

Wild Juvenile Salmonid Monitoring Program Broughton Archipelago 2018

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Summary

Beach seine sampling was conducted on behalf of Marine Harvest Canada, Cermaq Canada and Grieg Seafood BC Ltd. in the Broughton Archipelago, BC in 2018.

Sampling was completed to monitor sea lice abundance, prevalence and intensity on juvenile wild salmon and threespine stickleback within the Broughton Archipelago in support of the Aquaculture Stewardship Certification process for finfish aquaculture sites in the area.

Sampling was conducted during two separate sampling events in April and May 2018, selected to coincide with the peak outmigration period of juvenile salmonids. Sampling was completed at 32 sites within the Broughton Archipelago, BC. The sites were selected based on their locations relative to existing aquaculture sites located in the area and based on the historical abundance of juvenile salmon at each of the sites.

Thirty individuals from each target fish species or the total number of captured individuals from each target species (if less than 30 were captured) were collected from each of the 32 sites during the sampling events. Total catch numbers of each species were recorded. Water quality measurements including temperature and salinity were recorded at each site during each sampling event.

Collected sample fish were frozen and delivered to the Center for Aquatic Health Sciences (CAHS) for laboratory analysis. Sea lice infestation data was tabulated by CAHS and provided to Mainstream Biological Consulting for reporting. Sea lice observed on the individual fish specimens during laboratory analysis were identified as either *Lepeophtheirus spp.* or *Caligus sp.* These lice are assumed to be *L. salmonis* and *C. clemensi* due to the lack of documented infestation of Pacific salmon by other species. The lice were recorded by life stage and the sex of pre-adult or adult motile lice was determined.

This data summary report documents the observed sea lice infestation rate on retained wild juvenile salmon and threespine stickleback collected in the Broughton Archipelago in 2018. A total of 653 individual samples underwent lab analysis for sea lice infestation including 281 chum salmon (*Oncorhynchus keta*), 356 pink salmon (*Oncorhynchus gorbuscha*), 11 coho salmon (*Oncorhynchus kisutch*) and five threespine

stickleback (*Gasterosteus aculeatus*). No chinook salmon (*Oncorhynchus tshawytscha*), sockeye salmon (*Oncorhynchus nerka*) or Atlantic salmon (*Salmo salar*) were captured during sampling completed in the Broughton Archipelago in 2018. From the total sample population 112 individuals were infested with 165 sea lice. The calculated prevalence for the total sample population was 17.2 % and the sea lice abundance was 0.25 for the sample population collected in the Broughton Archipelago in 2018.

A total of 814 chum salmon were captured, representing 38.3 % of all captured samples. Of the 814 chum captured, 281 were kept for lab analysis for sea lice infestation. A total of 55 chum smolts were found to be infested with 77 lice resulting in a calculated prevalence of 19.6 % and an abundance of 0.27 for the chum salmon sample population.

A total of 1296 pink salmon were captured, representing 61.0 % of all captured samples. Of the 1296 pinks captured, 356 were kept for lab analysis for sea lice infestation. A total of 52 pink salmon were found to be infested with 80 lice resulting in a calculated prevalence of 14.6 % and an abundance of 0.22 for the pink salmon sample population.

A total of 11 coho salmon were captured, retained and analyzed for sea lice infestation. Of the 11 samples three coho salmon were found to be infested by five lice resulting in a calculated prevalence of 27.3 % and an abundance of 0.45 for the coho salmon sample population.

A total of five threespine stickleback were captured, retained and analyzed for sea lice infestation. Two stickleback were found to be infested with three lice.

A total of 55 *Lepeophtheirus salmonis* sea lice of various life stages were identified on 50 individuals and 110 *Caligus clemensi* sea lice were found on 81 of the samples analyzed in the lab. There were 19 samples that were infested with both a *L. salmonis* and a *C. clemensi* sea louse.

For the chum salmon sample population, a total of 32 *Lepeophtheirus salmonis* sea lice of various life stages were identified on 29 juvenile chum salmon and 45 *Caligus clemensi* sea lice were found on 35 of the juvenile chum salmon analyzed in the lab.

There were 9 juvenile chum salmon that were infested with both a *L. salmonis* and a *C. clemensi* sea louse.

For the pink salmon sample population, a total of 22 *Lepeophtheirus salmonis* sea lice of various life stages were identified on 20 juvenile pink salmon and 58 *Caligus clemensi* sea lice were found on 41 of the juvenile pink salmon analyzed in the lab. There were 9 juvenile pink salmon that were infested with both a *L. salmonis* and a *C. clemensi* sea louse.

Five sea lice were identified on three juvenile coho salmon collected in the Broughton Archipelago. All five lice identified on the juvenile coho salmon samples were *Caligus clemensi*.

One *Lepeophtheirus salmonis* and two *Caligus clemensi* were found on two threespine stickleback that were collected during beach seine sampling in the Broughton Archipelago in 2018.

The 2018 sampling represents the third year of monitoring completed in April and May. A comparison of the prevalence, abundance and average intensity of sea lice infestation by sea lice species found on chum and pink salmon was completed for 2016, 2017 and 2018 sample data collected in the Broughton Archipelago. This data is presented in the following summary tables with additional yearly comparisons of juvenile wild salmon monitoring results presented in Appendix IV.

Chum by Year	<i>Caligus clemensi</i>			<i>Lepeophtheirus salmonis</i>		
	Prevalence	Abundance	Average Intensity	Prevalence	Abundance	Average Intensity
2016 (n=512)	20.3 %	0.32	1.6	13.3 %	0.19	1.4
2017 (n=562)	17.4 %	0.31	1.8	11.0 %	0.14	1.3
2018 (n=281)	12.5 %	0.16	1.3	10.3 %	0.11	1.1

Pink by Year	<i>Caligus clemensi</i>			<i>Lepeophtheirus salmonis</i>		
	Prevalence	Abundance	Average Intensity	Prevalence	Abundance	Average Intensity
2016 (n=430)	24.4 %	0.33	1.3	15.3 %	0.24	1.5
2017 (n=411)	15.1 %	0.23	1.5	6.6 %	0.09	1.4
2018 (n=356)	11.5 %	0.16	1.4	5.6 %	0.06	1.1

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1.0 Introduction

At the request of Marine Harvest Canada, Cermaq Canada and Grieg Seafood BC Ltd. beach seine sampling to capture wild juvenile salmon and threespine stickleback to be analyzed for sea lice infestation took place at 32 sites located in the Broughton Archipelago, BC (Figure 1). The sample collection occurred on April 15/16/17 and May 15/16/17, 2018. These dates were selected to coincide with the estimated peak outmigration dates of juvenile salmonids.

Parasitic copepods from the family Caligidae (sea lice) found in the coastal waters of British Columbia are divided into two genera: *Lepeophtheirus* and *Caligus*. Eleven species of *Lepeophtheirus* have been identified infesting fish in the Pacific Ocean, while only one species of *Caligus* (*Caligus clemensi*) has been identified (Margolis and Arthur 1979; McDonald and Margolis, 1995). *Caligus clemensi* infest an extremely wide range of natural hosts in the marine environment including salmonids and non-salmonids; while *L. salmonis* natural hosts on the Pacific coast have been found to include Pacific salmon, threespine stickleback and Pacific herring. *Lepeophtheirus* spp. sea lice found on salmonid specimens were assumed to be *L. salmonis* due to the lack of documented infestations of Pacific salmon by other *Lepeophtheirus* lice species (Jones and Nemec, 2004).

Both of these genera have similar life histories and developmental stages (Kabata, 1972; Johnson and Albright, 1991a). The sea lice hatch from eggs and develop through two free-swimming naupilii stages before developing into an infectious free-swimming copepodid. At this point, the sea lice attach to their host and develop through four chalimus stages. The chalimus are “non-motile” and are attached to their host by a frontal filament. The final chalimus stage terminates as the sea lice become “motile” and are no longer attached to their hosts by the frontal filament. The sea lice can now move freely on the fish as they develop through a pre-adult stage before becoming reproductively viable adults.

Water temperature and salinity are two environmental variables that influence sea lice development, growth, survival and reproductive rate. In British Columbia, surface seawater temperatures range from approximately 6 °C to 13 °C. Research on sea lice abundance conducted in the Broughton Archipelago and elsewhere on the coast of British Columbia indicates that surface water temperature during the winter months does

not appear to hinder the seasonal abundance of *L. salmonis* (Saksida et al. 2007a, b). The rate of development and the generation times for *C. elongates* are strongly temperature dependent (Tully 1992) and although this research has not been conducted, similar relationships with temperature are to be expected for *C. clemensi* (Jones and Johnson, 2015). Survival and development of *L. salmonis* is optimal in high salinity seawater. Under laboratory conditions copepodid survival was limited to conditions where salinity was greater than 10 ppt (Johnson and Albright, 1991b).

Marine Harvest Canada, Cermaq Canada and Grieg Seafood BC Ltd. requested monitoring of sea lice abundance, prevalence and intensity on juvenile wild salmon within the Broughton Archipelago in support of the Aquaculture Stewardship Certification for their aquaculture sites within the area. This data summary report documents the observed sea lice infestation rates on retained juvenile salmonids and threespine stickleback collected in the Broughton Archipelago in 2018.

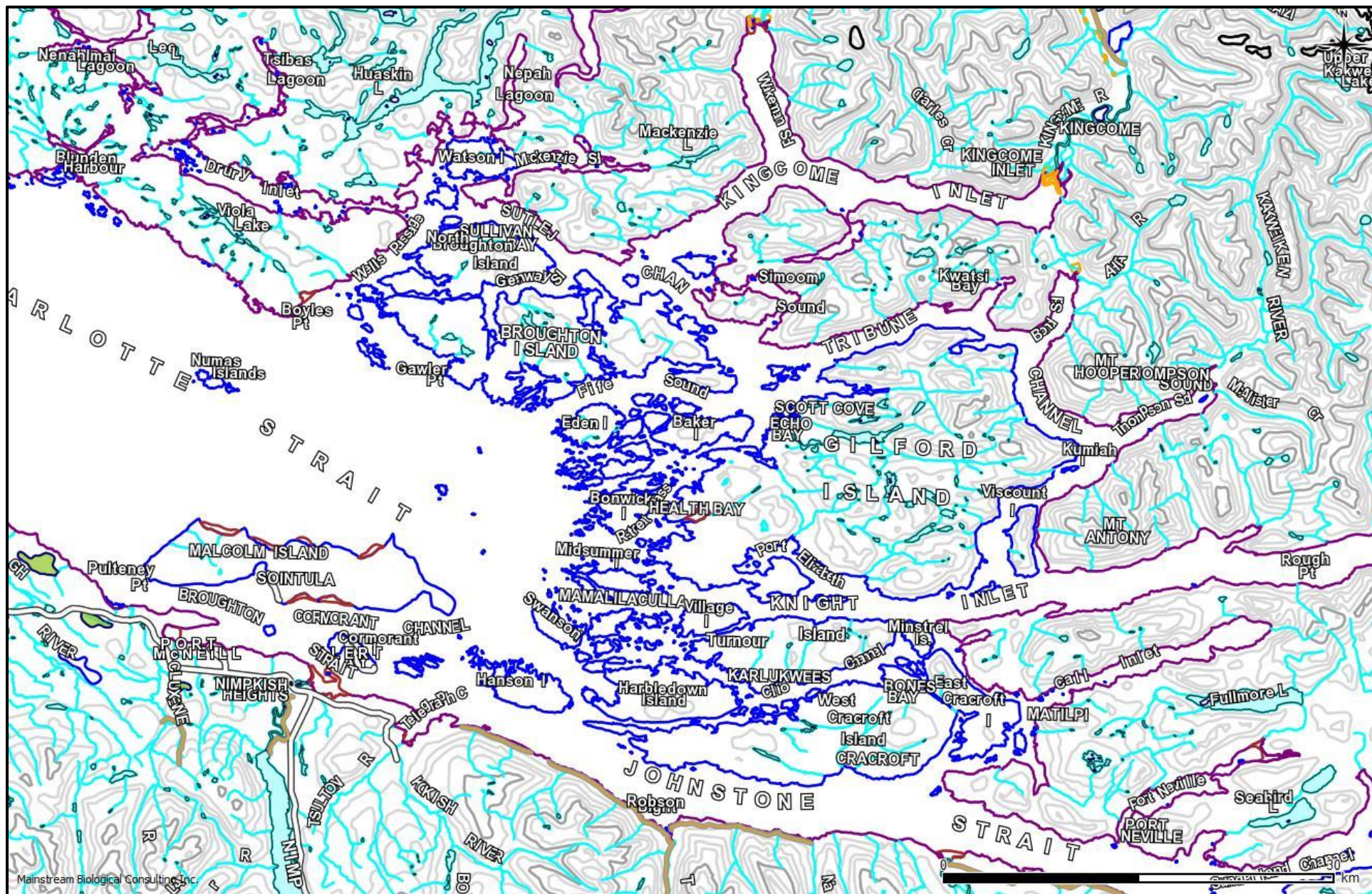


Figure 1: An overview map showing the location of the Broughton Archipelago located northeast of Port McNeill, BC.

2.0 Methods

The fish inspected for sea lice infestation were collected from 32 sites in the Broughton Archipelago, BC (Figure 2). These sites were chosen based on their locations relative to existing aquaculture sites in the area and adapted from sites sampled in 2010-2012. Each site was sampled once during two sampling weeks: April 15, 16 and 17, 2018 and May 15, 16, and 17, 2018.

2.1 Site Locations

The approximate locations of the 32 sites at which beach seining was conducted to collect specimens for sea lice analysis are shown in Figure 2. GPS coordinates collected in the field for the sites are presented in Table 1.

Table 1: The site number and location of the 32 beach seine sites where fish were collected for sea lice analysis in the Broughton Archipelago in 2018.

Site #	Site Name	Latitude	Longitude
1	Swanson Island Fish Farm	50 37.246	126 42.087
2	Midsummer Island Fish Farm (Potts Bay)	50 38.897	126 37.289
3	Chop Bay	50 39.038	126 30.445
4	Lady Island	50 38.523	126 25.789
5	Doctor Island Fish Farm	50 39.355	126 17.211
6	Brent Bay	50 38.746	126 06.200
7	Shelterless Bay	50 40.417	126 06.537
8	Lance Bay	50 40.329	126 08.951
9	Sargeaunt Pass	50 40.220	126 11.731
10	Humphrey Rock	50 41.640	126 15.762
11	Pumish Point	50 42.994	126 11.338
12	Oline Point	50 43.524	126 12.681
13	London Point	50 46.252	126 08.514
14	Miller Point	50 50.026	126 13.518
15	Kwatsi Point	50 50.411	126 15.583
16	Glacier Falls Fish Farm	50 50.935	126 19.435
17	Viner Sound	50 46.818	126 26.086
18	Denham Island	50 47.339	126 29.494
19	Baker Island	50 45.695	126 33.389
20	Jumper Island	50 47.601	126 36.075
21	Arthur Point	50 46.102	126 40.198
22	Wicklow Bay	50 46.831	126 42.303
A	Bennett Point Fish Farm (Noo-La)	50 36.563	126 22.023
B	Sambo Point	50 06.110	126 20.618
C	Penphrase Passage	50 49.682	126 34.665
D	Harry Bay	50 50.334	126 38.389
E	Phillip Point West	50 52.322	126 41.107
F	Sutlej North	50 53.281	126 44.573
G	Codrington Point	50 54.304	126 48.689
H	Wehlis Bay Fish Farm	50 52.018	126 55.028
I	Alder Bay	50 52.349	126 52.435
J	Poppelwell Point	50 50.963	126 57.041

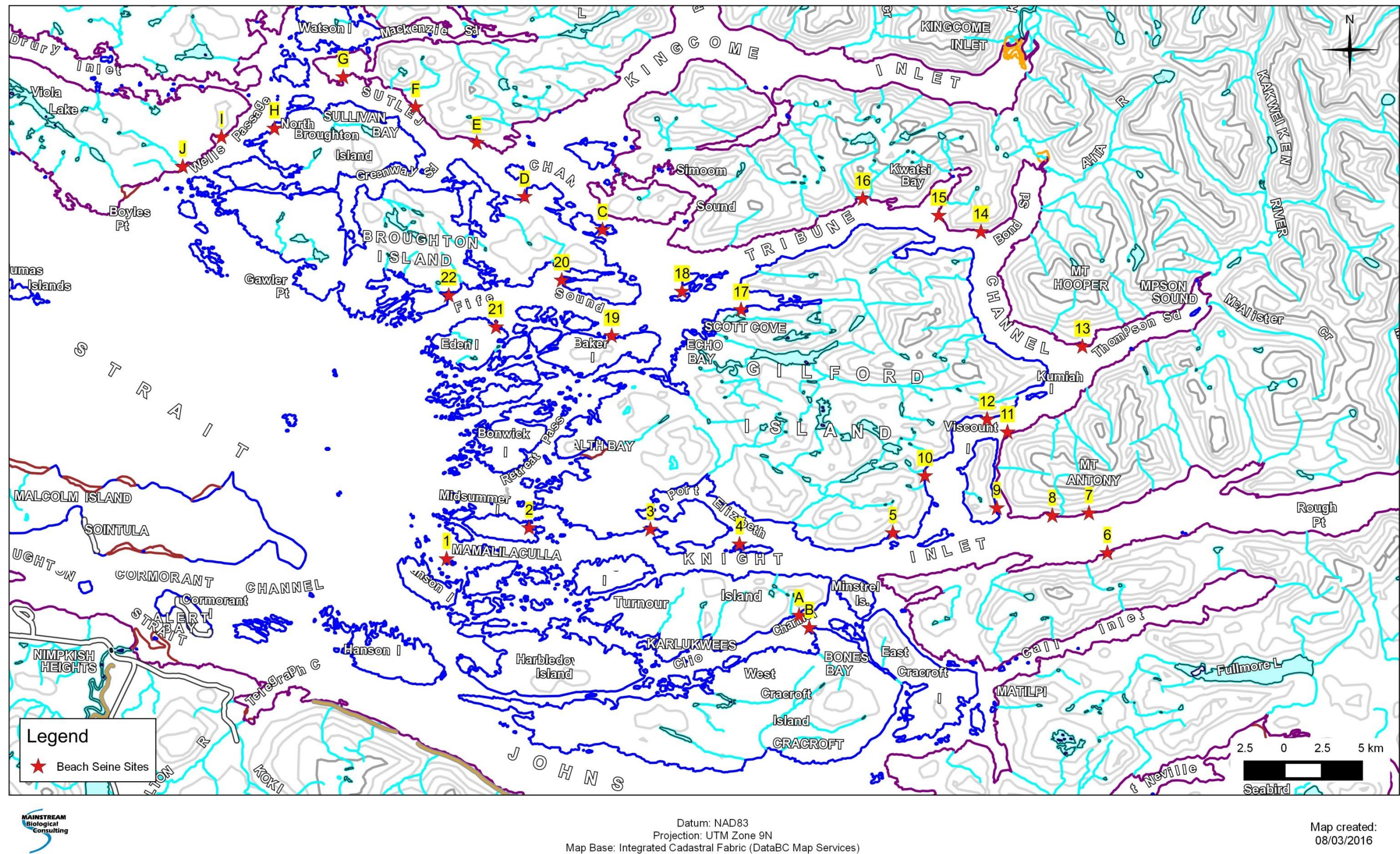


Figure 2: The approximate locations of the 32 beach seine sites (red stars) in the Broughton Archipelago sampled in 2018.

2.2 Field Procedures

Procedures for beach seining, fish collection and field data recording adapted from procedures utilized by the Department of Fisheries and Oceans (DFO) were used for juvenile salmon sampling by Mainstream Biological Consulting staff during sampling in the Broughton Archipelago in 2018.

An 18ft Boston Whaler, powered by a 60 horsepower outboard motor, was used to access the beach seine sites. A 150 ft (45.7 m) long by 12 ft (3.7 m) deep beach seine net was used to capture specimens. The net was constructed in three 50 ft (15.2 m) sections. The centre bunt section consists of one-quarter inch diameter diamond mesh, while the two side panels (wings) consist of half-inch diameter diamond mesh. Floats were located every 30 cm along the top-line and a lead line weighted the bottom of the net.

A three person crew was utilized to conduct the beach seine sets and retrieve samples in a consistent manner at each of the 32 selected sites. All beaches were approached slowly by boat and one crewmember was put ashore with the towline from one end of the beach seine net. The onshore crewmember held the towline at one side of the sample site, while the second crewmember ensured the net deployed smoothly off the bow or side of the boat. The third crewmember, the boat operator, backed the boat in a wide semicircle towards the opposite side of the sample site and remained on the boat. When the net was fully deployed, the second crewmember stepped into the shallow water with the towline or tossed it to the awaiting crewmember on shore. A slow retrieval of the net began immediately.

As the net was slowly retrieved, the probe of a YSI85 water meter was placed just below the water surface at the stern end of the boat, to collect salinity and water temperature data. The YSI85 meter was calibrated daily.

The crewmembers retrieved the net evenly from opposite ends ensuring that the lead line remained as close to the bottom as possible. All retrieved netting was piled on the beach above the water level. As the retrieval reached the net bunt, the lead line was retrieved at a faster rate than the floats to allow the netting of the bunt to form a bag under the captured fish. The lead line was then pulled up onto the beach above the water level. One crewmember worked their way around the outside of the net in the

shallow water to ensure the floats stayed above the surface of the water. In this manner a small, shallow bag formed from the bunt of the net held the captured fish in the water.

The three crew members participated in the collection of individual fish to ensure that captured fish remained in the net for as short a period of time as possible. The net was manipulated, if necessary, in response to rising or falling tides in order to ensure the captured fish remained in the net and were held in sufficient water to minimize stress. The level of sufficient water was dependant on the size and numbers of captured fish, but was generally thought of as enough water to minimize fish contact with the net or with other fish.

A total of 30 individuals from each target species captured or all of the individuals present (if less than 30) were collected as samples for sea lice infestation analysis. Individual fish were “swam” into an appropriately sized whirlpac bag. All handling of fish was kept to a minimum.

When all the fish for retention were collected, a total catch number for each species was recorded. The fish remaining in the net were counted out of the seine net, or an estimate of the remaining fish was made (estimates were used when it appeared that more than 500 individuals from any given species remained in the net). The total of fish remaining in the net was added to the number of retained individuals to calculate a total capture number for a given species.

A crewmember recorded all the information from each beach seine set in a standardized field form. The information recorded included the following:

- The site number (Site 1-22, A-J);
- The date;
- The time at the end of the individual fish collection;
- Comments on weather and oceanic conditions;
- Total capture and retained fish numbers for each specimen group; and
- Water temperature (°C) and salinity (ppt) to one decimal place.

The retained fish from each site were packaged separately in re-sealable bags and labelled with the site number (Site 1-22, A-J) and the week number (Week 1 or 2). Site sample bags were placed in a portable freezer, which was plugged into the boat's

battery. The specimens were transferred to a freezer immediately upon return from the field.

The beach seine net was reloaded onto the bow of the boat. Crewmembers scanned the net for obvious holes, which were repaired immediately if found. The YSI85 meter was shut off and stored, and all gear and coolers were reloaded into the boat.

The above procedures for beach seine net deployment and retrieval, as well as those described for fish collection, were repeated at all 32 sample sites.

2.3 Laboratory Procedures

Collected sample fish were frozen and delivered to the Center for Aquatic Health Sciences (CAHS) for laboratory analysis. Sea lice observed on the individual fish specimens during laboratory analysis were identified as either non-motile chalimus, or motile pre-adults and adults. Lice were identified as either of the two chalimus stages for *Lepeophtheirus salmonis* (Hamre et al., 2013) or four chalimus stages for *Caligus clemensi*. Motile lice, either pre-adults or adults, were identified as either *Lepeophtheirus salmonis* or *Caligus clemensi* and the sex of the louse was determined. Sea lice infestation data was tabulated by CAHS and provided to Mainstream Biological Consulting for reporting.

Data provided by CAHS also included measured fork length in millimetres and weight (recorded to the nearest tenth of a gram). Lengths and weights were recorded with the specimen's corresponding sea lice analysis results.

2.4 Data Analysis

Surface water quality data collected for temperature and salinity was summarized to report the minimum and maximum values as well as the calculated averages for each sample week.

Beach seine fish sample composition was summarized by species and site for each week. The recorded fork lengths and weights of the juvenile chum and pink salmon sample population were summarized to present minimum and maximum values as well as calculated averages. This analysis was not completed for other species as there were insufficient capture totals to warrant analysis. Sea lice infestation rates, including

the number of infested fish and the number of sea lice identified, were determined for the sample population. Prevalence, as defined as the number of host fish found to have one or more sea lice compared to the total number of host fish examined, was determined for the sample population and for chum, pink and coho salmon. Abundance, as defined as the total number of sea lice observed compared to the total number of host fish examined, was also determined for the sample population and chum, pink and coho salmon. The intensity of sea lice infestation, as described by the number of sea lice found on a single salmon was summarized. Average intensity was calculated by dividing the total number of sea lice identified by the number of infested fish

Statistical analysis of the spatial and temporal distribution of sea lice was not conducted. Spatial and temporal analysis has been limited to the simple presentation and discussion of the number of sea lice found on fish specimens collected from each site during each of the sampling events.

3.0 Results

The following sections outline the results of beach seine collection and subsequent sea lice infestation analysis of juvenile salmonids and threespine stickleback collected from the Broughton Archipelago, BC, in 2018. Water quality field data is presented in Appendix I, beach seine fish capture data is included in Appendix II and data on the sample population including sea lice lab analysis results provided by CAHS are located in Appendix III.

3.1 Water Quality Parameters

Surface measurements of water temperature and salinity taken during beach seining at each of the 32 sites during the sample period are presented in Table 2. The field data recorded at each site is included in Appendix I.

Recorded surface water temperatures ranged from a low of 8.3 °C recorded at Site D on April 15, 2018, to a high of 16.2 °C recorded at Sites 5 and 12 on May 15, 2018 (Table 2; Appendix I). Calculated weekly average surface water temperatures increased from 9.2 °C for April 15/16/17, 2018, to 11.3 °C for May 15/16/17, 2018.

Recorded surface water salinity ranged from a low of 5.3 ppt recorded at Site E on April 15, 2018, to a high of 33.9 ppt recorded at Site 1 on May 15, 2018 (Table 2; Appendix I). The calculated weekly average surface water salinity decreased from 27.1 ppt for April 15/16/17, 2018 to 26.0 ppt for May 15/16/17, 2018.

Table 2: Surface water quality parameters collected at beach seine sites in the Broughton Archipelago in 2018.

Site	Site Name	April 15/16/17, 2018		May 15/16/17, 2018	
		Temp. (°C)	Salinity (ppt)	Temp. (°C)	Salinity (ppt)
1	Swanson Island Fish Farm	8.6	30.3	9.7	33.9
2	Midsummer Island Fish Farm (Potts Bay)	8.7	30.0	9.3	33.8
3	Chop Bay	8.9	30.2	11.7	32.4
4	Lady Island	8.8	30.1	13.1	31.9
5	Doctor Island Fish Farm	8.6	30.6	16.2	26.1
6	Brent Bay	N/A	N/A	15.2	23.3
7	Shelterless Bay	8.5	30.3	15.5	19.4
8	Lance Bay	9.3	29.0	15.8	18.8
9	Sargeaunt Pass	8.8	30.1	15.3	21.8
10	Humphrey Rock	9.0	29.8	14.8	26.5
11	Pumish Point	8.8	30.0	15.6	24.7
12	Oline Point	9.0	29.8	16.2	22.3
13	London Point	9.1	26.7	11.3	18.5
14	Miller Point	9.7	28.4	13.3	23.7
15	Kwatsi Point	9.5	28.8	11.7	29.0
16	Glacier Falls Fish Farm	10.4	27.6	11.3	29.8
17	Viner Sound	10.1	28.0	12.2	28.0
18	Denham Island	9.8	28.3	13.3	13.8
19	Baker Island	8.9	26.9	10.5	30.6
20	Jumper Island	8.7	29.9	10.5	31.2
21	Arthur Point	10.1	27.8	10.0	33.0
22	Wicklow Bay	9.8	27.1	10.2	32.2
A	Bennett Point Fish Farm (Noo-La)	9.0	21.8	16.1	31.0
B	Sambo Point	9.1	25.7	15.7	31.0
C	Penphrase Passage	8.9	26.8	14.8	7.0
D	Harry Bay	8.3	23.9	14.8	6.9
E	Phillip Point West	8.5	5.3	15.4	6.8
F	Sutlej North	9.2	25.4	14.9	11.8
G	Codrington Point	8.7	28.6	15.2	12.8
H	Wehlis Bay Fish Farm	10.7	26.7	12.0	29.2
I	Alder Bay	8.7	30.8	10.7	32.8
J	Poppelwell Point	8.6	30.6	11.5	33.1
Average		9.2	27.1	11.3	26.0

3.2 Fish Sample Composition

A total of 2126 fish were captured during beach seine sampling conducted in the Broughton Archipelago in 2018. Of those, 653 individual fish (30.7 %) were collected as sample specimens and underwent analysis for sea lice infestation (Table 3). The total collected fish from each species and the percentage that it represents of the total beach seine capture population is presented in Table 3. Chum salmon and pink salmon were the most common species captured during sampling in 2018. Of the 814 chum salmon captured, 281 individuals (34.5 %) were retained and underwent lab analysis. Of the 1296 pink salmon captured, 356 individuals (27.5 %) were retained and underwent lab analysis. All of the coho salmon and threespine stickleback captured were retained and analyzed for sea lice infestation (Table 3). No chinook, sockeye or Atlantic salmon were captured during the two sampling events in April and May 2018.

A summary of the total number of fish captured and collected as specimens at each site over the collection period can be found in Table 4. Totals of fish captured and collected specimens at each site over the entire collection period can be found in Appendix II. No fish were caught at Sites 1, 2, 7, 11, 21 and H.

Table 3: The total of collected individuals of each fish species captured in the Broughton Archipelago, BC in April and May 2018, and the percentage of the total capture population that they represent.

Common Name	Capture Totals (% of total capture population)	Collection Totals	Collection %
chum salmon	814 (38.3 %)	281	34.5
pink salmon	1296 (61.0 %)	356	27.5
coho salmon	11 (0.5 %)	11	100.0
chinook salmon	0	0	0
sockeye salmon	0	0	0
threespine stickleback	5 (0.2 %)	5	100.0
All species	2126	653	30.7

Table 4: The number of captured fish (Capture Total) and the number of individual fish collected (Sample Total) from each of the 32 sample sites in the Broughton Archipelago, BC in April and May, 2018.

Site	Site Name	Chum		Coho		Pink		Threespine stickleback		Capture Total	Sample Total
		Capture Total	Sample Total	Capture Total	Sample Total	Capture Total	Sample Total	Capture Total	Sample Total		
1	Swanson Island Fish Farm	0	0	0	0	0	0	0	0	0	0
2	Midsummer Island Fish Farm (Potts Bay)	0	0	0	0	0	0	0	0	0	0
3	Chop Bay	138	48	0	0	347	60	0	0	395	108
4	Lady Island	9	9	0	0	26	26	0	0	35	35
5	Doctor Island Fish Farm	41	32	0	0	4	4	1	1	46	37
6	Brent Bay	0	0	4	4	4	4	0	0	8	8
7	Shelterless Bay	0	0	0	0	0	0	0	0	0	0
8	Lance Bay	3	3	0	0	6	6	0	0	9	9
9	Sargeaunt Pass	0	0	1	1	0	0	0	0	1	1
10	Humphrey Rock	1	1	0	0	1	1	0	0	2	2
11	Pumish Point	0	0	0	0	0	0	0	0	0	0
12	Oline Point	10	10	0	0	11	11	0	0	21	21
13	London Point	2	2	2	2	1	1	0	0	5	5
14	Miller Point	0	0	0	0	0	0	0	0	0	0
15	Kwatsi Point	1	1	1	1	2	2	0	0	4	4
16	Glacier Falls Fish Farm	0	0	0	0	3	3	0	0	3	3
17	Viner Sound	0	0	0	0	2	2	0	0	2	2
18	Denham Island	418	43	1	1	420	46	0	0	839	90
19	Baker Island	48	46	1	1	282	60	0	0	331	107
20	Jumper Island	93	36	0	0	115	58	3	3	211	97
21	Arthur Point	0	0	0	0	0	0	0	0	0	0
22	Wicklow Bay	0	0	0	0	0	0	1	1	1	1
A	Bennett Point Fish Farm (Noo-La)	2	2	0	0	7	7	0	0	9	9
B	Sambo Point	4	4	0	0	6	6	0	0	10	10
C	Penphrase Passage	29	29	0	0	0	0	0	0	29	29
D	Harry Bay	9	9	0	0	30	30	0	0	39	39
E	Phillip Point West	2	2	0	0	2	2	0	0	4	4
F	Sutlej North	4	4	0	0	0	0	0	0	4	4
G	Codrington Point	0	0	1	1	0	0	0	0	1	1
H	Wehlis Bay Fish Farm	0	0	0	0	0	0	0	0	0	0
I	Alder Bay	0	0	0	0	2	2	0	0	2	2
J	Poppelwell Point	0	0	0	0	25	25	0	0	25	25
	Total	814	281	11	11	1296	356	5	5	2126	653

3.3 Fish Sample Size Statistics

Summary statistics for the sample population of juvenile salmonids were completed for weight and fork length. This was completed for chum and pink salmon only as there were insufficient numbers of coho salmon (n=11), and threespine stickleback (n=5) captured to warrant this analysis.

3.3.1 Chum Salmon

Analysis of weight and fork length data was completed for the chum salmon sample population collected in the Broughton Archipelago in 2018. The weight of 281 chum smolts collected during the two sample events ranged from 0.30 g to 4.1 g and averaged 1.1 g (SD = 0.7). The fork length of the chum smolts ranged from 32 mm to 71 mm and averaged 44 mm (SD = 8). Chum salmon weight and length data was summarized by month which shows the increase in both parameters in the sample population from April to May, 2018 (Table 5).

3.3.2 Pink Salmon

Analysis of weight and fork length data was completed for the pink salmon sample population collected in the Broughton Archipelago in 2018. The weight of 356 pink smolts collected during the two sample events ranged from 0.19 g to 5.19 g and averaged 0.80 g (SD = 0.7). The fork length of the pink smolts ranged from 28 mm to 78 mm and averaged 40 mm (SD = 9). Pink salmon weight and length data was summarized by month which shows the increase in both parameters in the sample population from April to May, 2018 (Table 5).

Table 5: Average weights and lengths summarized by month of chum and pink salmon collected in the Broughton Archipelago in 2018.

Species	Average Weight (g)		Average Length (mm)	
	April	May	April	May
chum	0.63 (n=130)	1.42 (n=151)	39	48
pink	0.35 (n=193)	1.26 (n=163)	34	47

3.4 Sea Lice Infestation Rates

The results of the laboratory analysis for the presence of sea lice on the sample population collected in the Broughton Archipelago in 2018 are presented in Table 6. The data recorded for each fish in the sample population during lab analysis is included in Appendix III. A total of 653 samples were collected at 32 sites in the Broughton Archipelago in 2018 and were inspected for sea lice infestation. A total of 112 individuals in the sample population were found to be infested with 165 sea lice (Table 6). A total of 55 chum smolts, 52 pink salmon, three coho salmon and two threespine stickleback were found to be infested with sea lice (Table 6). This data reflects the identification of sea lice of either species (*L. salmonis* and *C. clemensi*) on inspected juvenile salmon.

Prevalence was defined as the number of fish found to be infested with one or more sea louse compared to the total number of fish. Abundance was defined as the total number of sea lice observed compared to the total number of fish (Table 6). The sea lice prevalence in the sample population collected in the Broughton Archipelago in 2018 was 17.2 % and the abundance was 0.25. Sea lice counts of both species observed (*L. salmonis* and *C. clemensi*) were added together for the prevalence and abundance calculations.

The intensity of sea lice infestation, as defined as the number of sea lice on a single infested salmon, ranged from one louse found on 72 individuals to a maximum of five lice found on one individual. There were 33 salmon infested with two lice, two salmon infested by three lice and four samples were found to have four lice. The average intensity was calculated by dividing the total number of sea lice by the number of infested fish of each species (Table 6).

Table 6: Results of analysis for sea lice infestation on salmonid smolts collected by beach seine in the Broughton Archipelago, BC in 2018.

Species	Sample size (n)	Total number of lice observed	Total number of fish infested	Prevalence (%)	Abundance	Average Intensity
chum	281	77	55	19.6	0.27	1.4
pink	356	80	52	14.6	0.22	1.5
coho	11	5	3	27.3	0.45	1.7
threespine stickleback	5	3	2	40.0	0.60	1.5
Total	653	165	112	17.2	0.25	1.5

3.4.1 Infestation Rates on Chum Salmon

A total of 55 chum salmon were found to be infested with 77 sea lice (Table 6). The results of the laboratory analysis for sea lice infestation for the chum salmon sample population are presented by site in Table 7. Individual sites with a total capture of more than 10 chum salmon are shown separately in Table 7, while sites with a capture total of less than 10 chum salmon are lumped together and presented at the bottom of the table.

Sea lice counts of both sea lice species observed (*L. salmonis* and *C. clemensi*) were added together for the presentation of sea lice infestation, prevalence and abundance on the chum salmon sample population (Table 6 and 7). For the chum salmon sample population (n=281) there were more infested individuals (32 chum) and more sea lice (44 lice) found on chum salmon collected in May than in April in 2018 (Table 7).

A total of 55 chum salmon were found to be infested with at least one sea louse. The prevalence of sea lice on the chum salmon sample population (n=281) collected in the Broughton Archipelago in 2018 was 19.6 %. Sea lice prevalence on chum salmon was higher in May (21.2 %) than April (17.7 %). The highest sea lice prevalence (53.3 %) was at Site 19 (Baker Island) in May 2018. Sea lice prevalence calculated by site for the total chum sample population was highly variable ranging from 0 % at Site C (Penphrase Passage) to a high of 39.1 % at Site 19 (Table 7).

A total of 77 sea lice were identified during laboratory analysis of retained chum salmon. The abundance of sea lice on the chum salmon sample population (n=281) collected in the Broughton Archipelago in 2018 was 0.27. Sea lice abundance was calculated by week and by site and is presented in Table 7. Sea lice abundance on

chum salmon were similar between April (0.25) and May (0.29) in 2018. The highest sea lice abundance (0.67) was at Site 19 (Baker Island) and Site 20 (Jumper Island) in May 2018. Sea lice abundance calculated by site for the total chum sample population was also highly variable ranging from 0 at Site C to a high of 0.48 at Site 19 (Table 7).

Table 7: The number of sea lice found on chum salmon collected in the Broughton Archipelago in 2018 summarized by the sites where beach seining was conducted. Sites with a capture total of 10 chum salmon or more are shown and sites with capture totals of less than 10 chum salmon are lumped. Calculated sea lice prevalence, abundance and average intensity is also included by site.

Site	Sample Week														Total Chum Sample Population		
	April 15/16/17, 2018							May 15/16/17, 2018									
	# of Chum Analyzed	# of Infested Chum	Average Weight of Infested Chum (g)	# of Lice	Prevalence (%)	Abundance	Average Intensity	# of Chum Analyzed	# of Infested Chum	Average Weight of Infested Chum (g)	# of Lice	Prevalence (%)	Abundance	Average Intensity	Prevalence (%)	Abundance	Average Intensity
3 – Chop Bay	30	7	0.93	9	23.3	0.30	1.3	18	6	1.38	8	33.3	0.44	1.3	27.1	0.35	1.3
5 – Doctor Island Fish Farm	0	0	-	0	-	-	-	32	2	0.76	2	6.3	0.06	1.0	6.3	0.06	1.0
12 – Oline Point	1	0	-	0	0	0	0	9	2	3.34	3	22.2	0.33	1.5	20.0	0.30	1.5
18 – Denham Island	30	11	0.91	16	36.7	0.53	1.5	13	1	0.85	1	7.7	0.08	1.0	27.9	0.40	1.4
19 – Baker Island	16	2	0.37	2	12.5	0.13	1.0	30	16	1.35	20	53.3	0.67	1.25	39.1	0.48	1.2
20 – Jumper Island	30	1	0.38	1	3.3	0.03	1.0	6	2	2.28	4	33.3	0.67	2.0	8.3	0.14	1.7
C – Penphrase Passage	0	0	-	0	-	-	-	29	0	-	0	0	0	0	0	0	0
Lumped Sites¹	23	2	1.78	5	8.7	0.22	2.5	14	3	1.45	6	21.4	0.43	2.0	13.5	0.30	2.2
TOTAL	130	23	0.92	33	17.7	0.25	1.4	151	32	1.49	44	21.2	0.29	1.4	19.6	0.27	1.4

¹Lumped sites include Sites 4 – Lady Island, 8 – Lance Bay, 10 – Humphrey Rock, 13 – London Point, 15- Kwatsi Point, A – Bennett Point Fish Farm (Noo-La), B- Sambo Point, D – Harry Bay, E- Phillip Point West and F- Suttlej North.

3.4.2 Infestation Rates on Pink Salmon

A total of 52 pink salmon were found to be infested with 80 sea lice (Table 6). The results of the laboratory analysis for sea lice infestation for the pink salmon sample population are presented by site in Table 8. Individual sites with a total capture of more than 10 pink salmon are shown in Table 8, while sites with a capture total of less than 10 pink salmon are lumped together and presented at the bottom of the table.

Sea lice counts of both sea lice species observed (*L. salmonis* and *C. clemensi*) were added together for the presentation of sea lice infestation, prevalence and abundance on the pink salmon sample population (Table 6 and 8). For the pink salmon sample population (n=356) there were more infested individuals (34 pinks) and more sea lice (59 lice) found on pink salmon collected in May than in April in 2018 (Table 8).

A total of 52 pink salmon were found to be infested with at least one sea louse. The prevalence of sea lice on the pink salmon sample population (n=356) collected in the Broughton Archipelago in 2018 was 14.6 %. Sea lice prevalence on pink salmon was lower in April (9.3 %) than May (20.9 %) 2018. The highest sea lice prevalence (51.7 %) was at Site 20 (Jumper Island) in May 2018 (Table 8). Sea lice prevalence calculated by site for the total pink sample population was highly variable ranging from 0 at Site D (Harry Bay) and Site 12 (Oline Point) to a high of 29.3 % at Site 20 (Table 8).

A total of 80 sea lice were identified during laboratory analysis of retained pink salmon. The abundance of sea lice on the pink salmon sample population (n=356) collected in the Broughton Archipelago in 2018 was 0.22. Sea lice abundance was calculated by week and by site and is presented in Table 8. Sea lice abundance on pink salmon was lower in April (0.11) than in May (0.36) in 2018. The highest sea lice abundance at an individual site (1.0) was Site 20 (Jumper Island) in May 2018. Sea lice abundance calculated by site for the total pink sample population was also highly variable ranging from 0 to a high of 0.53 at Site 20 (Table 8).

Table 8: The number of sea lice found on pink salmon collected in the Broughton Archipelago in 2018 summarized by the sites where beach seining was conducted. Sites with a capture total of 10 pink salmon or more are shown and sites with capture totals of less than 10 pink salmon are lumped. Calculated sea lice prevalence, abundance and average intensity is also included by site.

Site	Sample Week														Total Pink Sample Population		
	April 15/16/17, 2018							May 15/16/17, 2018									
	# of Pinks Analyzed	# of Infested Pinks	Average Weight of Infested Pinks (g)	# of Lice	Prevalence (%)	Abundance	Average Intensity	# of Pinks Analyzed	# of Infested Pinks	Average Weight of Infested Pinks (g)	# of Lice	Prevalence (%)	Abundance	Average Intensity	Prevalence (%)	Abundance	Average Intensity
3 – Chop Bay	30	3	0.39	4	10.0	0.13	13.	30	9	0.70	16	30.0	0.53	1.8	20.0	0.33	1.7
4 – Lady Island	0	0	-	0	-	-	-	26	2	1.01	2	7.7	0.08	1.0	7.7	0.08	1.0
12 – Oline Point	2	0	-	0	0	0	0	9	0	-	0	0	0	0	0	0	0
18 – Denham Island	31	2	0.37	3	6.5	0.10	1.5	15	0	-	0	0	0	0	4.3	0.07	1.5
19 – Baker Island	30	6	0.34	6	20.0	0.20	1.0	30	8	1.06	12	26.7	0.40	1.5	23.3	0.30	1.3
20 – Jumper Island	29	2	0.31	2	6.9	0.7	1.0	29	15	0.95	29	51.7	1.00	1.9	29.3	0.53	1.8
D – Harry Bay	30	0	-	0	0	0	0	0	0	-	0	-	-	-	0	0	0
J – Poppelwell Point	25	4	0.44	5	16.0	0.20	1.3	0	0	-	0	-	-	-	16.0	0.20	1.3
Lumped Sites¹	16	1	0.37	1	6.3	0.06	1.0	24	0	-	0	0	0	0	2.5	0.03	1.0
TOTAL	193	18	0.37	21	9.3	0.11	1.2	163	34	0.92	59	20.9	0.36	1.7	14.6	0.22	1.5

¹ Lumped sites include Sites 5- Doctor Island, 6 – Brent Bay, 8 – Lance Bay, 10 – Humphrey Rock, 13- London Point, 15 – Kwatsi Point, 16 – Glacier Falls Fish Farm, 17- Viner Sound, A – Bennett Point Fish Farm (Noo-La), B – Sambo Point, E – Phillip Point West and I – Alder Bay.

3.4.3 Infestation Rates on other species

Coho salmon were the third most abundant species collected during beach seine sampling in the Broughton Archipelago in 2018 (n= 11). A total of three coho salmon were found to be infested with five sea lice resulting in a species prevalence of 27.3 % and an abundance of 0.45 (Table 6). A single infested coho salmon was collected from Site 6, Site 15 and from Site 18.

A total of five threespine stickleback were collected during beach seine sampling in the Broughton Archipelago in 2018. Two samples, both collected at Site 20 (Jumper Island) on April 15, 2018 were infested with three lice resulting in a species prevalence of 40.0 % and an abundance of 0.60 (Table 6).

3.5 Infestation Rates by Sea Lice Species

A total of 55 *Lepeophtheirus salmonis* sea lice of various life stages were identified on 50 individuals and 110 *Caligus clemensi* sea lice were found on 81 of the samples analyzed in the lab (Appendix III). There were 19 samples that were infested with both a *L. salmonis* and a *C. clemensi* sea louse.

3.5.1 Infestation Rates by Sea lice Species on Chum Salmon

An analysis of the species of sea lice identified on the 281 chum salmon collected in the Broughton Archipelago was completed and is presented in Table 9. A total of 32 *Lepeophtheirus salmonis* sea lice of various life stages were identified on 29 juvenile chum salmon and 45 *Caligus clemensi* sea lice were found on 35 of the juvenile chum salmon analyzed in the lab (Appendix III). There were 9 juvenile chum salmon that were infested with both a *L. salmonis* and a *C. clemensi* sea louse. The sea lice species identified on chum salmon are also presented by site by week in Table 10. Individual sites with a total capture of more than 10 chum salmon are shown in Table 10. Sites with a capture total of less than 10 chum salmon are lumped together and presented at the bottom of the table.

For the chum salmon sample population infested with *Caligus clemensi* sea lice (n=35) there were 25 samples infested with one louse and ten samples infested with two sea lice. For the chum salmon sample population infested with *Lepeophtheirus salmonis* sea lice (n=29) there were 27 samples infested with one louse, one with two lice and one sample infested with three lice.

Table 9: The number of sea lice in each life stage by species identified on the chum salmon sample population from the Broughton Archipelago in 2018. LEP = *Lepeophtheirus salmonis* CAL = *Caligus clemensi*

Life Stage ¹	April 15/16/17, 2018	May 15/16/17, 2018
LEP Co	6	5
LEP C1	7	6
LEP C2	5	3
LEP PAM	0	0
LEP PAF	0	0
LEP AM	0	0
LEP AF	0	0
TOTAL LEP	18	14
CAL Co	5	4
CAL C1	10	12
CAL C2	0	5
CAL C3	0	4
CAL C4	0	2
CAL PAM	0	0
CAL PAF	0	1
CAL AM	0	1
CAL AF	0	1
TOTAL CAL	15	30

¹ Lice life stage codes: Co = copepodid, C1-4 = chalimus 1-4, PAM = pre-adult male, PAF = pre-adult female, AM = adult male, AF = adult female

Table 10: The species of sea lice found on chum salmon collected in the Broughton Archipelago in 2018 summarized by the sites where beach seining was conducted. Sites with a total capture of more than 10 chum salmon are shown. Sites with a capture total of less than 10 chum salmon are lumped. LEP = *Lepeophtheirus salmonis* CAL = *Caligus clemensi*

Site	Sample Week								TOTAL		
	April 15/16/17, 2018				May 15/16/17, 2018				# of Chum Analyzed	# of Infested Chum	# of Lice
	# of Chum Analyzed	# of Infested Chum	# of LEP	# of CAL	# of Chum Analyzed	# of Infested Chum	# of LEP	# of CAL			
3 – Chop Bay	30	7	5	4	18	6	2	6	48	13	17
5 – Doctor Island Fish Farm	0	0	0	0	32	2	2	0	32	2	2
12 – Oline Point	1	0	0	0	9	2	1	2	10	2	3
18 – Denham Island	30	11	11	5	13	1	1	0	43	12	17
19 – Baker Island	16	2	1	1	30	16	6	14	46	18	22
20 – Jumper Island	30	1	0	1	6	2	1	3	36	3	5
C – Penphrase Passage	0	0	0	0	29	0	0	0	29	0	0
Lumped Sites ¹	23	2	1	4	14	3	1	5	37	5	11
TOTAL	130	23	18	15	151	32	14	30	281	55	77

¹Lumped sites include Sites 4 – Lady Island, 8 – Lance Bay, 10 – Humphrey Rock, 13 – London Point, 15- Kwatsi Point, A – Bennett Point Fish Farm (Noo-La), B- Sambo Point, D – Harry Bay, E- Phillip Point West and F- Suttlej North.

3.5.2 Infestation Rates by Sea lice Species on Pink Salmon

An analysis of the species of sea lice identified on the 356 pink salmon collected in the Broughton Archipelago was completed and is presented in Table 11. A total of 22 *Lepeophtheirus salmonis* sea lice of various life stages were identified on 20 juvenile pink salmon and 58 *Caligus clemensi* sea lice were found on 41 of the juvenile pink salmon analyzed in the lab (Appendix III). There were 9 juvenile pink salmon that were infested with both a *L. salmonis* and a *C. clemensi* sea louse. The sea lice species identified on pink salmon are also presented by site and week in Table 12. Individual sites with a total capture of more than 10 pink salmon are shown in Table 12. Sites with a capture total of less than 10 pink salmon are lumped together and shown at the bottom of the table.

For the pink salmon sample population infested with *Caligus clemensi* sea lice (n=41) there were 29 samples infested with one louse, nine with two lice, one with three lice and two samples infested with four lice. For the pink salmon sample population infested with *Lepeophtheirus salmonis* sea lice (n=20) there were 18 samples infested with one louse and two samples infested with two lice.

Table 11: The number of sea lice in each life stage by species identified on the pink salmon sample population from the Broughton Archipelago in 2018. LEP = *Lepeophtheirus salmonis* CAL = *Caligus clemensi*

Life Stage ¹	April 15/16/17, 2018	May 15/16/17, 2018
LEP Co	5	4
LEP C1	5	2
LEP C2	0	5
LEP PAM	0	0
LEP PAF	0	1
LEP AM	0	0
LEP AF	0	0
TOTAL LEP	10	12
CAL Co	2	2
CAL C1	9	34
CAL C2	0	9
CAL C3	0	2
CAL C4	0	0
CAL PAM	0	0
CAL PAF	0	0
CAL AM	0	0
CAL AF	0	0
TOTAL CAL	11	47

¹ Lice life stage codes: Co = copepodid, C1-4 = chalimus 1-4, PAM = pre-adult male, PAF = pre-adult female, AM = adult male, AF = adult female.

Table 12: The species of sea lice found on pink salmon collected in the Broughton Archipelago in 2018 summarized by the sites where beach seining was conducted. Sites with a total capture of more than 10 pink salmon are shown. Sites with a capture total of less than 10 pink salmon are lumped. LEP = *Lepeophtheirus salmonis* CAL = *Caligus clemensi*

Site	Sample Week								TOTAL		
	April 15/16/17, 2018				May 15/16/17, 2018				# of Pinks Analyzed	# of Infested Pinks	# of Lice
	# of Pinks Analyzed	# of Infested Pinks	# of LEP	# of CAL	# of Pinks Analyzed	# of Infested Pinks	# of LEP	# of CAL			
3 – Chop Bay	30	3	2	2	30	9	5	11	60	12	20
4 – Lady Island	0	0	0	0	26	2	0	2	26	2	2
12 – Oline Point	2	0	0	0	9	0	0	0	11	0	0
18 – Denham Island	31	2	2	1	15	0	0	0	46	2	3
19 – Baker Island	30	6	2	4	30	8	4	8	60	14	18
20 – Jumper Island	29	2	1	1	29	15	3	26	58	17	31
D – Harry Bay	30	0	0	0	0	0	0	0	30	0	0
J – Poppelwell Point	25	4	3	2	0	0	0	0	25	4	5
Lumped Sites ¹	16	1	0	1	24	0	0	0	40	1	1
TOTAL	193	18	10	11	163	34	12	47	356	52	80

¹ Lumped sites include Sites 5- Doctor Island, 6 – Brent Bay, 8 – Lance Bay, 10 – Humphrey Rock, 13- London Point, 15 – Kwatsi Point, 16 – Glacier Falls Fish Farm, 17- Viner Sound, A – Bennett Point Fish Farm (Noo-La), B – Sambo Point, E – Phillip Point West and I – Alder Bay.

3.5.3 Infestation Rates by Sea lice Species on other species

Five sea lice were identified on three juvenile coho salmon collected in the Broughton Archipelago (Appendix III). All five lice identified on the juvenile coho salmon samples were *Caligus clemensi* (Table 13).

One *Lepeophtheirus salmonis* and two *Caligus clemensi* were found on two threespine stickleback that were collected during beach seine sampling in the Broughton Archipelago in 2018. Both samples were collected at Site 20 (Jumper Island) on April 15, 2018 (Table 13). One of the samples was infested with both a *L. salmonis* and a *C. clemensi* sea louse.

Table 13: The distribution of sea lice species identified on coho salmon and threespine stickleback collected in the Broughton Archipelago in 2018 by site. LEP = *Lepeophtheirus salmonis* CAL = *Caligus clemensi*

Species	# of individuals	Date Collected	Site	# of LEP (Life Stage)	# of CAL (Life Stage)
coho	1	April 15, 2018	18	0	1 (C1)
coho	1	May 15, 2018	6	0	2 (C1)
coho	1	May 16, 2018	15	0	2 (C3)
threespine stickleback	2	April 15, 2018	20	1 (C2)	2 (C1)
TOTAL	5			1	7

4.0 Conclusions

This report presents the data from the third year of beach seining and sea lice analysis conducted for wild juvenile salmonid monitoring in the Broughton Archipelago, BC by Marine Harvest Canada. This report is limited to the summary and presentation of the data collected in 2018. A tabular comparison of water quality data and sea lice infestation data for chum and pink for 2016, 2017 and 2018 is presented in Appendix IV.

A total of 653 individual samples underwent lab analysis for sea lice infestation including 281 chum salmon, 356 pink salmon, 11 coho salmon and five threespine stickleback. From the total sample population 112 individuals were infested with 165 sea lice. The calculated prevalence for the total sample population was 17.2 % and the sea lice abundance was 0.25 for the sample population collected in the Broughton Archipelago in 2018.

A total of 814 chum salmon were captured, representing 38.3 % of all captured samples. Of the 814 chum captured, 281 were kept for lab analysis for sea lice infestation. A total of 55 chum smolts were found to be infested with 77 lice resulting in a calculated prevalence of 19.6 % and an abundance of 0.27 for the chum salmon sample population.

A total of 1296 pink salmon were captured, representing 61.0 % of all captured samples. Of the 1296 pinks captured, 356 were kept for lab analysis for sea lice infestation. A total of 52 pink salmon were found to be infested with 80 lice resulting in a calculated prevalence of 14.6 % and an abundance of 0.22 for the pink salmon sample population.

A total of 11 coho salmon were captured, retained and analyzed for sea lice infestation. Of the 11 samples three coho salmon were found to be infested by five lice resulting in a calculated prevalence of 27.3 % and an abundance of 0.45 for the coho salmon sample population.

A total of five threespine stickleback were captured, retained and analyzed for sea lice infestation. Two stickleback were found to be infested with three lice.

A total of 55 *Lepeophtheirus salmonis* sea lice of various life stages were identified on 50 individuals and 110 *Caligus clemensi* sea lice were found on 81 of the samples

analyzed in the lab. There were 19 samples that were infested with both a *L. salmonis* and a *C. clemensi* sea louse.

For the chum salmon sample population, a total of 32 *Lepeophtheirus salmonis* sea lice of various life stages were identified on 29 juvenile chum salmon and 45 *Caligus clemensi* sea lice were found on 35 of the juvenile chum salmon analyzed in the lab. There were 9 juvenile chum salmon that were infested with both a *L. salmonis* and a *C. clemensi* sea louse.

For the pink salmon sample population, a total of 22 *Lepeophtheirus salmonis* sea lice of various life stages were identified on 20 juvenile pink salmon and 58 *Caligus clemensi* sea lice were found on 41 of the juvenile pink salmon analyzed in the lab. There were 9 juvenile pink salmon that were infested with both a *L. salmonis* and a *C. clemensi* sea louse.

Five sea lice were identified on three juvenile coho salmon collected in the Broughton Archipelago. All five lice identified on the juvenile coho salmon samples were *Caligus clemensi*.

One *Lepeophtheirus salmonis* and two *Caligus clemensi* were found on two threespine stickleback that were collected during beach seine sampling in the Broughton Archipelago in 2018.

A comparison of the prevalence, abundance and average intensity of sea lice infestation by sea lice species found on chum and pink salmon was completed for 2016, 2017 and 2018 sample data collected in the Broughton Archipelago. This data is presented in the following summary tables with additional yearly comparisons of juvenile wild salmon monitoring results presented in Appendix IV.

Chum by Year	<i>Caligus clemensi</i>			<i>Lepeophtheirus salmonis</i>		
	Prevalence	Abundance	Average Intensity	Prevalence	Abundance	Average Intensity
2016 (n=512)	20.3 %	0.32	1.6	13.3 %	0.19	1.4
2017 (n=562)	17.4 %	0.31	1.8	11.0 %	0.14	1.3
2018 (n=281)	12.5 %	0.16	1.3	10.3 %	0.11	1.1

Pink by Year	<i>Caligus clemensi</i>			<i>Lepeophtheirus salmonis</i>		
	Prevalence	Abundance	Average Intensity	Prevalence	Abundance	Average Intensity
2016 (n=430)	24.4 %	0.33	1.3	15.3 %	0.24	1.5
2017 (n=411)	15.1 %	0.23	1.5	6.6 %	0.09	1.4
2018 (n=356)	11.5 %	0.16	1.4	5.6 %	0.06	1.1

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Appendix I – Field Data

Date	Site	Site Name	Salinity (ppt)	Temperature (°C.)
04/17/18	Site 1	Swanson Island Fish Farm	30.3	8.6
04/17/18	Site 2	Midsummer Island Fish Farm (Pott's Bay)	30.0	8.7
04/17/18	Site 3	Chop Bay	30.2	8.9
04/17/18	Site 4	Lady Island	30.1	8.8
04/16/18	Site 5	Doctor Island Fish Farm	30.6	8.6
04/16/18	Site 6	Brent bay	N/A	N/A
04/16/18	Site 7	Shelterless Bay	30.3	8.5
04/16/18	Site 8	Lance Bay	29.0	9.3
04/16/18	Site 9	Sargeaunt Pass	30.1	8.8
04/16/18	Site 10	Humphrey Rock	30.2	9.0
04/16/18	Site 11	Pumish Point	30.0	8.8
04/16/18	Site 12	Oline Point	29.8	9.0
04/16/18	Site 13	London Point	26.7	9.1
04/16/18	Site 14	Millar Point	28.4	9.7
04/16/18	Site 15	Kwatsi Point	28.8	9.5
04/16/18	Site 16	Glacier Falls Fish Farm	27.6	10.4
04/16/18	Site 17	Viner Sound	28.0	10.1
04/15/18	Site 18	Denham Island	28.3	9.8
04/15/18	Site 19	Baker Island	26.9	8.9
04/15/18	Site 20	Jumper Island	29.9	8.7
04/15/18	Site 21	Arthur Point	27.8	10.1
04/15/18	Site 22	Wicklow Point	27.1	9.8
04/17/18	Site A	Bennett Point Fish Farm	21.8	9.0
04/17/18	Site B	Sambo Point	25.7	9.1
04/15/18	Site C	Penphrase Pass	26.8	8.9
04/15/18	Site D	Harry Bay	23.9	8.3
04/15/18	Site E	Phillip Point West	5.3	8.5
04/15/18	Site F	Sutlej North	25.4	9.2
04/15/18	Site G	Codrington Point	28.6	8.7
04/15/18	Site H	Wehlis Bay Fish Farm	26.7	10.7
04/15/18	Site I	Alder Bay	30.8	8.7
04/15/18	Site J	Poppelwell Point	30.6	8.6
05/15/18	Site 1	Swanson Island Fish Farm	33.9	9.7
05/15/18	Site 2	Midsummer Island Fish Farm (Pott's Bay)	33.8	9.3
05/15/18	Site 3	Chop Bay	32.4	11.7
05/15/18	Site 4	Lady Island	31.9	13.1
05/15/18	Site 5	Doctor Island Fish Farm	26.1	16.2
05/15/18	Site 6	Brent bay	23.3	15.2
05/15/18	Site 7	Shelterless Bay	19.4	15.5
05/15/18	Site 8	Lance Bay	18.8	15.8
05/15/18	Site 9	Sargeaunt Pass	21.8	15.3
05/15/18	Site 10	Humphrey Rock	26.5	14.8
05/15/18	Site 11	Pumish Point	24.7	15.6
05/15/18	Site 12	Oline Point	22.3	16.2
05/16/18	Site 13	London Point	18.5	11.3

Date	Site	Site Name	Salinity (ppt)	Temperature (°C.)
05/16/18	Site 14	Millar Point	23.7	13.3
05/16/18	Site 15	Kwatsi Point	29.0	11.7
05/16/18	Site 16	Glacier Falls Fish Farm	29.8	11.3
05/16/18	Site 17	Viner Sound	28.0	12.2
05/16/18	Site 18	Denham Island	13.8	13.3
05/17/18	Site 19	Baker Island	30.6	10.5
05/17/18	Site 20	Jumper Island	31.2	10.5
05/17/18	Site 21	Arthur Point	33.0	10.0
05/17/18	Site 22	Wicklows Point	32.2	10.2
05/15/18	Site A	Bennett Point Fish Farm	31.0	16.1
05/15/18	Site B	Sambo Point	31.0	15.7
05/16/18	Site C	Penphraser Pass	7.0	14.8
05/16/18	Site D	Harry Bay	6.9	14.8
05/16/18	Site E	Phillip Point West	6.8	15.4
05/16/18	Site F	Sutlej North	11.8	14.9
05/16/18	Site G	Codrington Point	12.8	15.2
05/16/18	Site H	Wehlis Bay Fish Farm	29.2	12
05/16/18	Site I	Alder Bay	32.8	10.7
05/16/18	Site J	Poppelwell Point	33.1	11.5

Appendix II – Capture and Collection Sample Totals

Date	Site	Site Name	Weather Comments	Pink Captured	Pink Retained	Chum Captured	Chum Retained	Coho Captured	Coho Retained	Chinook Captured	Chinook Retained	TSB Captured	TSB Retained	Comments
04/17/18	1	Swanson Island Fish Farm	Extremely low tide	0	0	0	0	0	0	0	0	0	0	Good shallow set, 12 sculpins
04/17/18	2	Midsummer Island Fish Farm (Pott's Bay)	Calm, extremely low tide	0	0	0	0	0	0	0	0	0	0	Abundance of seaweed
04/17/18	3	Chop Bay	Small chop, extremely low tide	300	30	138	30	0	0	0	0	0	0	6 juvenile lingcod
04/17/18	4	Lady Island	calm, extremely low tide	0	0	0	0	0	0	0	0	0	0	1 pipefish, 1 tubesnout, 1 juvenile lingcod
04/16/18	5	Doctor Island Fish Farm	slight chop, windy	0	0	0	0	0	0	0	0	0	0	Good set, no fish
04/16/18	6	Brent bay	30-40 knot inflow	0	0	0	0	0	0	0	0	0	0	Set aborted due to heavy inflow and tide in knight inlet. Could not safely cross.
04/16/18	7	Shelterless Bay	Heavy chop, whitecaps	0	0	0	0	0	0	0	0	0	0	
04/16/18	8	Lance Bay	Slight chop	0	0			0	0	0	0	0	0	Good set, no fish
04/16/18	9	Sargeaunt Pass	Slight chop	0	0	0	0	0	0	0	0	0	0	Good set, no fish
04/16/18	10	Humphrey Rock	Slight chop, extremely high tide	1	1	1	1	0	0	0	0	0	0	Good set
04/16/18	11	Pumish Point	Calm, sunny	0	0	0	0	0	0	0	0	0	0	Lots of tide, good set
04/16/18	12	Oline Point	Calm, sunny	2	2	1	1	0	0	0	0	0	0	Strong tide
04/16/18	13	London Point	Calm, sunny	1	1	2	2	0	0	0	0	0	0	Good set
04/16/18	14	Millar Point	Slight chop and tide	0	0	0	0	0	0	0	0	0	0	Poor set due to tide and wind. Net flattened against bluff.
04/16/18	15	Kwatsi Point	Calm, high overcast	1	1	0	0	0	0	0	0	0	0	Green urchin
04/16/18	16	Glacier Falls Fish Farm	Calm, high overcast	3	3	0	0	0	0	0	0	0	0	Juvenile sandlance
04/16/18	17	Viner Sound	Calm, clear	0	0	0	0	0	0	0	0	0	0	Good set with kicker
04/15/18	18	Denham Island	Calm, clear	405	31	405	30	1	1	0	0	0	0	Good set, 3 sculpins
04/15/18	19	Baker Island	Calm, clear and sunny	78	30	16	16	0	0	0	0	0	0	Good set, fish observed along rock bluff
04/15/18	20	Jumper Island	Calm, clear and sunny	29	29	87	30	0	0	0	0	3	3	Gunnel and flounder
04/15/18	21	Arthur Point	Calm, low overcast	0	0	0	0	0	0	0	0	0	0	No fish caught, good set
04/15/18	22	Wicklow Point	Calm, low overcast	0	0	0	0	0	0	0	0	0	0	No fish caught, good set
04/17/18	A	Bennett Point Fish Farm	Small chop, clear	3	3	2	2	0	0	0	0	0	0	
04/17/18	B	Sambo Point	Slight chop	4	4	4	4	0	0	0	0	0	0	
04/15/18	C	Penphrase Pass	Calm, sunny	0	0	0	0	0	0	0	0	0	0	No fish caught, good set
04/15/18	D	Harry Bay	Calm, sunny	30	30	8	8	0	0	0	0	0	0	Good set, murky water, No fish observed
04/15/18	E	Phillip Point West	Calm, extremely high tide	1	1	2	2	0	0	0	0	0	0	Murky water
04/15/18	F	Sutlej North	Slight chop, sunny	0	0	4	4	0	0	0	0	0	0	Good set
04/15/18	G	Codrington Point	Calm, sunny	0	0	0	0	0	0	0	0	0	0	Good set
04/15/18	H	Wehlis Bay Fish Farm	Slight chop	0	0	0	0	0	0	0	0	0	0	No search due to chop
04/15/18	I	Alder Bay	Slight NW chop on site	2	2	0	0	0	0	0	0	0	0	No search due to chop
04/15/18	J	Poppelwell Point	Slight breeze and chop	25	25	0	0	0	0	0	0	0	0	No search due to chop

Date	Site	Site Name	Weather Comments	Pink Captured	Pink Retained	Chum Captured	Chum Retained	Coho Captured	Coho Retained	Chinook Captured	Chinook Retained	TSB Captured	TSB Retained	Comments
05/15/18	1	Swanson Island Fish Farm	Calm, clear	0	0	0	0	0	0	0	0	0	0	1 rockfish, 4 gunnel retained. Lots of kelp.
05/15/18	2	Midsummer Island Fish Farm (Pott's Bay)	Calm, clear	0	0	0	0	0	0	0	0	0	0	76 tubesnout (25 retained)
05/15/18	3	Chop Bay	Calm, clear	47	30	18	18	0	0	0	0	0	0	46 shiner perch (25 retained) 1 gunnel, 1 sculpin released
05/15/18	4	Lady Island	Calm, clear	26	26	9	9	0	0	0	0	0	0	40 juvenile sandlance released. Very small in size
05/15/18	5	Doctor Island Fish Farm	Calm, clear	4	4	41	32	0	0	0	0	1	1	
05/15/18	6	Brent bay	Calm, clear	4	4	0	0	4	4	0	0	0	0	Strong tide during set
05/15/18	7	Shelterless Bay	Calm, clear	0	0	0	0	0	0	0	0	0	0	No fish caught, strong tide during set
05/15/18	8	Lance Bay	Calm, clear	6	6	3	3	0	0	0	0	0	0	
05/15/18	9	Sargeaunt Pass	Calm, clear	0	0	0	0	1	1	0	0	0	0	
05/15/18	10	Humphrey Rock	Calm, clear	0	0	0	0	0	0	0	0	0	0	No fish caught, set off bluff
05/15/18	11	Pumish Point	Calm, clear	0	0	0	0	0	0	0	0	0	0	No fish caught
05/15/18	12	Oline Point	Calm, clear	9	9	9	9	0	0	0	0	0	0	2 steelhead ~200mm
05/16/18	13	London Point	Calm, clear	0	0	0	0	2	2	0	0	0	0	1 C-O sole retained
05/16/18	14	Millar Point	Light wind, clear	0	0	0	0	0	0	0	0	0	0	Sea cucumber, sea urchin released, strong tide
05/16/18	15	Kwatsi Point	Calm, low overcast	1	1	1	1	1	1	0	0	0	0	1 sculpin retained
05/16/18	16	Glacier Falls Fish Farm	Calm, low overcast	0	0	0	0	0	0	0	0	0	0	1 shiner perch released, Strong tide
05/16/18	17	Viner Sound	Calm, low overcast	2	2	0	0	0	0	0	0	0	0	137 shiner perch released, 1 herring, 1 sculpin, 2 gunnels, 1 surf perch, 1 flatfish
05/16/18	18	Denham Island	Calm, low overcast	15	15	13	13	0	0	0	0	0	0	1 gunnel, 3 sculpin, 3 flounder released. Tide rising
05/17/18	19	Baker Island	Calm, low overcast	204	30	32	30	1	1	0	0	0	0	36 shiner perch released, 5 flatfish, 1 greenling retained
05/17/18	20	Jumper Island	Calm, low overcast	86	29	6	6	0	0	0	0	0	0	~900 shiner perch, a few flatfish and gunnels. (All released)
05/17/18	21	Arthur Point	Calm, low overcast	0	0	0	0	0	0	0	0	0	0	40 shiner perch released
05/17/18	22	Wicklow Point	Calm, low overcast	0	0	0	0	0	0	0	0	1	1	Strong tide during set on bluff
05/15/18	A	Bennett Point Fish Farm	Calm, clear	4	4	0	0	0	0	0	0	0	0	2 shiner perch released, 2 surf perch retained
05/15/18	B	Sambo Point	Calm, clear	2	2	0	0	0	0	0	0	0	0	70 shiner perch released
05/16/18	C	Penphrase Pass	Calm, low overcast	0	0	29	29	0	0	0	0	0	0	5 sculpin, 5 flatfish, 1 prickleback, 1 greenling
05/16/18	D	Harry Bay	Calm, low overcast	0	0	1	1	0	0	0	0	0	0	~100 juvenile sandlance released
05/16/18	E	Phillip Point West	Calm, low overcast	1	1	0	0	0	0	0	0	0	0	35 shine perch released, 3 pipefish, 1 flatfish retained
05/16/18	F	Sutlej North	Calm, low overcast	0	0	0	0	0	0	0	0	0	0	4 shiner perch released
05/16/18	G	Codrington Point	Calm, partly cloudy	0	0	0	0	1	1	0	0	0	0	1 sculpin retained
05/16/18	H	Wehlis Bay Fish Farm	Calm, clear	0	0	0	0	0	0	0	0	0	0	No fish caught
05/16/18	I	Alder Bay	Calm, clear	0	0	0	0	0	0	0	0	0	0	1 sculpin retained
05/16/18	J	Poppelwell Point	Calm, clear	0	0	0	0	0	0	0	0	0	0	1 sculpin retained

Appendix III – Sea Lice Analysis Data

Date of seine	Location	Fish Species	Length (mm)	Weight (g)	LEP Co	LEP C1	LEP C2	LEP PAM	LEP PAF	LEP AM	LEP AF	LEP Total	Cal Co	Cal C1	Cal c2	Cal c3	Cal C4	CAL PAM	CAL PAF	CAL AM	CAL AF	CAL Total
15-Apr-18	Site 18	PK	30	0.28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	PK	33	0.29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	PK	33	0.29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	PK	32	0.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	PK	32	0.32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	PK	35	0.37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	PK	35	0.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	PK	31	0.24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	PK	36	0.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	PK	38	0.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	PK	34	0.34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	PK	36	0.41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	PK	35	0.39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	PK	32	0.31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	PK	33	0.33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	PK	31	0.27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	PK	36	0.42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	PK	35	0.35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	PK	31	0.36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	PK	41	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	PK	33	0.31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	PK	43	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	PK	36	0.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	PK	34	0.38	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1
15-Apr-18	Site 18	PK	34	0.36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	PK	34	0.34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	PK	33	0.33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	PK	35	0.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	PK	33	0.36	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	PK	35	0.36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	PK	35	0.39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	CO	88	7.66	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
15-Apr-18	Site 18	CM	45	0.94	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	CM	38	0.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	CM	36	0.47	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	CM	44	1.04	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	CM	40	0.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	CM	37	0.39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	CM	37	0.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Date of seine	Location	Fish Species	Length (mm)	Weight (g)	LEP Co	LEP C1	LEP C2	LEP PAM	LEP PAF	LEP AM	LEP AF	LEP Total	Cal Co	Cal C1	Cal c2	Cal c3	Cal C4	CAL PAM	CAL PAF	CAL AM	CAL AF	CAL Total
15-Apr-18	Site 18	CM	37	0.44	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	CM	45	1.04	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	CM	53	1.69	0	2	1	0	0	0	0	3	1	1	0	0	0	0	0	0	0	2
15-Apr-18	Site 18	CM	45	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	CM	45	1.14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	CM	38	0.46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	CM	38	0.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	CM	41	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	CM	40	0.68	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	CM	38	0.48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	CM	37	0.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	CM	39	0.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	CM	37	0.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	CM	37	0.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	CM	39	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	CM	38	0.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	CM	41	0.77	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	CM	37	0.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	CM	37	0.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	CM	40	0.67	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	CM	35	0.4	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
15-Apr-18	Site 18	CM	34	0.35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 18	CM	52	1.8	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2
17-Apr-18	Site 3	PK	32	0.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	PK	35	0.46	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1
17-Apr-18	Site 3	PK	36	0.47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	PK	28	0.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	PK	32	0.37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	PK	31	0.32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	PK	35	0.54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	PK	31	0.34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	PK	35	0.41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	PK	31	0.24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	PK	33	0.31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	PK	35	0.41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	PK	31	0.28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	PK	36	0.53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	PK	33	0.37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	PK	36	0.51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	PK	30	0.29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	PK	33	0.37	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1

Date of seine	Location	Fish Species	Length (mm)	Weight (g)	LEP Co	LEP C1	LEP C2	LEP PAM	LEP PAF	LEP AM	LEP AF	LEP Total	Cal Co	Cal C1	Cal c2	Cal c3	Cal C4	CAL PAM	CAL PAF	CAL AM	CAL AF	CAL Total
17-Apr-18	Site 3	PK	32	0.33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	PK	33	0.35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	PK	35	0.35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	PK	35	0.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	PK	40	0.63	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	PK	36	0.48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	PK	32	0.27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	PK	34	0.33	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	PK	35	0.43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	PK	36	0.51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	PK	45	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	PK	36	0.52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	CM	41	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	CM	50	1.32	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	CM	50	1.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	CM	40	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	CM	45	1.09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	CM	39	0.65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	CM	41	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	CM	40	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	CM	42	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	CM	40	0.92	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
17-Apr-18	Site 3	CM	43	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	CM	40	0.73	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
17-Apr-18	Site 3	CM	44	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	CM	41	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	CM	35	0.48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	CM	41	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	CM	41	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	CM	48	1.32	0	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	CM	45	0.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	CM	40	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	CM	35	0.51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	CM	48	1.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	CM	40	0.74	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
17-Apr-18	Site 3	CM	38	0.55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	CM	42	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	CM	38	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	CM	41	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	CM	41	0.81	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site 3	CM	45	1.05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Date of seine	Location	Fish Species	Length (mm)	Weight (g)	LEP Co	LEP C1	LEP C2	LEP PAM	LEP PAF	LEP AM	LEP AF	LEP Total	Cal Co	Cal C1	Cal c2	Cal c3	Cal C4	CAL PAM	CAL PAF	CAL AM	CAL AF	CAL Total
17-Apr-18	Site 3	CM	41	0.64	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1
16-Apr-18	Site 15	PK	36	0.41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-Apr-18	Site 16	PK	30	0.19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-Apr-18	Site 16	PK	32	0.22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-Apr-18	Site 16	PK	33	0.29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site J	PK	36	0.36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site J	PK	38	0.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site J	PK	35	0.35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site J	PK	33	0.31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site J	PK	38	0.45	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
15-Apr-18	Site J	PK	35	0.37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site J	PK	36	0.36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site J	PK	32	0.29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site J	PK	34	0.27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site J	PK	35	0.44	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site J	PK	33	0.29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site J	PK	34	0.33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site J	PK	40	0.55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site J	PK	35	0.34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site J	PK	34	0.29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site J	PK	35	0.33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site J	PK	34	0.33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site J	PK	35	0.31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site J	PK	31	0.26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site J	PK	32	0.31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site J	PK	39	0.51	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1
15-Apr-18	Site J	PK	34	0.36	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site J	PK	34	0.34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site J	PK	33	0.31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site J	PK	35	0.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site I	PK	32	0.34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site I	PK	31	0.32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site E	PK	32	0.36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site E	CM	34	0.43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site E	CM	38	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site A	PK	33	0.34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site A	PK	38	0.60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site A	PK	32	0.37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site A	CM	35	0.41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site A	CM	38	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-Apr-18	Site 10	PK	32	0.28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Date of seine	Location	Fish Species	Length (mm)	Weight (g)	LEP Co	LEP C1	LEP C2	LEP PAM	LEP PAF	LEP AM	LEP AF	LEP Total	Cal Co	Cal C1	Cal c2	Cal c3	Cal C4	CAL PAM	CAL PAF	CAL AM	CAL AF	CAL Total
16-Apr-18	Site 10	CM	38	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site F	CM	43	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site F	CM	35	0.46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site F	CM	37	0.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site F	CM	35	0.38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site B	PK	32	0.37	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
17-Apr-18	Site B	PK	30	0.32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site B	PK	32	0.33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site B	PK	35	0.36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site B	CM	42	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site B	CM	35	0.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site B	CM	43	1.06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-18	Site B	CM	62	2.23	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2
15-Apr-18	Site 20	PK	33	0.28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	PK	36	0.43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	PK	30	0.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	PK	31	0.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	PK	32	0.24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	PK	36	0.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	PK	32	0.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	PK	33	0.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	PK	33	0.31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	PK	32	0.31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	PK	37	0.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	PK	35	0.36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	PK	31	0.28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	PK	35	0.36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	PK	31	0.24	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	PK	34	0.33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	PK	35	0.39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	PK	35	0.36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	PK	33	0.32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	PK	32	0.29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	PK	32	0.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	PK	33	0.31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	PK	36	0.37	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
15-Apr-18	Site 20	PK	33	0.36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	PK	37	0.35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	PK	36	0.33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	PK	36	0.32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	PK	35	0.35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Date of seine	Location	Fish Species	Length (mm)	Weight (g)	LEP Co	LEP C1	LEP C2	LEP PAM	LEP PAF	LEP AM	LEP AF	LEP Total	Cal Co	Cal C1	Cal c2	Cal c3	Cal C4	CAL PAM	CAL PAF	CAL AM	CAL AF	CAL Total
15-Apr-18	Site 20	PK	34	0.31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	TSB	42	0.73	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
15-Apr-18	Site 20	TSB	40	0.55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	TSB	47	0.91	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1
15-Apr-18	Site 20	CM	37	0.42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	CM	37	0.47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	CM	37	0.48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	CM	37	0.41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	CM	38	0.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	CM	35	0.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	CM	36	0.38	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
15-Apr-18	Site 20	CM	35	0.32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	CM	39	0.51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	CM	39	0.55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	CM	35	0.42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	CM	37	0.47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	CM	37	0.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	CM	40	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	CM	37	0.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	CM	41	0.56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	CM	36	0.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	CM	38	0.54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	CM	38	0.51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	CM	37	0.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	CM	37	0.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	CM	40	0.55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	CM	37	0.47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	CM	38	0.51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	CM	38	0.53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	CM	38	0.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	CM	38	0.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	CM	37	0.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	CM	37	0.41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 20	CM	37	0.46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site D	PK	35	0.27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site D	PK	34	0.32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site D	PK	34	0.26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site D	PK	34	0.33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site D	PK	32	0.31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site D	PK	32	0.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site D	PK	35	0.34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Date of seine	Location	Fish Species	Length (mm)	Weight (g)	LEP Co	LEP C1	LEP C2	LEP PAM	LEP PAF	LEP AM	LEP AF	LEP Total	Cal Co	Cal C1	Cal c2	Cal c3	Cal C4	CAL PAM	CAL PAF	CAL AM	CAL AF	CAL Total
15-Apr-18	Site D	PK	35	0.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site D	PK	35	0.31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site D	PK	31	0.27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site D	PK	34	0.32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site D	PK	34	0.32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site D	PK	35	0.39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site D	PK	32	0.24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site D	PK	33	0.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site D	PK	32	0.24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site D	PK	34	0.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site D	PK	35	0.36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site D	PK	32	0.27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site D	PK	35	0.34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site D	PK	34	0.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site D	PK	35	0.34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site D	PK	36	0.34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site D	PK	32	0.26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site D	PK	33	0.33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site D	PK	35	0.39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site D	PK	34	0.33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site D	PK	33	0.27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site D	PK	32	0.28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site D	PK	33	0.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site D	CM	37	0.53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site D	CM	38	0.46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site D	CM	38	0.35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site D	CM	36	0.41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site D	CM	37	0.38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site D	CM	32	0.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site D	CM	37	0.48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site D	CM	37	0.36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 19	PK	34	0.32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 19	PK	34	0.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 19	PK	33	0.31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 19	PK	34	0.36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 19	PK	34	0.29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 19	PK	33	0.26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 19	PK	35	0.36	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
15-Apr-18	Site 19	PK	35	0.38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 19	PK	34	0.33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 19	PK	33	0.27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Date of seine	Location	Fish Species	Length (mm)	Weight (g)	LEP Co	LEP C1	LEP C2	LEP PAM	LEP PAF	LEP AM	LEP AF	LEP Total	Cal Co	Cal C1	Cal c2	Cal c3	Cal C4	CAL PAM	CAL PAF	CAL AM	CAL AF	CAL Total
15-Apr-18	Site 19	PK	35	0.34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 19	PK	31	0.26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 19	PK	34	0.32	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
15-Apr-18	Site 19	PK	34	0.31	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
15-Apr-18	Site 19	PK	32	0.31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 19	PK	33	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 19	PK	34	0.34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 19	PK	33	0.32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 19	PK	35	0.39	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 19	PK	35	0.37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 19	PK	33	0.29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 19	PK	35	0.32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 19	PK	33	0.34	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
15-Apr-18	Site 19	PK	35	0.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 19	PK	33	0.31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 19	PK	35	0.35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 19	PK	35	0.33	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 19	PK	34	0.32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 19	PK	34	0.34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 19	PK	34	0.36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 19	CM	38	0.41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 19	CM	35	0.47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 19	CM	37	0.46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 19	CM	38	0.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 19	CM	33	0.3	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
15-Apr-18	Site 19	CM	38	0.51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 19	CM	38	0.37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 19	CM	36	0.43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 19	CM	36	0.55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 19	CM	38	0.47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 19	CM	37	0.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 19	CM	35	0.41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 19	CM	35	0.36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 19	CM	36	0.44	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 19	CM	35	0.37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-Apr-18	Site 19	CM	35	0.37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-Apr-18	Site 12	PK	33	0.24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-Apr-18	Site 12	PK	34	0.28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-Apr-18	Site 12	CM	39	0.55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-Apr-18	Site 13	PK	31	0.31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-Apr-18	Site 13	CM	54	1.68	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Date of seine	Location	Fish Species	Length (mm)	Weight (g)	LEP Co	LEP C1	LEP C2	LEP PAM	LEP PAF	LEP AM	LEP AF	LEP Total	Cal Co	Cal C1	Cal c2	Cal c3	Cal C4	CAL PAM	CAL PAF	CAL AM	CAL AF	CAL Total
16-Apr-18	Site 13	CM	50	1.33	0	1	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	2
15-May-18	Site A	PK	47	1.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site A	PK	50	1.32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site A	PK	55	1.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site A	PK	51	1.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site B	PK	48	1.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site B	PK	47	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site D	CM	50	1.48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site 15	CM	60	1.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site 15	PK	42	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site 15	CO	97	11.6	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2
15-May-18	Site 9	CO	105	14.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 13	CO	100	14.55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 13	CO	88	9.37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site E	PK	36	0.41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site G	CO	86	6.98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site 17	PK	57	1.94	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site 17	PK	52	1.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site 8	PK	58	2.04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 8	PK	76	4.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 8	PK	73	4.34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 8	PK	53	1.94	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 8	PK	68	3.65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 8	PK	65	2.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 8	CM	69	3.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 8	CM	65	3.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 8	CM	68	3.55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 5	CM	51	1.55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 5	CM	38	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 5	CM	39	0.56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 5	CM	48	1.23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 5	CM	39	0.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 5	CM	42	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 5	CM	50	1.63	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 5	CM	40	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 5	CM	38	0.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 5	CM	39	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 5	CM	40	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 5	CM	36	0.51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 5	CM	43	0.82	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 5	CM	40	0.65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Date of seine	Location	Fish Species	Length (mm)	Weight (g)	LEP Co	LEP C1	LEP C2	LEP PAM	LEP PAF	LEP AM	LEP AF	LEP Total	Cal Co	Cal C1	Cal c2	Cal c3	Cal C4	CAL PAM	CAL PAF	CAL AM	CAL AF	CAL Total
15-May-18	Site 5	CM	39	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 5	CM	44	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 5	CM	40	0.67	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 5	CM	50	1.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 5	CM	52	1.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 5	CM	47	1.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 5	CM	40	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 5	CM	39	0.69	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 5	CM	42	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 5	CM	40	0.63	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 5	CM	36	0.47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 5	CM	36	0.47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 5	CM	43	0.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 5	CM	35	0.42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 5	CM	37	0.58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 5	CM	40	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 5	CM	39	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 5	CM	42	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 5	PK	47	1.24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 5	PK	35	0.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 5	PK	42	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 5	PK	45	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 5	TSB	43	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 4	PK	51	1.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 4	PK	55	2.02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 4	PK	43	1.05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 4	CM	55	1.65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 4	PK	47	1.12	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
15-May-18	Site 4	PK	52	1.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 4	PK	78	1.27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 4	PK	46	1.22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 4	PK	59	1.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 4	PK	46	1.13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 4	PK	49	1.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 4	PK	52	1.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 4	PK	52	1.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 4	PK	55	1.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 4	PK	55	1.42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 4	PK	50	1.22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 4	PK	51	1.51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 4	PK	47	0.89	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1

Date of seine	Location	Fish Species	Length (mm)	Weight (g)	LEP Co	LEP C1	LEP C2	LEP PAM	LEP PAF	LEP AM	LEP AF	LEP Total	Cal Co	Cal C1	Cal c2	Cal c3	Cal C4	CAL PAM	CAL PAF	CAL AM	CAL AF	CAL Total
15-May-18	Site 4	PK	51	1.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 4	PK	52	1.28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 4	PK	51	1.20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 4	PK	50	1.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 4	PK	49	1.28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 4	PK	47	1.12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 4	PK	46	1.18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 4	CM	55	1.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 4	PK	53	1.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 4	PK	50	1.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 4	CM	52	1.38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 4	CM	51	1.75	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
15-May-18	Site 4	CM	50	1.37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 4	CM	44	1.07	0	0	1	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0
15-May-18	Site 4	CM	53	1.52	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
15-May-18	Site 4	CM	54	1.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 4	CM	44	1.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 6	CO	110	23.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 6	CO	90	11.05	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
15-May-18	Site 6	CO	102	10.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 6	CO	87	6.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 6	PK	58	1.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 6	PK	72	5.19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 6	PK	55	1.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 6	PK	55	1.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site 18	PK	47	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site 18	PK	40	0.68	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site 18	PK	40	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site 18	PK	44	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site 18	PK	40	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site 18	PK	43	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site 18	PK	31	0.26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site 18	PK	47	1.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site 18	PK	42	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site 18	PK	36	0.58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site 18	PK	42	0.63	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site 18	PK	50	1.56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site 18	PK	39	0.54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site 18	PK	35	0.39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site 18	PK	50	1.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site 18	CM	33	0.39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Date of seine	Location	Fish Species	Length (mm)	Weight (g)	LEP Co	LEP C1	LEP C2	LEP PAM	LEP PAF	LEP AM	LEP AF	LEP Total	Cal Co	Cal C1	Cal c2	Cal c3	Cal C4	CAL PAM	CAL PAF	CAL AM	CAL AF	CAL Total
16-May-18	Site 18	CM	45	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site 18	CM	43	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site 18	CM	37	0.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site 18	CM	36	0.52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site 18	CM	41	0.85	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
16-May-18	Site 18	CM	43	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site 18	CM	41	0.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site 18	CM	37	0.46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site 18	CM	40	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site 18	CM	36	0.53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site 18	CM	51	1.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site 18	CM	40	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 20	PK	45	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
17-May-18	Site 20	PK	54	1.63	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2
17-May-18	Site 20	PK	44	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 20	PK	43	0.89	0	0	0	0	0	0	0	0	0	2	1	1	0	0	0	0	0	4
17-May-18	Site 20	PK	40	0.73	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 20	PK	47	1.18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 20	PK	37	0.55	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2
17-May-18	Site 20	PK	52	1.84	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
17-May-18	Site 20	PK	45	1.14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 20	PK	53	1.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 20	PK	55	1.68	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 20	PK	53	1.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 20	PK	51	1.31	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2
17-May-18	Site 20	PK	36	0.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 20	PK	45	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 20	PK	43	0.96	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
17-May-18	Site 20	PK	50	1.35	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
17-May-18	Site 20	PK	35	0.55	0	0	1	0	0	0	0	1	0	3	0	0	0	0	0	0	0	3
17-May-18	Site 20	PK	55	1.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 20	PK	40	0.65	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
17-May-18	Site 20	PK	45	0.95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 20	PK	45	0.92	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1
17-May-18	Site 20	PK	44	0.80	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	4
17-May-18	Site 20	PK	45	0.95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 20	PK	34	0.4	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	2
17-May-18	Site 20	PK	49	1.04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 20	PK	48	0.7	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
17-May-18	Site 20	CM	43	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 20	CM	54	1.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Date of seine	Location	Fish Species	Length (mm)	Weight (g)	LEP Co	LEP C1	LEP C2	LEP PAM	LEP PAF	LEP AM	LEP AF	LEP Total	Cal Co	Cal C1	Cal c2	Cal c3	Cal C4	CAL PAM	CAL PAF	CAL AM	CAL AF	CAL Total
17-May-18	Site 20	CM	48	1.42	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	2
17-May-18	Site 20	CM	55	1.95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 20	CM	65	2.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 20	CM	65	3.13	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1
17-May-18	Site 20	PK	50	1.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 20	PK	52	1.52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site C	CM	52	1.54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site C	CM	53	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site C	CM	59	2.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site C	CM	58	2.12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site C	CM	71	4.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site C	CM	37	0.52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site C	CM	45	1.04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site C	CM	50	1.53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site C	CM	53	1.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site C	CM	55	1.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site C	CM	52	1.18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site C	CM	44	0.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site C	CM	55	1.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site C	CM	57	2.65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site C	CM	57	2.14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site C	CM	45	1.12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site C	CM	49	1.48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site C	CM	56	1.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site C	CM	59	2.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site C	CM	57	2.19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site C	CM	64	3.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site C	CM	57	2.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site C	CM	54	1.65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site C	CM	42	0.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site C	CM	42	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site C	CM	57	2.42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site C	CM	52	1.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site C	CM	64	2.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-May-18	Site C	CM	60	2.34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 3	PK	37	0.46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 3	PK	38	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 3	PK	54	1.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 3	PK	50	1.22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 3	PK	38	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 3	PK	39	0.76	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0

Date of seine	Location	Fish Species	Length (mm)	Weight (g)	LEP Co	LEP C1	LEP C2	LEP PAM	LEP PAF	LEP AM	LEP AF	LEP Total	Cal Co	Cal C1	Cal c2	Cal c3	Cal C4	CAL PAM	CAL PAF	CAL AM	CAL AF	CAL Total
15-May-18	Site 3	PK	41	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 3	PK	33	0.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 3	PK	38	0.75	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1
15-May-18	Site 3	PK	53	1.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 3	PK	33	0.35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 3	PK	32	0.39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 3	PK	36	0.55	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2
15-May-18	Site 3	PK	45	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 3	PK	39	0.57	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
15-May-18	Site 3	PK	53	1.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 3	PK	43	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 3	PK	44	0.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 3	PK	39	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 3	PK	38	0.7	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
15-May-18	Site 3	PK	47	1.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 3	PK	38	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 3	PK	36	0.66	2	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	1
15-May-18	Site 3	PK	36	0.58	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
15-May-18	Site 3	PK	33	0.58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 3	PK	42	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 3	PK	45	1.02	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2
15-May-18	Site 3	PK	39	0.73	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1
15-May-18	Site 3	PK	41	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 3	PK	42	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 3	CM	48	1.46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 3	CM	44	1.16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 3	CM	37	0.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 3	CM	48	1.11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 3	CM	33	0.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 3	CM	50	1.42	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1
15-May-18	Site 3	CM	52	2.06	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	2
15-May-18	Site 3	CM	44	0.95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 3	CM	39	0.78	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
15-May-18	Site 3	CM	36	0.56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 3	CM	40	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 3	CM	41	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 3	CM	45	1.18	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
15-May-18	Site 3	CM	39	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 3	CM	49	1.41	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
15-May-18	Site 3	CM	35	0.38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 3	CM	47	1.04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Date of seine	Location	Fish Species	Length (mm)	Weight (g)	LEP Co	LEP C1	LEP C2	LEP PAM	LEP PAF	LEP AM	LEP AF	LEP Total	Cal Co	Cal C1	Cal c2	Cal c3	Cal C4	CAL PAM	CAL PAF	CAL AM	CAL AF	CAL Total
15-May-18	Site 3	CM	50	1.45	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 19	CM	58	2.07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 19	CM	57	1.8	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 19	CM	53	0.93	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 19	CM	52	1.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 19	CM	60	2.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 19	CM	38	0.62	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
17-May-18	Site 19	CM	45	1.11	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
17-May-18	Site 19	CM	46	1.07	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1
17-May-18	Site 19	CM	40	0.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 19	CM	41	0.95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 19	CM	51	1.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
17-May-18	Site 19	CM	51	2.47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 19	CM	49	2.05	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
17-May-18	Site 19	CM	58	2.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
17-May-18	Site 19	CM	49	1.52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 19	CM	41	0.81	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 19	CM	35	0.51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 19	CM	38	0.56	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 19	CM	42	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 19	CM	43	0.77	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
17-May-18	Site 19	CM	40	0.81	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1
17-May-18	Site 19	CM	54	1.76	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
17-May-18	Site 19	CM	50	1.65	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	2
17-May-18	Site 19	CM	55	1.90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 19	CM	49	1.67	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 19	CM	54	2.01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 19	CM	53	1.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 19	CM	37	0.59	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2
17-May-18	Site 19	CM	52	1.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 19	PK	46	1.16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 19	PK	58	2.22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 19	PK	45	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 19	PK	48	1.44	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
17-May-18	Site 19	PK	40	0.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 19	PK	52	1.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 19	PK	40	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 19	PK	48	1.54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 19	PK	56	1.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 19	PK	35	0.49	2	0	0	0	0	0	0	2	0	1	1	0	0	0	0	0	0	2
17-May-18	Site 19	PK	50	1.38	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2

Date of seine	Location	Fish Species	Length (mm)	Weight (g)	LEP Co	LEP C1	LEP C2	LEP PAM	LEP PAF	LEP AM	LEP AF	LEP Total	Cal Co	Cal C1	Cal c2	Cal c3	Cal C4	CAL PAM	CAL PAF	CAL AM	CAL AF	CAL Total
17-May-18	Site 19	PK	65	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 19	PK	42	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 19	PK	54	1.7	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 19	PK	45	1.12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 19	PK	42	0.55	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
17-May-18	Site 19	PK	53	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 19	PK	55	2.09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 19	PK	56	2.48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 19	PK	48	1.32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 19	PK	46	1.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 19	PK	55	1.96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 19	PK	64	2.32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 19	PK	40	0.81	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 19	PK	57	2.04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 19	PK	69	3.32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 19	PK	43	0.79	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
17-May-18	Site 19	PK	50	1.35	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
17-May-18	Site 19	PK	47	1.04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 19	PK	45	0.94	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 19	CO	118	27.37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 19	CM	56	2.33	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
15-May-18	Site 12	PK	40	0.63	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 12	PK	48	1.06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 12	PK	41	0.68	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 12	PK	59	1.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 12	PK	41	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 12	PK	50	1.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 12	PK	49	1.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 12	PK	48	1.16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 12	PK	58	2.27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 12	CM	50	1.35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 12	CM	52	1.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 12	CM	65	3.39	0	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1
15-May-18	Site 12	CM	53	2.27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 12	CM	46	1.13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 12	CM	64	2.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 12	CM	67	3.29	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
15-May-18	Site 12	CM	50	1.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-18	Site 12	CM	58	2.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-May-18	Site 22	TSB	62	2.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix IV – 2016-2018 Comparisons

Surface water temperature comparison between data collected in the Broughton Archipelago between 2016 and 2018.

Site	Site Name	April			May		
		Temp. (°C) 2016	Temp. (°C) 2017	Temp. (°C) 2018	Temp. (°C) 2016	Temp. (°C) 2017	Temp. (°C) 2018
1	Swanson Island Fish Farm	9.1	8.1	8.6	9.8	12.6	9.7
2	Midsummer Island Fish Farm (Potts Bay)	9.1	8.1	8.7	9.8	12.9	9.3
3	Chop Bay	9.3	8.0	8.9	10.3	14.0	11.7
4	Lady Island	9.3	8.3	8.8	11.7	15.1	13.1
5	Doctor Island Fish Farm	9.6	8.7	8.6	12.4	14.4	16.2
6	Brent Bay	NA	8.6	N/A	12.2	13.3	15.2
7	Shelterless Bay	NA	9.4	8.5	11.8	13.3	15.5
8	Lance Bay	9.7	9.1	9.3	11.6	13.4	15.8
9	Sargeaunt Pass	9.8	8.8	8.8	11.8	13.8	15.3
10	Humphrey Rock	10.1	9.1	9.0	11.1	14.5	14.8
11	Pumish Point	9.5	8.6	8.8	13.0	13.9	15.6
12	Oline Point	9.7	8.6	9.0	11.8	14.2	16.2
13	London Point	9.5	8.4	9.1	12.7	14.3	11.3
14	Miller Point	9.4	8.2	9.7	13.0	14.9	13.3
15	Kwatsi Point	9.5	8.1	9.5	13.1	15.6	11.7
16	Glacier Falls Fish Farm	9.4	8.3	10.4	12.3	14.1	11.3
17	Viner Sound	10.0	8.4	10.1	13.5	14.5	28.0
18	Denham Island	10.2	8.4	9.8	13.5	14.6	13.3
19	Baker Island	12.9	8.3	8.9	11.9	18.9	10.5
20	Jumper Island	10.6	8.2	8.7	10.7	13.1	10.5
21	Arthur Point	10.3	8.4	10.1	10.7	15.8	10.0
22	Wicklow Bay	9.9	8.3	9.8	10.7	13.1	10.2
A	Bennett Point Fish Farm (Noo-La)	9.2	8.4	9.0	13.8	13.8	16.1
B	Sambo Point	9.5	8.5	9.1	14.0	13.8	15.7
C	Penphrase Passage	10.7	8.8	8.9	14.4	15.2	14.8
D	Harry Bay	10.1	8.7	8.3	14.0	15.1	14.8
E	Phillip Point West	10.7	9.0	8.5	13.9	16.0	15.4
F	Sutlej North	10.5	8.6	9.2	12.3	14.9	14.9
G	Codrington Point	10.6	8.7	8.7	14.3	15.4	15.2
H	Wehlis Bay Fish Farm	9.5	8.5	10.7	10.4	14.8	12
I	Alder Bay	9.6	8.5	8.7	11.0	13.8	10.7
J	Poppelwell Point	9.6	8.5	8.6	10.5	15.4	11.5
Average		9.9	8.5	9.2	12.1	14.5	13.7

Surface water salinity comparison between data collected in the Broughton Archipelago between 2016 and 2018.

Site	Site Name	April			May		
		Salinity (ppt) 2016	Salinity (ppt) 2017	Salinity (ppt) 2018	Salinity (ppt) 2016	Salinity (ppt) 2017	Salinity (ppt) 2018
1	Swanson Island Fish Farm	29.7	31.3	30.3	30.4	25.5	33.9
2	Midsummer Island Fish Farm (Potts Bay)	30.0	31.7	30.0	30.4	26.4	33.8
3	Chop Bay	28.3	31.1	30.2	29.5	24.9	32.4
4	Lady Island	27.9	31.2	30.1	28.1	22.6	31.9
5	Doctor Island Fish Farm	27.1	28.1	30.6	24.9	21.0	26.1
6	Brent Bay	NA	30.2	N/A	25.7	18.3	23.3
7	Shelterless Bay	NA	28.7	30.3	24.6	20.3	19.4
8	Lance Bay	25.5	28.8	29.0	25.8	21.3	18.8
9	Sargeaunt Pass	25.6	29.3	30.1	26.5	21.0	21.8
10	Humphrey Rock	26.5	29.8	29.8	26.3	20.8	26.5
11	Pumish Point	27.4	30.5	30.0	22.9	20.8	24.7
12	Oline Point	27.0	30.2	29.8	25.4	20.9	22.3
13	London Point	25.9	28.1	26.7	17.9	16.6	18.5
14	Miller Point	28.4	29.1	28.4	23.7	18.9	23.7
15	Kwatsi Point	28.5	30.8	28.8	22.0	18.4	29.0
16	Glacier Falls Fish Farm	28.7	30.6	27.6	25.1	20.9	29.8
17	Viner Sound	27.8	30.6	28.0	23.7	22.0	12.2
18	Denham Island	25.0	29.6	28.3	12.5	21.0	13.8
19	Baker Island	26.6	28.9	26.9	19.9	13.2	30.6
20	Jumper Island	27.0	30.5	29.9	28.2	24.7	31.2
21	Arthur Point	28.5	30.8	27.8	28.5	21.4	33.0
22	Wicklow Bay	28.4	30.6	27.1	28.3	23.8	32.2
A	Bennett Point Fish Farm (Noo-La)	29.0	31.3	21.8	21.0	23.4	31.0
B	Sambo Point	28.8	31.3	25.7	21.4	24.4	31.0
C	Penphrase Passage	22.8	27.9	26.8	7.9	10.1	7.0
D	Harry Bay	23.4	26.5	23.9	5.4	8.8	6.9
E	Phillip Point West	19.3	26.5	5.3	5.6	7.9	6.8
F	Sutlej North	22.8	26.9	25.4	23.9	9.7	11.8
G	Codrington Point	23.8	28.5	28.6	11.3	11.2	12.8
H	Wehlis Bay Fish Farm	28.3	29.8	26.7	29.1	19.9	29.2
I	Alder Bay	27.9	30.0	30.8	27.1	22.0	32.8
J	Poppelwell Point	28.2	29.4	30.6	29.1	19.9	33.1
Average		26.8	29.6	27.1	22.9	19.4	24.1

A comparison of the results of analysis for sea lice infestation on samples collected by beach seine in the Broughton Archipelago between 2016 and 2018.

Species	Sample size (n) 2016	Sample size (n) 2017	Sample size (n) 2018	Total # of fish infested 2016	Total # of fish infested 2017	Total # of fish infested 2018	Prevalence (%) 2016	Prevalence (%) 2017	Prevalence (%) 2018
chum	512	562	281	152	131	55	29.7	23.3	19.6
coho	25	19	11	14	2	3	56.0	10.5	27.3
pink	430	411	356	146	77	52	33.9	18.7	14.6
chinook	0	2	0	0	0	0	-	0	-
sockeye	0	0	0	0	0	0	-	-	-
TSB	2	1	5	0	1	2	0	100	40.0
Total	969	995	653	312	211	112	32.3	21.2	17.2

Species	Sample size (n) 2016	Sample size (n) 2017	Sample size (n) 2018	Total # of lice observed 2016	Total # of lice observed 2017	Total # of lice observed 2018	Abundance 2016	Abundance 2017	Abundance 2018
chum	512	562	281	262	257	77	0.5	0.46	0.27
coho	25	19	11	24	8	5	1.0	0.42	0.45
pink	430	411	356	242	130	80	0.6	0.32	0.22
chinook	0	2	0	0	0	0	-	0	-
sockeye	0	0	0	0	0	0	-	-	-
TSB	2	1	5	0	5	3	0	5.00	0.60
Total	969	995	653	528	400	165	0.6	0.40	0.25

Comparisons of prevalence, abundance and sea lice species by month and site could not be completed as catch data was variable from year to year and sites with a capture total of less than ten were lumped for data presentation.

The number of sea lice in each life stage by species identified on the chum salmon sample population from the Broughton Archipelago in 2016, 2017 and 2018.

LEP = *Lepeophtheirus salmonis* CAL = *Caligus clemensi*

Life Stage ¹	Number of Lice 2016	Number of Lice 2017	Number of Lice 2018
LEP Co	16	21	11
LEP C1	21	28	13
LEP C2	39	29	8
LEP PAM	8	2	0
LEP PAF	4	1	0
LEP AM	6	0	0
LEP AF	4	0	0
TOTAL LEP	98	81	32
CAL Co	7	27	9
CAL C1	111	103	22
CAL C2	15	33	5
CAL C3	8	9	4
CAL C4	11	2	2
CAL PAM	0	0	0
CAL PAF	0	0	1
CAL AM	3	1	1
CAL AF	9	1	1
TOTAL CAL	164	176	45

¹ Lice life stage codes: Co = copepodid, C1-4 = chalimus 1-4, PAM = pre-adult male, PAF = pre-adult female, AM = adult male, AF = adult female

The number of sea lice in each life stage by species identified on the pink salmon sample population from the Broughton Archipelago in 2016, 2017 and 2018.

LEP = *Lepeophtheirus salmonis* CAL = *Caligus clemensi*

Life Stage ¹	Number of Lice 2016	Number of Lice 2017	Number of Lice 2018
LEP Co	11	13	9
LEP C1	17	11	7
LEP C2	51	12	5
LEP PAM	7	0	0
LEP PAF	2	1	1
LEP AM	7	0	0
LEP AF	8	0	0
TOTAL LEP	103	37	22
CAL Co	1	8	4
CAL C1	74	50	43
CAL C2	26	21	9
CAL C3	16	6	2
CAL C4	6	3	0
CAL PAM	0	0	0
CAL PAF	0	2	0
CAL AM	5	3	0
CAL AF	12	0	0
TOTAL CAL	140	93	58

¹ Lice life stage codes: Co = copepodid, C1-4 = chalimus 1-4, PAM = pre-adult male, PAF = pre-adult female, AM = adult male, AF = adult female

A comparison of sea lice infestation rates on chum and pink salmon collected in the Broughton Archipelago between 2016 and 2018.

Chum by Year	<i>Caligus clemensi</i>			<i>Lepeophtheirus salmonis</i>		
	Prevalence	Abundance	Average Intensity	Prevalence	Abundance	Average Intensity
2016 (n=512)	20.3 %	0.32	1.6	13.3 %	0.19	1.4
2017 (n=562)	17.4 %	0.31	1.8	11.0 %	0.14	1.3
2018 (n=281)	12.5 %	0.16	0.13	10.3 %	0.11	1.1

Pink by Year	<i>Caligus clemensi</i>			<i>Lepeophtheirus salmonis</i>		
	Prevalence	Abundance	Average Intensity	Prevalence	Abundance	Average Intensity
2016 (n=430)	24.4 %	0.33	1.3	15.3 %	0.24	1.5
2017 (n=411)	15.1 %	0.23	1.5	6.6 %	0.09	1.4
2018 (n=356)	11.5 %	0.16	1.4	5.6 %	0.06	1.1