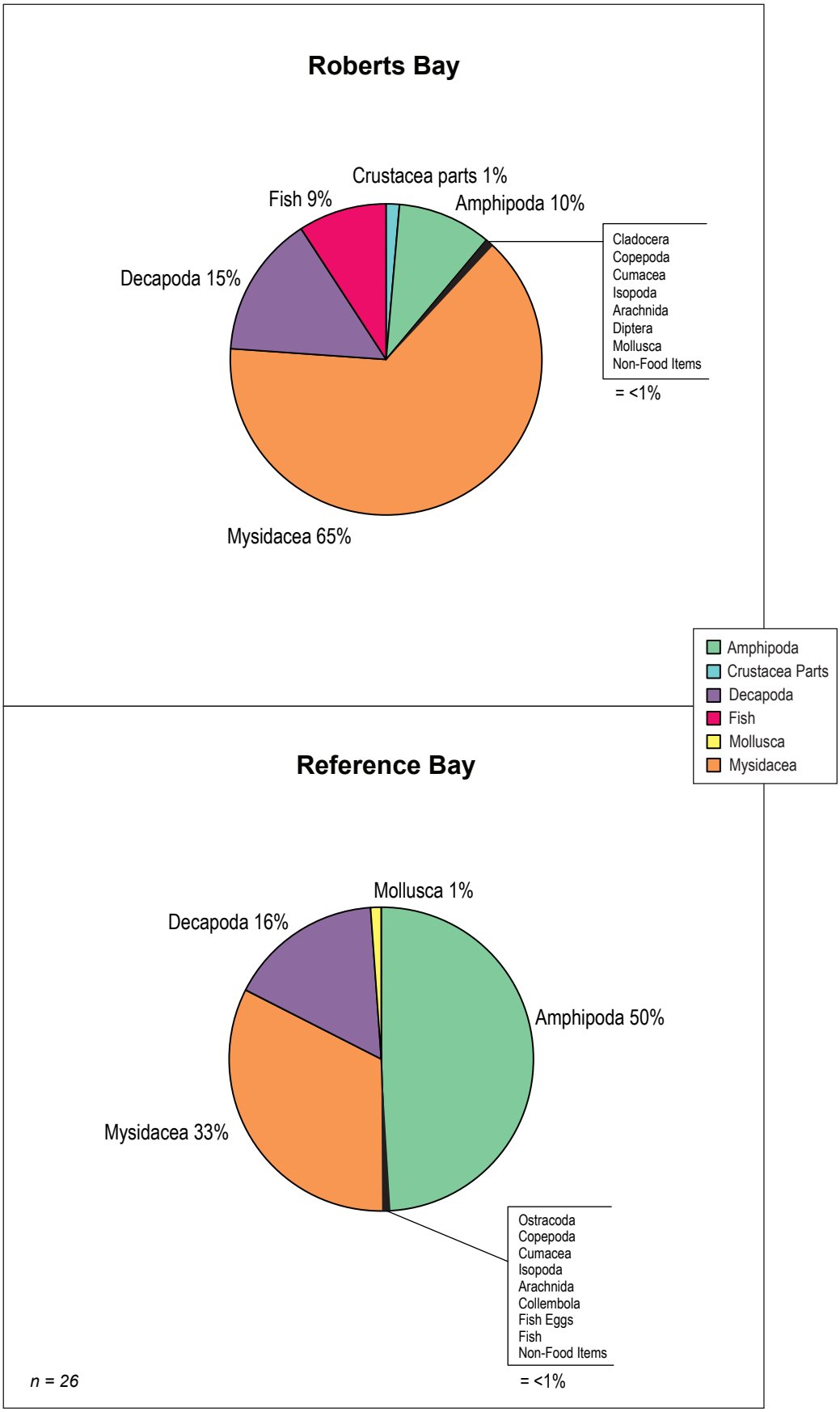

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Mean Taxonomic Composition of Pacific Herring Stomach Contents by Weight for Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

Figure 3.2-21

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Pacific herring prey diet by weight showed similar results with respect to dominant prey items although the order of importance shifted (Figure 3.2-21). Differences in diet composition between numbers and biomass were due to differences in the mean body weight of prey. In Roberts Bay, Mysidacea, Decapoda and Amphipoda were the dominant prey items by weight, followed by fish and unidentifiable crustacean parts (in decreasing order of importance). In Reference Bay, Amphipoda, Mysidacea, Decapoda and Mollusca were the dominant prey items by weight, in decreasing order of importance. Fish species identified in the stomachs of Pacific herring captured in Roberts Bay included representatives from the Family Agonidae (Atlantic poacher) and unknown juveniles; the former were not captured during 2009 fish community surveys in Roberts Bay. In Reference Bay, fish found in the stomachs of Pacific herring included representatives from the Family Gadidae and unknown juveniles. Although cod were commonly found in Roberts Bay during the 2009 fish community survey, none were captured in Reference Bay.

In addition to the Pacific herring stomachs assessed for diet, one stomach sample from an Arctic char captured in late August as part of the Doris North Authorization Monitoring Program (Rescan 2009) was assessed for diet. Fish, specifically capelin, were the only prey item found in the stomach of the Arctic char. During the fish community survey, capelin were only captured during the early sampling period and in very low numbers (n = 9).

3.3 MACROBENTHOS COMMUNITY

Data on the location, setting and retrieval times, and summary catch for macrobenthos are presented in Appendices 3.2-1 to 3.2-6. Biological data for macrobenthos sampled in Roberts Bay and Reference Bay are presented in Appendix 3.3-1. Only community composition was assessed for macrobenthos because the sample size was too low for further analysis.

Macrobenthos belonging to six different taxa were captured at the two sampling locations. Representatives included: Asteroidea, Bivalvia, Isopoda, Echinoidea, Gatropoda and Decapoda (Plates 3.3-1 to 3.3-6). Although jellyfish were not actively sampled, they were frequently observed in the waters of both Roberts Bay and Reference Bay during the late sampling period; none were observed during the early sampling period (Plate 3.3-7).

A total of 151 macrobenthos were captured in Roberts Bay and 46 macrobenthos in Reference Bay (Figure 3.3-1). Diversity was highest at the proposed port site in Roberts Bay where a representative from each taxon was captured. Five different taxa of macrobenthos were captured in Reference Bay and only two at the proposed barge site in Roberts Bay.

Macrobenthos catch varied between sites but was similar between sampling periods. At the proposed barge site, only one isopod was captured during the early sampling period (Figure 3.3-1). During the late sampling period, eight organisms from two taxa were captured with snails (88%) being the dominant catch.

At the proposed port site in Roberts Bay, a total of 60 macrobenthos from four taxa were captured during the early sampling period with sea stars (52%) and snails (37%) dominating the catch (Figure 3.3-1). During the late sampling period, a total of 82 macrobenthos from five taxa were captured. Sea urchin (50%) dominated the catch.

In Reference Bay, a total of 21 macrobenthos from five taxa were captured during the early sampling period and 25 macrobenthos from four taxa were captured during the late sampling period (Figure 3.3-1). Sea stars (62%) and crabs (56%) dominated the catch during early and late sampling periods,

respectively. Snails that were captured at the Reference Port during the late sampling period were sheathed in anemones (Plate 3.3-8).

In general, the proposed port site in Roberts Bay had the most diverse macrobenthos community, followed by Reference Bay. Macrobenthos were sparse at the proposed barge site in Roberts Bay. Differences observed between the two potential marine infrastructure sites in Roberts Bay may be due to differences in water depths and substrate type with the proposed port site being deeper and having mainly bedrock as substrate while the proposed barge site is composed mainly of fines.

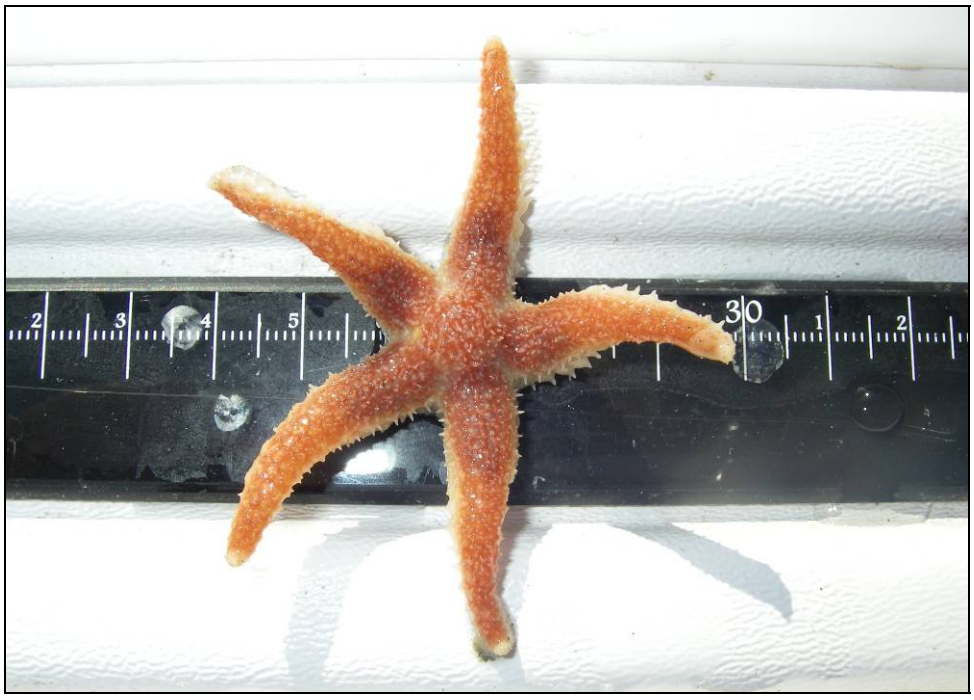


Plate 3.3-1. A sea star (Class Asteroidea) captured in Roberts Bay, Hope Bay Belt Project, 2009.

Plate 3.3-2. A clam (left) and mussel (right) (Class Bivalvia) captured in Roberts Bay, Hope Bay Belt Project, 2009.

Plate 3.3-3. An isopod (Order Isopoda) captured in Roberts Bay, Hope Bay Belt Project, 2009.

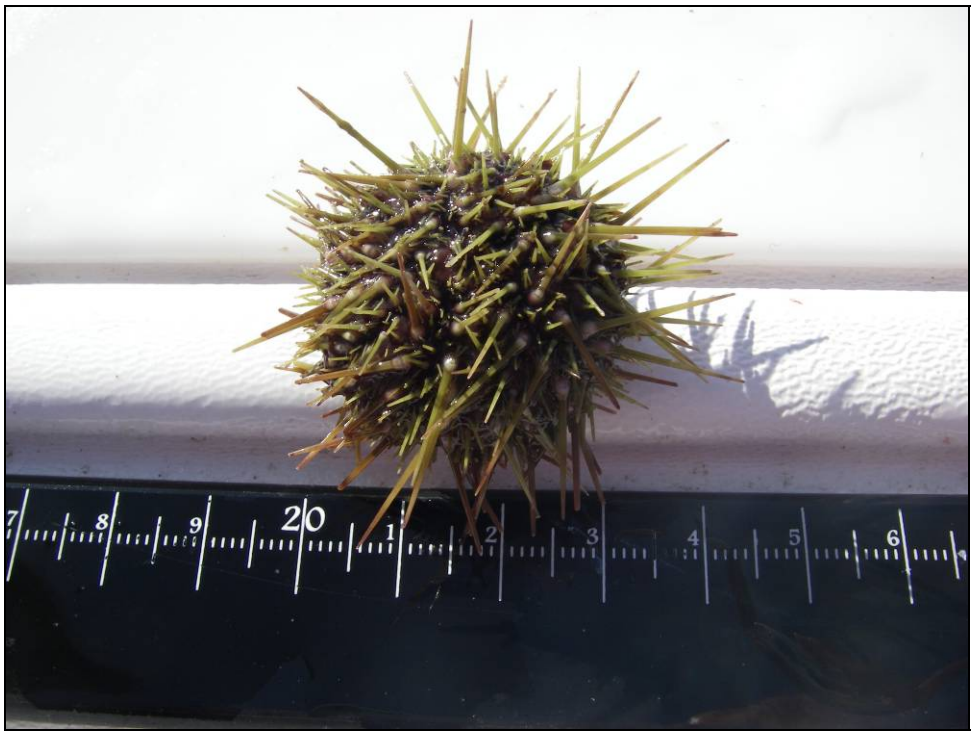


Plate 3.3-4. A sea urchin (Class Echinoidea) captured in Roberts Bay, Hope Bay Belt Project, 2009.

Plate 3.3-5. Snails (Class Gastropoda) captured in Roberts Bay, Hope Bay Belt Project, 2009.

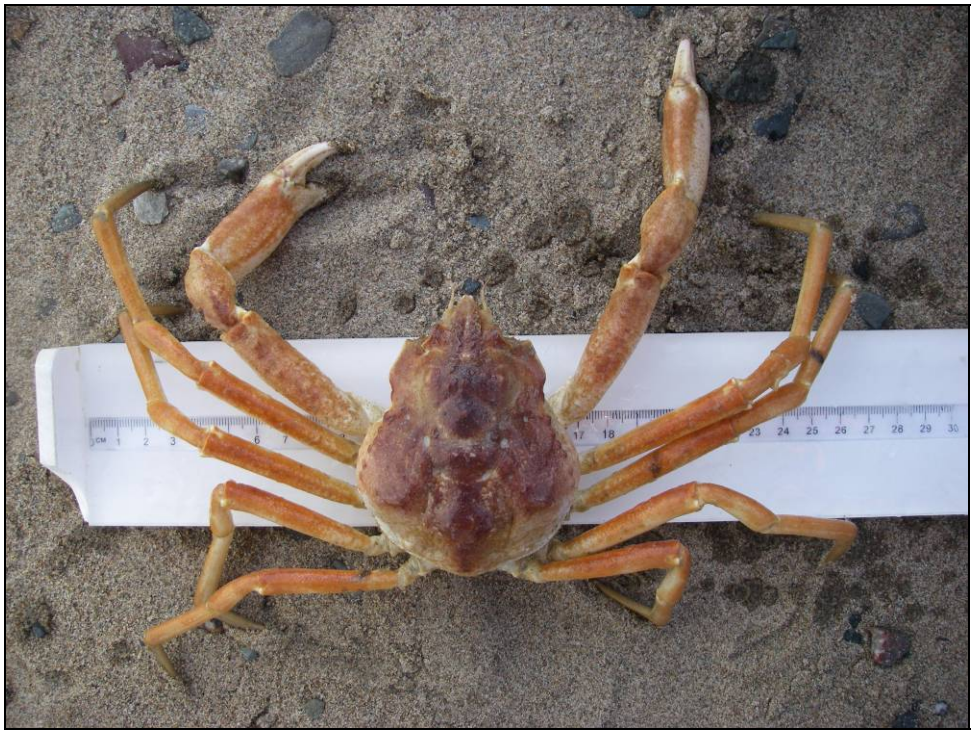
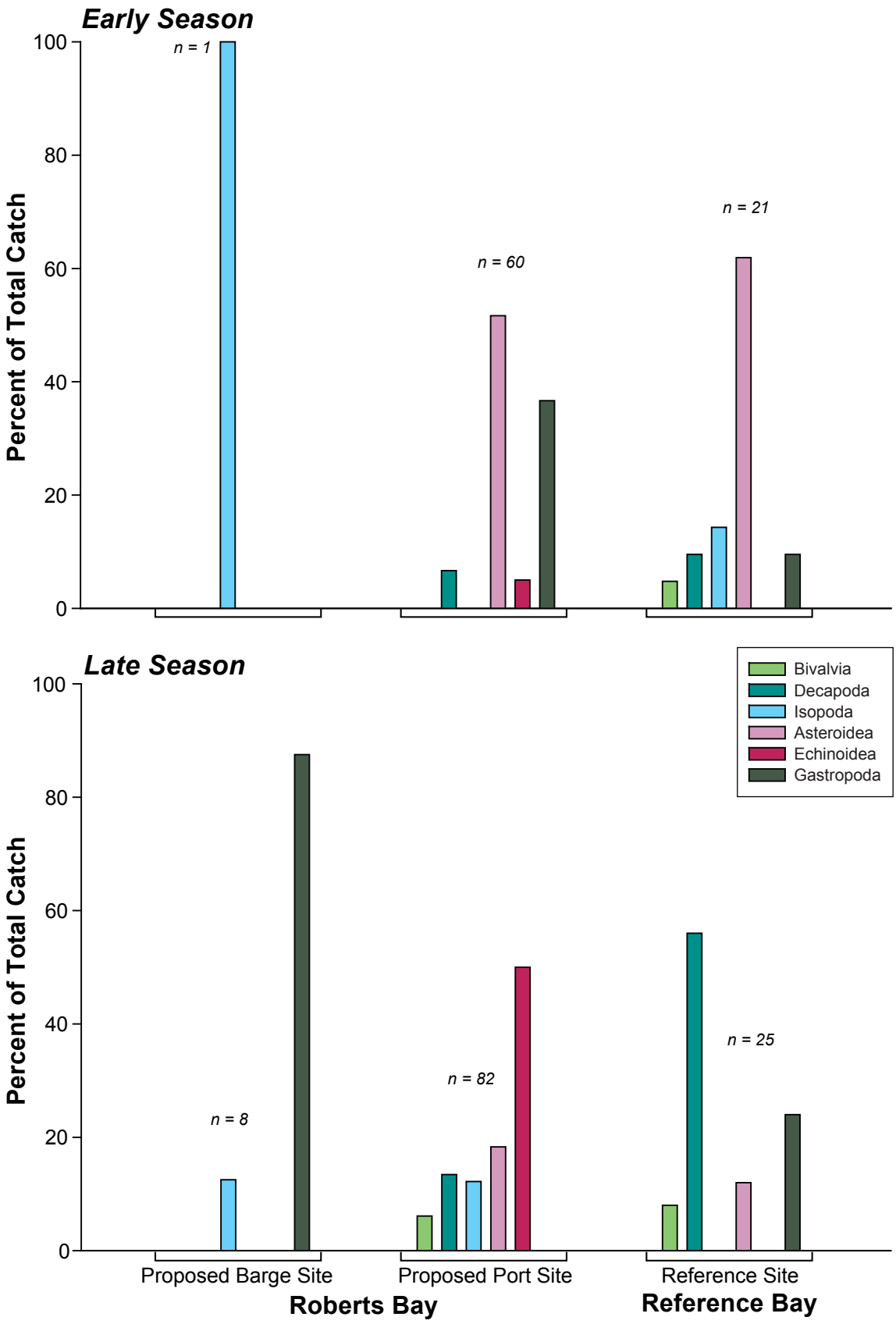


Plate 3.3-6. A crab (Order Decapoda) captured in Reference Bay, Hope Bay Belt Project, 2009.

Plate 3.3-7. Jellyfish observed in Reference Bay, Hope Bay Belt Project, 2009.

Plate 3.3-8. Snails with anemone attached captured in Reference Bay, Hope Bay Belt Project, 2009.



Note: n = total number of macrobenthos.

Percent Composition of Macrobenthos Captured in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

Figure 3.3-1

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4. Historical Trends

4. Historical Trends

4.1 INTRODUCTION

Several years of marine fish and fish habitat data have been collected from Roberts Bay and the surrounding area since 2000. The purpose of this section is to compare the data collected during 2009 to that collected in previous years. Data presented for 2009 includes fish captured as part of the baseline study (this report) and the Doris North Fisheries Authorization Monitoring Program (Rescan 2009).

Various types of data have been collected in Roberts Bay, including fish habitat, bathymetry, water quality, sediment quality, and fish community data. Most of the fishing effort from 2002 to 2007 focused on collecting fish community information from the mouth of Little Roberts Outflow and from the jetty location. In 2009, fishing effort in Roberts Bay focused on two potential marine infrastructure sites for the baseline study and the jetty and compensation shoals for the Doris North Fisheries Authorization Monitoring Program. In addition, a reference site and references shoals were sampled as part of the two programs in 2009. No reference sites were used prior to 2009, therefore only data collected in Roberts Bay is included in the historical comparisons. Some data can not be compared among years due to differences in the method of data collection.

4.2 YEARLY SUMMARIES

4.2.1 Sample Locations, Timing and Effort

Table 4.2-1 present a summary of the dates and methods of sample collection for each year since 2002.

The first marine data was collected in 2000 and consisted of a detailed shoreline habitat assessment of Roberts Bay (Rescan 2001). No marine fish sampling was conducted in 2000.

Marine fish community sampling started in 2002 and was initially conducted using fyke nets set perpendicular to the shoreline in Roberts Bay near the Roberts Lake Outflow (RL&L/Golder 2003a). Saffron cod was the predominant species captured (117 fish), followed by Greenland cod (16 fish). Single specimens of Arctic char, fourhorn sculpin (*Myoxocephalus quadricornis*) and banded gunnel (*Pholis fasciata*) were also captured. Sampling occurred over a period of seven days from August 27 to September 2.

In 2003, the marine fish community was sampled with a combination of fyke nets and gillnets (RL&L/Golder 2003b). Sampling was conducted over five days (July 24 to 28), and over August 9 to 29. Fyke nets were set in two locations in Roberts Bay: at the proposed jetty site and at the outflow from Little Roberts Lake. The fyke nets were set approximately 30 m off shore. Gillnets were set throughout Roberts Bay, using mostly sinking nets with variable mesh sizes. The nets measured 15.1 m by 1.5 m and the mesh size ranged from 19 mm to 102 mm. One larger mesh gillnet was also used for four sets. This gillnet had a mesh size of 89 mm and measured 15.1 m by 1.5 m. Capelin were the predominant species captured (2,627 fish), followed by saffron cod (1,715 fish). Other fish species captured included Arctic char, lake trout, cisco (*Coregonus artedi),* least cisco *(Coregonus sardinella),* Arctic flounder, Greenland cod, capelin, fourhorn sculpin, longhead dab and Pacific herring.

Table 4.2-1. Sampling Dates and Methods Used in Roberts Bay from 2002 to 2009

Sample Method	Year						
	2002 August 27 to September 2	2003 July 24 to 28 August 9 to 29	2004 August 20 to 21	2005 August 8 to 12	2006 July 10 to 12	2007 July 12 to 17	2009 August 21 to September 5
Sinking Gillnet	-	• multiple panels (not specified), each 15.1 x 1.5 m • variable mesh, 19 - 109 mm • throughout Roberts Bay	-	-	-	-	• 6 panels, totalling 91.2 x 2.4 m • variable mesh, 25 - 89 mm • Roberts Bay (including two potential marine infrastructure sites; jetty and compensation shoals), Reference Bay (including reference site and shoals)
Floating Gillnet	-	-	-	-	-	-	• 6 panels 91.2 x 2.4 m • variable mesh, 25 - 89 mm • Roberts Bay (including two potential marine infrastructure sites; jetty and compensation shoals), Reference Bay (including reference site and shoals)
Beach Seine	-	-	• In Roberts Bay at Little Roberts Outflow	• proposed jetty	-	-	• marine shoreline • Roberts Bay, Reference Bay
Minnow Trap	-	-	-	-	-	-	• marine shoreline and rock structures (jetty and shoals) • Roberts Bay (including two potential marine infrastructure sites; jetty and compensation shoals), Reference Bay (including reference site and shoals)
Angling	-	-	-	• throughout Roberts Bay	-	-	-
Fyke Net	• in Roberts Bay at Little Roberts Outflow	• proposed jetty • in Roberts Bay at Little Roberts Outflow	• in Roberts Bay at Little Roberts Outflow	• proposed jetty	• proposed jetty	• proposed jetty	-
Crab Trap	-	-	-	-	-	-	• marine fish and benthos • Roberts Bay (including two potential marine infrastructure sites; jetty and compensation shoals), Reference Bay (including reference site and shoals)
Visual Observation	-	-	-	-	-	-	• snorkel surveys • Roberts Bay (including jetty and compensation shoals), Reference Bay (including shoals)
Long Line	-	-	-	-	-	-	• floating/sinking combination line • Roberts Bay (including two potential marine infrastructure sites; jetty and compensation shoals), Reference Bay (including reference site and shoals)

In 2004, the fish community in Roberts Bay was assessed using fyke nets and beach seines (Golder 2005). One fyke net was set at the Little Roberts Outflow to collect fish migrating into and out of the Roberts Lake system. Beach seining was also conducted in the vicinity of the Little Roberts Outflow with a beach seine measuring 6 m in length with 5 mm mesh. Two saffron cod and one rainbow smelt (*Osmerus mordax)* were captured using fyke nets and beach seines, respectively. Only two days of sampling effort were expended from August 20 to 21.

Roberts Bay was sampled using fyke nets, angling and beach seining in 2005 (Golder 2006). All sampling was conducted in the vicinity of the Roberts Lake Outflow. Five days of sampling effort were expended from August 8 to 12. The dominant species in the catch was saffron cod (2,301 fish), followed by Arctic flounder (119 fish). The remaining catch (20 fish) was composed of Arctic char, fourhorn sculpin, lake trout (*Salvelinus namaycush*), lake whitefish (*Coregonus clupeaformis*), Pacific herring and starry flounder. The collection of both marine species and freshwater species (e.g., lake trout and lake whitefish) suggests that the sampling location was under tidal influence.

Fyke nets were also used in 2006 to capture fish in the vicinity of the Little Roberts Outflow in Roberts Bay (Golder 2007). The fyke net was set up to catch fish travelling east or west along the shoreline of Roberts Bay near the proposed jetty site for the purpose of assessing the possible effect of the jetty on nearshore fish migration. Fyke nets were set up for three days from July 10 to 12. The dominant species captured was Arctic flounder (34 fish), followed by capelin (32 fish), lake trout (24 fish) and Arctic char (11 fish). Three Greenland cod and two fourhorn sculpins were also captured.

A fyke net was used to sample fish in the vicinity of the jetty site prior to construction from July 12 to 18 in 2007 (Golder 2008). The fyke net was set up to catch fish travelling east or west along the shoreline and was used to determine if capelin migrations had started prior to jetty construction. The dominant species in the catch was Arctic flounder (145 fish), followed by Pacific herring (54 fish), saffron cod (34 fish) and fourhorn sculpin (16 fish). The remainder of the catch was composed of lake trout (7 fish) and Arctic char (6 fish).

No marine fisheries studies were conducted in 2008.

In 2009, marine fish sampling was conducted at various locations within Roberts Bay including the proposed barge and port sites, four compensation shoals and the jetty. Sampling was conducted between July 29 and September 3. The fish community was sampled using floating and sinking gillnets, long lines, beach seines, minnow traps and crab traps. Overall, the dominant species in the catch was Pacific herring and sculpin (164 fish) followed by saffron cod (154 fish).

4.2.2 Catch-per-Unit-Effort

There was little overlap in the types of sampling methods used from 2002 to 2007 and in 2009. Gillnets were the only common sampling method used, but they could not be directly compared due to differences in mesh size and net size among years. Therefore, the following summary of gillnet effort and catch in 2003 and 2009 in Roberts Bay should not be used to make inferences about the relative abundance of species caught.

Sinking gillnets were used in 2003 and 2009 in Roberts Bay. In 2003, a combination of variable mesh, sinking gillnets and single panel, single mesh-size gillnets were used along the southern shoreline of Roberts Bay from the proposed jetty location to the mouth of Little Roberts Outflow. Sampling occurred in late July and from mid- to late-August. Total CPUE was calculated as 1.05 fish/100 m^2/24 h in the east basin (near Little Roberts Outflow), and 12.34 fish/100 m^2/24 h in the west basin (near the

proposed jetty) (RL&L/Golder 2003b). Saffron cod had the highest CPUE at both sites. In 2009, the sinking gillnets used had six panels ranging in mesh size from 25 mm to 89 mm.

Sampling in 2009 occurred between July 29 and September 3 and was focused on the proposed barge and port sites, four compensation shoals, and the jetty. Sinking gillnet CPUE in 2009 ranged from 6.25 fish/100 m^2/24 h to 97.48 fish/100 m^2/24 h and varied among locations. Generally, saffron cod were the most abundant species in the sinking gillnet catch. The higher gillnet CPUE in 2009 relative to 2003 could stem from differences in sampling locations, gillnet mesh sizes and timing of sampling.

Floating gillnets with measurement identical to the sinking nets were also used in 2009. CPUE for floating gillnets ranged from 3.65 fish/100 m^2/24 h to 376.28 fish/100 m^2/24 h. Generally, Pacific herring and Arctic char dominated the floating gillnet catch.

4.2.3 Fish Community

Table 4.2-2 presents a summary of the catch composition in each sampling year since 2002. Saffron cod have dominated the catch, making up 53% of the total number of fish captured in the marine environment since 2002. The next most common fish was capelin, which comprised 33% of the total catch, only due to the extremely high numbers (2,627 fish) captured in 2003.

Table 4.2-2. Marine Fish Community Composition in Catch Records from 2002 to 2009, Roberts Bay

	2002		2003		2004		2005		2006		2007		2009		Total	
Species	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Arctic char	1	0.7	25	0.6	0	0	8	0.3	11	10.4	6	2.3	58	9.1	**109**	1.3
Arctic flounder	0	0.0	112	2.5	0	0	119	4.9	34	32.1	145	55.1	11	1.7	**421**	5.2
Arctic shanny	0	0.0	0	0.0	0	0	0	0.0	0	0.0	0	0.0	5	0.8	**5**	0.1
Banded gunnel	1	0.7	0	0.0	0	0	0	0.0	0	0.0	0	0.0	0	0.0	**1**	0.0
Capelin	0	0.0	2,627	57.9	0	0	0	0.0	32	30.2	0	0.0	9	1.4	**2,668**	32.8
Cisco	0	0.0	7	0.2	0	0	0	0.0	0	0.0	0	0.0	0	0.0	**7**	0.1
Flounder (unknown)	0	0.0	0	0.0	0	0	0	0.0	0	0.0	0	0.0	8	1.3	**8**	0.1
Greenland cod	16	11.8	3	0.1	0	0	0	0.0	3	2.8	0	0.0	44	6.9	**66**	0.8
Longhead dab	0	0.0	1	0.0	0	0	0	0.0	0	0.0	0	0.0	5	0.8	**6**	0.1
Lake trout	0	0.0	14	0.3	0	0	3	0.1	24	22.6	7	2.7	3	0.5	**51**	0.6
Lake whitefish	0	0.0	0	0.0	0	0	2	0.1	0	0.0	0	0.0	0	0.0	**2**	0.0
Least cisco	0	0.0	2	0.0	0	0	0	0.0	0	0.0	0	0.0	0	0.0	**2**	0.0
Ninespine stickleback	0	0.0	0	0.0	0	0	0	0.0	0	0.0	0	0.0	4	0.6	**4**	0.0
Pacific herring	0	0.0	6	0.1	0	0	5	0.2	0	0.0	54	20.5	164	25.7	**229**	2.8
Rainbow smelt	0	0.0	0	0.0	1	33	0	0.0	0	0.0	0	0.0	0	0.0	**1**	0.0
Saffron cod	117	86.0	1,715	37.8	2	67	2,301	94.2	0	0.0	35	13.3	154	24.1	**4,324**	53.2
Sculpin	1	0.7	22	0.5	0	0	1	0.0	2	1.9	16	6.1	164	25.7	**206**	2.5
Starry flounder	0	0.0	0	0.0	0	0	3	0.1	0	0.0	0	0.0	9	1.4	**12**	0.1
Total	**136**	100	**4,534**	100	**3**	100	**2,442**	100	**106**	100	**263**	100	**638**	100	**8,122**	**100**

Note:
The group sculpin includes fish from the genus Myoxocephalus sp.
2009 data only includes fish captured in Roberts Bay as part of the Doris North Authorization Monitoring Program (Rescan 2009) and baseline studies (this report). Fish captured in Reference Bay are not included.

4.2.3.1 Arctic Char

Arctic char were captured in all years except 2004 and comprised between 0.3% and 10.4% of the total catch. Figure 4.2-1 shows an inter-annual comparison of Arctic char length from 2002 to 2009. Length-frequency distributions are presented in Figure 4.2-2.

4.2.3.2 Arctic Flounder

Arctic flounder were captured in most years, except 2002 and 2004, and comprised between 1.7% and 55.1% of the total catch in each year. An inter-annual comparison of Arctic flounder lengths and conditions is presented in Figure 4.2-3. A length-frequency distribution reveals that no fish were caught from larger size classes in 2009, likely because fyke nets were not used (Figure 4.2-4).

4.2.3.3 Sculpin

Sculpin were captured in all years except 2004; however, fewer than three fish were captured in 2002, 2005 and 2006. An inter-annual comparison of sculpin lengths and conditions is presented in Figure 4.2-5. There were no discernible patterns in the length-frequency distributions, likely due to different sampling techniques used (Figure 4.2-6).

4.2.3.4 Saffron Cod

Saffron cod were the most abundant species captured in most years in Roberts Bay, comprising up to 94.2% of the catch. They were captured in all years except 2006. Extremely high numbers of saffron cod were collected in 2003 and 2005, likely due to increased sampling effort. Lengths and conditions of saffron cod captured between 2002 and 2009 are presented in Figure 4.2-7. The length-frequency distributions showed that in 2009 few fish from smaller size classes were captured, likely due to the fact that most cod were captured in gillnets with larger mesh sizes than were used historically (Figure 4.2-8). Prior to 2009, fyke nets (which have larger size limits than gillnets) were used extensively.

4.2.3.5 Greenland Cod

Greenland cod were captured in 2002, 2003, 2006 and 2009 and made up between 0.1% and 11.8% of the catch in the years they were sampled. Lengths and conditions of Greenland cod are presented in Figure 4.2-9. Length-frequency distributions of Greenland cod do not show any clear pattern, likely due to the small sample size in each year (Figure 4.2-10).

4.2.3.6 Pacific Herring

Pacific herring were captured in 2003, 2005, 2007 and 2009 and comprised between 0.1% and 25.7% of the catch in the years they were caught. In 2003 and 2009, all herring were captured in gillnets; whereas in 2005 and 2007, they were only captured in fyke nets. Herring captured in 2007 had lower mean lengths than herring captured in other years (Figure 4.2-11). This may indicate that the fyke net set near the proposed jetty in 2007 captured juvenile herring migrating along the shoreline rather than the adult herring generally captured in gillnets further from shore. The length-frequency distributions showed that in 2007, nearly all of the fish captured fell into one size class, supporting the idea that juvenile migration was sampled (Figure 4.2-12).

4.2.3.7 Other Species

Other species were not captured often enough or in high enough numbers to compare the data among years. These include Arctic shanny, banded gunnel, capelin, longhead dab, lake trout, lake whitefish, least cisco, cisco, starry flounder, ninespine stickleback and rainbow smelt. Capelin were

captured in extremely high numbers in 2003, but only sporadically after that. It is likely that the fyke nets caught a capelin spawning migration during the sampling period in that year. Lake trout were captured sporadically in the marine environment, and made up as much as 22.6% of the catch in 2006. Two lake whitefish were captured in 2005. These catches indicate either a strong tidal influence at the sampling sites or that some freshwater species such as lake trout and lake whitefish occasionally make excursions into coastal brackish water, perhaps in search of access to other freshwater systems.

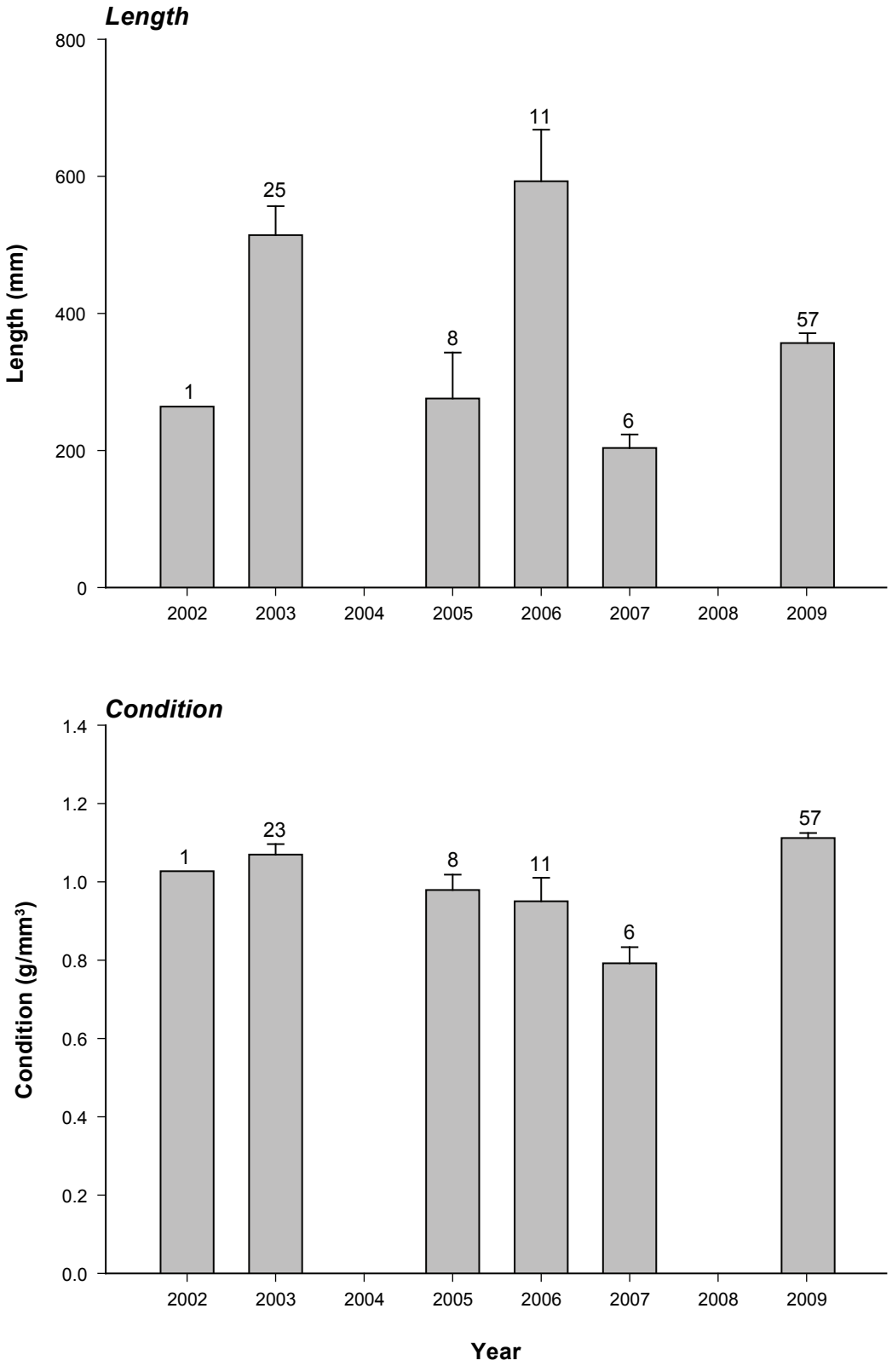
4.2.4 Fish Habitat

Fish habitat in Roberts Bay was surveyed from the air and from the ground in 2000 (Rescan 2001). Roberts Bay is dominated by cliffs up to 50 m in height at the northern and western areas of the bay. The eastern and southern areas of Roberts Bay are more gradually sloped and contain numerous lake drainages. While the cliff areas were generally devoid of terrestrial vegetation, the gently sloped valleys had lush growths of reeds, grasses and other vegetation. The shoreline substrate was classified mainly as bedrock in the northwest and south portions of Roberts Bay; however, gravel and sand were present in bays and at stream outlets. The eastern portion of the bay was dominated by boulder, gravel and sand substrate. The shoreline habitat quality of Roberts Bay ranged from fair (bedrock dominated northern areas) to excellent (Glenn and Little Roberts outflows in the southern area).

4.3 SUMMARY

There appears to be few differences in fish size or health that could be not explained by differing sample methodologies, sample locations, or sample timing among years from 2002 to 2009. The abundance of fish and number of species captured increased predictably with increasing effort. Saffron cod tended to be the most abundant species captured in most years. Capelin and herring migrations were captured in 2003 and 2007, boosting the numbers of those fish; however, the high abundance of these species was not repeated in other years. Sampling in 2009 caught more pelagic and bentho-pelagic species than in previous year (*i.e.,* herring, char). This is likely because more sampling effort was expended with gillnets in off-shore areas than in previous years, when sampling focused on capturing species near the shoreline. Sampling in 2009 also caught a variety of invertebrate species such as crabs, sea urchins and isopods that were not included in this historical section.

The fyke nets used from 2002 to 2007 were designed to capture fish migrating along the shoreline, and some directionality was observed with regard to the species and numbers of fish captured. These methods were used to identify species that migrated past the proposed jetty site and up into Little Roberts Outflow. Conversely, sampling in 2009 did not take into account migration patterns, and fish captured were considered to be resident to the area.



Note: Numbers above bars indicate sample size.
Error bars represent one standard error of the mean.
No marine fisheries studies were conducted in 2008.

NEWMONT NORTH AMERICA

Mean Lengths and Condition of Arctic Char Captured in Roberts Bay from 2002 to 2009

Figure 4.2-1

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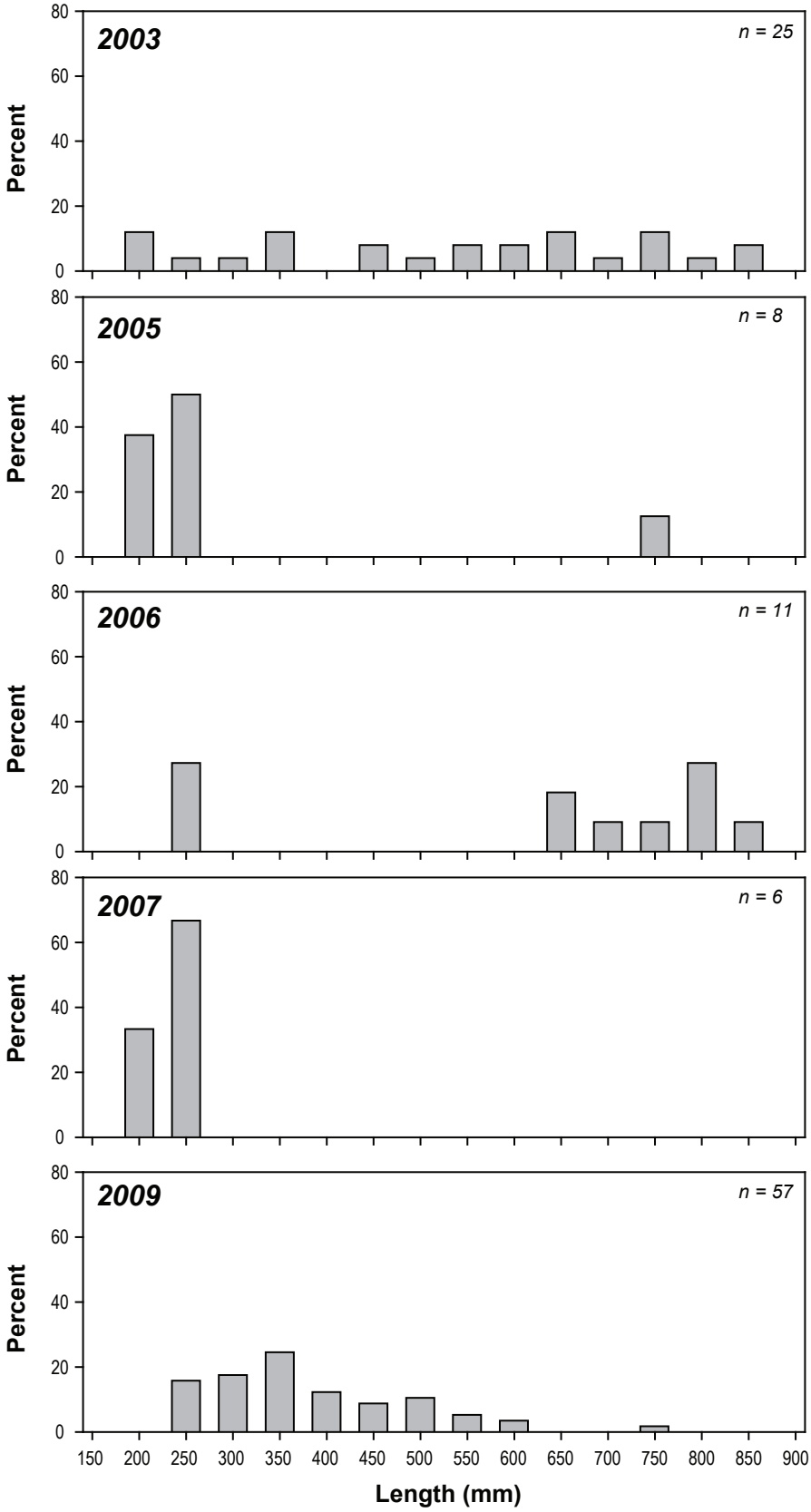

Figure 4.2-2

Length-Frequency Distributions of Arctic Char Captured in Roberts Bay from 2002 to 2009

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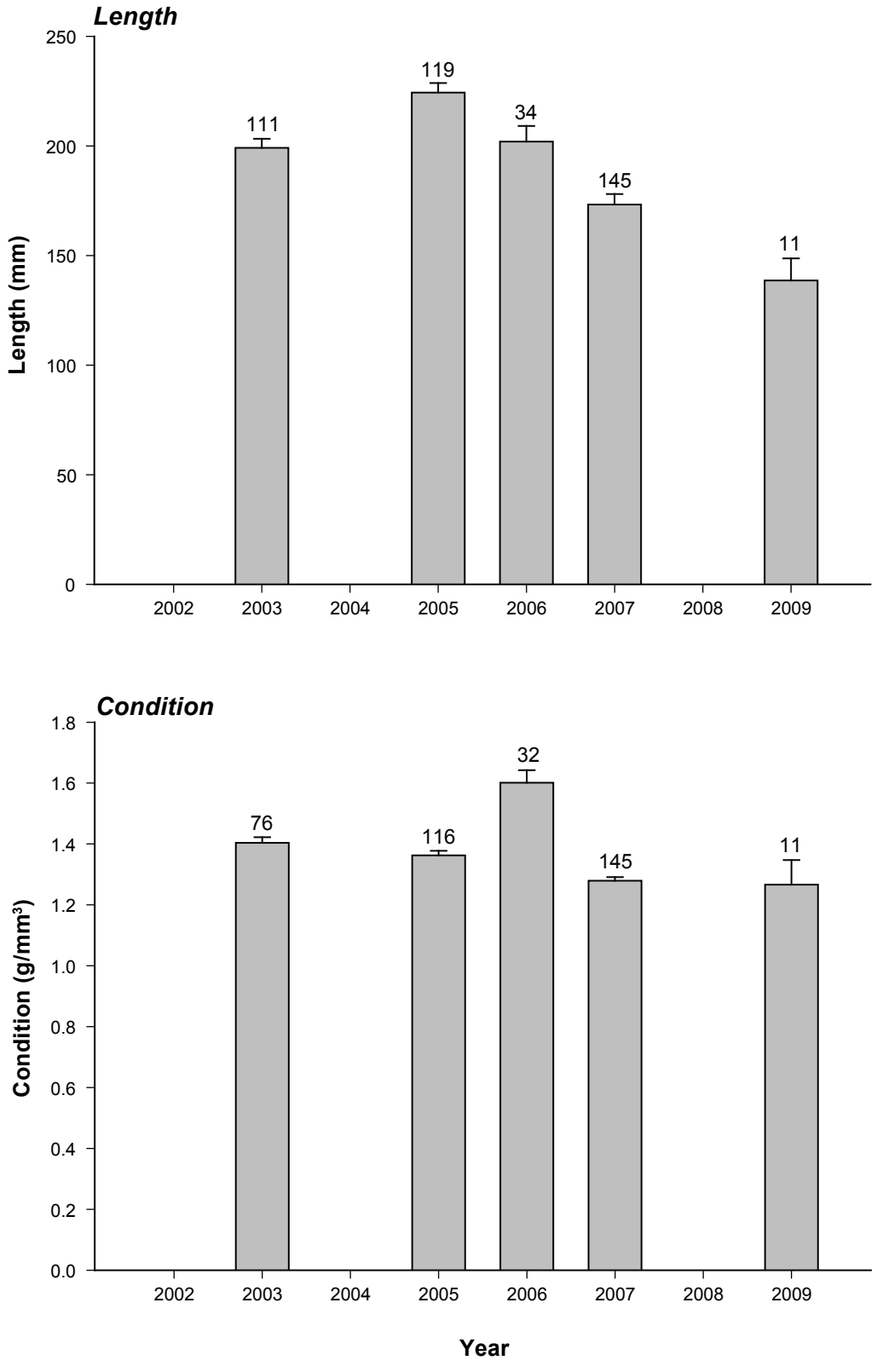

Note: Numbers above bars indicate sample size.
Error bars represent one standard error of the mean.
No marine fisheries studies were conducted in 2008.

NEWMONT NORTH AMERICA

Mean Lengths and Condition of Arctic Flounder Captured in Roberts Bay from 2002 to 2009

Figure 4.2-3

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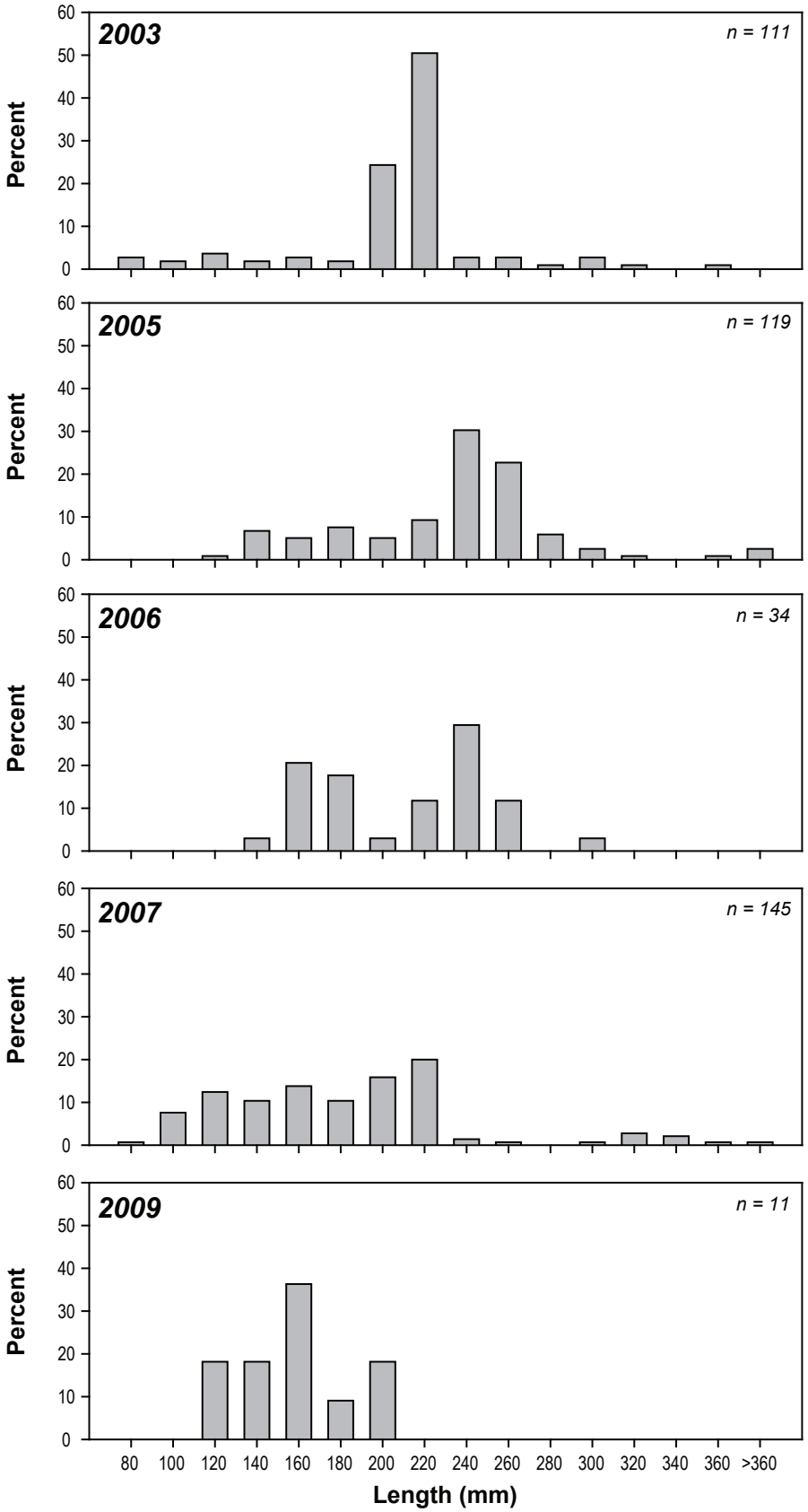

NEWMONT NORTH AMERICA

Length-Frequency Distributions of Arctic Flounder Captured in Roberts Bay from 2002 to 2009

Figure 4.2-4

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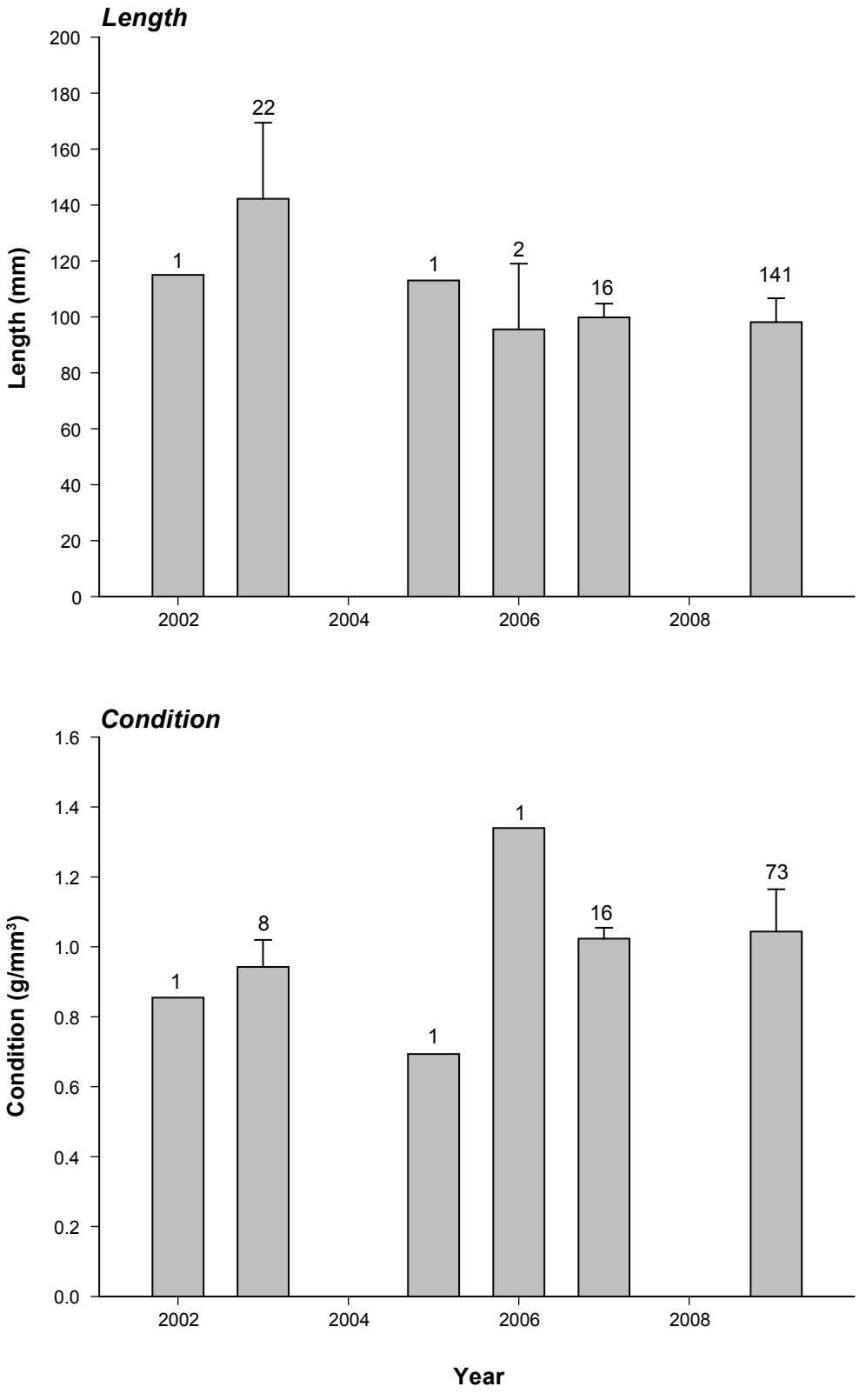

Note: Numbers above bars indicate sample size.
Error bars represent one standard error of the mean.
No marine fisheries studies were conducted in 2008.

NEWMONT NORTH AMERICA

Mean Lengths and Condition of Sculpin Captured in Roberts Bay from 2002 to 2009

Figure 4.2-5

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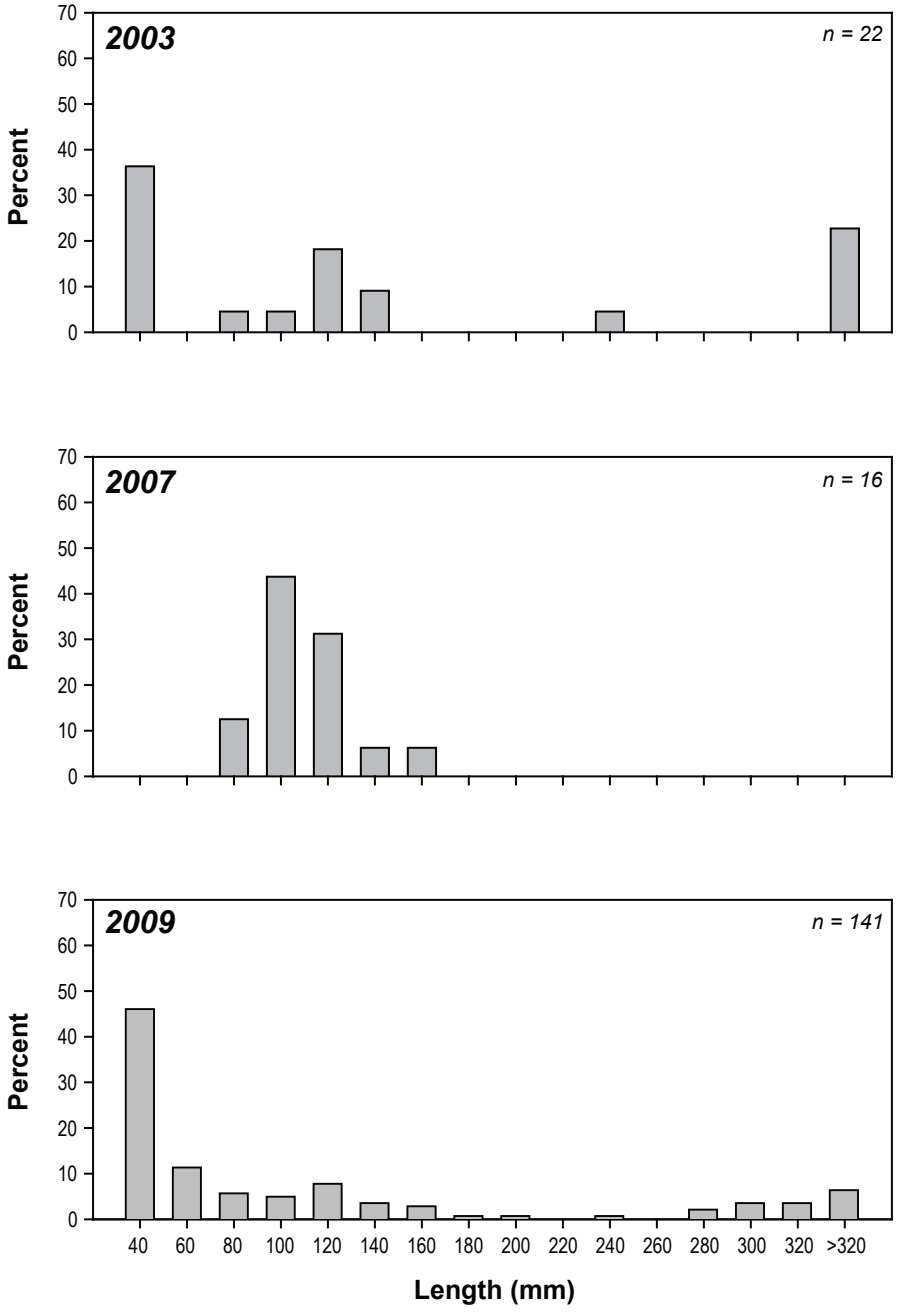

Figure 4.2-6

Length-Frequency Distributions of Sculpin Captured in Roberts Bay from 2002 to 2009

NEWMONT NORTH AMERICA

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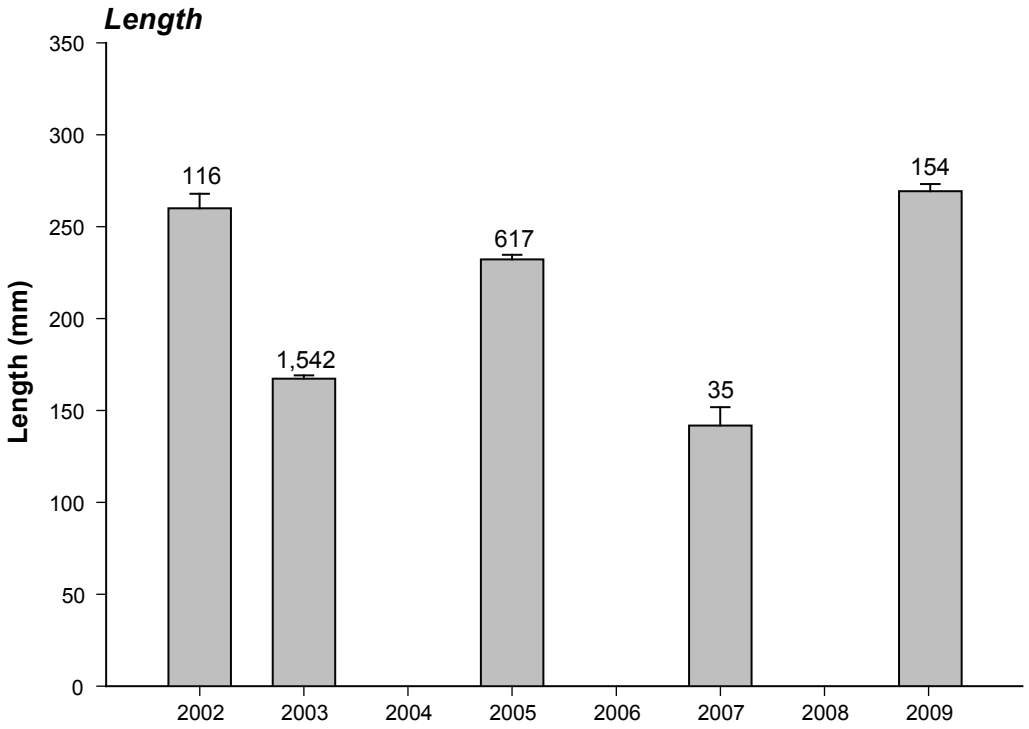

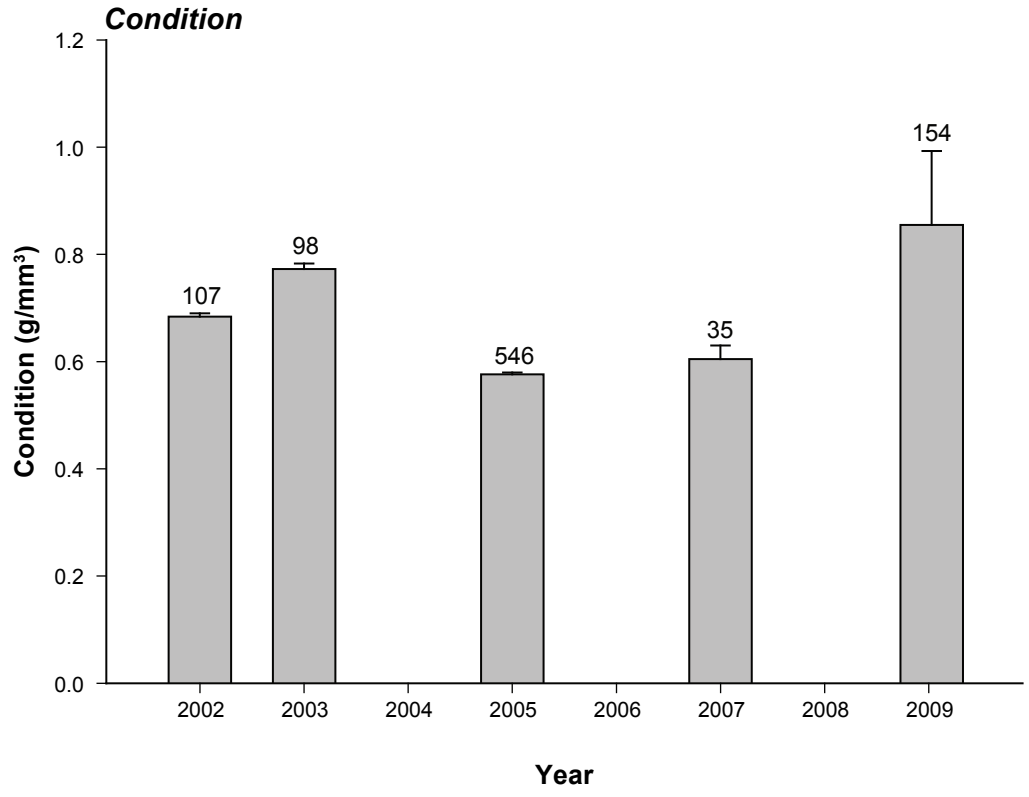

Note: Numbers above bars indicate sample size.
Error bars represent one standard error of the mean.
No marine fisheries studies were conducted in 2008.

NEWMONT NORTH AMERICA

Mean Lengths and Condition of Saffron Cod Captured in Roberts Bay from 2002 to 2009

Figure 4.2-7

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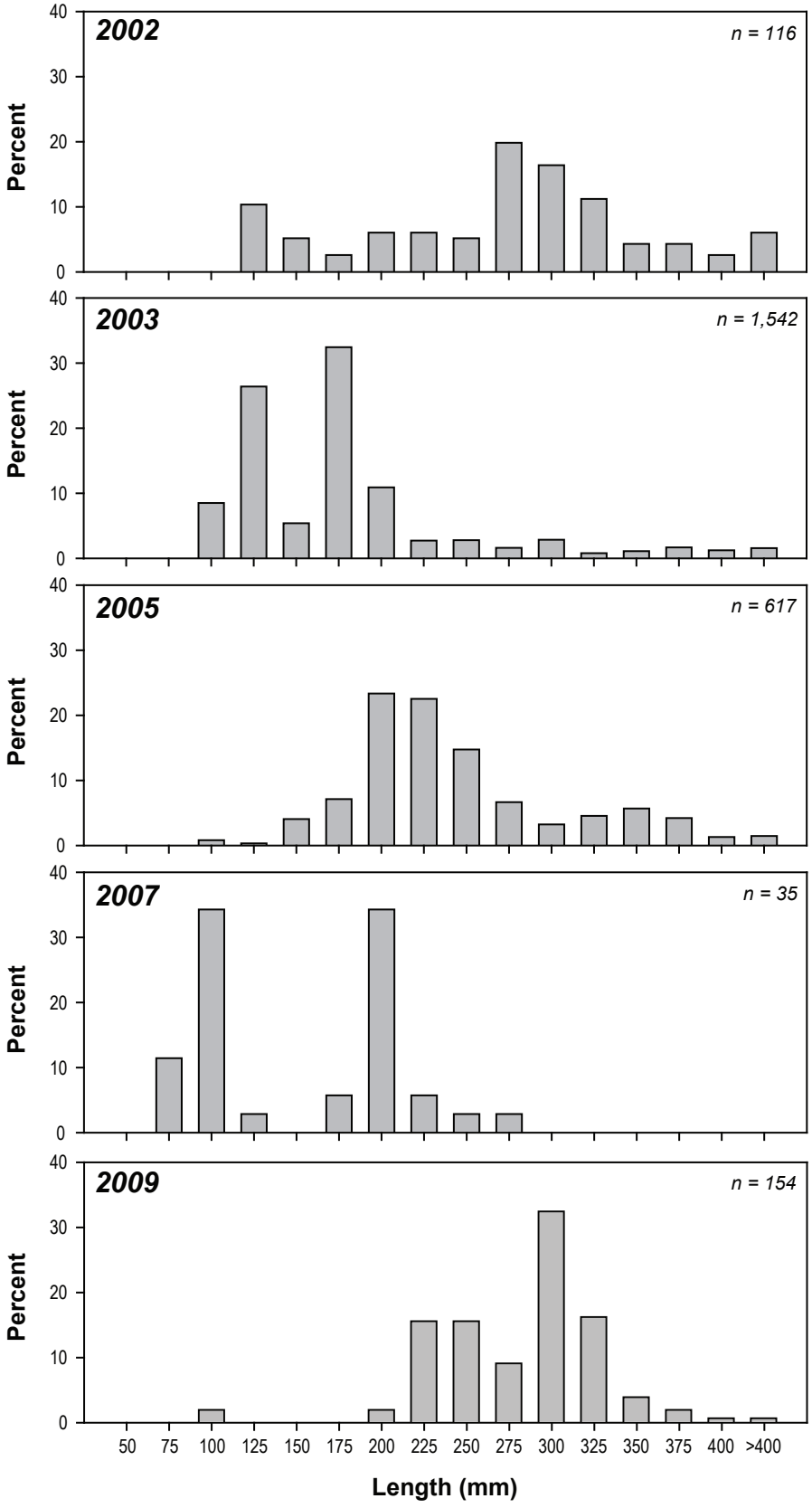
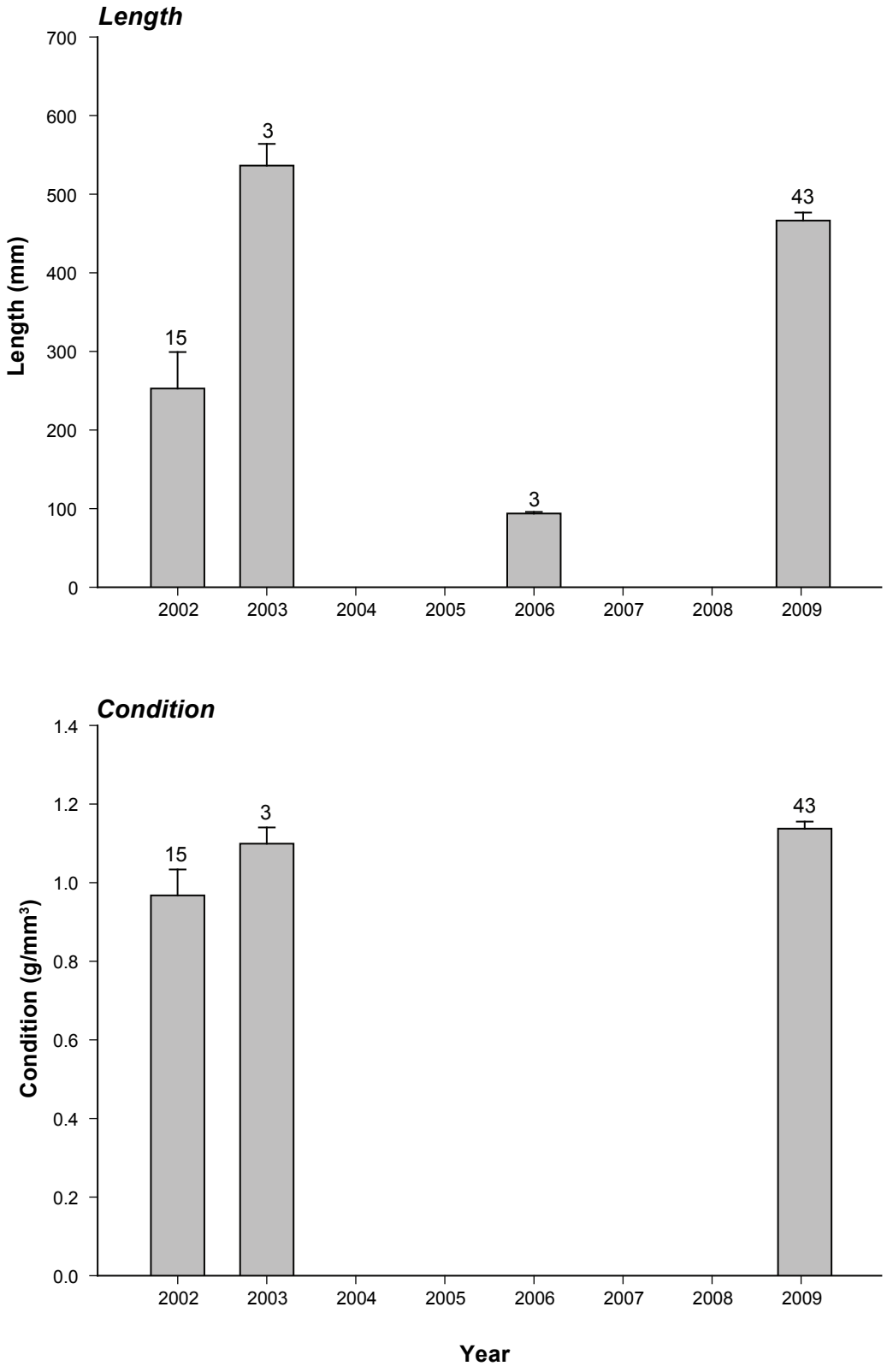


NEWMONT NORTH AMERICA

Length-Frequency Distributions of Saffron Cod Captured in Roberts Bay from 2002 to 2009

Figure 4.2-8

Rescan™ Engineers & Scientists



Note: Numbers above bars indicate sample size.
Error bars represent one standard error of the mean.
No marine fisheries studies were conducted in 2008.

NEWMONT NORTH AMERICA

Mean Lengths and Condition of Greenland Cod Captured in Roberts Bay from 2002 to 2009

Figure 4.2-9

Rescan™ Engineers & Scientists

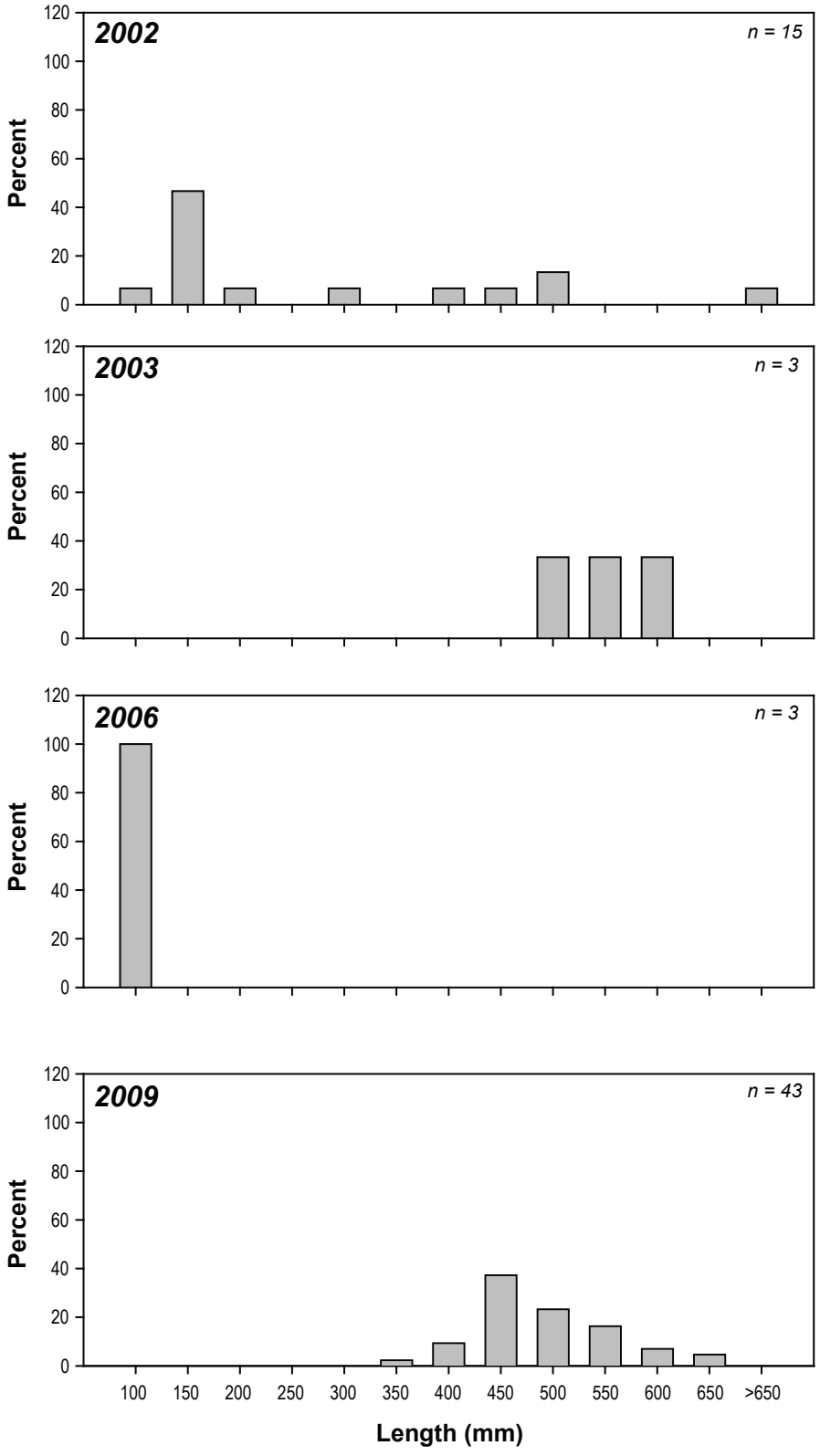
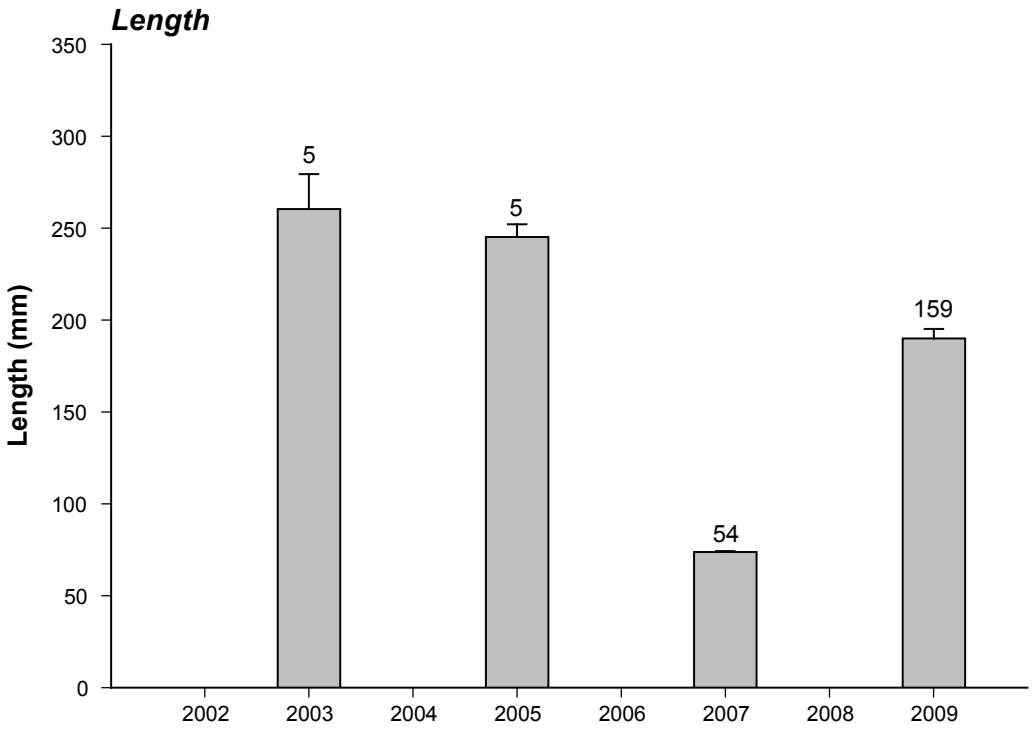


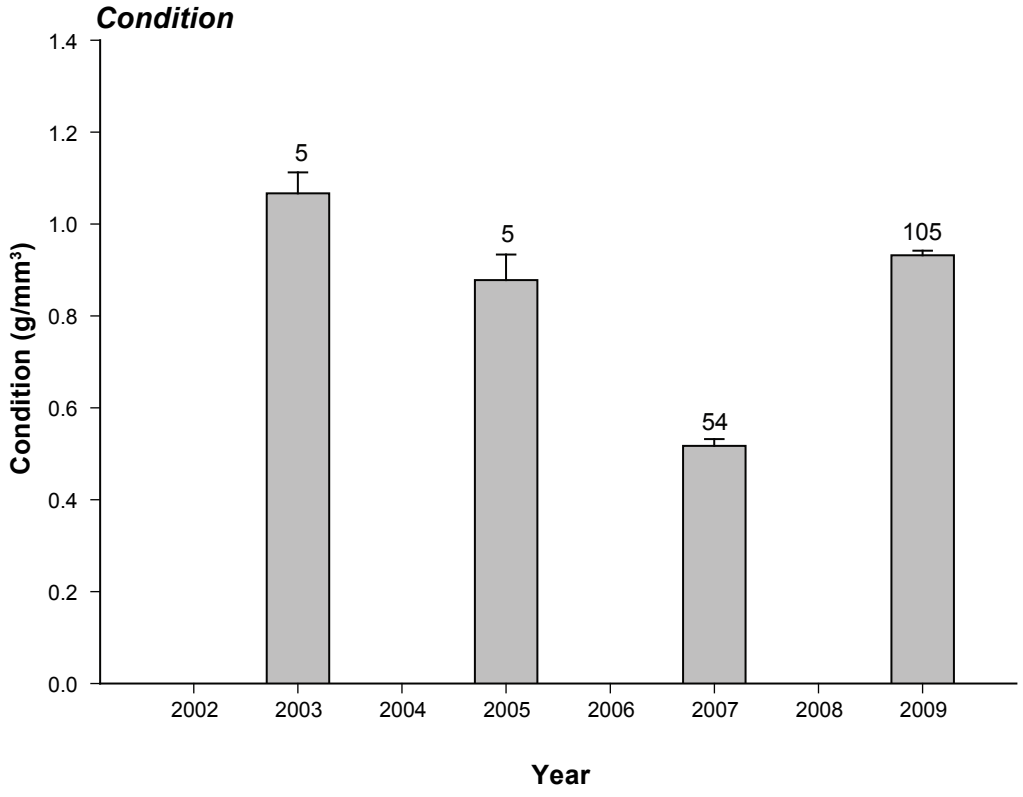
Figure 4.2-10

Length-Frequency Distributions of Greenland Cod Captured in Roberts Bay from 2002 to 2009

NEWMONT NORTH AMERICA

Rescan™ Engineers & Scientists





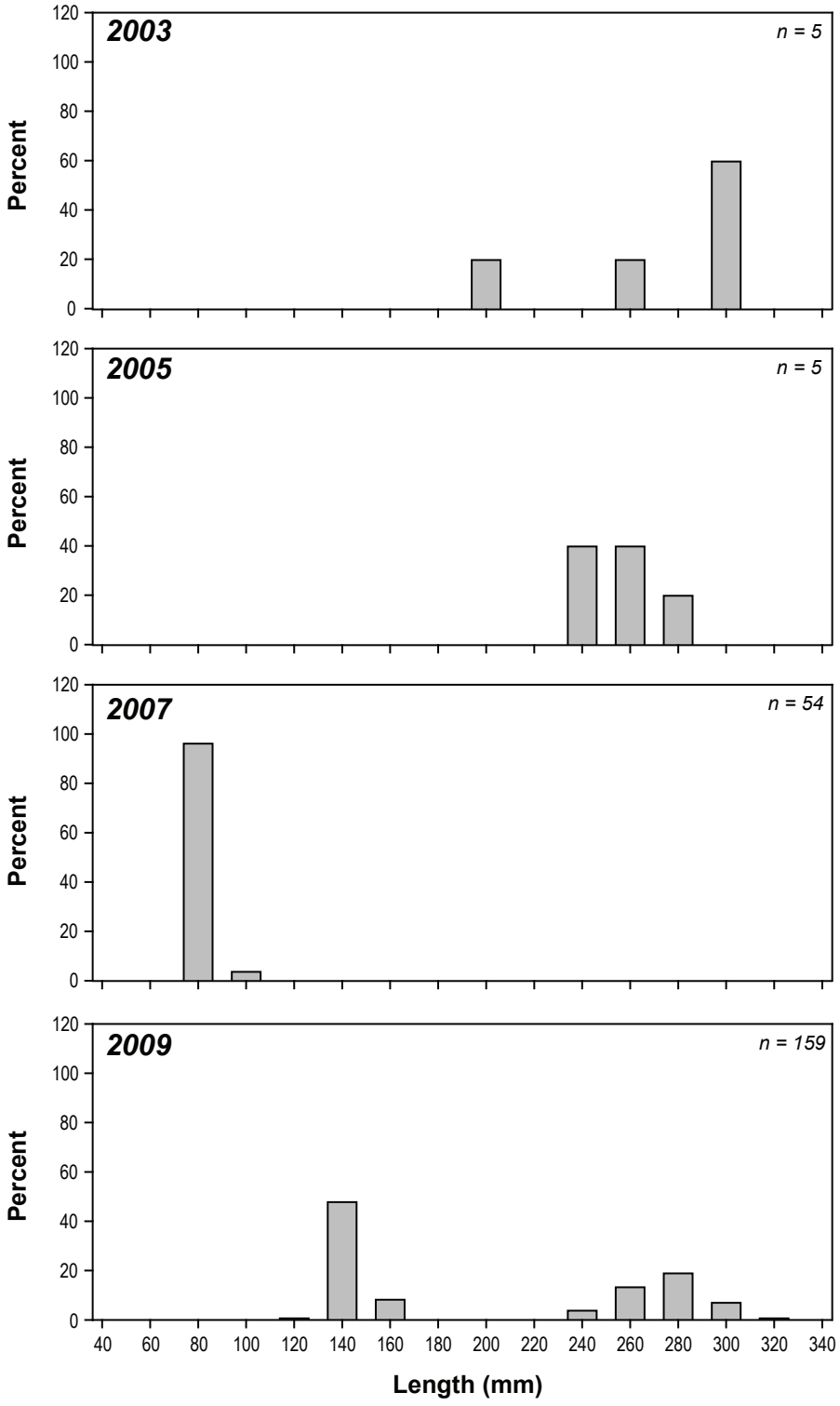
Note: Numbers above bars indicate sample size.
Error bars represent one standard error of the mean.
No marine fisheries studies were conducted in 2008.

NEWMONT NORTH AMERICA

Mean Lengths and Condition of Pacific Herring Captured in Roberts Bay from 2002 to 2009

Figure 4.2-11

Rescan™ Engineers & Scientists



NEWMONT NORTH AMERICA

Length-Frequency Distributions of Pacific Herring Captured in Roberts Bay from 2002 to 2009

Figure 4.2-12

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Appendix 3.1-1

Detailed Habitat Data for the Proposed Barge Site in Roberts Bay, Hope Bay Belt Project, 2009

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Appendix 3.1-1. Detailed Habitat Data for the Proposed Barge Site in Roberts Bay, Hope Bay Belt Project, 2009

Habitat Number	Habitat Unit Length (m)	UTMs Start		UTMs End		Picture #'s	Area (m^2)	Fines (%)	Gravel (%)	Cobble (%)	Boulder (%)	Bedrock (%)	Fines (m^2)	Gravel (m^2)	Cobble (m^2)	Boulder (m^2)	Bedrock (m^2)
1	16	432291	7563280	432278	7563287	4369-4370	80	0	10	20	20	50	0	8	16	16	40
2	35	432278	7563287	432244	7563292	4370-4372	188	5	15	60	15	0	9	28	113	28	0
3	37	432244	7563292	432215	7563307	4373-4376	197	5	10	70	15	0	10	20	138	30	0
4	17	432215	7563307	432206	7563321	4376	72	0	5	60	35	0	0	4	43	25	0
5	35	432206	7563321	432198	7563352	4378-4380	197	0	70	27	3	0	0	138	53	6	0
6	59	432198	7563352	432183	7563404	4382	238	0	5	75	5	15	0	12	179	12	36
7	10	432183	7563404	432175	7563410	4381	34	0	20	40	40	0	0	7	13	13	0
8	31	432175	7563410	432158	7563434	4383	100	0	5	30	50	15	0	5	30	50	15
9	5	432158	7563434	432156	7563439	4384	12	0	0	0	0	100	0	0	0	0	12
10	69	432156	7563439	432097	7563467	4384-4385	230	0	2	65	25	3	0	5	149	57	7
11	22	432097	7563467	432075	7563471	4386	80	0	0	20	75	5	0	0	16	60	4
12	8	432075	7563471	432068	7563473	4387-4388	43	0	25	40	30	5	0	11	17	13	2
13	28	432068	7563473	432043	7563462	4380	145	40	10	40	10	0	58	14	58	14	0
14	26	432043	7563462	432030	7563441	4380, 4389	72	20	10	30	40	0	14	7	22	29	0
15	19	432030	7563441	432020	7563424	4390-4391	31	30	20	30	15	0	9	6	9	5	0
16	22	432020	7563424	432000	7563418	4392	20	70	30	0	0	0	14	6	0	0	0
17	52	432000	7563418	431949	7563423	-	43	50	50	0	0	0	22	22	0	0	0
18	48	431949	7563423	431907	7563447	4393	121	50	35	15	0	0	60	42	18	0	0
19	111	431907	7563447	431927	7563549	4394-4395	418	20	5	70	5	0	84	21	293	21	0
20	36	431927	7563549	431938	7563583	4397	232	30	10	60	0	0	70	23	139	0	0
21	-	-	-	-	-	-	49,570	100	0	0	0	0	49,570	0	0	0	0
						Total	**2,553**	-	-	-	-	-	**350**	**378**	**1,307**	**379**	**116**
						Total (%)		-	-	-	-	-	**14**	**15**	**51**	**15**	**5**

Note:
Habitat Unit 21 is the offshore habitat assessed at this location.
Total area does not include offshore habitat values.

Appendix 3.1-2

Detailed Habitat Data for the Proposed Port Site in Roberts Bay, Hope Bay Belt Project, 2009

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Appendix 3.1-2. Detailed Habitat Data for the Proposed Port Site in Roberts Bay, Hope Bay Belt Project, 2009

Habitat Number	Habitat Unit Length (m)	UTMs Start		UTMs End		Picture #'s	Area (m^2)	Fines (%)	Gravel (%)	Cobble (%)	Boulder (%)	Bedrock (%)	Fines (m^2)	Gravel (m^2)	Cobble (m^2)	Boulder (m^2)	Bedrock (m^2)
1	89	431263	7565254	431182	7565221	4520-4521	600	0	10	85	5	0	0	60	510	30	0
2	15	431182	7565221	431172	7565211	4522-4523	97	10	25	65	1	0	10	24	63	1	0
3	18	431172	7565211	431156	7565202	4324	52	20	5	74	1	0	10	3	39	1	0
4	8	431156	7565202	431148	7565203	4325-4326	25	25	25	50	0	0	6	6	13	0	0
5	31	431148	7565203	431122	7565216	4528	116	60	40	0	0	0	70	47	0	0	0
6	6	431122	7565216	431117	7565218	4529	14	85	15	0	0	0	12	2	0	0	0
7	66	431117	7565218	431080	7565265	4530-4531	209	35	15	45	5	0	73	31	94	10	0
8	8	431080	7565265	431076	7565272	4545	19	85	0	10	5	0	16	0	2	1	0
9	32	431076	7565272	431073	7565303	4532	85	0	2	0	2	95	0	2	0	2	81
10	53	431073	7565303	431068	7565354	4548	186	30	25	40	5	0	56	47	74	9	0
11	7	431068	7565354	431067	7565361	4549-4550	18	20	35	40	5	0	4	6	7	1	0
12	119	431067	7565361	431111	7565466	4551-4553	478	20	35	40	5	0	96	167	191	24	0
13	45	431111	7565466	431136	7565504	4554	226	30	25	35	10	0	68	57	79	23	0
14	23	431136	7565504	431154	7565517	4555-4556, 4571	78	35	40	25	1	0	27	31	19	1	0
15	46	431154	7565517	431195	7565499	4555-4556, 4538, 4559	160	35	20	35	0	10	56	32	56	0	16
16	421	431195	7565499	431327	7565836	-	1,812	0	0	0	0	100	0	0	0	0	1,812
17	-	-	-	-	-	-	23,695	100	0	0	0	0	23,695	0	0	0	0
						Total	**4,176**	-	-	-	-	-	**504**	**515**	**1,147**	**102**	**1,909**
						Total (%)		-	-	-	-	-	**12**	**12**	**27**	**2**	**46**

Note:
Habitat Unit 17 is the offshore habitat assessed at this location.
Total area does not include offshore habitat values.

Appendix 3.2-1

Set Times, Retrieval Times and Locations of Floating Gillnets used in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

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Appendix 3.2-1. Set Times, Retrieval Times and Locations of Floating Gillnets used in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

Location		Gear			Set		Retrieval		UTM 1			UTM 2				Macrobenthos Catch
Location	Site	Method	Type	#	Date In	Time In	Date Out	Time Out	Depth	Easting	Northing	Depth	Easting	Northing	Fish Catch Summary	Summary
Roberts Bay	Proposed Barge Site	GN	F	1	29-Jul-09	12:15	29-Jul-09	13:25	10.0	432077	7563659	14.0	432061	7563750	3 CP; 27 PH	NIC
Roberts Bay	Proposed Barge Site	GN	F	2	30-Jul-09	12:00	30-Jul-09	13:00	8.8	432230	7563647	8.4	432266	7563562	1 CP; 8 PH; 1 SP	NIC
Roberts Bay	Proposed Barge Site	GN	F	3	30-Jul-09	13:15	30-Jul-09	14:15	8.5	432187	7563611	5.9	432199	7563520	4 PH	NIC
Roberts Bay	Proposed Barge Site	GN	F	4	31-Jul-09	9:05	31-Jul-09	10:05	8.5	432128	7563629	2.8	432137	7563537	1 PH	NIC
Roberts Bay	Proposed Barge Site	GN	F	5	31-Jul-09	10:25	31-Jul-09	11:25	8.5	432110	7563631	2.5	432142	7563545	1 PH	NIC
Roberts Bay	Proposed Barge Site	GN	F	6	11-Aug-09	8:50	11-Aug-09	9:50	9.8	432105	7563631	2.9	432145	7563548	NFC	NIC
Roberts Bay	Proposed Barge Site	GN	F	7	11-Aug-09	9:25	11-Aug-09	10:25	10.0	432133	7563663	9.6	432182	7563585	NFC	NIC
Roberts Bay	Proposed Barge Site	GN	F	8	11-Aug-09	10:05	11-Aug-09	11:05	8.4	432067	7563650	3.5	432100	7563564	NFC	NIC
Roberts Bay	Proposed Barge Site	GN	F	9	11-Aug-09	10:40	11-Aug-09	11:40	8.0	432198	7563527	2.3	432206	7563435	NFC	NIC
Roberts Bay	Proposed Barge Site	GN	F	10	11-Aug-09	11:30	11-Aug-09	12:15	7.7	432116	7563661	3.5	432129	7563570	1 AC	NIC
Roberts Bay	Proposed Barge Site	GN	F	1	21-Aug-09	11:50	21-Aug-09	12:45	1.5	431950	7563864	8.8	432030	7563910	NFC	NIC
Roberts Bay	Proposed Barge Site	GN	F	2	21-Aug-09	13:05	21-Aug-09	15:10	1.9	431799	7564090	10.5	431859	7564160	1 AC; 3 PH	NIC
Roberts Bay	Proposed Barge Site	GN	F	3	21-Aug-09	15:15	21-Aug-09	17:10	0.9	431633	7564076	2.3	431712	7564123	1AC; 3 PH; 1 SC; 1 SP	NIC
Roberts Bay	Proposed Barge Site	GN	F	4	26-Aug-09	11:35	26-Aug-09	13:02	1.8	432245	7563415	6.7	432290	7563491	NFC	NIC
Roberts Bay	Proposed Barge Site	GN	F	5	26-Aug-09	13:34	26-Aug-09	14:36	2.1	432160	7563497	7.2	432158	7563589	NFC	NIC
Roberts Bay	Proposed Barge Site	GN	F	6	26-Aug-09	14:40	26-Aug-09	17:40	7.0	432149	7563604	7.9	432111	7563688	1 AC	NIC
Roberts Bay	Proposed Port Site	GN	F	1	1-Aug-09	16:30	1-Aug-09	17:30	27.0	431316	7565536	20.0	431276	7565453	25 PH	NIC
Roberts Bay	Proposed Port Site	GN	F	2	2-Aug-09	13:00	2-Aug-09	14:00	26.0	431268	7565458	20.3	431331	7565391	21 PH	NIC
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	8:46	3-Aug-09	9:45	18.0	431292	7565565	12.0	431249	7565484	4 AC; 52 PH	1 Starfish
Roberts Bay	Proposed Port Site	GN	F	1	22-Aug-09	14:48	22-Aug-09	16:40	3.0	431352	7565828	16.8	431359	7565736	8 AC; 1 PH	NIC
Roberts Bay	Proposed Port Site	GN	F	2	22-Aug-09	16:46	22-Aug-09	17:38	18.5	431415	7565866	4.2	431350	7565801	7 AC; 1 GC	4 Crabs
Roberts Bay	Proposed Port Site	GN	F	3	29-Aug-09	12:45	29-Aug-09	14:36	8.0	431300	7565594	28.5	431355	7565520	NFC	NIC
Roberts Bay	Proposed Port Site	GN	F	4	29-Aug-09	15:21	29-Aug-09	17:06	19.7	431288	7565403	26.0	431363	7565456	1 AC	NIC
Roberts Bay	Proposed Port Site	GN	F	5	3-Sep-09	13:08	3-Sep-09	15:06	10.2	431294	7565551	27.2	431302	7565611	NFC	NIC
Roberts Bay	Proposed Port Site	GN	F	6	3-Sep-09	15:10	3-Sep-09	17:00	1.6	431233	7565492	11.0	431295	7565560	NFC	NIC
Reference Bay	Reference Site	GN	F	1	8-Aug-09	9:40	8-Aug-09	10:40	8.8	441234	7563080	19.0	441294	7563011	NFC	NIC
Reference Bay	Reference Site	GN	F	2	8-Aug-09	11:00	8-Aug-09	12:00	5.2	441311	7563287	22.0	441329	7563197	1 AC	NIC
Reference Bay	Reference Site	GN	F	3	9-Aug-09	9:10	9-Aug-09	10:10	12.0	441366	7563282	29.0	441439	7563229	NFC	NIC
Reference Bay	Reference Site	GN	F	4	9-Aug-09	10:30	9-Aug-09	11:30	2.4	441218	7563113	21.0	441310	7563107	NFC	NIC
Reference Bay	Reference Site	GN	F	5	10-Aug-09	11:25	10-Aug-09	12:25	20.0	441354	7563352	27.0	441418	7563285	1 PH	NIC
Reference Bay	Reference Site	GN	F	6	10-Aug-09	12:50	10-Aug-09	13:50	18.0	441296	7562988	14.0	441273	7563072	NFC	NIC
Reference Bay	Reference Site	GN	F	1	4-Sep-09	13:00	4-Sep-09	15:30	5.6	441257	7563130	15.7	441338	7563088	NFC	NIC
Reference Bay	Reference Site	GN	F	2	4-Sep-09	15:38	4-Sep-09	16:37	12.4	441306	7563126	17.8	441348	7563208	NFC	NIC
Reference Bay	Reference Site	GN	F	3	5-Sep-09	10:43	5-Sep-09	12:44	14.7	441381	7563404	18.2	441370	7563313	NFC	NIC

Note:
Catch Summary includes fish that escaped prior to being sampled for biological data.
Gear: GN = Gillnet; F = Floating.
Fish: AC = Arctic char; CP = Capelin; GC = Greenland cod; NFC = No Fish Captured; PH = Pacific herring; SC = Saffron cod; SP = Sculpin (Myoxocephalus sp.).
Macrobenthos: NIC = No Invertebrates Captured.

Appendix 3.2-2

Set Times, Retrieval Times and Locations of Sinking Gillnets used in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

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Appendix 3.2-2. Set Times, Retrieval Times and Locations of Sinking Gillnets used in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

Location		Gear			Set		Retrieval		UTM 1			UTM 2				
Location	Site	Method	Type	#	Date In	Time In	Date Out	Time Out	Depth	Easting	Northing	Depth	Easting	Northing	Fish Catch Summary	Macrobenthos Catch Summary
Roberts Bay	Proposed Barge Site	GN	S	1	29-Jul-09	9:10	29-Jul-09	10:10	16.0	432090	7563625	9.2	432066	7563714	5 CP; 1 FL; 1 PH	1 Isopod
Roberts Bay	Proposed Barge Site	GN	S	2	29-Jul-09	10:35	29-Jul-09	11:55	11.0	432148	7563631	12.0	432145	7563723	NFC	NIC
Roberts Bay	Proposed Barge Site	GN	S	3	30-Jul-09	9:00	30-Jul-09	10:00	3.0	432143	7563530	9.3	432145	7563622	1 FL	NIC
Roberts Bay	Proposed Barge Site	GN	S	4	30-Jul-09	10:15	30-Jul-09	11:15	8.2	432218	7563610	5.5	432251	7563524	NFC	NIC
Roberts Bay	Proposed Barge Site	GN	S	5	31-Jul-09	11:40	31-Jul-09	12:40	9.0	432174	7563633	7.3	432194	7563543	1 FL; 1 SC; 1 SP	NIC
Roberts Bay	Proposed Barge Site	GN	S	6	31-Jul-09	13:00	31-Jul-09	14:00	11.0	432113	7563641	6.9	432146	7563555	1 SP	NIC
Roberts Bay	Proposed Barge Site	GN	S	1	21-Aug-09	10:15	21-Aug-09	11:40	7.8	432128	7563559	2.4	432077	7563582	1 SP	NIC
Roberts Bay	Proposed Barge Site	GN	S	2	21-Aug-09	11:45	21-Aug-09	12:30	1.8	432361	7563709	6.3	432404	7563628	1 SC	NIC
Roberts Bay	Proposed Barge Site	GN	S	3	21-Aug-09	12:40	21-Aug-09	14:35	3.8	432096	7563948	2.1	432187	7563932	6 SC	NIC
Roberts Bay	Proposed Barge Site	GN	S	4	21-Aug-09	15:10	21-Aug-09	16:45	2.1	431962	7563855	8.6	432035	7563904	1 PH	NIC
Roberts Bay	Proposed Barge Site	GN	S	5	23-Aug-09	15:19	23-Aug-09	16:15	1.4	432079	7563687	6.5	432100	7563612	1 AC; 1 FL	NIC
Roberts Bay	Proposed Barge Site	GN	S	6	23-Aug-09	16:19	23-Aug-09	17:55	3.6	432293	7563427	9.2	432283	7563519	1 AC; 1 SP	NIC
Roberts Bay	Proposed Barge Site	GN	S	7	26-Aug-09	10:19	26-Aug-09	11:44	3.0	432251	7563438	6.3	432214	7563521	1 AF	NIC
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	11:50	26-Aug-09	13:27	2.0	432176	7563483	7.0	432230	7563552	1 GC; 1 LD; 49 SC; 2 SF; 1 SP	NIC
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	14:46	26-Aug-09	16:11	6.9	432226	7563539	7.4	432192	7563626	1 AF; 51 SC	NIC
Roberts Bay	Proposed Port Site	GN	S	1	1-Aug-09	13:25	1-Aug-09	14:25	13.0	431194	7565372	16.0	431235	7565454	1 PH	1 Sea Urchin; 14 Starfish
Roberts Bay	Proposed Port Site	GN	S	2	1-Aug-09	14:45	1-Aug-09	15:45	19.0	431295	7565542	27.0	431292	7565450	NFC	2 Starfish
Roberts Bay	Proposed Port Site	GN	S	3	2-Aug-09	14:25	2-Aug-09	15:25	>20	431306	7565441	13.0	431294	7565350	1 PH	NIC
Roberts Bay	Proposed Port Site	GN	S	4	2-Aug-09	15:46	2-Aug-09	16:49	20.0	431281	7565536	20.0	431257	7565447	1 PH	4 Starfish
Roberts Bay	Proposed Port Site	GN	S	5	3-Aug-09	10:30	3-Aug-09	11:30	30.0	431337	7565454	39.0	431336	7565546	NFC	NIC
Roberts Bay	Proposed Port Site	GN	S	6	3-Aug-09	11:45	3-Aug-09	12:45	9.3	431271	7565546	16.5	431241	7565459	1 AC; 1 PH; 1 SF	8 Starfish
Roberts Bay	Proposed Port Site	GN	S	1	22-Aug-09	12:34	22-Aug-09	13:40	15.0	431348	7565685	14.5	431318	7565598	2 PH; 1 SP	1 Crab; 2 Clams; 1 Starfish
Roberts Bay	Proposed Port Site	GN	S	2	22-Aug-09	13:50	22-Aug-09	15:02	7.0	431262	7565490	19.9	431288	7565402	1 GC	1 Sea Urchni; 2 Starfish
Roberts Bay	Proposed Port Site	GN	S	3	22-Aug-09	15:07	22-Aug-09	15:26	16.6	431320	7565582	14.8	431290	7565495	NFC	1 Clam; 1 Mussel; 4 Starfish
Roberts Bay	Proposed Port Site	GN	S	4	29-Aug-09	11:15	29-Aug-09	12:27	2.8	431229	7565501	22.0	431311	7565459	1 GC	1 Clam; 3 Sea Urchins; 1 Starfish
Roberts Bay	Proposed Port Site	GN	S	5	29-Aug-09	12:34	29-Aug-09	14:57	1.4	431229	7565508	22.7	431315	7565537	1 GC; 1 LD; 1 SP	NIC
Roberts Bay	Proposed Port Site	GN	S	6	29-Aug-09	15:13	29-Aug-09	17:24	1.0	431204	7565493	16.9	431246	7565411	8 AC; 2 GC; 1 SC; 1 SP	NIC
Roberts Bay	Proposed Port Site	GN	S	7	3-Sep-09	11:53	3-Sep-09	12:58	2.0	431231	7565503	12.2	431236	7565412	3 GC; 2 SF; 1 SP	5 Sea Urchins
Roberts Bay	Proposed Port Site	GN	S	8	3-Sep-09	13:03	3-Sep-09	14:56	8.3	431271	7565512	24.3	431340	7565451	1 LD; 1 SP	1 Starfish
Roberts Bay	Proposed Port Site	GN	S	9	3-Sep-09	15:19	3-Sep-09	17:08	9.2	431232	7565436	24.0	431312	7565482	NFC	6 Starfish
Reference Bay	Reference Site	GN	S	1	8-Aug-09	12:15	8-Aug-09	13:15	7.0	441229	7563090	19.0	441262	7563004	3 SP	4 Starfish
Reference Bay	Reference Site	GN	S	2	8-Aug-09	13:40	8-Aug-09	14:40	24.0	441351	7563069	28.0	441403	7563145	NFC	2 Snails
Reference Bay	Reference Site	GN	S	3	9-Aug-09	11:50	9-Aug-09	12:50	30.0	441453	7563297	20.0	441369	7563259	NFC	3 Starfish
Reference Bay	Reference Site	GN	S	4	9-Aug-09	13:10	9-Aug-09	14:10	20.0	441358	7563090	8.6	441266	7563095	1 AC; 4 PH; 1 SP	NIC
Reference Bay	Reference Site	GN	S	5	10-Aug-09	8:50	10-Aug-09	9:50	7.8	441307	7563287	24.0	441367	7563217	1 SP	1 Starfish
Reference Bay	Reference Site	GN	S	6	10-Aug-09	10:10	10-Aug-09	11:10	25.0	441423	7563082	19.0	441334	7563107	1 AC; 1 PH	2 Starfish
Reference Bay	Reference Site	GN	S	1	4-Sep-09	11:44	4-Sep-09	12:47	6.4	441219	7563051	13.0	441284	7563116	2 PH	1 Starfish
Reference Bay	Reference Site	GN	S	2	4-Sep-09	12:52	4-Sep-09	15:15	1.5	441277	7563209	19.4	441365	7563183	3 PH; 3 SF; 1 SP	3 Starfish
Reference Bay	Reference Site	GN	S	3	4-Sep-09	15:20	4-Sep-09	16:30	19.2	441426	7563108	22.1	441473	7563176	NFC	1 Crab; 1 Starfish
Reference Bay	Reference Site	GN	S	4	5-Sep-09	9:10	5-Sep-09	10:20	10.5	441320	7563098	18.9	441400	7563112	1 SP	1 Crab
Reference Bay	Reference Site	GN	S	5	5-Sep-09	10:24	5-Sep-09	12:26	12.5	441344	7563279	15.2	441333	7563188	3 PH; 1 SP	2 Clams
Reference Bay	Reference Site	GN	S	6	5-Sep-09	14:05	5-Sep-09	14:35	4.5	441311	7563268	21.0	441393	7563228	NFC	NIC

Note:

Catch Summary includes fish and macrobenthos that escaped prior to being sampled for biological data.

Gear: GN = Gillnet; S = Sinking.

Fish: AC = Arctic char; AF = Arctic flounder; CP = Capelin; FL = Flounder (unknown); GC = Greenland cod; LD = Longhead dab; NFC = No Fish Captured; PH = Pacific herring; SC = Saffron cod; SF = Starry flounder; SP = Sculpin (Myoxocephalus sp.).

The grouping of unknown flounder is comprised of Arctic flounder and/or longhead dab.

Macrobenthos: NIC = No Invertebrates Captured.

Appendix 3.2-3

Set Times, Retrieval Times and Locations of Long Lines used in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

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Appendix 3.2-3. Set Times, Retrieval Times and Locations of Long Lines used in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

Location		Gear		Set		Retrieval		UTM 1			UTM 2				Macrobenthos Catch
Location	Site	Method	#	Date In	Time In	Date Out	Time Out	Depth	Easting	Northing	Depth	Easting	Northing	Fish Catch Summary	Summary
Roberts Bay	Proposed Barge Site	LL	1	29-Jul-09	15:40	29-Jul-09	17:10	10.0	432129	7563662	9.0	432127	7563642	NFC	NIC
Roberts Bay	Proposed Barge Site	LL	2	30-Jul-09	11:30	30-Jul-09	14:30	9.0	432222	7563688	8.5	432229	7563669	NFC	NIC
Roberts Bay	Proposed Barge Site	LL	3	30-Jul-09	14:45	30-Jul-09	17:30	6.8	432182	7563562	7.0	432201	7563557	NFC	NIC
Roberts Bay	Proposed Barge Site	LL	4	31-Jul-09	12:00	31-Jul-09	16:00	8.8	432254	7563579	8.8	432265	7563562	NFC	NIC
Roberts Bay	Proposed Barge Site	LL	1	23-Aug-09	16:34	23-Aug-09	17:58	6.4	432265	7563695	6.1	432264	7563711	NFC	NIC
Roberts Bay	Proposed Barge Site	LL	2	26-Aug-09	10:32	26-Aug-09	12:41	7.4	432152	7563647	7.7	432145	7563666	4 SC	NIC
Roberts Bay	Proposed Barge Site	LL	3	26-Aug-09	12:54	26-Aug-09	14:53	7.5	432089	7563637	7.6	432103	7563650	3 SC	NIC
Roberts Bay	Proposed Port Site	LL	1	1-Aug-09	14:15	1-Aug-09	19:15	6.6	431260	7565518	4.0	431241	7565511	4 GC	NIC
Roberts Bay	Proposed Port Site	LL	2	2-Aug-09	15:25	2-Aug-09	18:10	26.0	431300	7565468	-	431293	7565449	NFC	NIC
Roberts Bay	Proposed Port Site	LL	3	3-Aug-09	11:20	3-Aug-09	15:30	22.0	431303	7565477	26.0	431300	7565457	NFC	NIC
Roberts Bay	Proposed Port Site	LL	1	22-Aug-09	14:40	22-Aug-09	15:32	8.0	431196	7565306	7.0	431177	7565293	NFC	NIC
Roberts Bay	Proposed Port Site	LL	2	29-Aug-09	11:30	29-Aug-09	15:00	13.4	431257	7565446	16.4	431269	7565433	NFC	NIC
Roberts Bay	Proposed Port Site	LL	3	29-Aug-09	15:08	29-Aug-09	16:57	9.9	431274	7565548	15.7	431291	7565542	NFC	NIC
Roberts Bay	Proposed Port Site	LL	4	3-Sep-09	12:02	3-Sep-09	17:28	12.5	431271	7565449	15.4	431286	7565431	NFC	NIC
Reference Bay	Reference Site	LL	1	8-Aug-09	9:45	8-Aug-09	12:15	15.0	441299	7563125	20.0	441314	7563112	NFC	NIC
Reference Bay	Reference Site	LL	2	8-Aug-09	12:30	8-Aug-09	15:30	17.0	441324	7563278	21.0	441328	7563258	NFC	NIC
Reference Bay	Reference Site	LL	3	9-Aug-09	10:30	9-Aug-09	13:30	18.0	441312	7563174	22.0	441326	7563160	NFC	NIC
Reference Bay	Reference Site	LL	4	9-Aug-09	13:40	9-Aug-09	16:10	12.0	441323	7563264	19.0	441339	7563275	NFC	NIC
Reference Bay	Reference Site	LL	5	10-Aug-09	9:15	10-Aug-09	11:30	9.8	441255	7563076	15.0	441275	7563075	NFC	NIC
Reference Bay	Reference Site	LL	6	10-Aug-09	11:40	10-Aug-09	15:00	18.0	441351	7563173	22.0	441365	7563159	NFC	NIC
Reference Bay	Reference Site	LL	1	4-Sep-09	11:48	4-Sep-09	15:45	11.3	441342	7563269	16.7	441358	7563266	NFC	NIC
Reference Bay	Reference Site	LL	2	5-Sep-09	10:30	5-Sep-09	12:47	17.9	441417	7563270	19.2	441397	7563270	NFC	NIC

Note:
Gear: LL = Long line.
Fish: GC = Greenland cod; NFC = No Fish Captured; SC = Saffron cod.
Macrobenthos: NIC = No Invertebrates Captured.

Appendix 3.2-4

Set Times, Retrieval Times and Locations of Beach Seines used in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

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Appendix 3.2-4. Set Times, Retrieval Times and Locations of Beach Seines used in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

Location		Gear		Set		Retrieval		UTM				Macrobenthos Catch
Location	Site	Method	#	Date In	Time In	Date Out	Time Out	Depth	Easting	Northing	Fish Catch Summary	Summary
Roberts Bay	Proposed Barge Site	BS	1	30-Jul-09	15:30	30-Jul-09	-	1.0	432007	7563425	1 FL; 1 SC; 1 SF; 12 SP	1 Isopod
Roberts Bay	Proposed Barge Site	BS	2	30-Jul-09	16:15	30-Jul-09	-	1.0	432007	7563425	2 FL; 1 LD; 19 SP	NIC
Roberts Bay	Proposed Barge Site	BS	3	30-Jul-09	17:00	30-Jul-09	-	1.0	432181	7563405	NFC	NIC
Roberts Bay	Proposed Barge Site	BS	4	30-Jul-09	17:15	30-Jul-09	-	1.0	432181	7563405	1 FL; 1 SC; 1 SP	NIC
Roberts Bay	Proposed Barge Site	BS	5	31-Jul-09	10:30	31-Jul-09	10:40	1.0	432007	7563425	NFC	NIC
Roberts Bay	Proposed Barge Site	BS	6	31-Jul-09	10:50	31-Jul-09	11:00	1.0	432007	7563425	NFC	NIC
Roberts Bay	Proposed Barge Site	BS	7	31-Jul-09	11:00	31-Jul-09	11:10	1.0	432181	7563405	NFC	NIC
Roberts Bay	Proposed Barge Site	BS	8	31-Jul-09	11:10	31-Jul-09	11:20	1.0	432181	7563405	3 SP	NIC
Roberts Bay	Proposed Barge Site	BS	1	21-Aug-09	15:45	21-Aug-09	15:50	0.7	431895	7563464	2 AF; 1 LD; 1 SP	NIC
Roberts Bay	Proposed Barge Site	BS	2	21-Aug-09	16:15	21-Aug-09	16:20	0.7	431895	7563464	4 AF; 1 SF; 2 SP	NIC
Roberts Bay	Proposed Barge Site	BS	3	23-Aug-09	17:06	23-Aug-09	-	0.4	431964	7563408	1 AF; 5 SP	NIC
Roberts Bay	Proposed Barge Site	BS	4	23-Aug-09	17:23	23-Aug-09	-	0.4	431981	7563405	1 NS; 12 SP	NIC
Roberts Bay	Proposed Barge Site	BS	5	26-Aug-09	16:56	26-Aug-09	-	0.2	432022	7563428	1 NS; 3 SP	NIC
Roberts Bay	Proposed Barge Site	BS	6	26-Aug-09	17:13	26-Aug-09	-	0.3	431953	7563423	5 SP	NIC
Roberts Bay	Proposed Barge Site	BS	7	26-Aug-09	17:22	26-Aug-09	-	0.5	431917	7563441	1 SP	NIC
Roberts Bay	Proposed Port Site	BS	1	1-Aug-09	16:50	1-Aug-09	-	-	431200	7565500	3 AC	NIC
Roberts Bay	Proposed Port Site	BS	2	1-Aug-09	17:10	1-Aug-09	-	-	431200	7565500	NFC	NIC
Roberts Bay	Proposed Port Site	BS	3	2-Aug-09	5:30	2-Aug-09	-	-	431200	7565500	1 SP	NIC
Roberts Bay	Proposed Port Site	BS	4	2-Aug-09	5:45	2-Aug-09	-	-	431200	7565500	NFC	NIC
Roberts Bay	Proposed Port Site	BS	5	2-Aug-09	6:00	2-Aug-09	-	-	431200	7565500	NFC	NIC
Roberts Bay	Proposed Port Site	BS	6	3-Aug-09	12:15	3-Aug-09	-	-	431200	7565500	NFC	NIC
Roberts Bay	Proposed Port Site	BS	7	3-Aug-09	12:30	3-Aug-09	-	-	431200	7565500	NFC	NIC
Roberts Bay	Proposed Port Site	BS	1	22-Aug-09	15:39	22-Aug-09	-	0.5	431154	7565499	1 SF; 21 SP	NIC
Roberts Bay	Proposed Port Site	BS	2	22-Aug-09	14:05	22-Aug-09	-	0.4	431142	7565491	7 SP	NIC
Roberts Bay	Proposed Port Site	BS	3	22-Aug-09	14:13	22-Aug-09	-	0.6	431128	7565473	NFC	NIC
Roberts Bay	Proposed Port Site	BS	4	29-Aug-09	16:25	29-Aug-09	-	0.5	431146	7565521	1 AF; 6 SP	NIC
Roberts Bay	Proposed Port Site	BS	5	29-Aug-09	16:34	29-Aug-09	-	0.5	431134	7565507	1 SP	NIC
Roberts Bay	Proposed Port Site	BS	6	29-Aug-09	16:40	29-Aug-09	-	0.6	431129	7565497	1 NS; 11 SP	NIC
Roberts Bay	Proposed Port Site	BS	7	3-Sep-09	13:35	3-Sep-09	-	0.5	431148	7565498	6 SP	NIC
Roberts Bay	Proposed Port Site	BS	8	3-Sep-09	13:40	3-Sep-09	-	0.6	431143	7565486	NFC	NIC
Roberts Bay	Proposed Port Site	BS	9	3-Sep-09	13:46	3-Sep-09	-	0.4	431130	7565482	1 SP	NIC
Reference Bay	Reference Site	BS	1	8-Aug-09	16:00	8-Aug-09	-	1.5	441210	7563091	4 SP	NIC
Reference Bay	Reference Site	BS	2	8-Aug-09	16:30	8-Aug-09	-	1	441215	7563103	12 SP	NIC
Reference Bay	Reference Site	BS	3	9-Aug-09	14:00	9-Aug-09	-	-	441214	7563118	5 SP	NIC
Reference Bay	Reference Site	BS	4	9-Aug-09	15:30	9-Aug-09	-	-	441318	7563316	5 SP	NIC
Reference Bay	Reference Site	BS	5	9-Aug-09	15:45	9-Aug-09	-	-	441318	7563316	5 SP	NIC
Reference Bay	Reference Site	BS	6	10-Aug-09	14:00	10-Aug-09	-	-	441214	7563118	NFC	NIC
Reference Bay	Reference Site	BS	7	10-Aug-09	14:10	10-Aug-09	-	-	441318	7563316	NFC	NIC
Reference Bay	Reference Site	BS	8	10-Aug-09	14:30	10-Aug-09	-	-	441318	7563316	1 SF; 16 SP	NIC
Reference Bay	Reference Site	BS	1	4-Sep-09	14:00	4-Sep-09	-	0.6	441180	7563096	1 AF; 2 SP	NIC
Reference Bay	Reference Site	BS	2	4-Sep-09	14:44	4-Sep-09	-	0.6	441194	7563097	3 NS; 6 SP	NIC
Reference Bay	Reference Site	BS	3	4-Sep-09	14:50	4-Sep-09	-	0.6	441148	7563086	NFC	NIC

Note:
Dashes indicate no data available.
Gear: BS = Beach seine.
Fish: AC = Arctic char; AF = Arctic flounder; FL = Flounder (unknown); GC = Greenland cod; LD = Longhead dab; NFC = No Fish Captured; NS = Ninespine stickleback; SC = Saffron cod; SF = Starry flounder; SP = Sculpin (Myoxocephalus sp.).
The grouping of unknown flounder is comprised of Arctic flounder and/or longhead dab.
Macrobenthos: NIC = No Invertebrates Captured.

Appendix 3.2-5

Set Times, Retrieval Times and Locations of Minnow Traps used in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

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Appendix 3.2-5. Set Times, Retrieval Times and Locations of Minnow Traps used in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

Location		Gear		Set		Retrieval		UTM				Macrobenthos Catch
Location	Site	Method	#	Date In	Time In	Date Out	Time Out	Depth	Easting	Northing	Fish Catch Summary	Summary
Roberts Bay	Proposed Barge Site	MT	1	29-Jul-09	11:20	30-Jul-09	9:30	0.3	432202	7563331	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	2	29-Jul-09	11:20	30-Jul-09	9:30	0.3	432183	7563393	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	3	29-Jul-09	11:20	30-Jul-09	9:30	0.2	432176	7563407	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	4	29-Jul-09	11:20	30-Jul-09	9:30	0.3	432158	7563429	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	5	29-Jul-09	11:20	30-Jul-09	9:30	0.2	432147	7563449	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	6	29-Jul-09	11:20	30-Jul-09	9:30	0.2	432130	7563456	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	7	29-Jul-09	11:20	30-Jul-09	9:30	0.2	432116	7563464	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	8	29-Jul-09	11:20	30-Jul-09	9:30	0.3	432093	7563470	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	9	29-Jul-09	11:20	30-Jul-09	9:30	0.2	432080	7563471	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	10	29-Jul-09	11:20	30-Jul-09	9:30	0.2	432062	7563474	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	11	29-Jul-09	11:20	30-Jul-09	9:30	0.4	432050	7563470	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	12	29-Jul-09	11:20	30-Jul-09	9:30	0.3	432043	7563464	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	13	29-Jul-09	11:20	30-Jul-09	9:30	0.2	432029	7563443	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	14	30-Jul-09	10:30	31-Jul-09	11:00	0.3	432202	7563331	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	15	30-Jul-09	10:30	31-Jul-09	11:00	0.3	432183	7563393	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	16	30-Jul-09	10:30	31-Jul-09	11:00	0.2	432176	7563407	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	17	30-Jul-09	10:30	31-Jul-09	11:00	0.3	432158	7563429	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	18	30-Jul-09	10:30	31-Jul-09	11:00	0.2	432147	7563449	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	19	30-Jul-09	10:30	31-Jul-09	11:00	0.2	432130	7563456	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	20	30-Jul-09	10:30	31-Jul-09	11:00	0.3	432093	7563470	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	21	30-Jul-09	10:30	31-Jul-09	11:00	0.2	432080	7563471	2 SP	NIC
Roberts Bay	Proposed Barge Site	MT	22	30-Jul-09	10:30	31-Jul-09	11:00	0.4	432050	7563470	NFC	1 Isopod
Roberts Bay	Proposed Barge Site	MT	23	30-Jul-09	10:30	31-Jul-09	11:00	0.3	432043	7563464	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	24	30-Jul-09	10:30	31-Jul-09	11:00	0.2	432029	7563443	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	1	21-Aug-09	11:20	22-Aug-09	10:10	1.4	432207	7563396	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	2	21-Aug-09	11:20	22-Aug-09	10:11	1.7	432176	7563434	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	3	21-Aug-09	11:20	22-Aug-09	10:12	1.5	432141	7563471	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	4	21-Aug-09	11:25	22-Aug-09	10:13	1.6	432108	7563505	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	5	21-Aug-09	11:25	22-Aug-09	10:14	1.1	432065	7563517	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	6	21-Aug-09	11:27	22-Aug-09	10:15	0.9	432011	7563553	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	7	21-Aug-09	11:28	22-Aug-09	10:16	1.0	431965	7563595	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	8	21-Aug-09	11:30	22-Aug-09	10:16	1.4	431969	7563642	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	9	21-Aug-09	11:30	22-Aug-09	10:17	1.5	431948	7563697	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	10	23-Aug-09	15:05	24-Aug-09	15:57	0.5	432014	7563474	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	11	23-Aug-09	15:07	24-Aug-09	15:57	0.6	432019	7563507	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	12	23-Aug-09	15:07	24-Aug-09	15:57	0.9	432059	7563516	NFC	1 Isopod
Roberts Bay	Proposed Barge Site	MT	13	23-Aug-09	15:08	24-Aug-09	15:57	1.0	432099	7563500	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	14	23-Aug-09	15:08	24-Aug-09	15:57	1.0	432132	7563473	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	15	23-Aug-09	15:09	24-Aug-09	15:57	1.1	432148	7563458	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	16	23-Aug-09	15:10	24-Aug-09	15:57	1.0	432168	7563429	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	17	23-Aug-09	15:11	24-Aug-09	15:57	0.9	432183	7563415	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	18	23-Aug-09	15:11	24-Aug-09	15:57	0.8	432198	7563391	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	19	23-Aug-09	15:11	24-Aug-09	16:07	0.8	432210	7563369	NFC	1 Isopod
Roberts Bay	Proposed Barge Site	MT	20	26-Aug-09	10:08	27-Aug-09	8:56	0.7	432132	7563466	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	21	26-Aug-09	10:08	27-Aug-09	8:57	0.6	432119	7563469	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	22	26-Aug-09	10:09	27-Aug-09	8:58	1.3	432111	7563477	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	23	26-Aug-09	10:10	27-Aug-09	8:59	1.2	432100	7563481	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	24	26-Aug-09	10:11	27-Aug-09	9:00	0.7	432080	7563482	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	25	26-Aug-09	10:12	27-Aug-09	9:01	0.7	432067	7563489	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	26	26-Aug-09	10:13	27-Aug-09	9:02	0.7	432047	7563486	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	27	26-Aug-09	10:14	27-Aug-09	9:03	0.4	432030	7563477	NFC	NIC
Roberts Bay	Proposed Barge Site	MT	28	26-Aug-09	10:15	27-Aug-09	9:04	0.4	432016	7563461	NFC	NIC

Note:
Gear: MT = Minnow trap.
Fish: AS = Arctic shanny; NFC = No Fish Captured; SP = Sculpin (Myoxocephalus sp.).
Macrobenthos: NIC = No Invertebrates Captured.

Appendix 3.2-5. Set Times, Retrieval Times and Locations of Minnow Traps used in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

Location		Gear		Set		Retrieval		UTM				Macrobenthos Catch
Location	Site	Method	#	Date In	Time In	Date Out	Time Out	Depth	Easting	Northing	Fish Catch Summary	Summary
Roberts Bay	Proposed Barge Site	MT	29	26-Aug-09	10:15	27-Aug-09	9:05	0.5	432002	7563467	NFC	NIC
Roberts Bay	Proposed Port Site	MT	1	31-Jul-09	15:30	1-Aug-09	13:45	0.4	431171	7565515	NFC	NIC
Roberts Bay	Proposed Port Site	MT	2	31-Jul-09	15:30	1-Aug-09	13:45	0.4	431184	7565506	2 SP	NIC
Roberts Bay	Proposed Port Site	MT	3	31-Jul-09	15:30	1-Aug-09	13:45	0.4	431203	7565497	NFC	NIC
Roberts Bay	Proposed Port Site	MT	4	31-Jul-09	15:30	1-Aug-09	13:45	0.4	431204	7565491	NFC	NIC
Roberts Bay	Proposed Port Site	MT	5	31-Jul-09	15:30	1-Aug-09	13:45	0.4	431208	7565500	NFC	NIC
Roberts Bay	Proposed Port Site	MT	6	31-Jul-09	15:30	1-Aug-09	13:45	0.5	431213	7565503	NFC	NIC
Roberts Bay	Proposed Port Site	MT	7	31-Jul-09	15:30	1-Aug-09	13:45	0.7	431223	7565509	NFC	NIC
Roberts Bay	Proposed Port Site	MT	8	31-Jul-09	15:30	1-Aug-09	13:45	1	431226	7565518	NFC	NIC
Roberts Bay	Proposed Port Site	MT	9	31-Jul-09	15:30	1-Aug-09	13:45	1.5	431295	7565591	NFC	NIC
Roberts Bay	Proposed Port Site	MT	10	31-Jul-09	15:30	1-Aug-09	13:45	1	431295	7565603	NFC	NIC
Roberts Bay	Proposed Port Site	MT	11	1-Aug-09	14:15	2-Aug-09	13:30	0.4	431171	7565515	NFC	NIC
Roberts Bay	Proposed Port Site	MT	12	1-Aug-09	14:15	2-Aug-09	13:30	0.4	431184	7565506	NFC	NIC
Roberts Bay	Proposed Port Site	MT	13	1-Aug-09	14:15	2-Aug-09	13:30	0.4	431203	7565497	2 SP	NIC
Roberts Bay	Proposed Port Site	MT	14	1-Aug-09	14:15	2-Aug-09	13:30	0.4	431204	7565491	NFC	NIC
Roberts Bay	Proposed Port Site	MT	15	1-Aug-09	14:15	2-Aug-09	13:30	0.4	431208	7565500	3 SP	NIC
Roberts Bay	Proposed Port Site	MT	16	1-Aug-09	14:15	2-Aug-09	13:30	0.5	431213	7565503	1 SP	4 Isopods
Roberts Bay	Proposed Port Site	MT	17	1-Aug-09	14:15	2-Aug-09	13:30	0.7	431223	7565509	NFC	NIC
Roberts Bay	Proposed Port Site	MT	18	1-Aug-09	14:15	2-Aug-09	13:30	1	431226	7565518	NFC	NIC
Roberts Bay	Proposed Port Site	MT	19	1-Aug-09	14:15	2-Aug-09	13:30	1.5	431295	7565591	NFC	NIC
Roberts Bay	Proposed Port Site	MT	20	1-Aug-09	14:15	2-Aug-09	13:30	1	431295	7565603	NFC	NIC
Roberts Bay	Proposed Port Site	MT	1	22-Aug-09	11:23	23-Aug-09	14:22	1.6	431323	7565705	NFC	NIC
Roberts Bay	Proposed Port Site	MT	2	22-Aug-09	11:25	23-Aug-09	14:22	1.4	431321	7565696	NFC	NIC
Roberts Bay	Proposed Port Site	MT	3	22-Aug-09	11:27	23-Aug-09	14:21	1.5	431317	7565674	NFC	NIC
Roberts Bay	Proposed Port Site	MT	4	22-Aug-09	11:29	23-Aug-09	14:20	1.5	431308	7565638	NFC	NIC
Roberts Bay	Proposed Port Site	MT	5	22-Aug-09	11:31	23-Aug-09	14:19	1.5	431309	7565597	NFC	NIC
Roberts Bay	Proposed Port Site	MT	6	22-Aug-09	11:34	23-Aug-09	14:18	1.5	431233	7565503	NFC	NIC
Roberts Bay	Proposed Port Site	MT	7	22-Aug-09	11:35	23-Aug-09	14:17	1.5	431227	7565483	NFC	NIC
Roberts Bay	Proposed Port Site	MT	8	22-Aug-09	11:36	23-Aug-09	14:16	1.5	431213	7565472	NFC	NIC
Roberts Bay	Proposed Port Site	MT	9	22-Aug-09	11:38	23-Aug-09	14:15	1.3	431184	7565463	NFC	NIC
Roberts Bay	Proposed Port Site	MT	10	22-Aug-09	11:42	23-Aug-09	14:14	1.0	431141	7565413	NFC	NIC
Roberts Bay	Proposed Port Site	MT	11	29-Aug-09	10:18	30-Aug-09	8:55	0.6	431122	7565436	NFC	1 Isopod
Roberts Bay	Proposed Port Site	MT	12	29-Aug-09	10:18	30-Aug-09	8:55	0.6	431149	7565477	1 SP	2 Isopods
Roberts Bay	Proposed Port Site	MT	13	29-Aug-09	10:18	30-Aug-09	8:55	0.8	431178	7565494	NFC	NIC
Roberts Bay	Proposed Port Site	MT	14	29-Aug-09	10:18	30-Aug-09	8:55	0.8	431193	7565493	NFC	NIC
Roberts Bay	Proposed Port Site	MT	15	29-Aug-09	10:18	30-Aug-09	8:55	1.2	431209	7565494	1 SP	NIC
Roberts Bay	Proposed Port Site	MT	16	29-Aug-09	10:30	30-Aug-09	9:13	2.0	431227	7565501	NFC	NIC
Roberts Bay	Proposed Port Site	MT	17	29-Aug-09	10:30	30-Aug-09	9:13	2.6	431238	7565528	1 AS; 1 SP	NIC
Roberts Bay	Proposed Port Site	MT	18	29-Aug-09	10:30	30-Aug-09	9:13	5.8	431267	7565552	NFC	6 Isopod
Roberts Bay	Proposed Port Site	MT	19	29-Aug-09	10:30	30-Aug-09	9:13	5.2	431273	7565565	1 AS	12 Sea Urchins
Roberts Bay	Proposed Port Site	MT	20	29-Aug-09	10:30	30-Aug-09	9:13	8.1	431298	7565593	1 AS	19 Sea Urchins
Reference Bay	Reference Site	MT	1	8-Aug-09	14:00	9-Aug-09	9:30	0.5	441325	7563316	NFC	1 Isopod
Reference Bay	Reference Site	MT	2	8-Aug-09	14:00	9-Aug-09	9:30	0.3	441318	7563303	NFC	NIC
Reference Bay	Reference Site	MT	3	8-Aug-09	14:00	9-Aug-09	9:30	0.5	441320	7563296	NFC	2 Isopods
Reference Bay	Reference Site	MT	4	8-Aug-09	14:00	9-Aug-09	9:30	0.5	441318	7563289	NFC	NIC
Reference Bay	Reference Site	MT	5	8-Aug-09	14:00	9-Aug-09	9:30	0.4	441305	7563278	NFC	NIC
Reference Bay	Reference Site	MT	6	8-Aug-09	14:00	9-Aug-09	9:30	0.4	441283	7563264	NFC	NIC
Reference Bay	Reference Site	MT	7	8-Aug-09	14:00	9-Aug-09	9:30	0.5	441279	7563252	NFC	NIC
Reference Bay	Reference Site	MT	8	8-Aug-09	14:00	9-Aug-09	9:30	0.3	441271	7563235	NFC	1 Isopod
Reference Bay	Reference Site	MT	9	8-Aug-09	14:00	9-Aug-09	9:30	0.3	441267	7563214	NFC	NIC
Reference Bay	Reference Site	MT	10	8-Aug-09	14:00	9-Aug-09	9:30	0.4	441264	7563193	NFC	NIC
Reference Bay	Reference Site	MT	11	8-Aug-09	14:00	9-Aug-09	9:30	0.4	441260	7563176	NFC	NIC

Note:
Gear: MT = Minnow trap.
Fish: AS = Arctic shanny; NFC = No Fish Captured; SP = Sculpin (Myoxocephalus sp.).
Macrobenthos: NIC = No Invertebrates Captured.

Appendix 3.2-5. Set Times, Retrieval Times and Locations of Minnow Traps used in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

Location		Gear		Set		Retrieval		UTM				Macrobenthos Catch
Location	Site	Method	#	Date In	Time In	Date Out	Time Out	Depth	Easting	Northing	Fish Catch Summary	Summary
Reference Bay	Reference Site	MT	12	8-Aug-09	14:00	9-Aug-09	9:30	0.3	441251	7563152	NFC	NIC
Reference Bay	Reference Site	MT	13	8-Aug-09	14:00	9-Aug-09	9:30	0.4	441249	7563138	NFC	NIC
Reference Bay	Reference Site	MT	14	8-Aug-09	14:00	9-Aug-09	9:30	0.3	441230	7563128	NFC	NIC
Reference Bay	Reference Site	MT	15	8-Aug-09	14:00	9-Aug-09	9:30	0.3	441217	7563118	NFC	NIC
Reference Bay	Reference Site	MT	16	8-Aug-09	14:00	9-Aug-09	9:30	0.5	441212	7563103	NFC	NIC
Reference Bay	Reference Site	MT	17	8-Aug-09	14:00	9-Aug-09	9:30	0.3	441207	7563103	2 SP	NIC
Reference Bay	Reference Site	MT	18	8-Aug-09	14:00	9-Aug-09	9:30	0.5	441205	7563092	NFC	NIC
Reference Bay	Reference Site	MT	19	9-Aug-09	12:30	10-Aug-09	9:30	0.5	441325	7563316	1 SP	NIC
Reference Bay	Reference Site	MT	20	9-Aug-09	12:30	10-Aug-09	9:30	0.3	441318	7563303	NFC	1 Isopod
Reference Bay	Reference Site	MT	21	9-Aug-09	12:30	10-Aug-09	9:30	0.5	441320	7563296	NFC	NIC
Reference Bay	Reference Site	MT	22	9-Aug-09	12:30	10-Aug-09	9:30	0.5	441318	7563289	NFC	4 Isopods
Reference Bay	Reference Site	MT	23	9-Aug-09	12:30	10-Aug-09	9:30	0.4	441305	7563278	NFC	3 Isopods
Reference Bay	Reference Site	MT	24	9-Aug-09	12:30	10-Aug-09	9:30	0.4	441283	7563264	NFC	2 Isopods
Reference Bay	Reference Site	MT	25	9-Aug-09	12:30	10-Aug-09	9:30	0.5	441279	7563252	NFC	NIC
Reference Bay	Reference Site	MT	26	9-Aug-09	12:30	10-Aug-09	9:30	0.3	441271	7563235	NFC	1 Isopod
Reference Bay	Reference Site	MT	27	9-Aug-09	12:30	10-Aug-09	9:30	0.3	441267	7563214	NFC	NIC
Reference Bay	Reference Site	MT	28	9-Aug-09	12:30	10-Aug-09	9:30	0.4	441264	7563193	1 SP	NIC
Reference Bay	Reference Site	MT	29	9-Aug-09	12:30	10-Aug-09	9:30	0.4	441260	7563176	2 SP	NIC
Reference Bay	Reference Site	MT	30	9-Aug-09	12:30	10-Aug-09	9:30	0.3	441251	7563152	NFC	NIC
Reference Bay	Reference Site	MT	31	9-Aug-09	12:30	10-Aug-09	9:30	0.4	441249	7563138	NFC	NIC
Reference Bay	Reference Site	MT	32	9-Aug-09	12:30	10-Aug-09	9:30	0.3	441230	7563128	NFC	1 Isopod
Reference Bay	Reference Site	MT	33	9-Aug-09	12:30	10-Aug-09	9:30	0.3	441217	7563118	1 SP	NIC
Reference Bay	Reference Site	MT	34	9-Aug-09	12:30	10-Aug-09	9:30	0.5	441212	7563103	NFC	NIC
Reference Bay	Reference Site	MT	35	9-Aug-09	12:30	10-Aug-09	9:30	0.3	441207	7563103	NFC	NIC
Reference Bay	Reference Site	MT	36	9-Aug-09	12:30	10-Aug-09	9:30	0.5	441205	7563092	NFC	NIC
Reference Bay	Reference Site	MT	1	4-Sep-09	11:27	5-Sep-09	9:47	1.1	441317	7563301	NFC	NIC
Reference Bay	Reference Site	MT	2	4-Sep-09	11:28	5-Sep-09	9:48	2.2	441313	7563279	NFC	NIC
Reference Bay	Reference Site	MT	3	4-Sep-09	11:29	5-Sep-09	9:49	2.7	441301	7563261	NFC	NIC
Reference Bay	Reference Site	MT	4	4-Sep-09	11:30	5-Sep-09	9:50	2.9	441283	7563234	NFC	NIC
Reference Bay	Reference Site	MT	5	4-Sep-09	11:31	5-Sep-09	9:51	2.2	441278	7563215	NFC	NIC
Reference Bay	Reference Site	MT	6	4-Sep-09	11:32	5-Sep-09	9:52	1.2	441273	7563198	NFC	NIC
Reference Bay	Reference Site	MT	7	4-Sep-09	11:33	5-Sep-09	9:53	1.5	441250	7563151	NFC	NIC
Reference Bay	Reference Site	MT	8	4-Sep-09	11:34	5-Sep-09	9:54	1.3	441228	7563116	NFC	NIC
Reference Bay	Reference Site	MT	9	4-Sep-09	11:35	5-Sep-09	9:55	1.2	441207	7563094	NFC	NIC
Reference Bay	Reference Site	MT	10	4-Sep-09	11:37	5-Sep-09	9:57	1.1	441185	7563088	NFC	NIC
Reference Bay	Reference Site	MT	11	5-Sep-09	9:47	6-Sep-09	9:21	1.3	441317	7563300	NFC	NIC
Reference Bay	Reference Site	MT	12	5-Sep-09	9:47	6-Sep-09	9:21	1.3	441310	7563278	NFC	NIC
Reference Bay	Reference Site	MT	13	5-Sep-09	9:47	6-Sep-09	9:21	1.3	441299	7563265	NFC	NIC
Reference Bay	Reference Site	MT	14	5-Sep-09	9:47	6-Sep-09	9:21	1.0	441279	7563238	NFC	NIC
Reference Bay	Reference Site	MT	15	5-Sep-09	9:47	6-Sep-09	9:21	1.0	441278	7563217	NFC	NIC
Reference Bay	Reference Site	MT	16	5-Sep-09	9:57	6-Sep-09	9:35	1.5	441274	7563193	NFC	NIC
Reference Bay	Reference Site	MT	17	5-Sep-09	9:57	6-Sep-09	9:35	1.0	441245	7563149	NFC	NIC
Reference Bay	Reference Site	MT	18	5-Sep-09	9:57	6-Sep-09	9:35	1.3	441226	7563113	NFC	NIC
Reference Bay	Reference Site	MT	19	5-Sep-09	9:57	6-Sep-09	9:35	1.0	441204	7563094	NFC	NIC
Reference Bay	Reference Site	MT	20	5-Sep-09	9:57	6-Sep-09	9:35	0.7	441186	7563093	NFC	NIC

Note:
Gear: MT = Minnow trap.
Fish: AS = Arctic shanny; NFC = No Fish Captured; SP = Sculpin (Myoxocephalus sp.).
Macrobenthos: NIC = No Invertebrates Captured.

Appendix 3.2-6

Set Times, Retrieval Times and Locations of Crab Traps used in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

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Appendix 3.2-6. Set Times, Retrieval Times and Locations of Crab Traps used in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

Location		Gear		Set		Retrieval		UTM				Macrobenthos Catch
Location	Site	Method	#	Date In	Time In	Date Out	Time Out	Depth	Easting	Northing	Fish Catch Summary	Summary
Roberts Bay	Proposed Barge Site	CT	1	29-Jul-09	15:40	30-Jul-09	9:30	9.0	432222	7563543	NFC	29 Isopods
Roberts Bay	Proposed Barge Site	CT	2	29-Jul-09	15:45	30-Jul-09	9:30	10.0	432224	7563580	NFC	6 Isopods
Roberts Bay	Proposed Barge Site	CT	3	29-Jul-09	15:50	30-Jul-09	9:30	10.0	432197	7563592	NFC	36 Isopods
Roberts Bay	Proposed Barge Site	CT	4	29-Jul-09	15:55	30-Jul-09	9:30	10.0	432177	7563566	NFC	30 Isopods
Roberts Bay	Proposed Barge Site	CT	5	29-Jul-09	16:00	30-Jul-09	9:00	9.4	432147	7563576	NFC	25 Isopods
Roberts Bay	Proposed Barge Site	CT	6	30-Jul-09	9:30	31-Jul-09	9:10	6.6	432188	7563520	NFC	NIC
Roberts Bay	Proposed Barge Site	CT	7	30-Jul-09	9:30	31-Jul-09	9:10	3.5	432160	7563520	NFC	NIC
Roberts Bay	Proposed Barge Site	CT	8	30-Jul-09	9:30	31-Jul-09	9:10	5.9	432197	7563502	NFC	NIC
Roberts Bay	Proposed Barge Site	CT	9	30-Jul-09	9:30	31-Jul-09	9:10	5.2	432221	7563470	NFC	NIC
Roberts Bay	Proposed Barge Site	CT	10	30-Jul-09	9:30	31-Jul-09	9:10	9.2	432223	7563672	NFC	4 Isopods
Roberts Bay	Proposed Barge Site	CT	11	30-Jul-09	9:30	31-Jul-09	9:10	8.7	432269	7563623	NFC	10 Isopods
Roberts Bay	Proposed Barge Site	CT	1	21-Aug-09	10:30	22-Aug-09	10:19	7.9	432086	7563690	NFC	NIC
Roberts Bay	Proposed Barge Site	CT	2	21-Aug-09	10:35	22-Aug-09	10:22	7.4	432184	7563575	1 SP	NIC
Roberts Bay	Proposed Barge Site	CT	3	21-Aug-09	10:35	22-Aug-09	10:24	7.4	432219	7563714	NFC	NIC
Roberts Bay	Proposed Barge Site	CT	4	21-Aug-09	10:45	22-Aug-09	10:27	7.6	432163	7563797	NFC	NIC
Roberts Bay	Proposed Barge Site	CT	5	21-Aug-09	10:50	22-Aug-09	10:28	7.9	432208	7563413	NFC	NIC
Roberts Bay	Proposed Barge Site	CT	6	23-Aug-09	14:49	24-Aug-09	15:48	6.2	432235	7563844	1 SP	7 Isopods
Roberts Bay	Proposed Barge Site	CT	7	23-Aug-09	14:53	24-Aug-09	15:49	7.5	432223	7563674	NFC	NIC
Roberts Bay	Proposed Barge Site	CT	8	23-Aug-09	14:56	24-Aug-09	15:53	7.3	432199	7563589	NFC	NIC
Roberts Bay	Proposed Barge Site	CT	9	23-Aug-09	14:58	24-Aug-09	15:55	7.7	432124	7563662	NFC	NIC
Roberts Bay	Proposed Barge Site	CT	10	23-Aug-09	15:00	24-Aug-09	15:57	7.9	432103	7563687	NFC	NIC
Roberts Bay	Proposed Barge Site	CT	11	26-Aug-09	9:53	27-Aug-09	8:50	8.0	432076	7563701	NFC	NIC
Roberts Bay	Proposed Barge Site	CT	12	26-Aug-09	9:55	27-Aug-09	8:51	7.6	432070	7563676	NFC	NIC
Roberts Bay	Proposed Barge Site	CT	13	26-Aug-09	9:57	27-Aug-09	8:52	7.4	432080	7563646	NFC	NIC
Roberts Bay	Proposed Barge Site	CT	14	26-Aug-09	9:59	27-Aug-09	8:53	6.2	432069	7563622	NFC	NIC
Roberts Bay	Proposed Barge Site	CT	15	26-Aug-09	10:01	27-Aug-09	8:55	6.7	432085	7563599	NFC	NIC
Roberts Bay	Proposed Port Site	CT	1	31-Jul-09	14:30	1-Aug-09	15:30	9.0	431241	7565463	NFC	NIC
Roberts Bay	Proposed Port Site	CT	2	31-Jul-09	14:30	1-Aug-09	15:30	10.0	431252	7565486	NFC	NIC
Roberts Bay	Proposed Port Site	CT	3	31-Jul-09	14:30	1-Aug-09	15:30	9.4	431265	7565497	NFC	NIC
Roberts Bay	Proposed Port Site	CT	4	31-Jul-09	14:30	1-Aug-09	15:30	9.4	431268	7565547	NFC	2 Sea Urchins
Roberts Bay	Proposed Port Site	CT	5	31-Jul-09	14:30	1-Aug-09	15:30	7.9	431290	7565571	NFC	NIC
Roberts Bay	Proposed Port Site	CT	6	31-Jul-09	14:30	1-Aug-09	15:30	12.0	431310	7565605	NFC	NIC
Roberts Bay	Proposed Port Site	CT	7	1-Aug-09	13:30	2-Aug-09	13:30	6.2	431205	7565476	NFC	NIC
Roberts Bay	Proposed Port Site	CT	8	1-Aug-09	13:30	2-Aug-09	13:30	5.6	431234	7565499	NFC	NIC
Roberts Bay	Proposed Port Site	CT	9	1-Aug-09	13:30	2-Aug-09	13:30	10.0	431252	7565528	NFC	NIC
Roberts Bay	Proposed Port Site	CT	10	1-Aug-09	13:30	2-Aug-09	13:30	5.8	431255	7565544	NFC	2 Sea Urchins
Roberts Bay	Proposed Port Site	CT	11	1-Aug-09	13:30	2-Aug-09	13:30	3.9	431273	7565556	NFC	NIC
Roberts Bay	Proposed Port Site	CT	12	1-Aug-09	13:30	2-Aug-09	13:30	4.5	431304	7565606	1 GC	NIC
Roberts Bay	Proposed Port Site	CT	13	2-Aug-09	13:45	3-Aug-09	8:50	20.0	431262	7565445	NFC	1 Crab; 3 Snails
Roberts Bay	Proposed Port Site	CT	14	2-Aug-09	13:45	3-Aug-09	8:55	26.0	431276	7565415	NFC	1 Crab; 16 Snails
Roberts Bay	Proposed Port Site	CT	15	2-Aug-09	13:45	3-Aug-09	9:00	23.0	431293	7565419	NFC	2 Crabs; 3 Snails
Roberts Bay	Proposed Port Site	CT	1	22-Aug-09	10:54	23-Aug-09	14:31	26.0	431334	7565510	NFC	NIC
Roberts Bay	Proposed Port Site	CT	2	22-Aug-09	11:00	23-Aug-09	14:33	34.5	431384	7565519	NFC	1 Crab
Roberts Bay	Proposed Port Site	CT	3	22-Aug-09	11:09	23-Aug-09	14:25	17.6	431321	7565591	1 AS	NIC
Roberts Bay	Proposed Port Site	CT	4	22-Aug-09	11:19	23-Aug-09	14:24	30.5	431359	7565577	NFC	NIC
Roberts Bay	Proposed Port Site	CT	5	22-Aug-09	11:21	23-Aug-09	14:29	11.3	431334	7565672	1 AS; 1 SP	1 Isopod; 1 Sea Urchin
Roberts Bay	Proposed Port Site	CT	6	29-Aug-09	10:33	30-Aug-09	9:20	24.9	431329	7565569	NFC	1 Crab
Roberts Bay	Proposed Port Site	CT	7	29-Aug-09	10:33	30-Aug-09	9:20	20.5	431315	7565560	NFC	1 Crab
Roberts Bay	Proposed Port Site	CT	8	29-Aug-09	10:41	30-Aug-09	9:20	32.0	431336	7565524	NFC	1 Crab
Roberts Bay	Proposed Port Site	CT	9	29-Aug-09	10:41	30-Aug-09	9:20	7.2	431250	7565496	NFC	NIC
Roberts Bay	Proposed Port Site	CT	10	29-Aug-09	11:10	30-Aug-09	9:33	23.8	431334	7565458	NFC	2 Crabs

Note:
Catch Summary includes macrobenthos that escaped prior to being sampled for biological data.
Gear: CT = Crab trap.
Fish: AS = Arctic shanny; GC = Greenland cod; NFC = No Fish Captured; SP = Sculpin (Myoxocephalus sp.).
Macrobenthos: NIC = No Invertebrates Captured.

Appendix 3.2-6. Set Times, Retrieval Times and Locations of Crab Traps used in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

Location		Gear		Set		Retrieval		UTM				Macrobenthos Catch
Location	Site	Method	#	Date In	Time In	Date Out	Time Out	Depth	Easting	Northing	Fish Catch Summary	Summary
Reference Bay	Reference Site	CT	1	8-Aug-09	15:00	9-Aug-09	9:15	12.0	441349	7563333	NFC	NIC
Reference Bay	Reference Site	CT	2	8-Aug-09	15:00	9-Aug-09	9:15	12.0	441347	7563293	NFC	NIC
Reference Bay	Reference Site	CT	3	8-Aug-09	15:00	9-Aug-09	9:15	9.0	441328	7563271	NFC	NIC
Reference Bay	Reference Site	CT	4	8-Aug-09	15:00	9-Aug-09	9:15	9.0	441279	7563131	NFC	NIC
Reference Bay	Reference Site	CT	5	8-Aug-09	15:00	9-Aug-09	9:15	8.5	441260	7563096	1 SP	1 Mussel
Reference Bay	Reference Site	CT	6	8-Aug-09	15:00	9-Aug-09	9:15	9.5	441249	7563069	NFC	NIC
Reference Bay	Reference Site	CT	7	9-Aug-09	9:20	10-Aug-09	9:00	28.0	441456	7563271	NFC	1 Crab
Reference Bay	Reference Site	CT	8	9-Aug-09	9:30	10-Aug-09	9:00	18.0	441313	7563026	NFC	NIC
Reference Bay	Reference Site	CT	9	9-Aug-09	9:35	10-Aug-09	9:00	28.0	441448	7563161	NFC	1 Crab; 1 Starfish
Reference Bay	Reference Site	CT	10	9-Aug-09	9:45	10-Aug-09	9:00	20.0	441361	7563064	NFC	NIC
Reference Bay	Reference Site	CT	1	4-Sep-09	11:06	5-Sep-09	9:13	8.4	441244	7563063	NFC	NIC
Reference Bay	Reference Site	CT	2	4-Sep-09	11:09	5-Sep-09	9:17	15.7	441339	7563124	NFC	2 Crabs
Reference Bay	Reference Site	CT	3	4-Sep-09	11:12	5-Sep-09	9:30	19.5	441394	7563205	NFC	2 Crabs
Reference Bay	Reference Site	CT	4	4-Sep-09	11:16	5-Sep-09	9:37	20.5	441411	7563231	NFC	3 Crabs; 4 Snails
Reference Bay	Reference Site	CT	5	4-Sep-09	11:22	5-Sep-09	9:43	21.3	441414	7563306	NFC	1 Crab
Reference Bay	Reference Site	CT	6	5-Sep-09	9:19	6-Sep-09	9:05	13.8	441317	7563090	NFC	NIC
Reference Bay	Reference Site	CT	7	5-Sep-09	9:21	6-Sep-09	9:05	18.9	441465	7563046	NFC	NIC
Reference Bay	Reference Site	CT	8	5-Sep-09	9:32	6-Sep-09	9:05	20.1	441435	7563158	NFC	2 Crabs; 1 Starfish; 2 Snails
Reference Bay	Reference Site	CT	9	5-Sep-09	9:39	6-Sep-09	9:05	22.2	441441	7563248	NFC	NIC
Reference Bay	Reference Site	CT	10	5-Sep-09	9:42	6-Sep-09	9:19	22.9	441502	7563248	NFC	2 Crabs

Note:
Catch Summary includes macrobenthos that escaped prior to being sampled for biological data.
Gear: CT = Crab trap.
Fish: AS = Arctic shanny; GC = Greenland cod; NFC = No Fish Captured; SP = Sculpin (Myoxocephalus sp.).
Macrobenthos: NIC = No Invertebrates Captured.

Appendix 3.2-7

Biological Data for Fish Sampled in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

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Appendix 3.2-7. Biological Data for Fish Sampled in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

Location		Gear				Individual			Length	Weight	Condition	Stomach	Aging Structures			Age	
Location	Site	Method	Type	#	Date	Number	Field Sample	Species	(mm)	(g)	(g/mm^3)	Samples	Otolith	Scales	Fin Clip	(years)	Comments
Roberts Bay	Proposed Barge Site	GN	F	1	29-Jul-09	1	-	PH	131	22	0.98	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	1	29-Jul-09	2	-	PH	138	25	0.95	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	1	29-Jul-09	3	-	PH	142	28	0.98	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	1	29-Jul-09	4	-	PH	130	19	0.86	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	1	29-Jul-09	5	-	PH	136	24	0.95	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	1	29-Jul-09	6	-	PH	132	22	0.96	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	1	29-Jul-09	7	-	PH	129	19	0.89	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	1	29-Jul-09	8	-	PH	126	19	0.95	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	1	29-Jul-09	9	-	PH	134	22	0.91	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	1	29-Jul-09	10	-	PH	128	19	0.91	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	1	29-Jul-09	11	-	PH	138	22	0.84	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	1	29-Jul-09	12	-	PH	129	22	1.02	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	1	29-Jul-09	13	-	PH	128	18	0.86	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	1	29-Jul-09	14	-	PH	125	18	0.92	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	1	29-Jul-09	15	-	PH	134	22	0.91	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	1	29-Jul-09	16	-	PH	132	19	0.83	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	1	29-Jul-09	17	-	CP	146	21	0.67	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	1	29-Jul-09	18	-	CP	142	21	0.73	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	1	29-Jul-09	19	-	CP	143	17	0.58	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	1	29-Jul-09	20	-	PH	132	20	0.87	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	1	29-Jul-09	21	-	PH	125	17	0.87	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	1	29-Jul-09	22	-	PH	124	17	0.89	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	1	29-Jul-09	23	-	PH	134	20	0.83	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	1	29-Jul-09	24	-	PH	133	21	0.89	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	1	29-Jul-09	25	-	PH	134	23	0.96	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	1	29-Jul-09	26	-	PH	131	21	0.93	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	1	29-Jul-09	27	-	PH	133	21	0.89	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	1	29-Jul-09	28	-	PH	131	20	0.89	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	1	29-Jul-09	29	-	PH	143	26	0.89	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	1	29-Jul-09	30	-	PH	132	23	1.00	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	1	29-Jul-09	31	-	CP	141	27	0.96	-	-	-	-	-	Photo 158
Roberts Bay	Proposed Barge Site	GN	S	1	29-Jul-09	32	-	CP	148	23	0.71	-	-	-	-	-	Photo 159
Roberts Bay	Proposed Barge Site	GN	S	1	29-Jul-09	33	-	CP	143	24	0.82	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	1	29-Jul-09	34	-	CP	142	19	0.66	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	1	29-Jul-09	35	-	CP	146	24	0.77	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	1	29-Jul-09	36	-	PH	128	21	1.00	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	1	29-Jul-09	37	-	FL	128	23	1.10	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	2	30-Jul-09	38	1001	PH	264	170	0.92	-	-	X	-	-	
Roberts Bay	Proposed Barge Site	GN	F	2	30-Jul-09	39	1002	PH	292	223	0.90	-	-	X	-	10	Photo 190-191
Roberts Bay	Proposed Barge Site	GN	F	2	30-Jul-09	40	1003	PH	283	206	0.91	-	-	X	-	11	
Roberts Bay	Proposed Barge Site	GN	F	2	30-Jul-09	41	-	PH	135	22	0.89	-	-	-	-	-	Photo 192
Roberts Bay	Proposed Barge Site	GN	F	2	30-Jul-09	42	-	PH	132	20	0.87	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	2	30-Jul-09	43	-	PH	135	23	0.93	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	2	30-Jul-09	44	-	PH	128	18	0.86	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	2	30-Jul-09	45	-	PH	145	23	0.75	-	-	-	-	-	Mortality
Roberts Bay	Proposed Barge Site	GN	F	2	30-Jul-09	46	-	CP	142	21	0.73	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	2	30-Jul-09	47	-	SP	298	267	1.01	-	-	-	-	-	Photo 193-197
Roberts Bay	Proposed Barge Site	GN	F	3	30-Jul-09	48	-	PH	132	22	0.96	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	3	30-Jul-09	49	-	PH	131	22	0.98	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	3	30-Jul-09	50	-	PH	137	25	0.97	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	3	30-Jul-09	51	-	PH	131	24	1.07	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	3	30-Jul-09	52	-	FL	145	31	1.02	-	-	-	-	-	

Notes:
General Method: BS = Beach seine; CT = Crab trap; GN = Gillnet; LL = Long line; MT = Minnow trap.
Gear Type: F = Floating; S = Sinking.
Species: AC = Arctic char; AF - Arctic flounder; AS = Arctic shanny; CP = Capelin; FL = Unknown flounder; GC = Greenland cod; LD = Longhead Dab; NS = Ninespine stickleback; PH = Pacific herring; SF = Starry flounder; SP = Sculpin (Myoxocephalus sp.).*
**Unknown flounder refers to either a Arctic flounder or a longhead dab.*
Outler fish include Individual Sample Numbers 19, 31, 186, 221 and 227.

Appendix 3.2-7. Biological Data for Fish Sampled in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

Location		Gear				Individual			Length	Weight	Condition	Stomach	Aging Structures			Age	
Location	Site	Method	Type	#	Date	Number	Field Sample	Species	(mm)	(g)	(g/mm^3)	Samples	Otolith	Scales	Fin Clip	(years)	Comments
Roberts Bay	Proposed Barge Site	BS	-	1	30-Jul-09	53	-	SF	135	33	1.34	-	-	-	-	-	Photo 201-202
Roberts Bay	Proposed Barge Site	BS	-	1	30-Jul-09	54	-	FL	133	30	1.28	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	1	30-Jul-09	55	-	SC	79	3	0.61	-	-	-	-	-	Photo 203-204
Roberts Bay	Proposed Barge Site	BS	-	1	30-Jul-09	56	-	SP	110	11	0.83	-	-	-	-	-	Photo 205
Roberts Bay	Proposed Barge Site	BS	-	1	30-Jul-09	57	-	SP	125	18	0.92	-	-	-	-	-	Photo 206
Roberts Bay	Proposed Barge Site	BS	-	1	30-Jul-09	58	-	SP	73	5	1.29	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	1	30-Jul-09	59	-	SP	76	7	1.59	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	1	30-Jul-09	60	-	SP	71	4	1.12	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	1	30-Jul-09	61	-	SP	22	1	9.39	-	-	-	-	-	Photo 207-208
Roberts Bay	Proposed Barge Site	BS	-	1	30-Jul-09	62	-	SP	19	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	1	30-Jul-09	63	-	SP	23	-	-	-	-	-	-	-	Photo 209
Roberts Bay	Proposed Barge Site	BS	-	1	30-Jul-09	64	-	SP	19	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	1	30-Jul-09	65	-	SP	22	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	1	30-Jul-09	66	-	SP	21	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	1	30-Jul-09	67	-	SP	20	-	-	-	-	-	-	-	Photo 210
Roberts Bay	Proposed Barge Site	BS	-	2	30-Jul-09	68	-	FL	145	46	1.51	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	2	30-Jul-09	69	-	FL	121	24	1.35	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	2	30-Jul-09	70	-	LD	134	34	1.41	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	2	30-Jul-09	71	-	SP	117	11	0.69	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	2	30-Jul-09	72	-	SP	124	14	0.73	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	2	30-Jul-09	73	-	SP	118	13	0.79	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	2	30-Jul-09	74	-	SP	81	3	0.56	-	-	-	-	-	Photo 211
Roberts Bay	Proposed Barge Site	BS	-	2	30-Jul-09	75	-	SP	84	3	0.51	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	2	30-Jul-09	76	-	SP	66	2	0.70	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	2	30-Jul-09	77	-	SP	72	2	0.54	-	-	-	-	-	Mortality; Photo 212-213
Roberts Bay	Proposed Barge Site	BS	-	2	30-Jul-09	78	-	SP	18	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	2	30-Jul-09	79	-	SP	20	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	2	30-Jul-09	80	-	SP	18	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	2	30-Jul-09	81	-	SP	21	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	2	30-Jul-09	82	-	SP	20	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	2	30-Jul-09	83	-	SP	20	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	2	30-Jul-09	84	-	SP	24	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	2	30-Jul-09	85	-	SP	-	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	2	30-Jul-09	86	-	SP	-	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	2	30-Jul-09	87	-	SP	-	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	2	30-Jul-09	88	-	SP	-	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	2	30-Jul-09	89	-	SP	-	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	4	30-Jul-09	90	-	SC	85	4	0.65	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	4	30-Jul-09	91	-	FL	171	67	1.34	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	4	30-Jul-09	92	-	SP	24	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	4	31-Jul-09	93		PH	133	18	0.77	-	-	-	-	-	Mortality
Roberts Bay	Proposed Barge Site	GN	F	5	31-Jul-09	94		PH	148	20	0.62	-	-	-	-	-	Mortality
Roberts Bay	Proposed Barge Site	GN	S	5	31-Jul-09	95	-	SP	298	339	1.28	-	-	-	-	-	Photo 214, 217, 218
Roberts Bay	Proposed Barge Site	GN	S	5	31-Jul-09	96	-	FL	158	47	1.19	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	5	31-Jul-09	97	-	SC	223	83	0.75	-	-	-	-	-	Mortality; Photo 214-216, 219-220
Roberts Bay	Proposed Barge Site	GN	S	6	31-Jul-09	98	-	SP	269	220	1.13	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	8	31-Jul-09	99	-	SP	24	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	8	31-Jul-09	100	-	SP	24	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	8	31-Jul-09	101	-	SP	17	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	MT	-	21	31-Jul-09	102	-	SP	115	12	0.79	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	MT	-	21	31-Jul-09	103	-	SP	112	10	0.71	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	10	11-Aug-09	104	-	AC	451	1042	1.14	-	-	-	-	-	

Notes:
General Method: BS = Beach seine; CT = Crab trap; GN = Gillnet; LL = Long line; MT = Minnow trap.
Gear Type: F = Floating; S = Sinking.
Species: AC = Arctic char; AF - Arctic flounder; AS = Arctic shanny; CP = Capelin; FL = Unknown flounder; GC = Greenland cod; LD = Longhead Dab; NS = Ninespine stickleback; PH = Pacific herring; SF = Starry flounder; SP = Sculpin (Myoxocephalus sp.).*
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Location		Gear				Individual			Length	Weight	Condition	Stomach	Aging Structures			Age	
Location	Site	Method	Type	#	Date	Number	Field Sample	Species	(mm)	(g)	(g/mm^3)	Samples	Otolith	Scales	Fin Clip	(years)	Comments
Roberts Bay	Proposed Barge Site	GN	F	2	21-Aug-09	105	9	AC	497	1500	1.22	-	-	X	X	5	
Roberts Bay	Proposed Barge Site	GN	F	2	21-Aug-09	106	10	PH	140	21	0.77	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	2	21-Aug-09	107	11	PH	142	21	0.73	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	2	21-Aug-09	108	12	PH	136	24	0.95	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	3	21-Aug-09	109	25	SC	228	69	0.58	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	3	21-Aug-09	110	26	SP	150	25	0.74	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	3	21-Aug-09	111	27	PH	131	10	0.44	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	3	21-Aug-09	112	28	PH	133	21	0.89	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	3	21-Aug-09	113	29	PH	136	28	1.11	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	F	3	21-Aug-09	114	30	AC	483	1280	1.14	-	-	X	X	5	
Roberts Bay	Proposed Barge Site	GN	S	1	21-Aug-09	115	1	SP	320	293	0.89	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	2	21-Aug-09	116	2	SC	227	76	0.65	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	3	21-Aug-09	117	3	SC	340	334	0.85	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	3	21-Aug-09	118	4	SC	370	379	0.75	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	3	21-Aug-09	119	5	SC	297	188	0.72	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	3	21-Aug-09	120	6	SC	290	188	0.77	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	3	21-Aug-09	121	7	SC	296	234	0.90	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	3	21-Aug-09	122	8	SC	262	128	0.71	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	4	21-Aug-09	123	24	PH	250	160	1.02	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	1	21-Aug-09	124	13	AF	186	102	1.59	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	1	21-Aug-09	125	14	LD	123	15	0.81	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	1	21-Aug-09	126	15	AF	155	52	1.40	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	1	21-Aug-09	127	16	SP	79	4	0.81	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	2	21-Aug-09	128	17	SF	111	17	1.24	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	2	21-Aug-09	129	18	AF	167	69	1.48	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	2	21-Aug-09	130	19	AF	134	34	1.41	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	2	21-Aug-09	131	20	AF	159	51	1.27	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	2	21-Aug-09	132	21	AF	142	35	1.22	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	2	21-Aug-09	133	22	SP	109	10	0.77	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	2	21-Aug-09	134	23	SP	70	4	1.17	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	CT	-	2	22-Aug-09	135	31	SP	345	450	1.10	-	-	-	X	6	Photo
Roberts Bay	Proposed Barge Site	GN	S	5	23-Aug-09	136	79	AC	445	1175	1.33	-	-	X	X	5	
Roberts Bay	Proposed Barge Site	GN	S	5	23-Aug-09	137	-	FL	-	-	-	-	-	-	-	-	Escaped
Roberts Bay	Proposed Barge Site	GN	S	6	23-Aug-09	138	99	SP	372	600	1.17	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	6	23-Aug-09	139	100	AC	502	1520	1.20	-	-	X	X	7	Mortality
Roberts Bay	Proposed Barge Site	BS	-	3	23-Aug-09	140	80	AF	117	23	1.44	-	-	-	-	-	Photo 1403-1405
Roberts Bay	Proposed Barge Site	BS	-	3	23-Aug-09	141	81	SP	26	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	3	23-Aug-09	142	82	SP	35	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	3	23-Aug-09	143	83	SP	34	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	3	23-Aug-09	144	84	SP	34	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	3	23-Aug-09	145	85	SP	33	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	4	23-Aug-09	146	86	NS	57	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	4	23-Aug-09	147	87	SP	34	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	4	23-Aug-09	148	88	SP	34	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	4	23-Aug-09	149	89	SP	35	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	4	23-Aug-09	150	90	SP	35	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	4	23-Aug-09	151	91	SP	33	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	4	23-Aug-09	152	92	SP	34	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	4	23-Aug-09	153	93	SP	29	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	4	23-Aug-09	154	94	SP	30	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	4	23-Aug-09	155	95	SP	27	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	4	23-Aug-09	156	96	SP	34	-	-	-	-	-	-	-	

Notes:
General Method: BS = Beach seine; CT = Crab trap; GN = Gillnet; LL = Long line; MT = Minnow trap.
Gear Type: F = Floating; S = Sinking.
Species: AC = Arctic char; AF - Arctic flounder; AS = Arctic shanny; CP = Capelin; FL = Unknown flounder; GC = Greenland cod; LD = Longhead Dab; NS = Ninespine stickleback; PH = Pacific herring; SF = Starry flounder; SP = Sculpin (Myoxocephalus sp.).*
**Unknown flounder refers to either a Arctic flounder or a longhead dab.*
Outler fish include Individual Sample Numbers 19, 31, 186, 221 and 227.

Appendix 3.2-7. Biological Data for Fish Sampled in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

Location		Gear				Individual			Length	Weight	Condition	Stomach	Aging Structures			Age	
Location	Site	Method	Type	#	Date	Number	Field Sample	Species	(mm)	(g)	(g/mm^3)	Samples	Otolith	Scales	Fin Clip	(years)	Comments
Roberts Bay	Proposed Barge Site	BS	-	4	23-Aug-09	157	97	SP	30	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	4	23-Aug-09	158	98	SP	30	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	CT	-	6	24-Aug-09	159	101	SP	330	450	1.25	-	-	-	-	-	Photo 1522-1527
Roberts Bay	Proposed Barge Site	GN	F	6	26-Aug-09	160	251	AC	265	201	1.08	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	7	26-Aug-09	161	127	AF	114	10	0.67	-	-	-	-	-	Photo 4429-4431
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	162	132	SC	274	152	0.74	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	163	133	SC	295	188	0.73	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	164	134	SC	299	172	0.64	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	165	135	SC	217	66	0.65	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	166	136	SC	197	51	0.67	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	167	137	SC	242	90	0.64	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	168	138	SC	269	141	0.72	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	169	139	SC	293	176	0.70	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	170	140	SC	293	176	0.70	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	171	141	SC	279	143	0.66	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	172	142	SC	286	172	0.74	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	173	143	SC	305	220	0.78	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	174	144	SC	293	177	0.70	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	175	145	SC	299	189	0.71	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	176	146	SC	299	192	0.72	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	177	147	SC	292	179	0.72	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	178	148	SC	310	191	0.64	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	179	149	SC	308	212	0.73	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	180	150	SC	261	138	0.78	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	181	151	SC	301	195	0.72	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	182	152	SC	230	81	0.67	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	183	153	SC	280	158	0.72	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	184	154	SC	286	159	0.68	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	185	155	SC	229	82	0.68	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	186	156	SC	97	199	21.80	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	187	157	SC	241	87	0.62	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	188	158	SC	224	78	0.69	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	189	159	SC	229	80	0.67	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	190	160	SC	214	59	0.60	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	191	161	SC	226	66	0.57	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	192	162	SC	225	70	0.61	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	193	163	SC	218	73	0.70	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	194	164	SC	281	153	0.69	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	195	165	SC	259	118	0.68	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	196	166	SC	222	83	0.76	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	197	167	SC	230	74	0.61	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	198	168	SC	290	185	0.76	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	199	169	SC	217	71	0.69	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	200	170	SC	229	76	0.63	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	201	171	SC	282	169	0.75	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	202	172	SC	223	77	0.69	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	203	173	SC	333	274	0.74	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	204	174	SC	225	75	0.66	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	205	175	SC	213	60	0.62	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	206	176	SC	210	60	0.65	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	207	177	SC	282	176	0.78	-	-	-	-	-	Mortality
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	208	178	SC	254	103	0.63	-	-	-	-	-	Mortality

Notes:
General Method: BS = Beach seine; CT = Crab trap; GN = Gillnet; LL = Long line; MT = Minnow trap.
Gear Type: F = Floating; S = Sinking.
Species: AC = Arctic char; AF - Arctic flounder; AS = Arctic shanny; CP = Capelin; FL = Unknown flounder; GC = Greenland cod; LD = Longhead Dab; NS = Ninespine stickleback; PH = Pacific herring; SF = Starry flounder; SP = Sculpin (Myoxocephalus sp.).*
**Unknown flounder refers to either a Arctic flounder or a longhead dab.*
Outler fish include Individual Sample Numbers 19, 31, 186, 221 and 227.

Appendix 3.2-7. Biological Data for Fish Sampled in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

Location		Gear				Individual			Length	Weight	Condition	Stomach	Aging Structures			Age	
Location	Site	Method	Type	#	Date	Number	Field Sample	Species	(mm)	(g)	(g/mm^3)	Samples	Otolith	Scales	Fin Clip	(years)	Comments
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	209	179	SC	242	100	0.71	-	-	-	-	-	Mortality
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	210	180	SC	301	195	0.72	-	-	-	-	-	Mortality
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	211	181	GC	645	3300	1.23	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	212	182	SP	340	483	1.23	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	213	183	SF	481	1483	1.33	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	214	184	SF	430	1189	1.50	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	8	26-Aug-09	215	185	LD	259	182	1.05	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	216	189	SC	302	196	0.71	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	217	190	SC	311	230	0.76	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	218	191	SC	266	130	0.69	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	219	192	SC	284	153	0.67	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	220	193	SC	290	119	0.49	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	221	194	SC	238	286	2.12	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	222	195	SC	306	208	0.73	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	223	196	SC	278	140	0.65	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	224	197	SC	300	190	0.70	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	225	198	SC	281	154	0.69	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	226	199	SC	291	183	0.74	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	227	200	SC	193	180	2.50	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	228	201	SC	303	201	0.72	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	229	202	SC	272	130	0.65	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	230	203	SC	220	69	0.65	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	231	204	SC	279	155	0.71	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	232	205	SC	306	192	0.67	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	233	206	SC	280	140	0.64	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	234	207	SC	215	60	0.60	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	235	208	SC	216	64	0.64	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	236	209	SC	233	89	0.70	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	237	210	SC	289	160	0.66	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	238	211	SC	245	98	0.67	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	239	212	SC	229	81	0.67	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	240	213	SC	319	244	0.75	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	241	214	SC	373	452	0.87	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	242	215	SC	260	127	0.72	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	243	216	SC	275	145	0.70	-	-	-	-	-	Mortality
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	244	217	SC	309	198	0.67	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	245	218	SC	227	75	0.64	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	246	219	SC	329	238	0.67	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	247	220	SC	214	64	0.65	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	248	221	SC	220	64	0.60	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	249	222	SC	223	62	0.56	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	250	223	SC	300	185	0.69	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	251	224	SC	227	76	0.65	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	252	225	SC	237	79	0.59	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	253	226	SC	280	156	0.71	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	254	227	SC	190	40	0.58	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	255	228	SC	220	70	0.66	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	256	229	SC	230	76	0.62	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	257	230	SC	233	88	0.70	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	258	231	SC	284	111	0.48	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	259	232	SC	229	74	0.62	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	260	233	SC	288	168	0.70	-	-	-	-	-	

Notes:
General Method: BS = Beach seine; CT = Crab trap; GN = Gillnet; LL = Long line; MT = Minnow trap.
Gear Type: F = Floating; S = Sinking.
Species: AC = Arctic char; AF - Arctic flounder; AS = Arctic shanny; CP = Capelin; FL = Unknown flounder; GC = Greenland cod; LD = Longhead Dab; NS = Ninespine stickleback; PH = Pacific herring; SF = Starry flounder; SP = Sculpin (Myoxocephalus sp.).*
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Location		Gear				Individual			Length	Weight	Condition	Stomach	Aging Structures			Age	
Location	Site	Method	Type	#	Date	Number	Field Sample	Species	(mm)	(g)	(g/mm^3)	Samples	Otolith	Scales	Fin Clip	(years)	Comments
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	261	234	SC	209	63	0.69	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	262	235	SC	225	69	0.61	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	263	236	SC	213	65	0.67	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	264	237	SC	235	85	0.65	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	265	238	SC	285	165	0.71	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	266	239	SC	220	66	0.62	-	-	-	-	-	Mortality
Roberts Bay	Proposed Barge Site	GN	S	9	26-Aug-09	267	240	AF	139	34	1.27	-	-	-	-	-	Spots on fin and right eye
Roberts Bay	Proposed Barge Site	LL	-	2	26-Aug-09	268	128	SC	440	653	0.77	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	LL	-	2	26-Aug-09	269	129	SC	321	270	0.82	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	LL	-	2	26-Aug-09	270	130	SC	391	442	0.74	-	-	-	-	-	Photo 4459-4462
Roberts Bay	Proposed Barge Site	LL	-	2	26-Aug-09	271	131	SC	274	139	0.68	-	-	-	-	-	Mortality
Roberts Bay	Proposed Barge Site	LL	-	3	26-Aug-09	272	186	SC	295	173	0.67	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	LL	-	3	26-Aug-09	273	187	SC	309	236	0.80	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	LL	-	3	26-Aug-09	274	188	SC	340	311	0.79	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	5	26-Aug-09	275	241	SP	34	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	5	26-Aug-09	276	242	SP	34	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	5	26-Aug-09	277	243	SP	34	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	5	26-Aug-09	278	244	NS	41	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	6	26-Aug-09	279	245	SP	33	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	6	26-Aug-09	280	246	SP	33	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	6	26-Aug-09	281	247	SP	36	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	6	26-Aug-09	282	248	SP	38	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	6	26-Aug-09	283	249	SP	34	-	-	-	-	-	-	-	
Roberts Bay	Proposed Barge Site	BS	-	7	26-Aug-09	284	250	SP	55	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	F	1	1-Aug-09	285	1005	PH	269	185	0.95	-	-	X	-	10	
Roberts Bay	Proposed Port Site	GN	F	1	1-Aug-09	286	1006	PH	273	209	1.03	-	-	X	-	10	
Roberts Bay	Proposed Port Site	GN	F	1	1-Aug-09	287	1007	PH	268	182	0.95	-	-	X	-	9	
Roberts Bay	Proposed Port Site	GN	F	1	1-Aug-09	288	1008	PH	274	190	0.92	-	-	X	-	10	
Roberts Bay	Proposed Port Site	GN	F	1	1-Aug-09	289	1009	PH	282	209	0.93	-	-	X	-	11	
Roberts Bay	Proposed Port Site	GN	F	1	1-Aug-09	290	1010	PH	248	146	0.96	-	-	X	-	8	
Roberts Bay	Proposed Port Site	GN	F	1	1-Aug-09	291	1011	PH	257	175	1.03	-	-	X	-	9	
Roberts Bay	Proposed Port Site	GN	F	1	1-Aug-09	292	1012	PH	251	156	0.99	-	-	X	-	9	
Roberts Bay	Proposed Port Site	GN	F	1	1-Aug-09	293	1013	PH	283	229	1.01	-	-	X	-	11	
Roberts Bay	Proposed Port Site	GN	F	1	1-Aug-09	294	1014	PH	233	112	0.89	-	-	X	-	5	
Roberts Bay	Proposed Port Site	GN	F	1	1-Aug-09	295	1015	PH	266	199	1.06	-	-	X	-	10	
Roberts Bay	Proposed Port Site	GN	F	1	1-Aug-09	296	1016	PH	257	152	0.90	-	-	X	-	9	
Roberts Bay	Proposed Port Site	GN	F	1	1-Aug-09	297	1017	PH	264	175	0.95	-	-	X	-	10	
Roberts Bay	Proposed Port Site	GN	F	1	1-Aug-09	298	-	PH	131	19	0.85	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	F	1	1-Aug-09	299	-	PH	142	26	0.91	-	-	-	-	-	Mortality
Roberts Bay	Proposed Port Site	GN	F	1	1-Aug-09	300	1021	PH	278	200	0.93	X	-	X	-	-	Mortality
Roberts Bay	Proposed Port Site	GN	F	1	1-Aug-09	301	1022	PH	253	163	1.01	X	-	X	-	8	Mortality
Roberts Bay	Proposed Port Site	GN	F	1	1-Aug-09	302	1023	PH	264	167	0.91	X	-	X	-	8	Mortality
Roberts Bay	Proposed Port Site	GN	F	1	1-Aug-09	303	1024	PH	283	203	0.90	X	-	X	-	7	Mortality
Roberts Bay	Proposed Port Site	GN	F	1	1-Aug-09	304	1025	PH	292	258	1.04	X	-	X	-	11	Mortality
Roberts Bay	Proposed Port Site	GN	F	1	1-Aug-09	305	-	PH	-	-	-	-	-	-	-	-	Escaped
Roberts Bay	Proposed Port Site	GN	F	1	1-Aug-09	306	-	PH	-	-	-	-	-	-	-	-	Escaped
Roberts Bay	Proposed Port Site	GN	F	1	1-Aug-09	307	-	PH	-	-	-	-	-	-	-	-	Escaped
Roberts Bay	Proposed Port Site	GN	F	1	1-Aug-09	308	-	PH	-	-	-	-	-	-	-	-	Escaped
Roberts Bay	Proposed Port Site	GN	F	1	1-Aug-09	309	-	PH	-	-	-	-	-	-	-	-	Escaped
Roberts Bay	Proposed Port Site	GN	S	1	1-Aug-09	310	1004	PH	277	206	0.97	X	-	X	-	12	Mortality
Roberts Bay	Proposed Port Site	LL	-	1	1-Aug-09	311	1026	GC	389	620	1.05	-	-	X	X	3	
Roberts Bay	Proposed Port Site	LL	-	1	1-Aug-09	312	1027	GC	402	801	1.23	-	-	X	X	3	

Notes:
General Method: BS = Beach seine; CT = Crab trap; GN = Gillnet; LL = Long line; MT = Minnow trap.
Gear Type: F = Floating; S = Sinking.
Species: AC = Arctic char; AF - Arctic flounder; AS = Arctic shanny; CP = Capelin; FL = Unknown flounder; GC = Greenland cod; LD = Longhead Dab; NS = Ninespine stickleback; PH = Pacific herring; SF = Starry flounder; SP = Sculpin (Myoxocephalus sp.).*
**Unknown flounder refers to either a Arctic flounder or a longhead dab.*
Outler fish include Individual Sample Numbers 19, 31, 186, 221 and 227.

Appendix 3.2-7. Biological Data for Fish Sampled in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

Location		Gear				Individual			Length	Weight	Condition	Stomach	Aging Structures			Age	
Location	Site	Method	Type	#	Date	Number	Field Sample	Species	(mm)	(g)	(g/mm^3)	Samples	Otolith	Scales	Fin Clip	(years)	Comments
Roberts Bay	Proposed Port Site	LL	-	1	1-Aug-09	313	1028	GC	469	1105	1.07	-	-	X	X	5	
Roberts Bay	Proposed Port Site	LL	-	1	1-Aug-09	314	1029	GC	468	1174	1.15	-	-	X	X	6	
Roberts Bay	Proposed Port Site	BS	-	1	1-Aug-09	315	1018	AC	215	102	1.03	-	-	X	X	3	
Roberts Bay	Proposed Port Site	BS	-	1	1-Aug-09	316	1019	AC	253	142	0.88	-	-	X	X	3	
Roberts Bay	Proposed Port Site	BS	-	1	1-Aug-09	317	1020	AC	206	78	0.89	-	-	X	X	4	
Roberts Bay	Proposed Port Site	MT	-	2	1-Aug-09	318	-	SP	86	3	0.47	-	-	-	-	-	
Roberts Bay	Proposed Port Site	MT	-	2	1-Aug-09	319	-	SP	85	7	1.14	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	F	2	2-Aug-09	320	1030	PH	247	161	1.07	-	-	X	-	8	
Roberts Bay	Proposed Port Site	GN	F	2	2-Aug-09	321	1031	PH	260	170	0.97	-	-	X	-	9	
Roberts Bay	Proposed Port Site	GN	F	2	2-Aug-09	322	1032	PH	248	144	0.94	-	-	X	-	7	
Roberts Bay	Proposed Port Site	GN	F	2	2-Aug-09	323	1033	PH	265	172	0.92	-	-	X	-	9	
Roberts Bay	Proposed Port Site	GN	F	2	2-Aug-09	324	1034	PH	251	151	0.95	-	-	X	-	9	
Roberts Bay	Proposed Port Site	GN	F	2	2-Aug-09	325	1035	PH	257	156	0.92	-	-	X	-	8	
Roberts Bay	Proposed Port Site	GN	F	2	2-Aug-09	326	1036	PH	268	189	0.98	-	-	X	-	8	
Roberts Bay	Proposed Port Site	GN	F	2	2-Aug-09	327	1037	PH	290	209	0.86	X	-	X	-	12	Mortality
Roberts Bay	Proposed Port Site	GN	F	2	2-Aug-09	328	1038	PH	254	163	0.99	X	-	X	-	6	Mortality
Roberts Bay	Proposed Port Site	GN	F	2	2-Aug-09	329	1039	PH	263	180	0.99	X	-	X	-	7	Mortality
Roberts Bay	Proposed Port Site	GN	F	2	2-Aug-09	330	1040	PH	285	220	0.95	X	-	X	-	-	Mortality
Roberts Bay	Proposed Port Site	GN	F	2	2-Aug-09	331	1041	PH	243	130	0.91	X	-	X	-	9	Mortality
Roberts Bay	Proposed Port Site	GN	F	2	2-Aug-09	332	1042	PH	264	170	0.92	-	-	X	-	10	Mortality
Roberts Bay	Proposed Port Site	GN	F	2	2-Aug-09	333	1043	PH	268	188	0.98	-	-	X	-	9	Mortality
Roberts Bay	Proposed Port Site	GN	F	2	2-Aug-09	334	1044	PH	291	232	0.94	-	-	X	-	12	Mortality
Roberts Bay	Proposed Port Site	GN	F	2	2-Aug-09	335	-	PH	248	143	0.94	-	-	-	-	-	Mortality
Roberts Bay	Proposed Port Site	GN	F	2	2-Aug-09	336	-	PH	274	205	1.00	-	-	-	-	-	Mortality
Roberts Bay	Proposed Port Site	GN	F	2	2-Aug-09	337	-	PH	240	146	1.06	-	-	-	-	-	Mortality
Roberts Bay	Proposed Port Site	GN	F	2	2-Aug-09	338	-	PH	251	164	1.04	-	-	-	-	-	Mortality
Roberts Bay	Proposed Port Site	GN	F	2	2-Aug-09	339	-	PH	265	177	0.95	-	-	-	-	-	Mortality
Roberts Bay	Proposed Port Site	GN	F	2	2-Aug-09	340	-	PH	274	196	0.95	-	-	-	-	-	Mortality
Roberts Bay	Proposed Port Site	GN	S	3	2-Aug-09	341	-	PH	251	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	S	4	2-Aug-09	342	-	PH	246	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	3	2-Aug-09	343	-	SP	52	1	0.71	-	-	-	-	-	
Roberts Bay	Proposed Port Site	MT	-	13	2-Aug-09	344	-	SP	98	6	0.64	-	-	-	-	-	
Roberts Bay	Proposed Port Site	MT	-	13	2-Aug-09	345	-	SP	89	5	0.71	-	-	-	-	-	
Roberts Bay	Proposed Port Site	MT	-	15	2-Aug-09	346	-	SP	128	15	0.72	-	-	-	-	-	
Roberts Bay	Proposed Port Site	MT	-	15	2-Aug-09	347	-	SP	152	31	0.88	-	-	-	-	-	
Roberts Bay	Proposed Port Site	MT	-	15	2-Aug-09	348	-	SP	139	21	0.78	-	-	-	-	-	
Roberts Bay	Proposed Port Site	MT	-	16	2-Aug-09	349	-	SP	100	8	0.80	-	-	-	-	-	
Roberts Bay	Proposed Port Site	CT	-	12	2-Aug-09	350	1045	GC	492	1290	1.08	-	-	X	X	8	
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	351	-	PH	275	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	352	-	PH	225	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	353	-	PH	265	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	354	-	PH	280	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	355	-	PH	285	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	356	-	PH	270	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	357	-	PH	225	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	358	-	PH	265	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	359	-	PH	270	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	360	-	PH	235	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	361	-	PH	130	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	362	-	PH	130	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	363	-	PH	135	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	364	-	PH	145	-	-	-	-	-	-	-	

Notes:
General Method: BS = Beach seine; CT = Crab trap; GN = Gillnet; LL = Long line; MT = Minnow trap.
Gear Type: F = Floating; S = Sinking.
Species: AC = Arctic char; AF - Arctic flounder; AS = Arctic shanny; CP = Capelin; FL = Unknown flounder; GC = Greenland cod; LD = Longhead Dab; NS = Ninespine stickleback; PH = Pacific herring; SF = Starry flounder; SP = Sculpin (Myoxocephalus sp.).*
**Unknown flounder refers to either a Arctic flounder or a longhead dab.*
Outler fish include Individual Sample Numbers 19, 31, 186, 221 and 227.

Appendix 3.2-7. Biological Data for Fish Sampled in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

Location		Gear				Individual			Length	Weight	Condition	Stomach	Aging Structures			Age	
Location	Site	Method	Type	#	Date	Number	Field Sample	Species	(mm)	(g)	(g/mm^3)	Samples	Otolith	Scales	Fin Clip	(years)	Comments
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	365	-	PH	135	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	366	-	PH	130	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	367	-	PH	140	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	368	-	PH	140	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	369	-	PH	135	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	370	-	PH	135	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	371	-	PH	140	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	372	-	PH	120	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	373	-	PH	135	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	374	-	PH	130	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	375	-	PH	130	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	376	-	PH	125	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	377	-	PH	145	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	378	-	PH	135	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	379	-	PH	140	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	380	-	PH	141	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	381	-	PH	136	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	382	-	PH	133	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	383	-	PH	135	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	384	-	PH	127	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	385	1046	AC	232	125	1.00	-	-	X	X	3	
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	386	1047	AC	242	139	0.98	-	-	X	X	3	
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	387	1048	AC	591	2100	1.02	-	-	X	X	12	
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	388	1049	AC	255	156	0.94	-	X	X	X	4	Mortality
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	389	-	PH	130	-	-	-	-	-	-	-	Mortality
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	390	-	PH	133	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	391	-	PH	128	-	-	-	-	-	-	-	Mortality
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	392	-	PH	133	-	-	-	-	-	-	-	Mortality
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	393	-	PH	129	-	-	-	-	-	-	-	Mortality
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	394	-	PH	130	-	-	-	-	-	-	-	Mortality
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	395	-	PH	144	-	-	-	-	-	-	-	Mortality
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	396	-	PH	127	-	-	-	-	-	-	-	Mortality
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	397	-	PH	145	-	-	-	-	-	-	-	Mortality
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	398	-	PH	134	-	-	-	-	-	-	-	Mortality
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	399	-	PH	133	-	-	-	-	-	-	-	Mortality
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	400	-	PH	137	-	-	-	-	-	-	-	Mortality
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	401	-	PH	135	-	-	-	-	-	-	-	Mortality
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	402	-	PH	136	-	-	-	-	-	-	-	Mortality
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	403	-	PH	142	-	-	-	-	-	-	-	Mortality
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	404	-	PH	132	-	-	-	-	-	-	-	Mortality
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	405	-	PH	141	-	-	-	-	-	-	-	Mortality
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	406	-	PH	137	-	-	-	-	-	-	-	Mortality
Roberts Bay	Proposed Port Site	GN	S	6	3-Aug-09	407	-	SF	455	1138	1.21	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	S	6	3-Aug-09	408	-	PH	284	197	0.86	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	S	6	3-Aug-09	409	-	AC	-	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	F	1	22-Aug-09	410	51	AC	595	2700	1.28	-	-	X	X	9	
Roberts Bay	Proposed Port Site	GN	F	1	22-Aug-09	411	52	AC	473	1259	1.19	-	-	X	X	5	
Roberts Bay	Proposed Port Site	GN	F	1	22-Aug-09	412	53	AC	300	319	1.18	-	-	X	X	3	
Roberts Bay	Proposed Port Site	GN	F	1	22-Aug-09	413	54	AC	702	3600	1.04	-	-	X	X	10	
Roberts Bay	Proposed Port Site	GN	F	1	22-Aug-09	414	55	AC	222	109	1.00	-	-	X	X	3	
Roberts Bay	Proposed Port Site	GN	F	1	22-Aug-09	415	56	AC	295	267	1.04	-	-	X	X	3	
Roberts Bay	Proposed Port Site	GN	F	1	22-Aug-09	416	57	AC	330	436	1.21	-	X	X	X	4	Mortality

Notes:
General Method: BS = Beach seine; CT = Crab trap; GN = Gillnet; LL = Long line; MT = Minnow trap.
Gear Type: F = Floating; S = Sinking.
Species: AC = Arctic char; AF - Arctic flounder; AS = Arctic shanny; CP = Capelin; FL = Unknown flounder; GC = Greenland cod; LD = Longhead Dab; NS = Ninespine stickleback; PH = Pacific herring; SF = Starry flounder; SP = Sculpin (Myoxocephalus sp.).*
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Outler fish include Individual Sample Numbers 19, 31, 186, 221 and 227.

Appendix 3.2-7. Biological Data for Fish Sampled in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

Location		Gear				Individual			Length	Weight	Condition	Stomach	Aging Structures			Age	
Location	Site	Method	Type	#	Date	Number	Field Sample	Species	(mm)	(g)	(g/mm^3)	Samples	Otolith	Scales	Fin Clip	(years)	Comments
Roberts Bay	Proposed Port Site	GN	F	1	22-Aug-09	417	58	AC	256	170	1.01	-	X	X	X	5	Mortality
Roberts Bay	Proposed Port Site	GN	F	1	22-Aug-09	418	59	PH	271	216	1.09	X	X	X	X	10	Mortality; Photo of reproductive organs
Roberts Bay	Proposed Port Site	GN	F	2	22-Aug-09	419	63	AC	515	1719	1.26	-	-	X	X	5	
Roberts Bay	Proposed Port Site	GN	F	2	22-Aug-09	420	64	AC	452	1080	1.17	-	-	X	X	5	
Roberts Bay	Proposed Port Site	GN	F	2	22-Aug-09	421	65	AC	426	1001	1.29	-	-	X	X	5	
Roberts Bay	Proposed Port Site	GN	F	2	22-Aug-09	422	66	AC	304	312	1.11	-	-	X	X	4	
Roberts Bay	Proposed Port Site	GN	F	2	22-Aug-09	423	67	AC	304	300	1.07	-	-	X	X	4	
Roberts Bay	Proposed Port Site	GN	F	2	22-Aug-09	424	68	AC	389	750	1.27	-	-	X	X	5	
Roberts Bay	Proposed Port Site	GN	F	2	22-Aug-09	425	69	AC	325	388	1.13	-	-	X	X	4	
Roberts Bay	Proposed Port Site	GN	F	2	22-Aug-09	426	70	GC	431	1025	1.28	-	-	X	X	3	Photo
Roberts Bay	Proposed Port Site	GN	S	1	22-Aug-09	427	34	SP	282	255	1.14	-	-	-	-	-	Photo; spotted pattern on ventral side
Roberts Bay	Proposed Port Site	GN	S	1	22-Aug-09	428	35	PH	270	229	1.16	X	X	X	X	10	
Roberts Bay	Proposed Port Site	GN	S	1	22-Aug-09	429	36	PH	270	202	1.03	X	X	X	X	11	Stomach full
Roberts Bay	Proposed Port Site	GN	S	2	22-Aug-09	430	39	GC	399	740	1.16	-	-	X	X	3	Photo
Roberts Bay	Proposed Port Site	BS	-	1	22-Aug-09	431	40	SF	115	20	1.32	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	1	22-Aug-09	432	41	SP	37	0	0.59	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	1	22-Aug-09	433	42	SP	40	0	0.63	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	1	22-Aug-09	434	43	SP	33	0	0.56	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	1	22-Aug-09	435	44	SP	35	0	0.70	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	1	22-Aug-09	436	45	SP	37	0	0.59	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	1	22-Aug-09	437	46	SP	34	0	0.76	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	1	22-Aug-09	438	47	SP	31	0	0.67	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	1	22-Aug-09	439	48	SP	42	1	0.67	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	1	22-Aug-09	440	49	SP	38	0	0.73	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	1	22-Aug-09	441	50	SP	26	0	1.14	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	1	22-Aug-09	442	-	SP	-	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	1	22-Aug-09	443	-	SP	-	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	1	22-Aug-09	444	-	SP	-	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	1	22-Aug-09	445	-	SP	-	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	1	22-Aug-09	446	-	SP	-	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	1	22-Aug-09	447	-	SP	-	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	1	22-Aug-09	448	-	SP	-	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	1	22-Aug-09	449	-	SP	-	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	1	22-Aug-09	450	-	SP	-	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	1	22-Aug-09	451	-	SP	-	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	1	22-Aug-09	452	-	SP	-	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	2	22-Aug-09	453	-	SP	-	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	2	22-Aug-09	454	-	SP	-	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	2	22-Aug-09	455	-	SP	-	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	2	22-Aug-09	456	-	SP	-	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	2	22-Aug-09	457	-	SP	-	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	2	22-Aug-09	458	-	SP	-	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	2	22-Aug-09	459	-	SP	-	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	CT	-	5	23-Aug-09	460	76	SP	35	1	2.33	-	-	-	-	-	
Roberts Bay	Proposed Port Site	CT	-	5	23-Aug-09	461	77	AS	104	8	0.71	-	-	-	-	-	
Roberts Bay	Proposed Port Site	CT	-	3	23-Aug-09	462	78	AS	108	8	0.64	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	F	4	29-Aug-09	463	352	AC	219	104	0.99	-	-	X	X	3	
Roberts Bay	Proposed Port Site	GN	S	4	29-Aug-09	464	327	GC	391	665	1.11	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	S	5	29-Aug-09	465	329	GC	432	880	1.09	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	S	5	29-Aug-09	466	330	SP	185	47	0.74	-	-	-	-	-	Photo 1598-1605
Roberts Bay	Proposed Port Site	GN	S	5	29-Aug-09	467	331	LD	157	42	1.09	-	-	-	-	-	Photo 1606-1607
Roberts Bay	Proposed Port Site	GN	S	6	29-Aug-09	468	353	SC	299	175	0.65	-	-	-	-	-	

Notes:
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Gear Type: F = Floating; S = Sinking.
Species: AC = Arctic char; AF - Arctic flounder; AS = Arctic shanny; CP = Capelin; FL = Unknown flounder; GC = Greenland cod; LD = Longhead Dab; NS = Ninespine stickleback; PH = Pacific herring; SF = Starry flounder; SP = Sculpin (Myoxocephalus sp.).*
**Unknown flounder refers to either a Arctic flounder or a longhead dab.*
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Appendix 3.2-7. Biological Data for Fish Sampled in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

Location		Gear				Individual			Length	Weight	Condition	Stomach	Aging Structures			Age	
Location	Site	Method	Type	#	Date	Number	Field Sample	Species	(mm)	(g)	(g/mm^3)	Samples	Otolith	Scales	Fin Clip	(years)	Comments
Roberts Bay	Proposed Port Site	GN	S	6	29-Aug-09	469	354	GC	395	519	0.84	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	S	6	29-Aug-09	470	355	GC	405	779	1.17	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	S	6	29-Aug-09	471	356	SP	315	305	0.98	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	S	6	29-Aug-09	472	357	AC	337	411	1.07	-	-	X	X	4	
Roberts Bay	Proposed Port Site	GN	S	6	29-Aug-09	473	358	AC	490	1391	1.18	-	-	X	X	6	
Roberts Bay	Proposed Port Site	GN	S	6	29-Aug-09	474	359	AC	510	1449	1.09	-	X	X	X	7	Mortality
Roberts Bay	Proposed Port Site	GN	S	6	29-Aug-09	475	360	AC	305	308	1.09	-	-	X	X	4	
Roberts Bay	Proposed Port Site	GN	S	6	29-Aug-09	476	361	AC	330	390	1.09	-	-	X	X	4	
Roberts Bay	Proposed Port Site	GN	S	6	29-Aug-09	477	362	AC	346	484	1.17	-	-	X	X	4	
Roberts Bay	Proposed Port Site	GN	S	6	29-Aug-09	478	363	AC	340	470	1.20	-	-	X	X	4	
Roberts Bay	Proposed Port Site	GN	S	6	29-Aug-09	479	364	AC	279	239	1.10	-	-	X	X	4	
Roberts Bay	Proposed Port Site	BS	-	4	29-Aug-09	480	332	AF	151	45	1.31	-	-	-	-	-	Photo 1617-1618
Roberts Bay	Proposed Port Site	BS	-	4	29-Aug-09	481	333	SP	34	-	-	-	-	-	-	-	Photo 1619-1623; darker color/patterned
Roberts Bay	Proposed Port Site	BS	-	4	29-Aug-09	482	334	SP	46	-	-	-	-	-	-	-	Photo 1624-1626; lighter color
Roberts Bay	Proposed Port Site	BS	-	4	29-Aug-09	483	335	SP	44	-	-	-	-	-	-	-	Lighter color
Roberts Bay	Proposed Port Site	BS	-	4	29-Aug-09	484	336	SP	44	-	-	-	-	-	-	-	Lighter color
Roberts Bay	Proposed Port Site	BS	-	4	29-Aug-09	485	337	SP	36	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	4	29-Aug-09	486	338	SP	35	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	5	29-Aug-09	487	339	SP	36	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	6	29-Aug-09	488	340	SP	35	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	6	29-Aug-09	489	341	SP	44	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	6	29-Aug-09	490	342	SP	37	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	6	29-Aug-09	491	343	SP	44	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	6	29-Aug-09	492	344	SP	45	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	6	29-Aug-09	493	345	SP	37	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	6	29-Aug-09	494	346	SP	44	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	6	29-Aug-09	495	347	SP	39	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	6	29-Aug-09	496	348	SP	33	-	-	-	-	-	-	-	Darker color/patterned; similar to Field Sample 333
Roberts Bay	Proposed Port Site	BS	-	6	29-Aug-09	497	349	NS	32	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	6	29-Aug-09	498	350	SP	40	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	6	29-Aug-09	499	351	SP	45	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	MT	-	12	30-Aug-09	500	365	SP	142	22	0.77	-	-	-	-	-	Photo 4675-4677; spotted pattern on ventral side
Roberts Bay	Proposed Port Site	MT	-	15	30-Aug-09	501	366	SP	129	30	1.40	-	-	-	-	-	Photo 4678-4684; spotted pattern on ventral side
Roberts Bay	Proposed Port Site	MT	-	17	30-Aug-09	502	367	AS	119	9	0.53	-	-	-	-	-	Photo 4686-4694;specimen preserved as voucher
Roberts Bay	Proposed Port Site	MT	-	17	30-Aug-09	503	370	SP	67	3	1.00	-	-	-	-	-	Photo 4700-4704
Roberts Bay	Proposed Port Site	MT	-	19	30-Aug-09	504	368	AS	112	8	0.57	-	-	-	-	-	Photo 4695-4697
Roberts Bay	Proposed Port Site	MT	-	20	30-Aug-09	505	369	AS	102	6	0.57	-	-	-	-	-	Photo 4698-4699
Roberts Bay	Proposed Port Site	GN	S	7	3-Sep-09	506	376	SP	340	450	1.14	-	-	-	-	-	Photo 4759-4763
Roberts Bay	Proposed Port Site	GN	S	7	3-Sep-09	507	377	GC	439	910	1.08	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	S	7	3-Sep-09	508	378	GC	501	1418	1.13	-	-	-	-	-	
Roberts Bay	Proposed Port Site	GN	S	7	3-Sep-09	509	379	SF	490	1589	1.35	-	-	-	-	-	Photo 4766-4768; eyes on left side of body
Roberts Bay	Proposed Port Site	GN	S	7	3-Sep-09	510	-	GC	-	-	-	-	-	-	-	-	Escaped
Roberts Bay	Proposed Port Site	GN	S	7	3-Sep-09	511	-	SF	-	-	-	-	-	-	-	-	Escaped
Roberts Bay	Proposed Port Site	GN	S	8	3-Sep-09	512	387	LD	178	56	0.99	-	-	-	-	-	Photo 4770-4771; spots on fins
Roberts Bay	Proposed Port Site	GN	S	8	3-Sep-09	513	388	SP	303	294	1.06	-	-	-	-	-	Photo 4778-4781
Roberts Bay	Proposed Port Site	BS	-	7	3-Sep-09	514	380	SP	43	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	7	3-Sep-09	515	381	SP	46	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	7	3-Sep-09	516	382	SP	49	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	7	3-Sep-09	517	383	SP	45	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	7	3-Sep-09	518	384	SP	38	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	7	3-Sep-09	519	385	SP	37	-	-	-	-	-	-	-	
Roberts Bay	Proposed Port Site	BS	-	9	3-Sep-09	520	386	SP	51	-	-	-	-	-	-	-	

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Species: AC = Arctic char; AF - Arctic flounder; AS = Arctic shanny; CP = Capelin; FL = Unknown flounder; GC = Greenland cod; LD = Longhead Dab; NS = Ninespine stickleback; PH = Pacific herring; SF = Starry flounder; SP = Sculpin (Myoxocephalus sp.).*
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Location	Site	Method	Type	#	Date	Number	Field Sample	Species	(mm)	(g)	(g/mm^3)	Samples	Otolith	Scales	Fin Clip	(years)	Comments
Reference Bay	Reference Site	GN	F	2	8-Aug-09	521	1082	AC	238	119	0.88	-	-	X	X	3	
Reference Bay	Reference Site	GN	S	1	8-Aug-09	522	-	SP	239	120	0.88	-	-	-	-	-	
Reference Bay	Reference Site	GN	S	1	8-Aug-09	523	-	SP	304	294	1.05	-	-	-	-	-	
Reference Bay	Reference Site	GN	S	1	8-Aug-09	524	-	SP	277	248	1.17	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	1	8-Aug-09	525	-	SP	18	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	1	8-Aug-09	526	-	SP	17	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	1	8-Aug-09	527	-	SP	20	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	1	8-Aug-09	528	-	SP	18	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	2	8-Aug-09	529	-	SP	20	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	2	8-Aug-09	530	-	SP	22	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	2	8-Aug-09	531	-	SP	23	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	2	8-Aug-09	532	-	SP	27	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	2	8-Aug-09	533	-	SP	17	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	2	8-Aug-09	534	-	SP	23	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	2	8-Aug-09	535	-	SP	22	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	2	8-Aug-09	536	-	SP	18	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	2	8-Aug-09	537	-	SP	19	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	2	8-Aug-09	538	-	SP	22	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	2	8-Aug-09	539	-	SP	21	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	2	8-Aug-09	540	-	SP	73	3	0.77	-	-	-	-	-	
Reference Bay	Reference Site	GN	S	4	9-Aug-09	541	-	SP	322	366	1.10	-	-	-	-	-	
Reference Bay	Reference Site	GN	S	4	9-Aug-09	542	1083	AC	466	1098	1.09	-	X	X	X	6	Mortality
Reference Bay	Reference Site	GN	S	4	9-Aug-09	543	1084	PH	249	134	0.87	X	-	X	-	11	Mortality
Reference Bay	Reference Site	GN	S	4	9-Aug-09	544	1085	PH	285	223	0.96	X	X	X	-	12	Mortality
Reference Bay	Reference Site	GN	S	4	9-Aug-09	545	1086	PH	232	132	1.06	X	X	X	-	7	Mortality
Reference Bay	Reference Site	GN	S	4	9-Aug-09	546	1087	PH	266	185	0.98	X	-	X	-	7	Mortality
Reference Bay	Reference Site	BS	-	3	9-Aug-09	547	-	SP	16	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	3	9-Aug-09	548	-	SP	22	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	3	9-Aug-09	549	-	SP	19	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	3	9-Aug-09	550	-	SP	20	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	3	9-Aug-09	551	-	SP	18	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	4	9-Aug-09	552	-	SP	81	4	0.75	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	4	9-Aug-09	553	-	SP	20	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	4	9-Aug-09	554	-	SP	24	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	4	9-Aug-09	555	-	SP	19	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	4	9-Aug-09	556	-	SP	18	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	5	9-Aug-09	557	-	SP	19	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	5	9-Aug-09	558	-	SP	21	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	5	9-Aug-09	559	-	SP	20	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	5	9-Aug-09	560	-	SP	17	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	5	9-Aug-09	561	-	SP	19	-	-	-	-	-	-	-	
Reference Bay	Reference Site	MT	-	1	9-Aug-09	562	-	SP	128	14	0.67	-	-	-	-	-	
Reference Bay	Reference Site	MT	-	3	9-Aug-09	563	-	SP	130	16	0.73	-	-	-	-	-	
Reference Bay	Reference Site	CT	-	5	9-Aug-09	564	-	SP	108	10	0.79	-	-	-	-	-	
Reference Bay	Reference Site	GN	F	5	10-Aug-09	565	1090	PH	133	19	0.81	-	-	X	-	2	
Reference Bay	Reference Site	GN	S	5	10-Aug-09	566	-	SP	309	312	1.06	-	-	-	-	-	
Reference Bay	Reference Site	GN	S	6	10-Aug-09	567	1088	AC	484	1147	1.01	-	-	X	X	11	
Reference Bay	Reference Site	GN	S	6	10-Aug-09	568	1089	PH	272	189	0.94	X	X	X	-	8	Mortality
Reference Bay	Reference Site	BS	-	8	10-Aug-09	569	-	SF	139	125	4.65	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	8	10-Aug-09	570	-	SP	30	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	8	10-Aug-09	571	-	SP	29	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	8	10-Aug-09	572	-	SP	22	-	-	-	-	-	-	-	

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Appendix 3.2-7. Biological Data for Fish Sampled in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

Location		Gear				Individual			Length	Weight	Condition	Stomach	Aging Structures			Age	
Location	Site	Method	Type	#	Date	Number	Field Sample	Species	(mm)	(g)	(g/mm^3)	Samples	Otolith	Scales	Fin Clip	(years)	Comments
Reference Bay	Reference Site	BS	-	8	10-Aug-09	573	-	SP	19	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	8	10-Aug-09	574	-	SP	19	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	8	10-Aug-09	575	-	SP	21	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	8	10-Aug-09	576	-	SP	19	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	8	10-Aug-09	577	-	SP	21	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	8	10-Aug-09	578	-	SP	22	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	8	10-Aug-09	579	-	SP	21	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	8	10-Aug-09	580	-	SP	24	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	8	10-Aug-09	581	-	SP	31	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	8	10-Aug-09	582	-	SP	27	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	8	10-Aug-09	583	-	SP	19	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	8	10-Aug-09	584	-	SP	32	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	8	10-Aug-09	585	-	SP	17	-	-	-	-	-	-	-	
Reference Bay	Reference Site	MT	-	19	10-Aug-09	586	-	SP	105	7	0.60	-	-	-	-	-	
Reference Bay	Reference Site	MT	-	28	10-Aug-09	587	-	SP	73	2	0.51	-	-	-	-	-	
Reference Bay	Reference Site	MT	-	30	10-Aug-09	588	-	SP	108	8	0.64	-	-	-	-	-	
Reference Bay	Reference Site	MT	-	30	10-Aug-09	589	-	SP	76	3	0.68	-	-	-	-	-	
Reference Bay	Reference Site	MT	-	33	10-Aug-09	590	-	SP	73	2	0.51	-	-	-	-	-	
Reference Bay	Reference Site	GN	S	1	4-Sep-09	591	396	PH	261	203	1.14	X	X	X	X	9	Photo 4848-4851
Reference Bay	Reference Site	GN	S	1	4-Sep-09	592	397	PH	245	139	0.95	X	X	X	X	9	Photo 4852
Reference Bay	Reference Site	GN	S	2	4-Sep-09	593	411	SP	303	361	1.30	-	-	-	-	-	Photo 4877-4879
Reference Bay	Reference Site	GN	S	2	4-Sep-09	594	412	PH	262	207	1.15	X	X	X	X	9	Photo 4880-4881
Reference Bay	Reference Site	GN	S	2	4-Sep-09	595	413	PH	258	213	1.24	X	X	X	X	9	Photo 4882-4884
Reference Bay	Reference Site	GN	S	2	4-Sep-09	596	414	PH	274	220	54.29	X	X	X	X	9	Photo 4885-4886
Reference Bay	Reference Site	GN	S	2	4-Sep-09	597	415	SF	109	28	2.16	-	-	-	-	-	
Reference Bay	Reference Site	GN	S	2	4-Sep-09	598	416	SF	76	10	2.28	-	-	-	-	-	
Reference Bay	Reference Site	GN	S	2	4-Sep-09	599	417	SF	59	3	1.46	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	1	4-Sep-09	600	399	AF	61	2	0.88	-	-	-	-	-	Photo 4861-4863
Reference Bay	Reference Site	BS	-	1	4-Sep-09	601	400	SP	38	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	1	4-Sep-09	602	401	SP	31	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	2	4-Sep-09	603	402	NS	28	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	2	4-Sep-09	604	403	NS	22	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	2	4-Sep-09	605	404	NS	30	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	2	4-Sep-09	606	405	SP	45	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	2	4-Sep-09	607	406	SP	35	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	2	4-Sep-09	608	407	SP	44	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	2	4-Sep-09	609	408	SP	37	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	2	4-Sep-09	610	409	SP	34	-	-	-	-	-	-	-	
Reference Bay	Reference Site	BS	-	2	4-Sep-09	611	410	SP	22	-	-	-	-	-	-	-	Darker coloration
Reference Bay	Reference Site	GN	S	4	5-Sep-09	612	-	SP	-	-	-	-	-	-	-	-	Escaped
Reference Bay	Reference Site	GN	S	5	5-Sep-09	613	427	SP	347	342	0.82	-	-	-	-	-	
Reference Bay	Reference Site	GN	S	5	5-Sep-09	614	428	PH	240	139	1.01	X	X	X	X	8	Photo 4910-4911
Reference Bay	Reference Site	GN	S	5	5-Sep-09	615	429	PH	275	237	1.14	X	X	X	X	13	Photo 4912-4913
Reference Bay	Reference Site	GN	S	5	5-Sep-09	616	430	PH	260	197	1.12	X	X	X	X	8	Photo 4914-4915

Notes:
General Method: BS = Beach seine; CT = Crab trap; GN = Gillnet; LL = Long line; MT = Minnow trap.
Gear Type: F = Floating; S = Sinking.
Species: AC = Arctic char; AF - Arctic flounder; AS = Arctic shanny; CP = Capelin; FL = Unknown flounder; GC = Greenland cod; LD = Longhead Dab; NS = Ninespine stickleback; PH = Pacific herring; SF = Starry flounder; SP = Sculpin (Myoxocephalus sp.).*
**Unknown flounder refers to either a Arctic flounder or a longhead dab.*
Outler fish include Individual Sample Numbers 19, 31, 186, 221 and 227.

Appendix 3.2-8

Summary Statistics of Effort, Catch, and Catch-per-Unit-Effort for Each Gear Type used in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

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Appendix 3.2-8. Summary Statistics of Effort, Catch, and Catch-per-Unit-Effort for Each Gear Type used in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

			Number	Total	Total Species Catch													Mean CPUE																	
		Sampling	Gillnets	Effort													All	AC		AF		AS		CP		FL		GC		LD		NS		PH		SC	
Location	Site	Period	Set	(hrs)	AC	AF	AS	CP	FL	GC	LD	NS	PH	SC	SF	SP	Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Floating Gillnet																																			
Roberts Bay	Proposed Barge Site	Early	10	9.9	1	0	0	4	0	0	0	0	41	0	0	1	47	0.06	0.06	-	-	-	-	0.16	0.12	-	-	-	-	-	-	-	-	1.70	1.05	-	-
Roberts Bay	Proposed Barge Site	Late	6	10.4	3	0	0	0	0	0	0	0	6	1	0	1	11	0.10	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.23	0.14	0.04	0.04
Roberts Bay	Proposed Port Site	Early	3	3.0	4	0	0	0	0	0	0	0	98	0	0	0	102	0.62	0.62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15.06	4.58	-	-
Roberts Bay	Proposed Port Site	Late	6	10.1	16	0	0	0	0	1	0	0	1	0	0	0	18	0.98	0.62	-	-	-	-	-	-	-	-	0.09	0.09	-	-	-	-	0.04	0.04	-	-
Reference Bay	Reference Site	Early	6	6.0	1	0	0	0	0	0	0	0	1	0	0	0	2	0.08	0.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.08	0.08	-	-
Reference Bay	Reference Site	Late	3	5.5	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sinking Gillnets																																			
Roberts Bay	Proposed Barge Site	Early	6	41.3	0	0	0	5	3	0	0	0	1	1	0	2	12	-	-	-	-	-	-	0.38	0.38	0.16	0.09	-	-	-	-	-	-	0.08	0.08	0.01	0.01
Roberts Bay	Proposed Barge Site	Late	9	12.7	2	2	0	0	1	1	1	0	1	107	2	3	120	0.09	0.06	0.07	0.05	-	-	-	-	0.05	0.05	0.03	0.03	0.03	0.03	-	-	0.03	0.03	3.59	2.20
Roberts Bay	Proposed Port Site	Early	6	6.1	1	0	0	0	0	0	0	0	4	0	1	0	6	0.08	0.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.30	0.10	-	-
Roberts Bay	Proposed Port Site	Late	9	92.5	8	0	0	0	0	8	2	0	2	1	2	5	28	0.02	0.02	-	-	-	-	-	-	-	-	0.07	0.04	0.01	0.00	-	-	0.09	0.09	0.00	0.00
Reference Bay	Reference Site	Early	6	6.0	2	0	0	0	0	0	0	0	5	0	0	5	12	0.15	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.38	0.30	-	-
Reference Bay	Reference Site	Late	6	8.3	0	0	0	0	0	0	0	0	8	0	3	3	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.35	0.16	-	-
Long Lines																																			
Roberts Bay	Proposed Barge Site	Early	4	11.3	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Roberts Bay	Proposed Barge Site	Late	3	5.5	0	0	0	0	0	0	0	0	0	7	0	0	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.69	0.36
Roberts Bay	Proposed Port Site	Early	3	11.9	0	0	0	0	0	4	0	0	0	0	0	0	4	-	-	-	-	-	-	-	-	-	-	0.95	0.95	-	-	-	-	-	-	-	-
Roberts Bay	Proposed Port Site	Late	4	11.6	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Reference Bay	Reference Site	Early	6	16.6	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Reference Bay	Reference Site	Late	2	6.2	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beach Seines																																			
Roberts Bay	Proposed Barge Site	Early	8	1152.0	0	0	0	0	4	0	1	0	0	2	1	35	43	-	-	-	-	-	-	-	-	0.35	0.19	-	-	0.09	0.09	-	-	-	-	0.17	0.11
Roberts Bay	Proposed Barge Site	Late	7	1620.0	0	7	0	0	0	0	1	2	0	0	1	29	40	-	-	0.29	0.14	-	-	-	-	-	-	-	-	0.03	0.03	0.20	0.13	-	-	-	-
Roberts Bay	Proposed Port Site	Early	7	1008.0	3	0	0	0	0	0	0	0	0	0	0	1	4	0.30	0.30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Roberts Bay	Proposed Port Site	Late	9	1296.0	0	1	0	0	0	0	0	1	0	0	1	53	56	-	-	0.08	0.08	-	-	-	-	-	-	-	-	-	-	0.08	0.08	-	-	-	-
Reference Bay	Reference Site	Early	8	1152.0	0	0	0	0	0	0	0	0	0	0	1	47	48	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Reference Bay	Reference Site	Late	3	432.0	0	1	0	0	0	0	0	3	0	0	0	8	12	-	-	0.23	0.23	-	-	-	-	-	-	-	-	-	-	0.69	0.69	-	-	-	-
Minnow Traps																																			
Roberts Bay	Proposed Barge Site	Early	24	557.7	0	0	0	0	0	0	0	0	0	0	0	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Roberts Bay	Proposed Barge Site	Late	29	681.7	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Roberts Bay	Proposed Port Site	Early	20	455.0	0	0	0	0	0	0	0	0	0	0	0	8	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Roberts Bay	Proposed Port Site	Late	20	494.4	0	0	3	0	0	0	0	0	0	0	0	3	6	-	-	-	-	0.14	0.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Reference Bay	Reference Site	Early	36	729.0	0	0	0	0	0	0	0	0	0	0	0	7	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Reference Bay	Reference Site	Late	20	459.3	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crab Traps																																			
Roberts Bay	Proposed Barge Site	Early	11	229.8	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Roberts Bay	Proposed Barge Site	Late	15	358.1	0	0	0	0	0	0	0	0	0	0	0	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Roberts Bay	Proposed Port Site	Early	15	351.5	0	0	0	0	0	1	0	0	0	0	0	0	1	-	-	-	-	-	-	-	-	-	-	0.07	0.07	-	-	-	-	-	-	-	-
Roberts Bay	Proposed Port Site	Late	10	249.9	0	0	2	0	0	0	0	0	0	0	0	1	3	-	-	-	-	0.23	0.15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Reference Bay	Reference Site	Early	10	203.3	0	0	0	0	0	0	0	0	0	0	0	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Reference Bay	Reference Site	Late	10	229.4	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Note:

AC = Arctic char; AF = Arctic flounder; AS = Arctic Shanny; CP = Capelin; FL = Unknown flounder; GC = Greenland cod; LD = Longhead dab; NS = Ninespine stickleback; PH = Pacific herring; SC = Saffron cod; SF = Starry flounder; SP = Sculpin (Myoxocephalus sp.).*

Units for Mean CPUE: floating and sinking gillnets = fish/100m ^{2} /hr; long line = fish/hook/hr; beach seine = fish/100m ^{2} ; minnow trap and crab trap = fish/trap/24hrs.

**Unknown flounder refers to either an Arctic flounder or a longhead dab.*

SE = Standard error of the mean.

Dashes indicate no data available.

Appendix 3.2-9

Biological Data for Fish Captured for Stomach Analysis as Part of the Doris North Authorization Monitoring Program, Hope Bay Belt Project, 2009

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Appendix 3.2-9. Biological Data for Fish Captured for Stomach Analysis as Part of the Doris North Authorization Monitoring Program, Hope Bay Belt Project, 2009

Location		Gear				Individual						
Location	Site	Method	Type	#	Date	Number	Field Sample	Species	Length (mm)	Weight (g)	Age (years)	Comments
Roberts Bay	Shoals	GN	F	1	04-Aug-09	3	1052	PH	261	185	9	Dead
Roberts Bay	Shoals	GN	F	1	04-Aug-09	4	1053	PH	221	94	7	Dead
Roberts Bay	Shoals	GN	F	1	04-Aug-09	5	1054	PH	248	459	8	Dead
Roberts Bay	Shoals	GN	F	1	04-Aug-09	6	1055	PH	278	195	10	Dead
Roberts Bay	Shoals	GN	F	1	04-Aug-09	7	1056	PH	279	206	10	Dead
Roberts Bay	Shoals	GN	S	1	04-Aug-09	9	1058	PH	257	158	8	Dead
Roberts Bay	Shoals	GN	S	2	04-Aug-09	11	1060	PH	308	264	-	Dead
Roberts Bay	Shoals	GN	S	3	05-Aug-09	20	1063	PH	255	153	8	Dead
Roberts Bay	Shoals	GN	S	3	05-Aug-09	21	1064	PH	254	166	11	Dead
Roberts Bay	Shoals	GN	S	3	27-Aug-09	61	295	PH	137	21	-	Dead
Reference Bay	Shoals	GN	F	3	07-Aug-09	135	1072	PH	254	143	8	Dead
Reference Bay	Shoals	GN	F	3	07-Aug-09	136	1073	PH	254	151	7	Dead
Reference Bay	Shoals	GN	F	3	07-Aug-09	137	1074	PH	268	182	10	Dead
Reference Bay	Shoals	GN	F	3	07-Aug-09	138	1075	PH	271	184	10	Dead
Reference Bay	Shoals	GN	F	3	07-Aug-09	139	1076	PH	258	167	9	Dead
Reference Bay	Shoals	GN	F	3	07-Aug-09	140	1077	PH	250	142	8	Dead
Reference Bay	Shoals	GN	F	3	07-Aug-09	141	1078	PH	283	219	9	Dead
Reference Bay	Shoals	GN	F	4	07-Aug-09	143	1080	PH	304	245	11	Dead
Reference Bay	Shoals	GN	F	4	07-Aug-09	144	1081	PH	283	196	11	Dead
Reference Bay	Shoals	GN	F	2	06-Sep-09	180	452	PH	301	286	10	Photo 4975
Reference Bay	Shoals	GN	F	2	06-Sep-09	181	453	PH	272	240	15	Photo 4976
Reference Bay	Shoals	GN	F	2	06-Sep-09	182	454	PH	225	312	12	Photo 4977

Notes:
From: 2009 Roberts Bay Jetty Fisheries Authorization Monitoring Report (Rescan 2009).
General Method: GN = Gillnet.
Gear Type: F = Floating; S = Sinking.
Species: PH = Pacific herring.

Appendix 3.2-10

Pacific Herring Diet by Number, Hope Bay Belt Project, 2009

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Appendix 3.2-10. Pacific Herring Diet by Number, Hope Bay Belt Project, 2009

Location			Roberts Bay	Roberts Bay	Roberts Bay	Roberts Bay	Roberts Bay	Roberts Bay	Roberts Bay
Site			Proposed Port Site	Proposed Port Site	Proposed Port Site	Proposed Port Site	Proposed Port Site	Proposed Port Site	Proposed Port Site
Date			1-Aug-09	1-Aug-09	1-Aug-09	1-Aug-09	1-Aug-09	1-Aug-09	2-Aug-09
Sample No.			090408	090409	090410	090411	090412	090413	090414
Field Sample			1004	1021	1022	1023	1024	1025	1037
Individual Sample			310	300	301	302	303	304	327
Fullness (%)			50	50	25	50	75	10	25
Digestion (%)			90	75	95	25	25	90	95
Actual Weight (mg)			853	479	98	423	1,826	387	397
Species/Group	Stage	Origin							
CRUSTACEA	Parts			X					
CLADOCERA									
Evadne nordmanni		MA							
OSTRACODA									
Cypris		FW							
COPEPODA									
Calanoida		MA							
Pseudocalanidae									
Pseudocalanus minutus	F			1					
Temoridae	M								
Cyclopoida	Dam								
Harpacticoida									
Ectinosoma neglectum	A	MA							
Tisbe furcata	A	MA	4						18
CUMACEA									
Diastylis	Juv	MA							
ISOPODA									
Saduria entomon	Juv	MA	2					2	
AMPHIPODA	Dam							20	8
Hyperiidae									
Hyperia galba	Juv	MA	1	7	2	2	1	14	
Gammaridae									
Gammarellus homari	Juv	MA							
Gammarus setosus	Juv	MA	8	2	2			3	
Gammarus setosus	A	MA							
Ampeliscidae									
Ampelisca sp		MA/FW							
Haustoridae									
Pontoporeia femorata		MA							
Lysianassidae	Dam								
Anonyx nugax		MA							
Onisimus glacialis?		MA					1	1	
MYSIDACEA									
Mysis litoralis		MA	39		3	40	277		
DECAPODA									
Brachyura	zoea	MA	58	176			2	8	
Brachyura	megalops	MA							
ARACHNIDA									
Hydracarina		FW							1
INSECTA									
Collembola									
Anurida	A	FW							
DIPTERA	P								
Chironomidae	A	FW	1	1					
MOLLUSCA									
Bivalvia									
Gastropoda		MA		1		1			
FISH									
Fish Eggs	Eggs 1.2 mm	MA							
Fish	Juv	MA							
Gadidae		MA							
Boreogadus saida (otolith)	Juv	MA							
Agonidae		MA							
Agonus decagonus		MA							
NON-FOOD ITEMS									
Plant			X						
Pebble									X
TOTAL			**113**	**188**	**7**	**43**	**281**	**48**	**27**

Notes:
A = adult
F = female
M = male
Juv = juvenile
P = pupa (second juvenile of homometabolous insect)
X = present (in fish diet)
FW = freshwater organism
MA = marine
Dam = damaged
zoea = first decapod stages after hatching from egg
megalops = decapod stage following zoea
Estimated Weights (mg) = When stomach contents are heavily digested, the actual weight underestimates the real weight of food eaten, so the the total weights are estimated from parts of organisms.

Appendix 3.2-10. Pacific Herring Diet by Number, Hope Bay Belt Project, 2009

Location	Roberts Bay	Roberts Bay	Roberts Bay	Roberts Bay	Roberts Bay	Roberts Bay	Roberts Bay	Roberts Bay	Roberts Bay
Site	Proposed Port Site	Proposed Port Site	Proposed Port Site	Shoals	Shoals	Shoals	Shoals	Shoals	Shoals
Date	2-Aug-09	2-Aug-09	2-Aug-09	4-Aug-09	4-Aug-09	4-Aug-09	4-Aug-09	4-Aug-09	4-Aug-09
Sample No.	090415	090416	090417	090419	090420	090421	090422	090423	090424
Field Sample	1038	1039	1040	1052	1053	1054	1055	1056	1058
Individual Sample	328	329	330	3	4	5	6	7	9
Fullness (%)	0	90	100	25	75	10	25	50	25
Digestion (%)	100	75	50	75	50	90	90	50	50
Actual Weight (mg)	0	863	2,892	381	1,153	126	325	416	217
Species/Group									
CRUSTACEA									
CLADOCERA									
Evadne nordmanni									
OSTRACODA									
Cypris									
COPEPODA									
Calanoida									
Pseudocalanidae									
Pseudocalanus minutus									
Temoridae									
Cyclopoida							1		
Harpacticoida									
Ectinosoma neglectum			1						
Tisbe furcata		1	3	2	21		1		10
CUMACEA									
Diastylis		1							
ISOPODA									
Saduria entomon		1							1
AMPHIPODA				1			1		
Hyperiidae									
Hyperia galba		38	78		8				
Gammaridae									
Gammarellus homari									
Gammarus setosus		1	1		2	1			4
Gammarus setosus									
Ampeliscidae									
Ampelisca sp									
Haustoridae									
Pontoporeia femorata		1							
Lysianassidae									
Anonyx nugax				1					
Onisimus glacialis?		1	8	1				1	
MYSIDACEA									
Mysis litoralis		33	60			1			
DECAPODA									
Brachyura		274	117	250	300	90	206	340	135
Brachyura									
ARACHNIDA									
Hydracarina				1					
INSECTA									
Collembola									
Anurida									
DIPTERA									
Chironomidae									1
MOLLUSCA									
Bivalvia									
Gastropoda		2							
FISH									
Fish Eggs									
Fish			1		4		1		
Gadidae									
Boreogadus saida (otolith)									
Agonidae									
Agonus decagonus									
NON-FOOD ITEMS									
Plant		X							
Pebble				X	X				X
TOTAL	**0**	**353**	**269**	**256**	**335**	**92**	**210**	**341**	**151**

Notes:
A = adult
F = female
M = male
Juv = juvenile
P = pupa (second juvenile of homometabolous insect)
X = present (in fish diet)
FW = freshwater organism
MA = marine
Dam = damaged
zoea = first decapod stages after hatching from egg
megalops = decapod stage following zoea
Estimated Weights (mg) = When stomach contents are heavily digested, the actual weight underestimates the real weight of food eaten, so the the total weights are estimated from parts of organisms.

Appendix 3.2-10. Pacific Herring Diet by Number, Hope Bay Belt Project, 2009

Location	Roberts Bay	Roberts Bay	Roberts Bay	Roberts Bay	Roberts Bay	Roberts Bay	Reference Bay	Reference Bay	Reference Bay
Site	Shoals	Shoals	Shoals	Proposed Port Site	Proposed Port Site	Proposed Port Site	Shoals	Shoals	Shoals
Date	4-Aug-09	5-Aug-09	5-Aug-09	22-Aug-09	22-Aug-09	22-Aug-09	7-Aug-09	7-Aug-09	7-Aug-09
Sample No.	090425	090426	090427	090442	090443	090444	090428	090429	090430
Field Sample	1060	1063	1064	35	36	59	1072	1073	1074
Individual Sample	11	20	21	428	429	418	135	136	137
Fullness (%)	10	60	15	100	100	100	75	75	20
Digestion (%)	50	50	75	25	25	25	10	10	50
Actual Weight (mg)	78	413	177	1,604	2,938	3,712	702	726	300
Species/Group									
CRUSTACEA									
CLADOCERA									
Evadne nordmanni				1					
OSTRACODA									
Cypris									
COPEPODA									
Calanoida									
Pseudocalanidae									
Pseudocalanus minutus									
Temoridae	3	1							
Cyclopoida									
Harpacticoida									
Ectinosoma neglectum									
Tisbe furcata	36	1							
CUMACEA									
Diastylis						2			
ISOPODA									
Saduria entomon								1	
AMPHIPODA		1							
Hyperiidae									
Hyperia galba			1						
Gammaridae									
Gammarellus homari									
Gammarus setosus		1		1	3		174	55	26
Gammarus setosus									
Ampeliscidae									
Ampelisca sp					1				
Haustoridae									
Pontoporeia femorata									
Lysianassidae									
Anonyx nugax									
Onisimus glacialis?							2	1	1
MYSIDACEA									
Mysis litoralis			12	125	215	92			
DECAPODA									
Brachyura	64	350	100	6				10	24
Brachyura									
ARACHNIDA									
Hydracarina									1
INSECTA									
Collembola									
Anurida									
DIPTERA									
Chironomidae									
MOLLUSCA									
Bivalvia									1
Gastropoda			1						
FISH									
Fish Eggs								29	
Fish						4			
Gadidae									
Boreogadus saida (otolith)									
Agonidae									
Agonus decagonus						2			
NON-FOOD ITEMS									
Plant								X	
Pebble									
TOTAL	**103**	**354**	**114**	**133**	**219**	**100**	**176**	**96**	**53**

Notes:
A = adult
F = female
M = male
Juv = juvenile
P = pupa (second juvenile of homometabolous insect)
X = present (in fish diet)
FW = freshwater organism
MA = marine
Dam = damaged
zoea = first decapod stages after hatching from egg
megalops = decapod stage following zoea
Estimated Weights (mg) = When stomach contents are heavily digested, the actual weight underestimates the real weight of food eaten, so the the total weights are estimated from parts of organisms.

Appendix 3.2-10. Pacific Herring Diet by Number, Hope Bay Belt Project, 2009

Location	Reference Bay	Reference Bay	Reference Bay	Reference Bay	Reference Bay	Reference Bay	Reference Bay	Reference Bay	Reference Bay
Site	Shoals	Shoals	Shoals	Shoals	Shoals	Shoals	Reference Site	Reference Site	Reference Site
Date	7-Aug-09	7-Aug-09	7-Aug-09	7-Aug-09	7-Aug-09	7-Aug-09	9-Aug-09	9-Aug-09	9-Aug-09
Sample No.	090431	090432	090433	090434	090435	090436	090437	090438	090439
Field Sample	1075	1076	1077	1078	1080	1081	1084	1085	1086
Individual Sample	138	139	140	141	143	144	543	544	545
Fullness (%)	90	90	75	50	100	50	10	100	50
Digestion (%)	25	10	25	50	10	50	90	90	90
Actual Weight (mg)	1,448	1,196	1,085	869	2,617	813	136	2,278	570
Species/Group									
CRUSTACEA									
CLADOCERA									
Evadne nordmanni									
OSTRACODA									
Cypris			1						
COPEPODA									
Calanoida									
Pseudocalanidae									
Pseudocalanus minutus									
Temoridae					5				
Cyclopoida									
Harpacticoida									
Ectinosoma neglectum									
Tisbe furcata			1		1				
CUMACEA									
Diastylis								1	
ISOPODA									
Saduria entomon	1								
AMPHIPODA									
Hyperiidae									
Hyperia galba									
Gammaridae									
Gammarellus homari								1	
Gammarus setosus	120	110	65	67	250	63			
Gammarus setosus	1				1				
Ampeliscidae									
Ampelisca sp									
Haustoridae									
Pontoporeia femorata									
Lysianassidae									1
Anonyx nugax									
Onisimus glacialis?	2	5	2	1	1			1	
MYSIDACEA									
Mysis litoralis			2				6	44	21
DECAPODA									
Brachyura	4		42	1			35	1,300	26
Brachyura									
ARACHNIDA									
Hydracarina									
INSECTA									
Collembola									
Anurida	1								
DIPTERA									
Chironomidae									
MOLLUSCA									
Bivalvia			1		1				
Gastropoda	2						1	1	1
FISH									
Fish Eggs			2	96		2			
Fish									
Gadidae									
Boreogadus saida (otolith)									
Agonidae									
Agonus decagonus									
NON-FOOD ITEMS									
Plant								X	
Pebble								X	
TOTAL	**131**	**115**	**116**	**165**	**259**	**65**	**42**	**1,348**	**49**

Notes:
A = adult
F = female
M = male
Juv = juvenile
P = pupa (second juvenile of homometabolous insect)
X = present (in fish diet)
FW = freshwater organism
MA = marine
Dam = damaged
zoea = first decapod stages after hatching from egg
megalops = decapod stage following zoea
Estimated Weights (mg) = When stomach contents are heavily digested, the actual weight underestimates the real weight of food eaten, so the the total weights are estimated from parts of organisms.

Appendix 3.2-10. Pacific Herring Diet by Number, Hope Bay Belt Project, 2009

Location	Reference Bay	Reference Bay	Reference Bay	Reference Bay	Reference Bay	Reference Bay	Reference Bay	Reference Bay	Reference Bay
Site	Reference Site	Reference Site	Shoals	Reference Site	Reference Site	Reference Site	Reference Site	Reference Site	Reference Site
Date	**9-Aug-09**	**10-Aug-09**	**27-Aug-10**	**4-Sep-09**	**4-Sep-09**	**4-Sep-09**	**4-Sep-09**	**4-Sep-09**	**5-Sep-09**
Sample No.	**090440**	**090441**	**090418**	**090446**	**090447**	**090448**	**090449**	**090450**	**090451**
Field Sample	**1087**	**1089**	**295**	**396**	**397**	**412**	**413**	**414**	**428**
Individual Sample	**546**	**568**	**61**	**591**	**592**	**594**	**595**	**596**	**614**
Fullness (%)	**15**	**90**	**0**	**75**	**5**	**2**	**50**	**60**	**5**
Digestion (%)	**90**	**90**	**100**	**75**	**90**	**95**	**75**	**75**	**75**
Actual Weight (mg)	**327**	**1,767**	**0**	**1,059**	**133**	**185**	**780**	**1,070**	**103**
Species/Group									
CRUSTACEA									
CLADOCERA									
Evadne nordmanni									
OSTRACODA									
Cypris									
COPEPODA									
Calanoida									
Pseudocalanidae									
Pseudocalanus minutus									
Temoridae							1		
Cyclopoida									
Harpacticoida									
Ectinosoma neglectum									
Tisbe furcata									
CUMACEA									
Diastylis						4		1	2
ISOPODA									
Saduria entomon									
AMPHIPODA									
Hyperiidae									
Hyperia galba									
Gammaridae									
Gammarellus homari						3		3	3
Gammarus setosus				1		3		60	5
Gammarus setosus									
Ampeliscidae									
Ampelisca sp									
Haustoridae									
Pontoporeia femorata									
Lysianassidae	1								
Anonyx nugax									
Onisimus glacialis?		4		1			1	2	
MYSIDACEA									
Mysis litoralis	8	42		20	7	4	30	14	1
DECAPODA									
Brachyura	26	50		24	4	1		137	1
Brachyura				45	1	4	7		14
ARACHNIDA									
Hydracarina									
INSECTA									
Collembola									
Anurida									
DIPTERA									
Chironomidae									
MOLLUSCA									
Bivalvia									
Gastropoda	2	4							
FISH									
Fish Eggs									
Fish						2			
Gadidae									
Boreogadus saida (otolith)									
Agonidae									
Agonus decagonus									
NON-FOOD ITEMS									
Plant									
Pebble									
TOTAL	**37**	**100**	**0**	**91**	**12**	**21**	**39**	**217**	**26**

Notes:
A = adult
F = female
M = male
Juv = juvenile
P = pupa (second juvenile of homometabolous insect)
X = present (in fish diet)
FW = freshwater organism
MA = marine
Dam = damaged
zoea = first decapod stages after hatching from egg
megalops = decapod stage following zoea
Estimated Weights (mg) = When stomach contents are heavily digested, the actual weight underestimates the real weight of food eaten, so the the total weights are estimated from parts of organisms.

Appendix 3.2-10. Pacific Herring Diet by Number, Hope Bay Belt Project, 2009

Location	Reference Bay	Reference Bay	Reference Bay	Reference Bay	Reference Bay
Site	Reference Site	Reference Site	Shoals	Shoals	Shoals
Date	5-Sep-09	5-Sep-09	6-Sep-09	6-Sep-09	6-Sep-09
Sample No.	090452	090453	090454	090455	090456
Field Sample	429	430	452	453	454
Individual Sample	615	616	180	181	182
Fullness (%)	90	100	50	25	1
Digestion (%)	50	50	25	90	50
Actual Weight (mg)	865	1,100	375	136	25
Species/Group					
CRUSTACEA					
CLADOCERA					
Evadne nordmanni					
OSTRACODA					
Cypris					
COPEPODA					
Calanoida					
Pseudocalanidae					
Pseudocalanus minutus					
Temoridae					
Cyclopoida					
Harpacticoida					
Ectinosoma neglectum					
Tisbe furcata					
CUMACEA					
Diastylis	1	7	1		
ISOPODA					
Saduria entomon					
AMPHIPODA					
Hyperiidae					
Hyperia galba					
Gammaridae					
Gammarellus homari					
Gammarus setosus			4	1	1
Gammarus setosus					
Ampeliscidae					
Ampelisca sp					
Haustoridae					
Pontoporeia femorata					
Lysianassidae					
Anonyx nugax					
Onisimus glacialis?		1			
MYSIDACEA					
Mysis litoralis	24	46			
DECAPODA					
Brachyura	11	72	166	39	13
Brachyura	183	129		19	
ARACHNIDA					
Hydracarina					
INSECTA					
Collembola					
Anurida					
DIPTERA					
Chironomidae					
MOLLUSCA					
Bivalvia	1				
Gastropoda	1	1	1		
FISH					
Fish Eggs					
Fish					
Gadidae					
Boreogadus saida (otolith)				1	
Agonidae					
Agonus decagonus					
NON-FOOD ITEMS					
Plant					
Pebble			X		
TOTAL	**221**	**256**	**172**	**60**	**14**

Notes:
A = adult
F = female
M = male
Juv = juvenile
P = pupa (second juvenile of homometabolous insect)
X = present (in fish diet)
Estimated Weights (mg) = When stomach contents are heavily digested, the actual weight underestimates the real weight of food eaten, so the the total weights are estimated from parts of organisms.

FW = freshwater organism
MA = marine
Dam = damaged
zoea = first decapod stages after hatching from egg
megalops = decapod stage following zoea

Appendix 3.2-11

Pacific Herring Diet by Weight, Hope Bay Belt Project, 2009

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Appendix 3.2-11. Pacific Herring Diet by Weight, Hope Bay Belt Project, 2009

Location			Roberts Bay	Roberts Bay	Roberts Bay	Roberts Bay	Roberts Bay	Roberts Bay	Roberts Bay
Site			Proposed Port Site	Proposed Port Site	Proposed Port Site	Proposed Port Site	Proposed Port Site	Proposed Port Site	Proposed Port Site
Date			1-Aug-09	1-Aug-09	1-Aug-09	1-Aug-09	1-Aug-09	1-Aug-09	2-Aug-09
Sample No.			090408	090409	090410	090411	090412	090413	090414
Field Sample			1004	1021	1022	1023	1024	1025	1037
Individual Sample			310	300	301	302	303	304	327
Fullness (%)			50	50	25	50	75	10	25
Digestion (%)			90	75	95	25	25	90	95
Actual Weight (mg)			853	479	98	423	1,826	387	397
Species/Group	Stage	Origin							
CRUSTACEA	Parts			258					
CLADOCERA									
Evadne nordmanni		MA							
OSTRACODA									
Cypris		FW							
COPEPODA									
Calanoida		MA							
Pseudocalanidae									
Pseudocalanus minutus	F			0					
Temoridae	M								
Cyclopoida	Dam								
Harpacticoida									
Ectinosoma neglectum	A	MA							
Tisbe furcata	A	MA	1						3
CUMACEA									
Diastylis		MA							
ISOPODA									
Saduria entomon	Juv	MA	7					5	
AMPHIPODA	Dam							224	392
Hyperiidae									
Hyperia galba	Juv	MA	40	34	10	11	5	70	
Gammaridae									
Gammarellus homari	Juv	MA							
Gammarus setosus	Juv	MA	32	10	28			30	
Gammarus setosus	A	MA							
Ampeliscidae									
Ampelisca sp		MA/FW							
Haustoridae									
Pontoporeia femorata		MA							
Lysianassidae	Dam								
Anonyx nugax		MA							
Onisimus glacialis?		MA					6	50	
MYSIDACEA									
Mysis litoralis		MA	713		60	403	1,813		
DECAPODA									
Brachyura	zoea	MA	58	176			2	8	
Brachyura	megalops	MA							
ARACHNIDA									
Hydracarina		FW							1
INSECTA									
Collembola									
Anurida	A	FW							
DIPTERA	P								
Chironomidae	A	FW	1	0					
MOLLUSCA									
Bivalvia									
Gastropoda		MA		1		9			
FISH									
Fish Eggs	Eggs 1.2 mm	MA							
Fish	Juv	MA							
Gadidae		MA							
Boreogadus saida (otolith)	Juv	MA							
Agonidae		MA							
Agonus decagonus		MA							
NON-FOOD ITEMS									
Plant			1						
Pebble									1
TOTAL			**853**	**479**	**98**	**423**	**1,826**	**387**	**397**

Notes:
A = adult
F = female
M = male
Juv = juvenile
P = pupa (second juvenile of homometabolous insect)
FW = freshwater organism
MA = marine
Dam = damaged
zoea = first decapod stages after hatching from egg
megalops = decapod stage following zoea
Estimated Weights (mg) = When stomach contents are heavily digested, the actual weight underestimates the real weight of food eaten, so the the total weights are estimated from parts of organisms.

Appendix 3.2-11. Pacific Herring Diet by Weight, Hope Bay Belt Project, 2009

Location	Roberts Bay	Roberts Bay	Roberts Bay	Roberts Bay	Roberts Bay	Roberts Bay	Roberts Bay	Roberts Bay	Roberts Bay
Site	Proposed Port Site	Proposed Port Site	Proposed Port Site	Shoals	Shoals	Shoals	Shoals	Shoals	Shoals
Date	2-Aug-09	2-Aug-09	2-Aug-09	4-Aug-09	4-Aug-09	4-Aug-09	4-Aug-09	4-Aug-09	4-Aug-09
Sample No.	090415	090416	090417	090419	090420	090421	090422	090423	090424
Field Sample	1038	1039	1040	1052	1053	1054	1055	1056	1058
Individual Sample	328	329	330	3	4	5	6	7	9
Fullness (%)	0	90	100	25	75	10	25	50	25
Digestion (%)	100	75	50	75	50	90	90	50	50
Actual Weight (mg)	0	863	2,892	381	1,153	126	325	416	217
Species/Group									
CRUSTACEA									
CLADOCERA									
Evadne nordmanni									
OSTRACODA									
Cypris									
COPEPODA									
Calanoida									
Pseudocalanidae									
Pseudocalanus minutus									
Temoridae									
Cyclopoida							0		
Harpacticoida									
Ectinosoma neglectum			0						
Tisbe furcata		0	1	0	3		0		2
CUMACEA									
Diastylis		6							
ISOPODA									
Saduria entomon		3							2
AMPHIPODA				10			8		
Hyperiidae									
Hyperia galba		247	470		63				
Gammaridae									
Gammarellus homari									
Gammarus setosus		1	31		1	1			12
Gammarus setosus									
Ampeliscidae									
Ampelisca sp									
Haustoridae									
Pontoporeia femorata		14							
Lysianassidae									
Anonyx nugax				18					
Onisimus glacialis?		10	68	6				4	
MYSIDACEA									
Mysis litoralis		301	2,155			35			
DECAPODA									
Brachyura		274	117	346	317	90	264	412	199
Brachyura									
ARACHNIDA									
Hydracarina				0					
INSECTA									
Collembola									
Anurida									
DIPTERA									
Chironomidae									1
MOLLUSCA									
Bivalvia									
Gastropoda		6							
FISH									
Fish Eggs									
Fish			50		763		52		
Gadidae									
Boreogadus saida (otolith)									
Agonidae									
Agonus decagonus									
NON-FOOD ITEMS									
Plant		1							
Pebble				1	6				1
TOTAL	**0**	**863**	**2,892**	**381**	**1,153**	**126**	**325**	**416**	**217**

Notes:
A = adult
F = female
M = male
Juv = juvenile
P = pupa (second juvenile of homometabolous insect)
FW = freshwater organism
MA = marine
Dam = damaged
zoea = first decapod stages after hatching from egg
megalops = decapod stage following zoea
Estimated Weights (mg) = When stomach contents are heavily digested, the actual weight underestimates the real weight of food eaten, so the the total weights are estimated from parts of organisms.

Appendix 3.2-11. Pacific Herring Diet by Weight, Hope Bay Belt Project, 2009

Location	Roberts Bay	Roberts Bay	Roberts Bay	Roberts Bay	Roberts Bay	Roberts Bay	Reference Bay	Reference Bay	Reference Bay
Site	Shoals	Shoals	Shoals	Proposed Port Site	Proposed Port Site	Proposed Port Site	Shoals	Shoals	Shoals
Date	4-Aug-09	5-Aug-09	5-Aug-09	22-Aug-09	22-Aug-09	22-Aug-09	7-Aug-09	7-Aug-09	7-Aug-09
Sample No.	090425	090426	090427	090442	090443	090444	090428	090429	090430
Field Sample	1060	1063	1064	35	36	59	1072	1073	1074
Individual Sample	11	20	21	428	429	418	135	136	137
Fullness (%)	10	60	15	100	100	100	75	75	20
Digestion (%)	50	50	75	25	25	25	10	10	50
Actual Weight (mg)	78	413	177	1,604	2,938	3,712	702	726	300
Species/Group									
CRUSTACEA									
CLADOCERA									
Evadne nordmanni				0					
OSTRACODA									
Cypris									
COPEPODA									
Calanoida									
Pseudocalanidae									
Pseudocalanus minutus									
Temoridae	0	0							
Cyclopoida									
Harpacticoida									
Ectinosoma neglectum									
Tisbe furcata	8	0							
CUMACEA									
Diastylis						15			
ISOPODA									
Saduria entomon								3	
AMPHIPODA		5							
Hyperiidae									
Hyperia galba			3						
Gammaridae									
Gammarellus homari									
Gammarus setosus		2		2	18		697	683	268
Gammarus setosus									
Ampeliscidae									
Ampelisca sp					10				
Haustoridae									
Pontoporeia femorata									
Lysianassidae									
Anonyx nugax									
Onisimus glacialis?							5	2	2
MYSIDACEA									
Mysis litoralis			36	1,595	2,910	2,736			
DECAPODA									
Brachyura	70	406	125	7				10	24
Brachyura									
ARACHNIDA									
Hydracarina									1
INSECTA									
Collembola									
Anurida									
DIPTERA									
Chironomidae									
MOLLUSCA									
Bivalvia									5
Gastropoda			13						
FISH									
Fish Eggs								23	
Fish						506			
Gadidae									
Boreogadus saida (otolith)									
Agonidae									
Agonus decagonus						455			
NON-FOOD ITEMS									
Plant								5	
Pebble									
TOTAL	**78**	**413**	**177**	**1,604**	**2,938**	**3,712**	**702**	**726**	**300**

Notes:
A = adult
F = female
M = male
Juv = juvenile
P = pupa (second juvenile of homometabolous insect)
FW = freshwater organism
MA = marine
Dam = damaged
zoea = first decapod stages after hatching from egg
megalops = decapod stage following zoea
Estimated Weights (mg) = When stomach contents are heavily digested, the actual weight underestimates the real weight of food eaten, so the the total weights are estimated from parts of organisms.

Appendix 3.2-11. Pacific Herring Diet by Weight, Hope Bay Belt Project, 2009

Location	Reference Bay	Reference Bay	Reference Bay	Reference Bay	Reference Bay	Reference Bay	Reference Bay	Reference Bay	Reference Bay
Site	Shoals	Shoals	Shoals	Shoals	Shoals	Shoals	Reference Site	Reference Site	Reference Site
Date	7-Aug-09	7-Aug-09	7-Aug-09	7-Aug-09	7-Aug-09	7-Aug-09	9-Aug-09	9-Aug-09	9-Aug-09
Sample No.	090431	090432	090433	090434	090435	090436	090437	090438	090439
Field Sample	1075	1076	1077	1078	1080	1081	1084	1085	1086
Individual Sample	138	139	140	141	143	144	543	544	545
Fullness (%)	90	90	75	50	100	50	10	100	50
Digestion (%)	25	10	25	50	10	50	90	90	90
Actual Weight (mg)	1,448	1,196	1,085	869	2,617	813	136	2,278	570
Species/Group									
CRUSTACEA									
CLADOCERA									
Evadne nordmanni									
OSTRACODA									
Cypris			0						
COPEPODA									
Calanoida									
Pseudocalanidae									
Pseudocalanus minutus									
Temoridae					0				
Cyclopoida									
Harpacticoida									
Ectinosoma neglectum									
Tisbe furcata			0		0				
CUMACEA									
Diastylis								79	
ISOPODA									
Saduria entomon	3								
AMPHIPODA									
Hyperiidae									
Hyperia galba									
Gammaridae									
Gammarellus homari								2	
Gammarus setosus	1,283	1,152	1,030	790	2,518	812			
Gammarus setosus	77				97				
Ampeliscidae									
Ampelisca sp									
Haustoridae									
Pontoporeia femorata									
Lysianassidae									5
Anonyx nugax									
Onisimus glacialis?	28	44	6	7	1			15	
MYSIDACEA									
Mysis litoralis			6				92	660	516
DECAPODA									
Brachyura	4		42	1			40	1,503	30
Brachyura									
ARACHNIDA									
Hydracarina									
INSECTA									
Collembola									
Anurida	1								
DIPTERA									
Chironomidae									
MOLLUSCA									
Bivalvia			0		1				
Gastropoda	52						4	4	19
FISH									
Fish Eggs			1	71		1			
Fish									
Gadidae									
Boreogadus saida (otolith)									
Agonidae									
Agonus decagonus									
NON-FOOD ITEMS									
Plant								14	
Pebble								1	
TOTAL	**1,448**	**1,196**	**1,085**	**869**	**2,617**	**813**	**136**	**2,278**	**570**

Notes:
A = adult
F = female
M = male
Juv = juvenile
P = pupa (second juvenile of homometabolous insect)
FW = freshwater organism
MA = marine
Dam = damaged
zoea = first decapod stages after hatching from egg
megalops = decapod stage following zoea
Estimated Weights (mg) = When stomach contents are heavily digested, the actual weight underestimates the real weight of food eaten, so the the total weights are estimated from parts of organisms.

Appendix 3.2-11. Pacific Herring Diet by Weight, Hope Bay Belt Project, 2009

Location	Reference Bay	Reference Bay	Reference Bay	Reference Bay	Reference Bay	Reference Bay	Reference Bay	Reference Bay	Reference Bay
Site	Reference Site	Reference Site	Shoals	Reference Site	Reference Site	Reference Site	Reference Site	Reference Site	Reference Site
Date	9-Aug-09	10-Aug-09	27-Aug-10	4-Sep-09	4-Sep-09	4-Sep-09	4-Sep-09	4-Sep-09	5-Sep-09
Sample No.	090440	090441	090418	090446	090447	090448	090449	090450	090451
Field Sample	1067	1089	295	396	397	412	413	414	428
Individual Sample	546	568	61	591	592	594	595	596	614
Fullness (%)	15	90	0	75	5	2	50	60	5
Digestion (%)	90	90	100	75	90	95	75	75	75
Actual Weight (mg)	327	1,767	0	1,059	133	185	780	1,070	103
Species/Group									
CRUSTACEA									
CLADOCERA									
Evadne nordmanni									
OSTRACODA									
Cypris									
COPEPODA									
Calanoida									
Pseudocalanidae									
Pseudocalanus minutus									
Temoridae							0		
Cyclopoida									
Harpacticoida									
Ectinosoma neglectum									
Tisbe furcata									
CUMACEA									
Diastylis						20		4	8
ISOPODA									
Saduria entomon									
AMPHIPODA									
Hyperiidae									
Hyperia galba									
Gammaridae									
Gammarellus homari						10		12	10
Gammarus setosus				2		6		308	25
Gammarus setosus									
Ampeliscidae									
Ampelisca sp									
Haustoridae									
Pontoporeia femorata									
Lysianassidae	3								
Anonyx nugax									
Onisimus glacialis?		61		8			11	23	
MYSIDACEA									
Mysis litoralis	276	1,602		957	128	94	761	544	30
DECAPODA									
Brachyura	30	54		35	4	1		179	1
Brachyura				57	1	4	8		29
ARACHNIDA									
Hydracarina									
INSECTA									
Collembola									
Anurida									
DIPTERA									
Chironomidae									
MOLLUSCA									
Bivalvia									
Gastropoda	18	50							
FISH									
Fish Eggs									
Fish						50			
Gadidae									
Boreogadus saida (otolith)									
Agonidae									
Agonus decagonus									
NON-FOOD ITEMS									
Plant									
Pebble									
TOTAL	**327**	**1,767**	**0**	**1,059**	**133**	**185**	**780**	**1,070**	**103**

Notes:
A = adult
F = female
M = male
Juv = juvenile
P = pupa (second juvenile of homometabolous insect)
FW = freshwater organism
MA = marine
Dam = damaged
zoea = first decapod stages after hatching from egg
megalops = decapod stage following zoea
Estimated Weights (mg) = When stomach contents are heavily digested, the actual weight underestimates the real weight of food eaten, so the the total weights are estimated from parts of organisms.

Appendix 3.2-11. Pacific Herring Diet by Weight, Hope Bay Belt Project, 2009

Location	Reference Bay	Reference Bay	Reference Bay	Reference Bay	Reference Bay
Site	Reference Site	Reference Site	Shoals	Shoals	Shoals
Date	5-Sep-09	5-Sep-09	6-Sep-09	6-Sep-09	6-Sep-09
Sample No.	090452	090453	090454	090455	090456
Field Sample	429	430	452	453	454
Individual Sample	615	616	180	181	182
Fullness (%)	90	100	50	25	1
Digestion (%)	50	50	25	90	50
Actual Weight (mg)	865	1,100	375	136	25
Species/Group					
CRUSTACEA					
CLADOCERA					
Evadne nordmanni					
OSTRACODA					
Cypris					
COPEPODA					
Calanoida					
Pseudocalanidae					
Pseudocalanus minutus					
Temoridae					
Cyclopoida					
Harpacticoida					
Ectinosoma neglectum					
Tisbe furcata					
CUMACEA					
Diastylis	4	38	8		
ISOPODA					
Saduria entomon					
AMPHIPODA					
Hyperiidae					
Hyperia galba					
Gammaridae					
Gammarellus homari					
Gammarus setosus			12	34	3
Gammarus setosus					
Ampeliscidae					
Ampelisca sp					
Haustoridae					
Pontoporeia femorata					
Lysianassidae					
Anonyx nugax					
Onisimus glacialis?		6			
MYSIDACEA					
Mysis litoralis	442	639			
DECAPODA					
Brachyura	22	144	293	89	22
Brachyura	367	257		47	
ARACHNIDA					
Hydracarina					
INSECTA					
Collembola					
Anurida					
DIPTERA					
Chironomidae					
MOLLUSCA					
Bivalvia	2				
Gastropoda	28	16	54		
FISH					
Fish Eggs					
Fish					
Gadidae					
Boreogadus saida (otolith)				20	
Agonidae					
Agonus decagonus					
NON-FOOD ITEMS					
Plant					
Pebble			8		
TOTAL	**865**	**1,100**	**375**	**190**	**25**

Notes:
A = adult
F = female
M = male
Juv = juvenile
P = pupa (second juvenile of homometabolous insect)
FW = freshwater organism
MA = marine
Dam = damaged
zoea = first decapod stages after hatching from egg
megalops = decapod stage following zoea
Estimated Weights (mg) = When stomach contents are heavily digested, the actual weight underestimates the real weight of food eaten, so the the total weights are estimated from parts of organisms.

Appendix 3.3-1

Biological Data for Macrobenthos Sampled in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

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Appendix 3.3-1. Biological Data for Macrobenthos Sampled in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

Location		Gear				Individual					
Location	Site	Method	Type	#	Date	Number	Field Sample	Species	Length (mm)	Weight (g)	Comments
Roberts Bay	Proposed Barge Site	GN	S	1	29-Jul-09	1	-	Isopod	78	10	
Roberts Bay	Proposed Barge Site	MT	-	12	24-Aug-09	2	-	Isopod	-	-	
Roberts Bay	Proposed Barge Site	CT	-	7	24-Aug-09	3	-	Snail	-	-	Photo 1528-1533
Roberts Bay	Proposed Barge Site	CT	-	7	24-Aug-09	4	-	Snail	-	-	
Roberts Bay	Proposed Barge Site	CT	-	7	24-Aug-09	5	-	Snail	-	-	
Roberts Bay	Proposed Barge Site	CT	-	7	24-Aug-09	6	-	Snail	-	-	
Roberts Bay	Proposed Barge Site	CT	-	7	24-Aug-09	7	-	Snail	-	-	
Roberts Bay	Proposed Barge Site	CT	-	7	24-Aug-09	8	-	Snail	-	-	
Roberts Bay	Proposed Barge Site	CT	-	7	24-Aug-09	9	-	Snail	-	-	
Roberts Bay	Proposed Port Site	GN	S	1	1-Aug-09	10	-	Sea Star	82	-	
Roberts Bay	Proposed Port Site	GN	S	1	1-Aug-09	11	-	Sea Star	135	-	
Roberts Bay	Proposed Port Site	GN	S	1	1-Aug-09	12	-	Sea Star	-	-	
Roberts Bay	Proposed Port Site	GN	S	1	1-Aug-09	13	-	Sea Star	-	-	
Roberts Bay	Proposed Port Site	GN	S	1	1-Aug-09	14	-	Sea Star	-	-	
Roberts Bay	Proposed Port Site	GN	S	1	1-Aug-09	15	-	Sea Star	-	-	
Roberts Bay	Proposed Port Site	GN	S	1	1-Aug-09	16	-	Sea Star	-	-	
Roberts Bay	Proposed Port Site	GN	S	1	1-Aug-09	17	-	Sea Star	-	-	
Roberts Bay	Proposed Port Site	GN	S	1	1-Aug-09	18	-	Sea Star	-	-	
Roberts Bay	Proposed Port Site	GN	S	1	1-Aug-09	19	-	Sea Star	-	-	
Roberts Bay	Proposed Port Site	GN	S	1	1-Aug-09	20	-	Sea Star	-	-	
Roberts Bay	Proposed Port Site	GN	S	1	1-Aug-09	21	-	Sea Star	-	-	
Roberts Bay	Proposed Port Site	GN	S	1	1-Aug-09	22	-	Sea Star	-	-	
Roberts Bay	Proposed Port Site	GN	S	1	1-Aug-09	23	-	Sea Star	-	-	
Roberts Bay	Proposed Port Site	GN	S	1	1-Aug-09	24	-	Sea Star	-	-	
Roberts Bay	Proposed Port Site	GN	S	1	1-Aug-09	25	-	Sea Star	-	-	
Roberts Bay	Proposed Port Site	GN	S	1	1-Aug-09	26	-	Sea Urchin	45	-	
Roberts Bay	Proposed Port Site	GN	S	2	1-Aug-09	27	-	Sea Star	90	-	
Roberts Bay	Proposed Port Site	GN	S	2	1-Aug-09	28	-	Sea Star	64	-	
Roberts Bay	Proposed Port Site	CT	-	4	1-Aug-09	29	-	Sea Urchin	27	-	
Roberts Bay	Proposed Port Site	CT	-	4	1-Aug-09	30	-	Sea Urchin	48	-	
Roberts Bay	Proposed Port Site	GN	S	4	2-Aug-09	31	-	Sea Star	140	-	
Roberts Bay	Proposed Port Site	GN	S	4	2-Aug-09	32	-	Sea Star	89	-	
Roberts Bay	Proposed Port Site	GN	S	4	2-Aug-09	33	-	Sea Star	-	-	
Roberts Bay	Proposed Port Site	GN	S	4	2-Aug-09	34	-	Sea Star	-	-	
Roberts Bay	Proposed Port Site	GN	F	3	3-Aug-09	35	-	Sea Star	113	-	
Roberts Bay	Proposed Port Site	GN	S	6	3-Aug-09	36	-	Sea Star	58	-	
Roberts Bay	Proposed Port Site	GN	S	6	3-Aug-09	37	-	Sea Star	159	-	
Roberts Bay	Proposed Port Site	GN	S	6	3-Aug-09	38	-	Sea Star	-	-	
Roberts Bay	Proposed Port Site	GN	S	6	3-Aug-09	39	-	Sea Star	-	-	
Roberts Bay	Proposed Port Site	GN	S	6	3-Aug-09	40	-	Sea Star	-	-	
Roberts Bay	Proposed Port Site	GN	S	6	3-Aug-09	41	-	Sea Star	-	-	
Roberts Bay	Proposed Port Site	GN	S	6	3-Aug-09	42	-	Sea Star	-	-	
Roberts Bay	Proposed Port Site	GN	S	6	3-Aug-09	43	-	Sea Star	-	-	
Roberts Bay	Proposed Port Site	CT	-	13	3-Aug-09	44	-	Crab	48	85	Photo 394-395
Roberts Bay	Proposed Port Site	CT	-	13	3-Aug-09	45	-	Snail	-	-	
Roberts Bay	Proposed Port Site	CT	-	13	3-Aug-09	46	-	Snail	-	-	
Roberts Bay	Proposed Port Site	CT	-	13	3-Aug-09	47	-	Snail	-	-	
Roberts Bay	Proposed Port Site	CT	-	14	3-Aug-09	48	-	Crab	65	199	Photo 400
Roberts Bay	Proposed Port Site	CT	-	14	3-Aug-09	49	-	Snail	-	-	
Roberts Bay	Proposed Port Site	CT	-	14	3-Aug-09	50	-	Snail	-	-	
Roberts Bay	Proposed Port Site	CT	-	14	3-Aug-09	51	-	Snail	-	-	
Roberts Bay	Proposed Port Site	CT	-	14	3-Aug-09	52	-	Snail	-	-	

Notes:
Dashes indicate no data available.
General Method: BS = Beach seine; CT = Crab trap; GN = Gillnet; LL = Long line; MT = Minnow trap.
Gear Type: F = Floating; S = Sinking.
Length measurements taken for Crabs = carapace width, Isopods = total length, Sea stars = maximum leght-from one arm tip to another, and Sea urchins = diameter of test.

Appendix 3.3-1. Biological Data for Macrobenthos Sampled in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

Location		Gear				Individual					
Location	Site	Method	Type	#	Date	Number	Field Sample	Species	Length (mm)	Weight (g)	Comments
Roberts Bay	Proposed Port Site	CT	-	14	3-Aug-09	53	-	Snail	-	-	
Roberts Bay	Proposed Port Site	CT	-	14	3-Aug-09	54	-	Snail	-	-	
Roberts Bay	Proposed Port Site	CT	-	14	3-Aug-09	55	-	Snail	-	-	
Roberts Bay	Proposed Port Site	CT	-	14	3-Aug-09	56	-	Snail	-	-	
Roberts Bay	Proposed Port Site	CT	-	14	3-Aug-09	57	-	Snail	-	-	
Roberts Bay	Proposed Port Site	CT	-	14	3-Aug-09	58	-	Snail	-	-	
Roberts Bay	Proposed Port Site	CT	-	14	3-Aug-09	59	-	Snail	-	-	
Roberts Bay	Proposed Port Site	CT	-	14	3-Aug-09	60	-	Snail	-	-	
Roberts Bay	Proposed Port Site	CT	-	14	3-Aug-09	61	-	Snail	-	-	
Roberts Bay	Proposed Port Site	CT	-	14	3-Aug-09	62	-	Snail	-	-	
Roberts Bay	Proposed Port Site	CT	-	14	3-Aug-09	63	-	Snail	-	-	
Roberts Bay	Proposed Port Site	CT	-	14	3-Aug-09	64	-	Snail	-	-	
Roberts Bay	Proposed Port Site	CT	-	15	3-Aug-09	65	-	Crab	68	202	
Roberts Bay	Proposed Port Site	CT	-	15	3-Aug-09	66	-	Crab	46	51	
Roberts Bay	Proposed Port Site	CT	-	15	3-Aug-09	67	-	Snail	-	-	
Roberts Bay	Proposed Port Site	CT	-	15	3-Aug-09	68	-	Snail	-	-	
Roberts Bay	Proposed Port Site	CT	-	15	3-Aug-09	69	-	Snail	-	-	
Roberts Bay	Proposed Port Site	GN	F	2	22-Aug-09	70	71	Crab	60	221	Photo
Roberts Bay	Proposed Port Site	GN	F	2	22-Aug-09	71	72	Crab	53	119	
Roberts Bay	Proposed Port Site	GN	F	2	22-Aug-09	72	73	Crab	50	104	
Roberts Bay	Proposed Port Site	GN	F	2	22-Aug-09	73	74	Crab	43	70	
Roberts Bay	Proposed Port Site	GN	S	1	22-Aug-09	74	32	Sea Star	66	-	Photo
Roberts Bay	Proposed Port Site	GN	S	1	22-Aug-09	75	33	Crab	40	-	
Roberts Bay	Proposed Port Site	GN	S	1	22-Aug-09	76	-	Clam	-	-	Photo - double walled/white shell
Roberts Bay	Proposed Port Site	GN	S	1	22-Aug-09	77	-	Clam	-	-	Photo - double walled/white shell
Roberts Bay	Proposed Port Site	GN	S	2	22-Aug-09	78	37	Sea Star	132	-	Photo
Roberts Bay	Proposed Port Site	GN	S	2	22-Aug-09	79	38	Sea Star	115	-	Photo
Roberts Bay	Proposed Port Site	GN	S	2	22-Aug-09	80	-	Sea Urchin	30		Photo
Roberts Bay	Proposed Port Site	GN	S	3	22-Aug-09	81	60	Sea Star	110	-	
Roberts Bay	Proposed Port Site	GN	S	3	22-Aug-09	82	61	Sea Star	109	-	
Roberts Bay	Proposed Port Site	GN	S	3	22-Aug-09	83	62	Sea Star	75	-	
Roberts Bay	Proposed Port Site	GN	S	3	22-Aug-09	84	-	Sea Star	-	-	Escaped
Roberts Bay	Proposed Port Site	GN	S	3	22-Aug-09	85	-	Mussel	-	-	Photo
Roberts Bay	Proposed Port Site	GN	S	3	22-Aug-09	86	-	Clam	-	-	Photo
Roberts Bay	Proposed Port Site	CT	-	2	23-Aug-09	87	75	Crab	40	48	Dying
Roberts Bay	Proposed Port Site	CT	-	5	23-Aug-09	88	-	Sea Urchin	-	-	
Roberts Bay	Proposed Port Site	CT	-	5	23-Aug-09	89	-	Isopodpod	-	-	
Roberts Bay	Proposed Port Site	GN	S	4	29-Aug-09	90	328	Sea Star	124	33	Photo 4656-24659
Roberts Bay	Proposed Port Site	GN	S	4	29-Aug-09	91	-	Sea Urchin	-	-	Photo
Roberts Bay	Proposed Port Site	GN	S	4	29-Aug-09	92	-	Sea Urchin	-	-	Photo
Roberts Bay	Proposed Port Site	GN	S	4	29-Aug-09	93	-	Sea Urchin	-	-	Photo
Roberts Bay	Proposed Port Site	GN	S	4	29-Aug-09	94	-	Clam	-	-	Photo
Roberts Bay	Proposed Port Site	MT	-	11	30-Aug-09	95	-	Isopod	-	-	
Roberts Bay	Proposed Port Site	MT	-	12	30-Aug-09	96	-	Isopod	-	-	
Roberts Bay	Proposed Port Site	MT	-	12	30-Aug-09	97	-	Isopod	-	-	
Roberts Bay	Proposed Port Site	MT	-	18	30-Aug-09	98	-	Isopod	-	-	
Roberts Bay	Proposed Port Site	MT	-	18	30-Aug-09	99	-	Isopod	-	-	
Roberts Bay	Proposed Port Site	MT	-	18	30-Aug-09	100	-	Isopod	-	-	
Roberts Bay	Proposed Port Site	MT	-	18	30-Aug-09	101	-	Isopod	-	-	
Roberts Bay	Proposed Port Site	MT	-	18	30-Aug-09	102	-	Isopod	-	-	
Roberts Bay	Proposed Port Site	MT	-	18	30-Aug-09	103	-	Isopod	-	-	
Roberts Bay	Proposed Port Site	MT	-	19	30-Aug-09	104	-	Sea Urchin	-	-	

Notes:
Dashes indicate no data available.
General Method: BS = Beach seine; CT = Crab trap; GN = Gillnet; LL = Long line; MT = Minnow trap.
Gear Type: F = Floating; S = Sinking.
Length measurements taken for Crabs = carapace width, Isopods = total length, Sea stars = maximum leght-from one arm tip to another, and Sea urchins = diameter of test.

Appendix 3.3-1. Biological Data for Macrobenthos Sampled in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

Location		Gear				Individual					
Location	Site	Method	Type	#	Date	Number	Field Sample	Species	Length (mm)	Weight (g)	Comments
Roberts Bay	Proposed Port Site	MT	-	19	30-Aug-09	105	-	Sea Urchin	-	-	
Roberts Bay	Proposed Port Site	MT	-	19	30-Aug-09	106	-	Sea Urchin	-	-	
Roberts Bay	Proposed Port Site	MT	-	19	30-Aug-09	107	-	Sea Urchin	-	-	
Roberts Bay	Proposed Port Site	MT	-	19	30-Aug-09	108	-	Sea Urchin	-	-	
Roberts Bay	Proposed Port Site	MT	-	19	30-Aug-09	109	-	Sea Urchin	-	-	
Roberts Bay	Proposed Port Site	MT	-	19	30-Aug-09	110	-	Sea Urchin	-	-	
Roberts Bay	Proposed Port Site	MT	-	19	30-Aug-09	111	-	Sea Urchin	-	-	
Roberts Bay	Proposed Port Site	MT	-	19	30-Aug-09	112	-	Sea Urchin	-	-	
Roberts Bay	Proposed Port Site	MT	-	19	30-Aug-09	113	-	Sea Urchin	-	-	
Roberts Bay	Proposed Port Site	MT	-	19	30-Aug-09	114	-	Sea Urchin	-	-	
Roberts Bay	Proposed Port Site	MT	-	19	30-Aug-09	115	-	Sea Urchin	-	-	
Roberts Bay	Proposed Port Site	MT	-	20	30-Aug-09	116	-	Sea Urchin	-	-	
Roberts Bay	Proposed Port Site	MT	-	20	30-Aug-09	117	-	Sea Urchin	-	-	
Roberts Bay	Proposed Port Site	MT	-	20	30-Aug-09	118	-	Sea Urchin	-	-	
Roberts Bay	Proposed Port Site	MT	-	20	30-Aug-09	119	-	Sea Urchin	-	-	
Roberts Bay	Proposed Port Site	MT	-	20	30-Aug-09	120	-	Sea Urchin	-	-	
Roberts Bay	Proposed Port Site	MT	-	20	30-Aug-09	121	-	Sea Urchin	-	-	
Roberts Bay	Proposed Port Site	MT	-	20	30-Aug-09	122	-	Sea Urchin	-	-	
Roberts Bay	Proposed Port Site	MT	-	20	30-Aug-09	123	-	Sea Urchin	-	-	
Roberts Bay	Proposed Port Site	MT	-	20	30-Aug-09	124	-	Sea Urchin	-	-	
Roberts Bay	Proposed Port Site	MT	-	20	30-Aug-09	125	-	Sea Urchin	-	-	
Roberts Bay	Proposed Port Site	MT	-	20	30-Aug-09	126	-	Sea Urchin	-	-	
Roberts Bay	Proposed Port Site	MT	-	20	30-Aug-09	127	-	Sea Urchin	-	-	
Roberts Bay	Proposed Port Site	MT	-	20	30-Aug-09	128	-	Sea Urchin	-	-	
Roberts Bay	Proposed Port Site	MT	-	20	30-Aug-09	129	-	Sea Urchin	-	-	
Roberts Bay	Proposed Port Site	MT	-	20	30-Aug-09	130	-	Sea Urchin	-	-	
Roberts Bay	Proposed Port Site	MT	-	20	30-Aug-09	131	-	Sea Urchin	-	-	
Roberts Bay	Proposed Port Site	MT	-	20	30-Aug-09	132	-	Sea Urchin	-	-	
Roberts Bay	Proposed Port Site	MT	-	20	30-Aug-09	133	-	Sea Urchin	-	-	
Roberts Bay	Proposed Port Site	MT	-	20	30-Aug-09	134	-	Sea Urchin	-	-	
Roberts Bay	Proposed Port Site	CT	-	6	30-Aug-09	135	371	Crab	62	179	Photo 4707-4710
Roberts Bay	Proposed Port Site	CT	-	7	30-Aug-09	136	372	Crab	53	94	Missing one claw; very pale in color
Roberts Bay	Proposed Port Site	CT	-	8	30-Aug-09	137	373	Crab	54	87	Missing one claw
Roberts Bay	Proposed Port Site	CT	-	10	30-Aug-09	138	374	Crab	60	156	
Roberts Bay	Proposed Port Site	CT	-	10	30-Aug-09	139	375	Crab	49	89	
Roberts Bay	Proposed Port Site	GN	S	7	3-Sep-09	140	-	Sea Urchin	-	-	
Roberts Bay	Proposed Port Site	GN	S	7	3-Sep-09	141	-	Sea Urchin	-	-	
Roberts Bay	Proposed Port Site	GN	S	7	3-Sep-09	142	-	Sea Urchin	-	-	
Roberts Bay	Proposed Port Site	GN	S	7	3-Sep-09	143	-	Sea Urchin	-	-	
Roberts Bay	Proposed Port Site	GN	S	7	3-Sep-09	144	-	Sea Urchin	-	-	
Roberts Bay	Proposed Port Site	GN	S	8	3-Sep-09	145	389	Sea Star	113	22	Photo 4782-4785
Roberts Bay	Proposed Port Site	GN	S	9	3-Sep-09	146	390	Sea Star	135	36	Photo; specimen preserved as voucher
Roberts Bay	Proposed Port Site	GN	S	9	3-Sep-09	147	391	Sea Star	150	49	Photo
Roberts Bay	Proposed Port Site	GN	S	9	3-Sep-09	148	392	Sea Star	146	41	Photo
Roberts Bay	Proposed Port Site	GN	S	9	3-Sep-09	149	393	Sea Star	113	21	Photo
Roberts Bay	Proposed Port Site	GN	S	9	3-Sep-09	150	394	Sea Star	84	9	Photo
Roberts Bay	Proposed Port Site	GN	S	9	3-Sep-09	151	395	Sea Star	95	17	Photo
Reference Bay	Reference Site	GN	S	1	8-Aug-09	152	-	Sea Star	82	-	
Reference Bay	Reference Site	GN	S	1	8-Aug-09	153	-	Sea Star	114	-	
Reference Bay	Reference Site	GN	S	1	8-Aug-09	154	-	Sea Star	-	-	
Reference Bay	Reference Site	GN	S	1	8-Aug-09	155	-	Snail	-	-	
Reference Bay	Reference Site	GN	S	2	8-Aug-09	156	-	Sea Star	-	-	

Notes:
Dashes indicate no data available.
General Method: BS = Beach seine; CT = Crab trap; GN = Gillnet; LL = Long line; MT = Minnow trap.
Gear Type: F = Floating; S = Sinking.
Length measurements taken for Crabs = carapace width, Isopods = total length, Sea stars = maximum leght-from one arm tip to another, and Sea urchins = diameter of test.

Appendix 3.3-1. Biological Data for Macrobenthos Sampled in Roberts Bay and Reference Bay, Hope Bay Belt Project, 2009

Location		Gear				Individual					
Location	Site	Method	Type	#	Date	Number	Field Sample	Species	Length (mm)	Weight (g)	Comments
Reference Bay	Reference Site	GN	S	2	8-Aug-09	157	-	Snail	-	-	
Reference Bay	Reference Site	GN	S	3	9-Aug-09	158	-	Sea Star	80	-	
Reference Bay	Reference Site	GN	S	3	9-Aug-09	159	-	Sea Star	138	-	
Reference Bay	Reference Site	GN	S	3	9-Aug-09	160	-	Sea Star	-	-	
Reference Bay	Reference Site	MT	-	8	9-Aug-09	161	-	Isopod	-	-	
Reference Bay	Reference Site	MT	-	17	9-Aug-09	162	-	Isopod	-	-	
Reference Bay	Reference Site	MT	-	17	9-Aug-09	163	-	Isopod	-	-	
Reference Bay	Reference Site	CT	-	5	9-Aug-09	164	-	Mussel	37	5	
Reference Bay	Reference Site	GN	S	5	10-Aug-09	165	-	Sea Star	88	-	
Reference Bay	Reference Site	GN	S	6	10-Aug-09	166	-	Sea Star	114	-	
Reference Bay	Reference Site	GN	S	6	10-Aug-09	167	-	Sea Star	75	-	
Reference Bay	Reference Site	GN	S	6	10-Aug-09	168	-	Sea Star	-	-	
Reference Bay	Reference Site	GN	S	6	10-Aug-09	169	-	Sea Star	-	-	
Reference Bay	Reference Site	CT	-	7	10-Aug-09	170	-	Crab	-	-	
Reference Bay	Reference Site	CT	-	9	10-Aug-09	171	-	Crab	65	181	
Reference Bay	Reference Site	CT	-	9	10-Aug-09	172	-	Sea Star	122	-	
Reference Bay	Reference Site	GN	S	1	4-Sep-09	173	398	Sea Star	78	9	
Reference Bay	Reference Site	GN	S	3	4-Sep-09	174	418	Crab	69	153	
Reference Bay	Reference Site	GN	S	3	4-Sep-09	175	-	Sea Star	-	-	Escaped
Reference Bay	Reference Site	GN	S	4	5-Sep-09	176	426	Crab	53	97	
Reference Bay	Reference Site	GN	S	5	5-Sep-09	177	-	Clam	-	-	
Reference Bay	Reference Site	GN	S	5	5-Sep-09	178	-	Clam	-	-	
Reference Bay	Reference Site	CT	-	2	5-Sep-09	179	419	Crab	68	213	
Reference Bay	Reference Site	CT	-	2	5-Sep-09	180	420	Crab	50	66	
Reference Bay	Reference Site	CT	-	3	5-Sep-09	181	421	Crab	67	184	
Reference Bay	Reference Site	CT	-	3	5-Sep-09	182	422	Crab	63	184	
Reference Bay	Reference Site	CT	-	4	5-Sep-09	183	423	Crab	54	94	
Reference Bay	Reference Site	CT	-	4	5-Sep-09	184	424	Crab	75	216	
Reference Bay	Reference Site	CT	-	4	5-Sep-09	185	425	Crab	47	69	Photo 4892-98; belly inflated
Reference Bay	Reference Site	CT	-	4	5-Sep-09	186	-	Snail	-	-	Photo 4901-4904
Reference Bay	Reference Site	CT	-	4	5-Sep-09	187	-	Snail	-	-	
Reference Bay	Reference Site	CT	-	4	5-Sep-09	188	-	Snail	-	-	
Reference Bay	Reference Site	CT	-	4	5-Sep-09	189	-	Snail	-	-	
Reference Bay	Reference Site	CT	-	5	5-Sep-09	190	-	Crab	-	-	Escaped
Reference Bay	Reference Site	CT	-	8	6-Sep-09	191	431	Crab	67	206	
Reference Bay	Reference Site	CT	-	8	6-Sep-09	192	432	Crab	57	110	
Reference Bay	Reference Site	CT	-	8	6-Sep-09	193	435	Sea Star	16	109	
Reference Bay	Reference Site	CT	-	8	6-Sep-09	194	-	Snail	-	-	Photo 4930-4932; jelly like 'thing' on top
Reference Bay	Reference Site	CT	-	8	6-Sep-09	195	-	Snail	-	-	Photo 4930-4932; jelly like 'thing' on top
Reference Bay	Reference Site	CT	-	10	6-Sep-09	196	433	Crab	48	95	
Reference Bay	Reference Site	CT	-	10	6-Sep-09	197	434	Crab	40	43	Photo 4934-4936; inflated belly similar to Crab #425

Notes:
Dashes indicate no data available.
General Method: BS = Beach seine; CT = Crab trap; GN = Gillnet; LL = Long line; MT = Minnow trap.
Gear Type: F = Floating; S = Sinking.
Length measurements taken for Crabs = carapace width, Isopods = total length, Sea stars = maximum leght-from one arm tip to another, and Sea urchins = diameter of test.