

Wild Juvenile Salmonid Monitoring Program Quatsino Sound, BC 2017

Prepared for

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June 2017

Summary

Beach seine sampling was conducted on behalf of Marine Harvest Canada in Quatsino Sound, BC in 2017. Sampling was completed to monitor sea lice abundance, prevalence and intensity on juvenile wild salmon within Quatsino Sound in support of the Aquaculture Stewardship Certification process for Marine Harvest Canada finfish aquaculture sites in the area.

This data report represents the third year of wild juvenile salmonid monitoring within Quatsino Sounds and Holberg Inlet.

Sampling was conducted during two separate sampling events in April and May 2017, selected to coincide with the peak outmigration period of juvenile salmonids. Sampling was completed at 10 sites within Quatsino Sound and Holberg Inlet, BC. The sites were selected based on their locations relative to existing aquaculture sites located in the area. Sampling was completed with the support of the G̓usgimukw people of the Quatsino First Nation.

Thirty individuals from each target fish species (Pacific salmonids and threespine stickleback) or the total number of captured individuals from each target species (if less than 30 were captured) were collected from each of the 10 sites during the sampling events. Total catch numbers of each species were recorded. Water quality measurements including surface 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 collected in Quatsino Sound and Holberg Inlet in 2017. A total of 537 wild juvenile salmonids and one threespine stickleback (*Gasterosteus aculeatus*) underwent lab analysis for sea lice infestation including 479 chum salmon (*Oncorhynchus keta*) and 58 coho salmon (*Oncorhynchus kisutch*). No Atlantic salmon (*Salmo salar*) were captured during sampling completed in Quatsino Sound and Holberg Inlet in 2017. From the total sample population 23 samples were infested with 29 sea lice. The calculated prevalence for the total sample population was 4.3 % and the sea lice abundance was 0.05 for the sample population collected in Quatsino Sound and Holberg Inlet in 2017.

Chum salmon smolts were captured in significantly greater numbers than any other species. A total of 4994 chum salmon were captured, representing 98.8 % of all captured salmonids. Of the 4994 chum captured, 479 were kept for lab analysis for sea lice infestation. A total of 16 chum smolts were found to be infested with a total of 16 lice resulting in a calculated prevalence of 3.3 %, abundance of 0.03 and an average intensity of 1.0 for the chum salmon sample population.

A total of 59 coho salmon were captured, representing 1.2 % of all captured salmonids. Of the 59 coho captured, 58 were kept for lab analysis for sea lice infestation. A total of six coho smolts were found to be infested with a total of 11 lice resulting in a calculated prevalence of 10.3 %, abundance of 0.19 and an average intensity of 1.8 for the coho salmon sample population.

The single threespine stickleback was found to be infested with two sea lice.

A total of 10 *Lepeophtheirus salmonis* lice of various life stages were identified on 10 individual samples and 19 *Caligus clemensi* lice were identified on 14 fish. There was one salmonid infested with both sea lice species.

For the chum salmon sample population, a total of eight *Lepeophtheirus salmonis* sea lice of various life stages were identified on eight juvenile chum salmon and eight *Caligus clemensi* sea lice were found on eight of the juvenile chum salmon analyzed in the lab. There were no juvenile chum salmon that were infested with both a *L. salmonis* and a *C. clemensi* sea louse.

For the coho salmon sample population, a total of two *Lepeophtheirus salmonis* sea lice of various life stages were identified on two juvenile coho salmon and nine *Caligus clemensi* sea lice were found on five of the juvenile coho salmon analyzed in the lab. One juvenile coho salmon was infested with three *C. clemensi* and there was one juvenile coho salmon that was infested with a *L. salmonis* and three *C. clemensi* sea lice.

A comparison of the prevalence, abundance and average intensity of sea lice species found on chum salmon was completed for sample data between 2015 and 2017 collected in Quatsino Sound and Holberg Inlet. This data is presented in the following summary table with additional yearly comparisons of juvenile wild salmon monitoring results presented in Appendix IV.

Year	<i>Caligus clemensi</i>			<i>Lepeophtheirus salmonis</i>		
	Prevalence	Abundance	Average Intensity	Prevalence	Abundance	Average Intensity
2015	13.6 %	0.24	1.75	12.4 %	0.21	1.72
2016	8.6 %	0.11	1.32	8.9 %	0.10	1.09
2017	1.7 %	0.02	1.00	1.7 %	0.02	1.00

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1.0 Introduction

At the request of Marine Harvest Canada, beach seine sampling to capture wild juvenile salmon to be analyzed for sea lice infestation took place at 10 sites located in Quatsino Sound and Holberg Inlet, BC (Figure 1). The sample collection occurred during two sample events in 2017 on April 4 and May 2. These weeks were selected to coincide with the estimated peak outmigration dates of juvenile salmonids. Sampling was completed with the support of the G̓usgimukw people of the Quatsino First Nation.

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*) have been identified (Margolis and Arthur 1979; McDonald and Margolis, 1995). *Caligus clemensi* infest a 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 requested monitoring of sea lice abundance, prevalence and intensity on juvenile wild salmon within Quatsino Sound and Holberg Inlet in support of 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 collected in Quatsino Sound and Holberg Inlet in 2017. This represents the third year of wild juvenile salmonid monitoring in Quatsino Sound and Holberg Inlet conducted by Marine Harvest Canada. During the past three years there have been no Atlantic salmon captured or observed at the 10 beach seine sites.

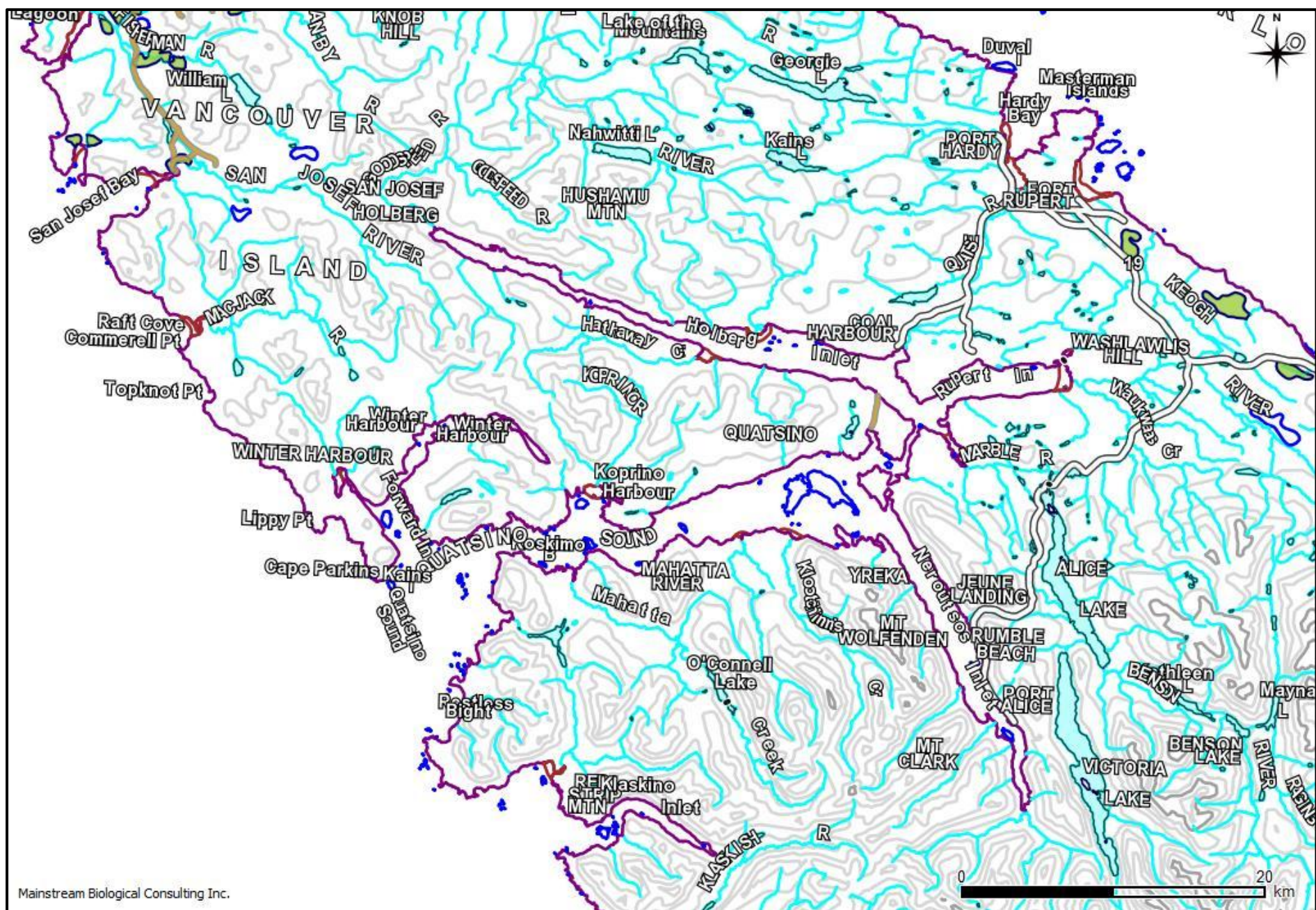


Figure 1: An overview map showing the location of Quatsino Sound and Holberg Inlet on the west coast of northern Vancouver Island, BC.

2.0 Methods

The fish inspected for sea lice infestation were collected from 10 sites in Quatsino Sound and Holberg Inlet, BC. These sites were chosen based on their locations relative to existing Marine Harvest Canada aquaculture sites in the area (Figure 2). The sites were sampled twice in 2017 on April 4 and May 2.

2.1 Site Locations

The 10 sites at which beach seining was conducted to collect specimens for sea lice analysis consisted of three sites in Holberg Inlet (Sites 1, 2 and 3) and seven sites in Quatsino Sound. The approximate locations of the 10 beach seine sites 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 10 beach seine sites where fish were collected for sea lice analysis in Quatsino Sound and Holberg Inlet in 2017.

Site #	UTM Coordinates (NAD 83)		
	UTM Zone	Easting	Northing
1	9	594113	5604358
2	9	598764	5603542
3	9	599381	5603384
4	9	586996	5592794
5	9	585851	5591387
6	9	581818	5591805
7	9	580210	5590249
8	9	578392	5590120
9	9	578608	5592552
10	9	579737	5594278

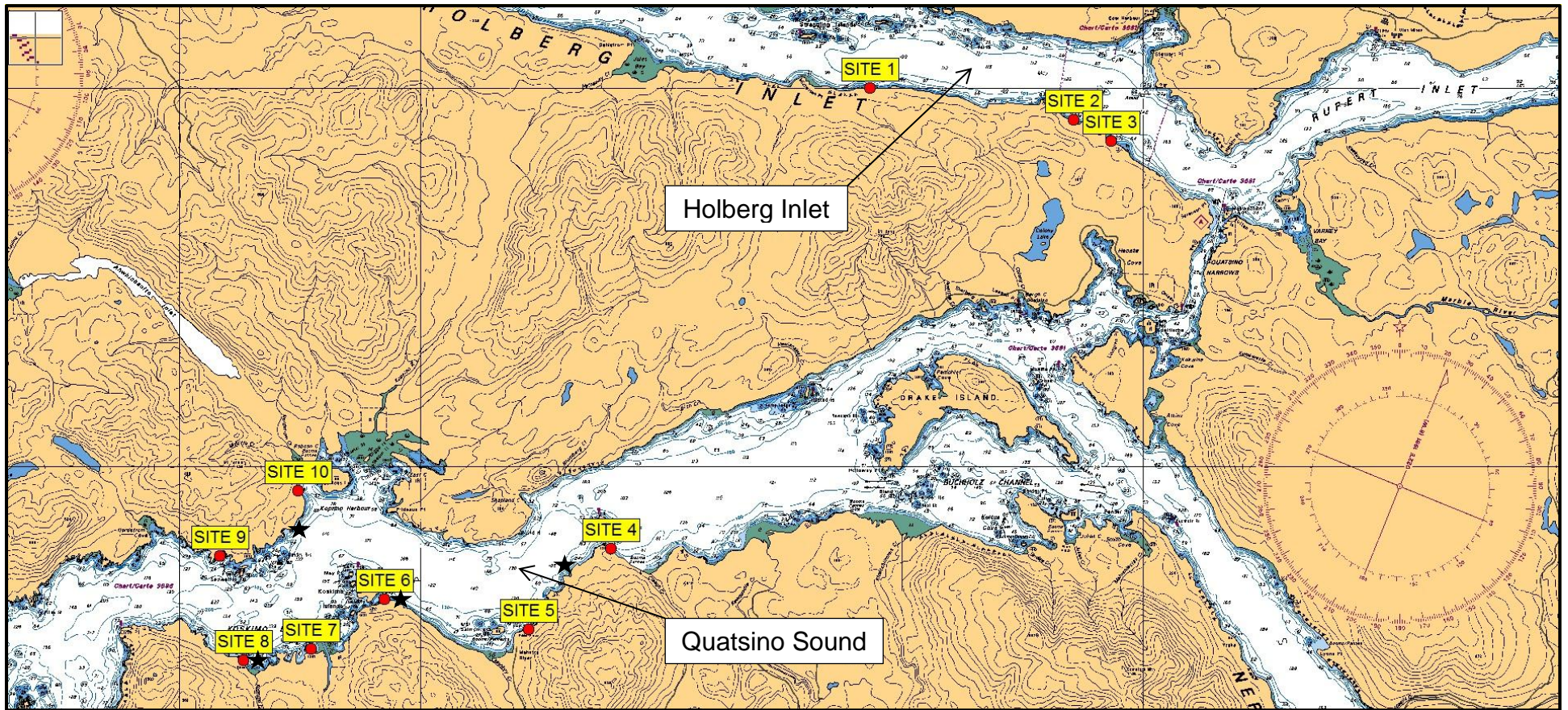


Figure 2: The locations of the 10 beach seine sites in Quatsino Sound and Holberg Inlet sampled in 2017. Marine Harvest Canada active aquaculture site locations are indicated with a black star.

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 Quatsino Sound and Holberg Inlet in 2017.

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 four person crew was utilized to conduct the beach seine sets and retrieve samples in a consistent manner at each of the 10 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 and third crewmembers ensured the net deployed smoothly off the bow or side of the boat. The fourth 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 and third crewmembers 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 weekly with de-ionized water while traveling to the sample sites.

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 shore 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 1-10);
- 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 1-10) 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 10 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 identified as being in any of the four chalimus stages were identified as *Lepeophtheirus salmonis* or *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 salmon sample population were summarized to present minimum and maximum values as well as calculated averages. Sea lice infestation rates, including the number of infested fish and the number of sea lice identified, were determined for the juvenile salmon 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 chum salmon 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 chum salmon 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 inspection of juvenile salmonids collected from Quatsino Sound and Holberg Inlet, BC, in 2017. Water quality field data is presented in Appendix I, beach seine fish capture data is included in Appendix II and data on the juvenile salmon 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 10 sites during the two sample periods, 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 8.5 °C recorded at Sites 2, 3 and 10 on April 4, 2017, to a high of 13.1 °C recorded at Site 5 on May 2, 2017 (Table 2; Appendix I). Calculated weekly average surface water temperatures increased from 8.8 °C for April 4, 2017, to 12.7 °C for May 2, 2017.

Recorded surface water salinity ranged from a low of 20.1 ppt recorded at Site 10 on May 2, 2017, to a high of 29.0 ppt recorded at Site 5 on April 4, 2017 (Table 2; Appendix I). The calculated weekly average surface water salinity varied from 26.0 ppt for April 4, 2017 to 23.3 ppt for May 2, 2017.

Table 2: Water quality parameters collected at beach seine sites in Quatsino Sound and Holberg Inlet in 2017.

Site	April 4, 2017		May 2, 2017	
	Temp. (°C)	Salinity (ppt)	Temp. (°C)	Salinity (ppt)
1	9.2	21.9	12.3	22.1
2	8.5	23.7	12.5	21.7
3	8.5	22.3	12.4	21.1
4	8.9	28.8	12.5	25.5
5	9.1	29.0	13.1	24.5
6	9.1	28.6	12.8	25.2
7	9.0	28.4	12.9	24.9
8	9.0	28.3	12.5	23.8
9	9.0	28.1	12.9	24.4
10	8.5	21.0	12.7	20.1
Average	8.8	26.0	12.7	23.3

3.2 Fish Sample Composition

A total of 5054 fish were captured during beach seine sampling conducted in Quatsino Sound and Holberg Inlet, BC in 2017 with 538 retained for sea lice analysis (Table 3). 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. Of the 4994 chum salmon captured, 479 individual chum salmon (9.6 %) were retained and underwent lab analysis. Of the 59 coho salmon captured, 58 were retained and underwent lab analysis. No other species of Pacific salmon were captured and no Atlantic salmon were captured during the two sampling events in April and May 2017. The one threespine stickleback captured was retained for lab analysis (Table 3).

Chum salmon smolts were captured in significantly greater numbers than any other species. A total of 4994 chum salmon were captured, representing 98.8 % of all captured salmonids. Coho salmon were the next most commonly caught species with a total capture of 59 individuals (Table 3).

Table 3: The total of collected individuals of each fish species captured in Quatsino Sound and Holberg Inlet, BC in April and May 2017, and the percentage of the total capture population that they represent.

Common Name	Capture Totals (% of total capture population)	Collection Totals	Collection %
chum salmon	4994 (98.8 %)	479	9.6
coho salmon	59 (1.2 %)	58	98.3
threespine stickleback	1 (0.02 %)	1	100
All species	5054	538	10.6

Table 4: The number of captured fish (Capture Total) and the number of individual fish collected (Sample Total) from each of the 10 sample sites in Quatsino Sound and Holberg Inlet, BC in April and May 2017.

SITE	Chum		Coho		Threespine stickleback		Capture Total	Sample Total
	Capture Total	Sample Total	Capture Total	Sample Total	Capture Total	Sample Total		
1	447	37	2	2	0	0	449	39
2	299	60	0	0	0	0	299	60
3	451	60	23	23	1	1	475	84
4	465	60	1	1	0	0	466	61
5	61	36	0	0	0	0	61	36
6	13	13	0	0	0	0	13	13
7	70	33	2	2	0	0	72	35
8	1127	60	0	0	0	0	1127	60
9	1325	60	0	0	0	0	1325	60
10	736	60	31	30	0	0	767	90
Total	4994	479	59	58	1	1	5054	538

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 coho salmon.

3.3.1 Chum Salmon

Analysis of weight and fork length data was completed for the chum salmon sample population collected in Quatsino Sound and Holberg Inlet in 2017. The weight of 479 chum smolts collected during the two sample events ranged from 0.26 g to 2.00 g and averaged 0.58 g (SD = 0.2). The fork length of the chum smolts ranged from 32 mm to 55 mm and averaged 39 mm (SD = 3.2). Chum salmon weight and length data was summarized by month which shows an increase in both parameters in the sample population from April to May (Table 5).

3.3.2 Coho Salmon

Analysis of weight and fork length data was completed for the coho salmon sample population collected in Quatsino Sound and Holberg Inlet in 2017. No coho salmon were captured during sampling completed in April 2017. The weight of 58 coho smolts collected in May 2017 ranged from 0.40 g to 25.88 g and averaged 11.41 g (SD = 5.0). The fork length of the coho smolts ranged from 33 mm to 141 mm and averaged 97 mm (SD = 18). Coho salmon weight and length data was summarized in Table 5.

Table 5: Average weights and lengths summarized by month of chum and coho salmon collected in Quatsino Sound and Holberg Inlet in 2017.

Species	Weight (g)		Length (mm)	
	April	May	April	May
Chum	0.52 (n=202)	0.63 (n=277)	38	40
Coho	- (n=0)	11.4 (n=58)	-	97

3.4 Sea Lice Infestation Rates

The results of the laboratory analysis for the presence of sea lice on the sample population collected in Quatsino Sound and Holberg Inlet in 2017 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 538 samples were collected at 10 sites in Quatsino Sound and Holberg Inlet in 2017 and were inspected for sea lice infestation. A total of 23 individuals in the sample population were found to be infested with 29 sea lice (Table

6). A total of 16 chum smolts, six coho salmon and one 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. The sea lice prevalence in the sample population collected in Quatsino Sound and Holberg Inlet in 2017 was 4.3 % and the abundance was 0.05 (Table 6). Sea lice counts of both species observed (*L. salmonis* and *C. clemensi*) were added together for the prevalence and abundance calculations for the entire sample population.

The intensity of sea lice infestation, as defined as the number of sea lice on a single sample, ranged from one louse found on 20 individuals to a maximum of four lice found on one individual. There was one sample infested with two lice, one infested by three lice, and one found to have four lice. The average intensity was calculated by dividing the total number of sea lice by the number of infested fish which was 1.0 for chum salmon, 1.8 for coho salmon and 2.0 for threespine stickleback (Table 6).

Table 6: Results of analysis for sea lice infestation on the sample population collected by beach seine in Quatsino Sound and Holberg Inlet, BC in 2017.

Species	Sample size (n)	Total number of lice observed	Total number of fish infested	Prevalence (%)	Abundance	Average Intensity
chum	479	16	16	3.3	0.03	1.0
coho	58	11	6	10.3	0.19	1.8
threespine stickleback	1	2	1	100	2.00	2.0
Total	538	29	23	4.3	0.05	1.3

3.4.2 Infestation Rates on Chum Salmon

The results of the laboratory analysis for sea lice infestation for chum salmon are presented by site in Table 7. A total of 16 chum salmon were found to be infested with 16 sea lice. The largest number of chum salmon infested with sea lice (seven chum) and the greatest number of sea lice (seven lice) were found on samples collected at Site 8 on May 2, 2017 (Table 7).

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 7).

The chum salmon sample population sea lice infestation rates were summarized by site. Chum were caught at each site throughout both sampling events. No sea lice were found on chum salmon samples collected at Sites 1, 3 and 6 (Table 7).

A total of 16 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=479) collected in Quatsino Sound and Holberg Inlet in 2017 was 3.3 %. Sea lice prevalence calculated by site and week for chum salmon is presented in Table 7. Sea lice prevalence was higher in chum salmon collected in May (4.7 %) than in April (1.5 %). The highest sea lice prevalence (23.3 %) was at Site 8 on May 2, 2017. Sea lice prevalence calculated by site for the total chum sample population was variable ranging from 0 at Sites 1, 3 and 6 to a high of 11.7 % at Site 8.

A total of 16 sea lice were identified during laboratory analysis of retained chum salmon. The abundance of sea lice on the chum salmon sample population (n=479) collected in Quatsino Sound and Holberg Inlet in 2017 was 0.03. Sea lice abundance was calculated by week and by site and is presented in Table 7. The highest sea lice abundance (0.23) was at Site 8 on May 2, 2017. Sea lice abundance calculated by site for the total chum sample population was also variable ranging from 0 at Site 1, 3, and 6 to a high of 0.12 at Site 8.

Site 8 had the highest sea lice prevalence and abundance on chum salmon of any of the sites in Quatsino Sound and Holberg Inlet where juvenile wild salmon monitoring was conducted in 2017.

Table 7: The number of sea lice found on chum salmon collected in Quatsino Sound and Holberg Inlet in 2017 summarized by the 10 sites where beach seining was conducted. Calculated sea lice prevalence, abundance and average intensity is also included by site.

Site	Sample Week														Total Chum Sample Population		
	April 4, 2017							May 2, 2017							Prevalence (%)	Abundance	Average Intensity
	# 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			
1	7	0	-	0	0	0	0	30	0	-	0	0	0	0	0	0	0
2	30	1	0.43	1	3.3	0.03	1.0	30	1	0.33	1	3.3	0.03	1.0	3.3	0.03	1.0
3	30	0	-	0	0	0	0	30	0	-	0	0	0	0	0	0	0
4	30	1	0.26	1	3.3	0.03	1.0	30	1	0.52	1	3.3	0.03	1.0	3.3	0.03	1.0
5	6	0	-	0	0	0	0	30	1	0.68	1	3.3	0.03	1.0	2.8	0.03	1.0
6	7	0	-	0	0	0	0	6	0	-	0	0	0	0	0	0	0
7	2	0	-	0	0	0	0	31	1	1.00	1	3.2	0.03	1.0	3.0	0.03	1.0
8	30	0	-	0	0	0	0	30	7	0.73	7	23.3	0.23	1.0	11.7	0.12	1.0
9	30	1	0.51	1	3.3	0.03	1.0	30	0	-	0	0	0	0	1.7	0.02	1.0
10	30	0	-	0	0	0	0	30	2	0.93	2	6.7	0.07	1.0	3.3	0.03	1.0
TOTAL	202	3	0.40	3	1.5	0.01	1.0	277	13	0.73	13	4.7	0.05	1.0	3.3	0.03	1.0

3.4.3 Infestation Rates on Coho salmon

The results of the laboratory analysis for sea lice infestation for coho salmon are presented by site in Table 8. There were no coho caught on April 4, 2017 therefore Table 8 represents data from the May 2, 2017 sampling event only. A total of six coho salmon were found to be infested with 11 sea lice. For the coho salmon sample population (n=58) there were more infested individuals (three coho) and more sea lice (five lice) found on coho salmon collected at Site 3 on May 2, 2016 (Table 7). Site 10 had the highest number of coho samples (n=30) collected over the two week sampling period.

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 coho salmon sample population (Table 8). Prevalence, abundance and average intensity in Table 8 also represent the coho sample population as a whole.

Sea lice were found on coho samples caught at Site 1, 3, and 10 on May 2, 2017. A total of six coho salmon were found to be infested with at least one sea louse. The prevalence of sea lice on the coho salmon sample population (n=58) collected in Quatsino Sound and Holberg Inlet in 2017 was 10.3 %. Sea lice prevalence calculated by site and week for coho salmon and is presented in Table 8. The highest sea lice prevalence (50.0 %) was at Site 1 on May 2, 2017.

A total of 11 sea lice were identified during laboratory analysis of retained coho salmon. The abundance of sea lice on the coho salmon sample population (n=58) collected in Quatsino Sound and Holberg Inlet in 2017 was 0.19. Sea lice abundance was calculated by week and by site and is presented in Table 8. The highest sea lice abundance (2.00) was at Site 1 on May 2, 2017.

Site 1 had the highest sea lice prevalence and abundance on coho salmon of any of the sites in Quatsino Sound and Holberg Inlet where juvenile wild salmon monitoring was conducted in 2017.

Table 8: The number of sea lice found on coho salmon collected in Quatsino Sound and Holberg Inlet in 2017 summarized by the 10 sites where beach seining was conducted. Calculated sea lice prevalence, abundance and average intensity is also included by site.

Site	Sample Week						
	May 2, 2017						
	# of Coho Analyzed	# of Infested Coho	Average Weight of Infested Coho (g)	# of Lice	Prevalence (%) ¹	Abundance ¹	Average Intensity ¹
1	2	1	-	4	50.0	2.00	4.0
2	0	0	-	0	0	0	0
3	23	3	13.9	5	13.0	0.22	1.7
4	1	0	-	0	0	0	0
5	0	0	-	0	0	0	0
6	0	0	-	0	0	0	0
7	2	0	-	0	0	0	0
8	0	0	-	0	0	0	0
9	0	0	-	0	0	0	0
10	30	2	9.5	2	6.7	0.07	1
TOTAL	58	6	11.7	11	10.3	0.19	1.8

¹ Prevalence, abundance and average intensity for May 2, 2017 also represent the total coho sample population

3.4.4 Infestation Rates on Threespine Stickleback

There was one threespine stickleback captured on May 2, 2017 at Site 3. The threespine stickleback was infested with two lice resulting in a calculated prevalence of 100 %, an abundance of 2.00 and an average intensity of 2.0.

3.5 Infestation Rates by Sea Lice Species

A total of 10 *Lepeophtheirus salmonis* sea lice of various life stages were identified on 10 juvenile salmon and 19 *Caligus clemensi* sea lice were found on 14 of the samples analyzed in the lab (Appendix III). There was one juvenile salmon that was 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 16 infested chum salmon collected in Quatsino Sound and Holberg Inlet was completed and is presented in Table 9. A total of eight *Lepeophtheirus salmonis* sea lice of various life stages were identified on eight juvenile chum salmon and eight *Caligus clemensi* sea lice were found on eight

of the juvenile chum salmon analyzed in the lab (Appendix III). None of the chum salmon analyzed in the lab were infested with multiple lice or lice from both species. The sea lice species identified on chum salmon are also presented by site in Table 10.

Table 9: The number of sea lice in each life stage by species identified on the chum salmon sample population from Quatsino Sound and Holberg Inlet in 2017.
LEP = *Lepeophtheirus salmonis* CAL = *Caligus clemensi*

Life Stage ¹	April 4, 2017	May 2, 2017
LEP Co	2	4
LEP C1	0	1
LEP C2	0	1
LEP C3	0	0
LEP C4	0	0
LEP PAM	0	0
LEP PAF	0	0
LEP AM	0	0
LEP AF	0	0
TOTAL LEP	2	6
CAL Co	0	1
CAL C1	1	5
CAL C2	0	1
CAL C3	0	0
CAL C4	0	0
CAL PAM	0	0
CAL PAF	0	0
CAL AM	0	0
CAL AF	0	0
TOTAL CAL	1	7

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 Quatsino Sound and Holberg Inlet in 2017 summarized by the 10 sites where beach seining was conducted. LEP = *Lepeophtheirus salmonis* CAL = *Caligus clemensi*

Site	Sample Week								TOTAL		
	April 4, 2017				May 2, 2017						
	# of Chum Analyzed	# of Infested Chum	# of LEP	# of CAL	# of Chum Analyzed	# of Infested Chum	# of LEP	# of CAL	# of Chum Analyzed	# of Infested Chum	# of Lice
1	7	0	0	0	30	0	0	0	37	0	0
2	30	1	1	0	30	1	1	0	60	2	2
3	30	0	0	0	30	0	0	0	60	0	0
4	30	1	1	0	30	1	1	0	60	2	2
5	6	0	0	0	30	1	1	0	36	1	1
6	7	0	0	0	6	0	0	0	13	0	0
7	2	0	0	0	31	1	1	0	33	1	1
8	30	0	0	0	30	7	1	6	60	7	7
9	30	1	0	1	30	0	0	0	60	1	1
10	30	0	0	0	30	2	1	1	60	2	2
TOTAL	202	3	2	1	277	13	6	7	479	16	16

3.5.2 Infestation Rates by Sea Lice Species on Coho Salmon

The sea lice species found on the six infested coho salmon are presented in Table 11. No coho salmon were captured during the April sampling event therefore Table 11 and Table 12 present data collected on retained coho salmon collected on May 2, 2017. A total of two *Lepeophtheirus salmonis* sea lice of various life stages were identified on two juvenile coho and nine *Caligus clemensi* sea lice were found on five juvenile coho salmon analyzed in the lab (Appendix III). One juvenile coho salmon was infested with three *C. clemensi* and there was one juvenile coho salmon that was infested with a *L. salmonis* and three *C. clemensi* sea lice. The locations where the individual fish were collected are presented in Table 12.

Table 11: The number of sea lice in each life stage by species identified on coho salmon from Quatsino Sound and Holberg Inlet in 2017. LEP = *Lepeophtheirus salmonis* CAL = *Caligus clemensi*

Life Stage ¹	May 2, 2017
LEP Co	1
LEP C1	0
LEP C2	0
LEP C3	0
LEP C4	0
LEP PAM	1
LEP PAF	0
LEP AM	0
LEP AF	0
TOTAL LEP	2
CAL Co	2
CAL C1	3
CAL C2	2
CAL C3	0
CAL C4	1
CAL PAM	0
CAL PAF	0
CAL AM	0
CAL AF	1
TOTAL CAL	9

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 coho salmon collected in Quatsino Sound and Holberg Inlet in 2017 summarized by the 10 sites where beach seining was conducted. LEP = *Lepeophtheirus salmonis* CAL = *Caligus clemensi*

Site	Sample Week						
	May 2, 2017						
	# of Coho Analyzed	# of Infested Coho	# of LEP	# of CAL	# of Coho Analyzed	# of Infested Coho	# of Lice
1	2	1	1	3	2	1	4
2	0	0	0	0	0	0	0
3	23	3	0	5	23	3	5
4	1	0	0	0	1	0	0
5	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0
7	2	0	0	0	2	0	0
8	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0
10	30	2	1	1	30	2	2
TOTAL	58	6	2	9	58	6	11

3.5.3 Infestation Rates by Sea Lice on Threespine Stickleback

One threespine stickleback was captured on May 2, 2017 at Site 3. A total of two *Caligus clemensi* were identified during lab analysis which determined the threespine stickleback was infested with one CAL Co and one CAL C2.

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 Quatsino Sound and Holberg Inlet, BC by Marine Harvest Canada. This report is limited to the summary and presentation of the 2017 collected data. A tabular comparison of water quality data and chum sea lice infestation data from 2015, 2016 and 2017 is presented in Appendix IV.

A total of 538 samples underwent lab analysis for sea lice infestation in 2017 including 479 chum, 58 coho and one threespine stickleback. Sea lice were found on the chum, coho and threespine stickleback samples. A total of 23 individuals were found to be infested with sea lice in the total sample population, resulting in a calculated sea lice prevalence of 4.3 % in 2017. A total of 29 sea lice were found during laboratory analysis resulting in an abundance of 0.05 for the sample population.

Chum salmon smolts were captured in significantly greater numbers than any other species. A total of 4994 chum salmon were captured, representing 98.8 % of all captured samples. Of the 4994 chum captured, 479 were kept for lab analysis for sea lice infestation. A total of 16 chum smolts were found to be infested with a total of 16 lice resulting in a calculated prevalence of 3.3 %, abundance of 0.03 and an average intensity of 1.0 for the chum salmon sample population.

A total of 59 coho salmon were captured, representing 1.2 % of all captured samples. Of the 59 coho captured, 58 were kept for lab analysis for sea lice infestation. A total of six coho smolts were found to be infested with a total of 11 lice resulting in a calculated prevalence of 10.3 %, abundance of 0.19 and an average intensity of 1.8 for the coho salmon sample population.

The threespine stickleback was found to be infested with two sea lice.

A total of 10 *Lepeophtheirus salmonis* lice of various life stages were identified on 10 juvenile salmonids and 19 *Caligus clemensi* lice were identified on 14 samples. There was one salmonid that was infested by at least one louse of each species.

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

the lab. There were no juvenile chum salmon that were infested with both a *L. salmonis* and a *C. clemensi* sea louse.

For the coho salmon sample population, a total of two *Lepeophtheirus salmonis* sea lice of various life stages were identified on two juvenile coho salmon and nine *Caligus clemensi* sea lice were found on five of the juvenile coho salmon analyzed in the lab. One juvenile coho salmon was infested with three *C. clemensi* and there was one juvenile coho salmon that was infested with a *L. salmonis* and three *C. clemensi* sea lice.

A comparison of the prevalence, abundance and average intensity of sea lice species found on chum salmon was completed for sample data from 2015 and 2017 collected in Quatsino Sound and Holberg Inlet. This data is presented in the following summary table with additional yearly comparisons of juvenile wild salmon monitoring results presented in Appendix IV.

Year	<i>Caligus clemensi</i>			<i>Lepeophtheirus salmonis</i>		
	Prevalence	Abundance	Average Intensity	Prevalence	Abundance	Average Intensity
2015	13.6 %	0.24	1.75	12.4 %	0.21	1.72
2016	8.6 %	0.11	1.32	8.9 %	0.10	1.09
2017	1.7 %	0.02	1.00	1.7 %	0.02	1.00

5.0 References

- Healey M.C. 1991. Life history of coho salmon (*Oncorhynchus tshawytscha*). In: Pacific Salmon Life Histories. C Grott, L Margolis (eds). UBC Press, Vancouver. Pp 313-393.
- Jones S. and S. Johnson. 2015. Sea lice monitoring and non-chemical measures A: Biology of sea lice, *Lepeophtheirus salmonis* and *Caligus spp.*, in western and eastern Canada. DFO Canadian Science Advisory Secretariat. Research Document 2014/019 Pacific Region. Pacific Biological Station, Fisheries and Oceans Canada.
- Jones S. and A. Nemec. 2004. Pink Salmon Action Plan Research. Part II: Sea Lice on Juvenile Salmon and on Three-spine Sticklebacks in 2003. PSARC Working Paper H2004-01.
- Johnson S.C. and L.J. Albright. 1991a. The developmental stages of *Lepeophtheirus salmonis* (Kroyer, 1837) (Copepoda: Caligidae). Canadian Journal of Zoology 69: 929-950.
- Johnson S.C. and L.J. Albright. 1991b. Development, growth and survival of *Lepeophtheirus salmonis* (Copepoda: Caligidae) under laboratory conditions. Journal of the Marine Biological Association of the UK 71: 425-436.
- Kabata Z. 1972. Developmental stages of *Caligus clemensi* (Copepoda: Caligidae) from fishes of British Columbia. Journal of the Fisheries Research Board of Canada 29: 1571-1593.
- Kabata Z. 1974. The species of *Lepeophtheirus* (Copepoda: Caligidae), from fishes of British Columbia. Journal of the Fisheries Research Board of Canada 30: 729-759.
- Margolis L., J.R. Arthur. 1979. Synopsis of the parasites of fishes of Canada. Bulletin of the Fisheries Research Board of Canada, Number 199. Ottawa. 269 pages.
- Mainstream Biological Consulting Inc. 2015. Quatsino Sound Sea Lice 2015. An unpublished report prepared for Marine Harvest Canada.
- McDonald T.E., and L. Margolis. 1995. Synopsis of the parasites of fishes of Canada (1978-1993). Canadian Special Publication of Fisheries and Aquatic Sciences No. 122. National Research Council of Canada, Ottawa. 265 pages.
- Pacific Aquaculture Regulations. Finfish Aquaculture Licence conditions under the Pacific Aquaculture Regulations. Section 7. Sea Lice Monitoring
- Parker R.R. and L. Margolis. 1964. A new species of parasitic copepod, *Caligus clemensi* sp. nov. (Clogoida: Caligidae), from pelagic fishes in the coastal waters of British Columbia. Journal of Fisheries Research Board of Canada 21: 873-889.
- Pollard W.R., G.F. Hartman, C. Groot, and P. Edgell. 1997. Field Identification of Coastal Juvenile Salmonids. Published by Harbour Publishing for the Federal Department of Fisheries and Oceans and MacMillan Bloedel Ltd. Madeira Park, BC Canada.
- Saksida, S., Constantine J., Karreman G.A. and Donald A. 2007a. Evaluation of sea lice abundance levels on farmed Atlantic salmon (*Salmo salar* L) located in the

- Broughton Archipelago of British Columbia from 2003 to 2005. *Aquacult. Res.* 38: 219-231.
- Saksida, S., Karreman G.A., Constantine J., and Donald A. 2007b. Differences in *Lepeophtheirus salmonis* abundance levels on Atlantic salmon farms in the Broughton Archipelago, British Columbia, Canada. *J. Fish Dis.* 30:357-366.
- Salo E.O. 1991. Life history of chum salmon (*Oncorhynchus keta*). In: Pacific Salmon Life Histories. C Grott, L Margolis (eds). UBC Press, Vancouver. Pp 233-309.
- Sandercock F.K. 1991. Life history of coho salmon (*Oncorhynchus kisutch*). In: Pacific Salmon Life Histories. C. Grott, L. Margolis (eds). UBC Press, Vancouver. Pp 397-445.
- Tully O. 1992. Predicting infestation parameters and impacts of caligid copepods in wild and captured fish populations. *Invert. Reprod. Develop.* 22: 91-102.

Appendix I – Field Data

Date	Time	Site Name	Salinity (ppt)	Temperature (°C)
			0.2m	0.2m
04/04/17	8:00	Site 1	21.9	9.2
04/04/17	9:17	Site 2	23.7	8.5
04/04/17	9:45	Site 3	22.3	8.5
04/04/17	11:00	Site 4	28.8	8.9
04/04/17	11:15	Site 5	29.0	9.1
04/04/17	11:40	Site 6	28.6	9.1
04/04/17	11:56	Site 7	28.4	9.0
04/04/17	12:06	Site 8	28.3	9.0
04/04/17	12:36	Site 9	28.1	9.0
04/04/17	13:20	Site 10	21.0	8.5
05/02/17	8:02	Site 1	22.1	12.3
05/02/17	8:24	Site 2	21.7	12.5
05/02/17	8:51	Site 3	21.1	12.4
05/02/17	9:45	Site 4	25.5	12.5
05/02/17	10:05	Site 5	24.5	13.1
05/02/17	10:30	Site 6	25.2	12.8
05/02/17	10:50	Site 7	24.9	12.9
05/02/17	11:11	Site 8	23.8	12.5
05/02/17	11:32	Site 9	24.4	12.9
05/02/17	12:05	Site 10	20.1	12.7

Appendix II – Capture and Collection Sample Totals

Date	Time	Site Name	Weather Comments	Tide Stage	Chum Captured	Chum Retained	Coho Captured	Coho Retained	TSB Captured	TSB Retained	Salmonid Mortalities	Comments
04/04/17	8:00	Site 1	Light rain, calm.	High	7	7	0	0	0	0	0	
04/04/17	9:17	Site 2	Light rain, calm.	High	89	30	0	0	0	0	0	
04/04/17	9:45	Site 3	Cloudy, light chop.	High	111	30	0	0	0	0	0	One perch.
04/04/17	11:00	Site 4	Light rain, chop.	Mid	125	30	0	0	0	0	1	One surf perch. Set at new location around the corner.
04/04/17	11:15	Site 5	Light rain, calm.	High	6	6	0	0	0	0	0	Two flounder.
04/04/17	11:40	Site 6	Light rain, chop.	High	7	7	0	0	0	0	0	One goby, two sculpin.
04/04/17	11:56	Site 7	Light rain, chop.	Mid	2	2	0	0	0	0	0	Two pipefish, one sculpin, four flounder.
04/04/17	12:06	Site 8	Light rain, calm.	Mid	47	30	0	0	0	0	0	One rockfish, one flounder, two pipefish.
04/04/17	12:36	Site 9	Light rain, chop.	Mid	1200	30	0	0	0	0	8	Four herring, one flounder.
04/04/17	13:20	Site 10	Light rain, chop.	Mid	406	30	0	0	0	0	0	Two pipefish, one sculpin.
05/02/17	8:02	Site 1	Calm, sunny.	Mid	440	30	2	2	0	0	0	One chinook ~ 200 mm.
05/02/17	8:24	Site 2	Calm, sunny.	Mid	210	30	0	0	0	0	0	
05/02/17	8:51	Site 3	Calm, sunny.	Mid	340	30	23	23	1	1	2	One shiner perch.
05/02/17	9:45	Site 4	Calm, cloudy.	Low	340	30	1	1	0	0	2	
05/02/17	10:05	Site 5	Calm, cloudy.	Low	55	30	0	0	0	0	0	One sculpin, one gunnel.
05/02/17	10:30	Site 6	Calm, cloudy.	Low	6	6	0	0	0	0	0	Two juvenile rockfish, one tubesnout, one shiner perch, one striped perch.
05/02/17	10:50	Site 7	Calm, cloudy.	Low	68	31	2	2	0	0	0	Seven juvenile rockfish, six gunnel, five great horned sculpin, six greenling, 20 pipefish.
05/02/17	11:11	Site 8	Calm, cloudy.	Low	1080	30	0	0	0	0	0	Two juvenile rockfish, one great horned sculpin.
05/02/17	11:32	Site 9	Calm, cloudy.	Low	125	30	0	0	0	0	0	Six sculpin, 20 pipefish.
05/02/17	12:05	Site 10	Light rain, calm.	Low	330	30	31	30	0	0	0	Two sculpin, five flounder, ten pipefish.

Appendix III – Sea Lice Analysis Data

Sample Date	Site	Fish Species	Length (mm)	Weight (g)	LEP Co	LEP C1	LEP C2	LEP C3	LEP C4	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
4-Apr-17	Site 1	CM	37	0.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 1	CM	37	0.43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 1	CM	35	0.36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 1	CM	32	0.26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 1	CM	37	0.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 1	CM	37	0.39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 1	CM	36	0.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 2	CM	36	0.41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 2	CM	40	0.51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 2	CM	38	0.56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 2	CM	44	0.58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 2	CM	39	0.55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 2	CM	40	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 2	CM	36	0.38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 2	CM	41	0.38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 2	CM	42	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 2	CM	37	0.42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 2	CM	38	0.46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 2	CM	38	0.55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 2	CM	39	0.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 2	CM	41	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 2	CM	36	0.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 2	CM	37	0.43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 2	CM	36	0.46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 2	CM	37	0.33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 2	CM	34	0.32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 2	CM	37	0.48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 2	CM	37	0.44	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 2	CM	37	0.52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 2	CM	37	0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 2	CM	35	0.37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 2	CM	38	0.43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 2	CM	39	0.43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 2	CM	36	0.34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 2	CM	37	0.46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 2	CM	37	0.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 2	CM	37	0.54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	site 3	CM	38	0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	site 3	CM	37	0.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	site 3	CM	34	0.38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	site 3	CM	36	0.39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	site 3	CM	39	0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	site 3	CM	34	0.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	site 3	CM	36	0.36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	site 3	CM	34	0.31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	site 3	CM	34	0.33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	site 3	CM	37	0.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Sample Date	Site	Fish Species	Length (mm)	Weight (g)	LEP Co	LEP C1	LEP C2	LEP C3	LEP C4	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
4-Apr-17	site 3	CM	35	0.36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	site 3	CM	34	0.31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	site 3	CM	37	0.47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	site 3	CM	38	0.46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	site 3	CM	34	0.42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	site 3	CM	37	0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	site 3	CM	36	0.37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	site 3	CM	37	0.47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	site 3	CM	33	0.42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	site 3	CM	36	0.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	site 3	CM	38	0.55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	site 3	CM	37	0.47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	site 3	CM	36	0.39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	site 3	CM	34	0.41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	site 3	CM	36	0.41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	site 3	CM	35	0.37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	site 3	CM	39	0.52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	site 3	CM	38	0.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	site 3	CM	39	0.51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	site 3	CM	37	0.41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 4	CM	40	0.51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 4	CM	40	0.67	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 4	CM	38	0.56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 4	CM	38	0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 4	CM	40	0.58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 4	CM	41	0.78	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 4	CM	39	0.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 4	CM	40	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 4	CM	38	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 4	CM	36	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 4	CM	34	0.28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 4	CM	40	0.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 4	CM	40	0.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 4	CM	36	0.48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 4	CM	34	0.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 4	CM	38	0.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 4	CM	40	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 4	CM	36	0.51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 4	CM	38	0.67	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 4	CM	37	0.52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 4	CM	42	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 4	CM	38	0.55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 4	CM	35	0.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 4	CM	38	0.55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 4	CM	40	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 4	CM	38	0.56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 4	CM	35	0.65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 4	CM	36	0.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 4	CM	40	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 4	CM	39	0.56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Sample Date	Site	Fish Species	Length (mm)	Weight (g)	LEP Co	LEP C1	LEP C2	LEP C3	LEP C4	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
4-Apr-17	Site 5	CM	35	0.39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 5	CM	34	0.47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 5	CM	37	0.41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 5	CM	46	1.20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 5	CM	39	0.55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 5	CM	39	0.68	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 6	CM	34	0.34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 6	CM	33	0.41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 6	CM	35	0.36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 6	CM	35	0.42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 6	CM	34	0.38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 6	CM	36	0.38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 6	CM	40	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 7	CM	34	0.37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 7	CM	37	0.41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 8	CM	37	0.47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 8	CM	37	0.51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 8	CM	38	0.54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 8	CM	40	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 8	CM	36	0.42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 8	CM	39	0.58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 8	CM	40	0.67	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 8	CM	38	0.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 8	CM	38	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 8	CM	42	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 8	CM	42	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 8	CM	37	0.54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 8	CM	36	0.43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 8	CM	38	0.46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 8	CM	36	0.43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 8	CM	40	0.52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 8	CM	38	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 8	CM	46	1.06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 8	CM	41	0.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 8	CM	40	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 8	CM	42	0.70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 8	CM	39	0.58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 8	CM	44	0.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 8	CM	40	0.51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 8	CM	38	0.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 8	CM	42	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 8	CM	39	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 8	CM	45	1.01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 8	CM	39	0.56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 8	CM	38	0.42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 9	CM	38	0.56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 9	CM	37	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 9	CM	38	0.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 9	CM	38	0.56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 9	CM	37	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Sample Date	Site	Fish Species	Length (mm)	Weight (g)	LEP Co	LEP C1	LEP C2	LEP C3	LEP C4	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
4-Apr-17	Site 9	CM	37	0.51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 9	CM	38	0.53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 9	CM	40	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 9	CM	37	0.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 9	CM	38	0.53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 9	CM	37	0.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 9	CM	44	1.02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 9	CM	37	0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 9	CM	37	0.53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 9	CM	37	0.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 9	CM	38	0.55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 9	CM	37	0.46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 9	CM	39	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 9	CM	39	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 9	CM	41	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 9	CM	38	0.52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 9	CM	40	0.64	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
4-Apr-17	Site 9	CM	37	0.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 9	CM	37	0.55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 9	CM	36	0.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 9	CM	41	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 9	CM	36	0.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 9	CM	38	0.63	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 9	CM	37	0.46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 9	CM	38	0.53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 10	CM	41	0.65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 10	CM	39	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 10	CM	38	0.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 10	CM	38	0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 10	CM	38	0.47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 10	CM	39	0.58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 10	CM	36	0.48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 10	CM	36	0.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 10	CM	36	0.42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 10	CM	41	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 10	CM	39	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 10	CM	36	0.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 10	CM	39	0.54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 10	CM	37	0.48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 10	CM	38	0.56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 10	CM	44	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 10	CM	38	0.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 10	CM	37	0.51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 10	CM	39	0.52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 10	CM	37	0.46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 10	CM	40	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 10	CM	39	0.47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 10	CM	36	0.48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 10	CM	38	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 10	CM	38	0.56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Sample Date	Site	Fish Species	Length (mm)	Weight (g)	LEP Co	LEP C1	LEP C2	LEP C3	LEP C4	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
4-Apr-17	Site 10	CM	37	0.53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 10	CM	39	0.56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 10	CM	37	0.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 10	CM	40	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Apr-17	Site 10	CM	38	0.53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 01	CO	93	9.55	1	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	3
2-May-17	Site 01	CO	98	10.38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 01	CM	39	0.56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 01	CM	42	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 01	CM	39	0.42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 01	CM	37	0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 01	CM	39	0.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 01	CM	38	0.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 01	CM	39	0.54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 01	CM	41	0.63	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 01	CM	37	0.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 01	CM	35	0.46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 01	CM	37	0.46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 01	CM	36	0.43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 01	CM	39	0.58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 01	CM	35	0.43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 01	CM	41	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 01	CM	37	0.58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 01	CM	36	0.43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 01	CM	39	0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 01	CM	40	0.60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 01	CM	37	0.39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 01	CM	39	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 01	CM	38	0.51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 01	CM	37	0.47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 01	CM	37	0.42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 01	CM	38	0.56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 01	CM	37	0.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 01	CM	40	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 01	CM	39	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 01	CM	36	0.36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 01	CM	37	0.43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 02	CM	36	0.35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 02	CM	40	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 02	CM	37	0.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 02	CM	34	0.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 02	CM	36	0.33	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 02	CM	39	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 02	CM	38	0.48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 02	CM	36	0.46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 02	CM	37	0.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 02	CM	33	0.35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 02	CM	36	0.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 02	CM	37	0.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 02	CM	36	0.48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Sample Date	Site	Fish Species	Length (mm)	Weight (g)	LEP Co	LEP C1	LEP C2	LEP C3	LEP C4	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
2-May-17	Site 02	CM	37	0.42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 02	CM	38	0.56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 02	CM	37	0.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 02	CM	39	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 02	CM	36	0.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 02	CM	39	0.46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 02	CM	36	0.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 02	CM	37	0.41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 02	CM	36	0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 02	CM	39	0.47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 02	CM	36	0.36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 02	CM	36	0.38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 02	CM	37	0.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 02	CM	35	0.37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 02	CM	35	0.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 02	CM	36	0.43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 02	CM	36	0.35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CM	37	0.48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CM	38	0.56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CM	37	0.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CM	38	0.48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CM	38	0.48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CM	37	0.47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CM	36	0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CM	36	0.34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CM	36	0.53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CM	38	0.54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CM	39	0.58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CM	35	0.43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CM	38	0.54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CM	36	0.38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CM	36	0.41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CM	35	0.37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CM	38	0.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CM	36	0.42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CM	38	0.51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CM	34	0.36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CM	36	0.46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CM	34	0.37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CM	36	0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CM	39	0.60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CM	37	0.51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CM	38	0.46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CM	38	0.46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CM	35	0.39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CM	38	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CM	36	0.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CO	105	11.27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CO	120	21.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CO	141	25.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Sample Date	Site	Fish Species	Length (mm)	Weight (g)	LEP Co	LEP C1	LEP C2	LEP C3	LEP C4	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
2-May-17	Site 03	CO	112	15.86	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
2-May-17	Site 03	CO	120	17.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CO	124	18.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CO	113	18.13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CO	88	8.76	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	3
2-May-17	Site 03	CO	87	8.56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CO	103	12.19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CO	128	21.26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CO	118	19.28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CO	125	19.58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CO	119	15.68	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CO	94	10.19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CO	117	16.48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CO	94	10.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CO	112	12.55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CO	108	14.53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CO	113	17.19	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
2-May-17	Site 03	CO	92	8.94	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CO	127	19.22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	CO	92	9.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 03	TSB	56	1.69	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	2
2-May-17	Site 04	CO	69	4.35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 04	CM	43	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 04	CM	51	1.36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 04	CM	37	0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 04	CM	36	0.48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 04	CM	36	0.43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 04	CM	39	0.68	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 04	CM	52	1.53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 04	CM	38	0.53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 04	CM	36	0.52	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 04	CM	42	0.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 04	CM	38	0.63	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 04	CM	38	0.58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 04	CM	37	0.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 04	CM	39	0.51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 04	CM	35	0.41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 04	CM	48	1.17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 04	CM	43	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 04	CM	41	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 04	CM	40	0.68	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 04	CM	36	0.41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 04	CM	38	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 04	CM	39	0.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 04	CM	52	2.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 04	CM	37	0.56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 04	CM	46	1.18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 04	CM	40	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 04	CM	42	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 04	CM	41	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Sample Date	Site	Fish Species	Length (mm)	Weight (g)	LEP Co	LEP C1	LEP C2	LEP C3	LEP C4	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
2-May-17	Site 04	CM	42	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 04	CM	51	1.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 05	CM	39	0.56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 05	CM	41	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 05	CM	41	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 05	CM	39	0.46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 05	CM	37	0.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 05	CM	47	1.12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 05	CM	42	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 05	CM	53	1.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 05	CM	41	0.76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 05	CM	43	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 05	CM	39	0.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 05	CM	37	0.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 05	CM	43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 05	CM	42	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 05	CM	43	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 05	CM	43	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 05	CM	39	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 05	CM	39	0.52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 05	CM	39	0.63	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 05	CM	38	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 05	CM	38	0.58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 05	CM	37	0.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 05	CM	38	0.60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 05	CM	41	0.68	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 05	CM	42	0.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 05	CM	44	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 05	CM	43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 05	CM	39	0.54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 05	CM	41	0.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 05	CM	47	1.20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 06	CM	42	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 06	CM	38	0.39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 06	CM	39	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 06	CM	38	0.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 06	CM	39	0.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 06	CM	37	0.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 07	CO	72	4.09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 07	CO	33	0.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 07	CM	36	0.38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 07	CM	35	0.38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 07	CM	43	0.68	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 07	CM	42	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 07	CM	40	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 07	CM	39	0.55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 07	CM	38	0.41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 07	CM	39	0.46	0	0	0	0	0	0	0	0	0	0	0	0	0	0						

Sample Date	Site	Fish Species	Length (mm)	Weight (g)	LEP Co	LEP C1	LEP C2	LEP C3	LEP C4	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
2-May-17	Site 07	CM	37	0.43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 07	CM	37	0.51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 07	CM	39	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 07	CM	37	0.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 07	CM	38	0.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 07	CM	37	0.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 07	CM	46	1.00	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 07	CM	36	0.48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 07	CM	36	0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 07	CM	40	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 07	CM	40	0.65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 07	CM	35	0.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 07	CM	43	0.68	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 07	CM	41	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 07	CM	38	0.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 07	CM	37	0.39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 07	CM	39	0.60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 07	CM	40	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 07	CM	37	0.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 07	CM	39	0.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 07	CM	41	0.63	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 08	CM	38	0.47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 08	CM	40	0.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 08	CM	42	0.77	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 08	CM	40	0.65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 08	CM	40	0.63	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
2-May-17	Site 08	CM	43	0.95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 08	CM	49	1.35	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
2-May-17	Site 08	CM	39	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 08	CM	42	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 08	CM	45	0.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 08	CM	44	0.95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 08	CM	42	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 08	CM	39	0.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 08	CM	55	1.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 08	CM	41	0.67	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 08	CM	46	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 08	CM	37	0.38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 08	CM	37	0.47	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
2-May-17	Site 08	CM	40	0.60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 08	CM	39	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 08	CM	44	0.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 08	CM	38	0.58	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
2-May-17	Site 08	CM	39	0.64	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
2-May-17	Site 08	CM	39	0.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 08	CM	37	0.53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 08	CM	43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 08	CM	40	0.67	0	0	0	0	0	0	0	0	0	0	0	0	0	0						

Sample Date	Site	Fish Species	Length (mm)	Weight (g)	LEP Co	LEP C1	LEP C2	LEP C3	LEP C4	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
2-May-17	Site 08	CM	40	0.67	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
2-May-17	Site 09	CM	39	0.53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 09	CM	43	0.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 09	CM	39	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 09	CM	43	0.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 09	CM	40	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 09	CM	40	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 09	CM	43	0.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 09	CM	38	0.48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 09	CM	39	0.56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 09	CM	39	0.52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 09	CM	40	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 09	CM	40	0.63	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 09	CM	39	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 09	CM	43	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 09	CM	39	0.58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 09	CM	40	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 09	CM	40	0.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 09	CM	39	0.56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 09	CM	39	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 09	CM	40	0.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 09	CM	37	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 09	CM	41	0.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 09	CM	40	0.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 09	CM	36	0.60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 09	CM	38	0.51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 09	CM	39	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 09	CM	43	0.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 09	CM	36	0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 09	CM	40	0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 09	CM	37	0.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CM	39	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CM	47	1.00	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
2-May-17	Site 10	CM	42	0.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CM	46	1.23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CM	43	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CM	40	0.53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CM	40	0.58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CM	40	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CM	36	0.47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CM	46	1.05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CM	44	0.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CM	38	0.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CM	35	0.42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CM	37	0.46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CM	46	0.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CM	39	0.60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CM	43	0.86	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CM	44	0.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CM	45	0.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Sample Date	Site	Fish Species	Length (mm)	Weight (g)	LEP Co	LEP C1	LEP C2	LEP C3	LEP C4	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
2-May-17	Site 10	CM	39	0.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CM	47	1.17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CM	44	1.04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CM	45	1.02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CM	41	0.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CM	48	1.24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CM	44	0.81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CM	44	0.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CM	47	1.05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CM	41	0.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CM	44	1.01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CO	98	12.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CO	90	10.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CO	79	7.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CO	95	11.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CO	90	10.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CO	92	9.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CO	94	8.60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CO	86	8.30	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CO	95	12.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CO	101	13.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CO	74	5.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CO	82	8.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CO	79	6.70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CO	82	6.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CO	94	13.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CO	90	9.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CO	105	14.10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CO	98	7.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CO	95	10.70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
2-May-17	Site 10	CO	94	10.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CO	90	9.90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CO	75	5.70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CO	81	6.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CO	83	7.20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CO	84	7.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CO	81	6.20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CO	88	7.60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CO	101	15.10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CO	95	9.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-May-17	Site 10	CO	88	8.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix IV – 2015-2017 Comparisons

Surface water temperature comparison between data collected in Quatsino Sound and Holberg Inlet between 2015 and 2017.

Site	April Temp. (°C)			May Temp. (°C)		
	2015	2016	2017	2015	2016	2017
1	8.7	11.1	9.2	11.6	10.8	12.3
2	8.0	11.2	8.5	11.9	11.1	12.5
3	8.4	11.0	8.5	12.5	11.2	12.4
4	9.7	9.8	8.9	11.6	11.0	12.5
5	9.6	10.0	9.1	11.2	11.2	13.1
6	10.5	9.9	9.1	12.1	11.6	12.8
7	10.1	9.9	9.0	12.3	11.0	12.9
8	10.0	9.6	9.0	12.7	11.1	12.5
9	10.0	9.3	9.0	11.9	11.2	12.9
10	10.4	8.1	8.5	13.5	11.1	12.7
Average	9.5	10.0	8.8	12.1	11.1	12.7

Surface water salinity comparison between data collected in Quatsino Sound and Holberg Inlet between 2015 and 2017.

Site	April Salinity (ppt)			May Salinity (ppt)		
	2015	2016	2017	2015	2016	2017
1	14.0	22.3	21.9	27.5	27.9	22.1
2	13.8	21.0	23.7	28.4	27.8	21.7
3	18.1	21.0	22.3	28.0	27.7	21.1
4	26.2	26.6	28.8	30.2	29.5	25.5
5	26.5	27.7	29.0	29.8	29.3	24.5
6	27.2	27.8	28.6	30.3	29.6	25.2
7	24.3	27.5	28.4	29.9	29.0	24.9
8	20.2	24.2	28.3	30.4	29.4	23.8
9	26.5	13.8	28.1	30.4	29.5	24.4
10	26.3	9.2	21.0	29.8	25.5	20.1
Average	22.3	22.1	26.0	29.5	28.5	23.3

A comparison of the results of analysis for sea lice infestation on samples collected by beach seine in Quatsino Sound and Holberg Inlet, BC between 2015 and 2017.

Species	Sample size (n) 2015	Sample size (n) 2016	Sample size (n) 2017	Total # of fish infested 2015	Total # of fish infested 2016	Total # of fish infested 2017	Prevalence (%) 2015	Prevalence (%) 2016	Prevalence (%) 2017	Total # of lice observed 2015	Total # of lice observed 2016	Total # of lice observed 2017	Abundance 2015	Abundance 2016	Abundance 2017
chum	177	235	479	37	36	16	20.9	15.3	3.3	80	54	16	0.45	0.23	0.03
coho	21	1	58	7	0	6	33.3	0.0	10.3	12	0	11	0.57	0.00	0.19
pink	1	2	0	0	1	0	0.0	50.0	0	0	1	0	0.0	0.50	0
chinook	12	19	0	2	9	0	16.7	47.4	-	2	14	0	0.17	0.74	-
TSB	7	0	1	4	0	1	57.1	-	100	5	0	2	0.71	-	2.0
Total	218	257	538	50	46	23	22.9	17.9	4.3	99	69	29	0.45	0.27	0.05

A comparison of the calculated sea lice prevalence and abundance by site and by week as determined for chum salmon collected in Quatsino Sound and Holberg Inlet, BC between 2015 and 2017.

Site	Sample Month											
	April						May					
	Prevalence (%) 2015	Prevalence (%) 2016	Prevalence (%) 2017	Abundance 2015	Abundance 2016	Abundance 2017	Prevalence (%) 2015	Prevalence (%) 2016	Prevalence (%) 2017	Abundance 2015	Abundance 2016	Abundance 2017
1	6.6	0	0	0.07	0	0	31.3	20.0	0	0.50	0.33	0
2	0	3.3	3.3	0	0.03	0.03	0	33.3	3.3	0	0.03	0.03
3	3.3	0	0	0.03	0	0	17.2	-	0	0.17	-	0
4	40.0	-	3.3	0.80	-	0.03	-	-	3.3	-	-	0.03
5	-	0	0	-	0	0	-	-	3.3	-	-	0.03
6	-	-	0	-	-	0	-	-	0	-	-	0
7	0	26.7	0	0	0.40	0	-	-	3.2	-	-	0.03
8	41.9	-	0	1.10	-	0	50.0	-	23.3	2.50	-	0.23
9	-	10.0	3.3	-	0.17	0.03	60.0	65.5	0	2.60	1.00	0
10	-	3.3	0	-	0.03	0	-	-	6.7	-	-	0.07
TOTAL	17.1	6.9	1.5	0.39	0.10	0.01	26.4	48.9	4.7	0.54	0.74	0.05

The number of sea lice in each life stage by species identified on the chum salmon sample population from Quatsino Sound and Holberg Inlet in 2015, 2016 and 2017.

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

Life Stage ¹	Number of Lice 2015	Number of Lice 2016	Number of Lice 2017
LEP Co	2	3	6
LEP C1	3	4	1
LEP C2	9	2	1
LEP C3	16	7	0
LEP C4	5	2	0
LEP PAM	0	6	0
LEP PAF	2	0	0
LEP AM	1	1	0
LEP AF	0	0	0
TOTAL LEP	38	25	8
CAL Co	2	3	1
CAL C1	24	18	6
CAL C2	7	4	1
CAL C3	4	2	0
CAL C4	5	2	0
CAL PAM	0	0	0
CAL PAF	0	0	0
CAL AM	0	0	0
CAL AF	0	0	0
TOTAL CAL	42	29	8

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 species of sea lice found on chum salmon collected in Quatsino Sound and Holberg Inlet between 2015 and 2017 summarized by the 10 sites where beach seining was conducted. LEP = *Lepeophtheirus salmonis* CAL = *Caligus clemensi*

Site	Sample Week											
	April						May					
	# of LEP 2015	# of LEP 2016	# of LEP 2017	# of CAL 2015	# of CAL 2016	# of CAL 2017	# of LEP 2015	# of LEP 2016	# of LEP 2017	# of CAL 2015	# of CAL 2016	# of CAL 2017
1	0	0	0	2	0	0	1	3	0	15	2	0
2	0	1	1	0	0	0	0	0	1	0	1	0
3	1	0	0	0	0	0	3	-	0	2	-	0
4	2	-	1	2	-	0	-	-	1	-	-	0
5	-	0	0	-	0	0	-	-	1	-	-	0
6	-	-	0	-	-	0	-	-	0	-	-	0
7	0	2	0	0	10	0	-	-	1	-	-	0
8	23	-	0	11	-	0	2	-	1	3	-	6
9	-	2	0	-	3	1	6	16	0	7	13	0
10	-	1	0	-	0	0	-	-	1	-	-	1
TOTAL	26	6	2	15	13	1	12	19	6	27	16	7

A comparison of sea lice infestation rates on chum salmon collected in Quatsino Sound and Holberg Inlet between 2015 and 2017.

Year	<i>Caligus clemensi</i>			<i>Lepeophtheirus salmonis</i>		
	Prevalence	Abundance	Average Intensity	Prevalence	Abundance	Average Intensity
2015	13.6 %	0.24	1.75	12.4 %	0.21	1.72
2016	8.6 %	0.11	1.32	8.9 %	0.10	1.09
2017	1.7 %	0.02	1.0	1.7 %	0.02	1.0