

# Wild Juvenile Salmonid Monitoring Program 2021 Quatsino Sound, BC

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## Summary

Beach seine sampling was conducted on behalf of MOWI Canada West in Quatsino Sound, BC in 2021. 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 MOWI Canada West finfish aquaculture sites in the area.

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

Sampling was conducted during two separate sampling events in April and May 2021, 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.

Thirty individuals from each target fish species (Pacific salmonids) 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 *Lepeophtheirus salmonis* and *Caligus 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 2021. A total of 463 wild juvenile salmonids underwent lab analysis for sea lice infestation including 417 chum salmon, 42 coho salmon, three chinook salmon and one pink salmon. No Atlantic salmon (*Salmo salar*) were captured during sampling completed in Quatsino Sound and Holberg Inlet in 2021. From the total sample population 78 samples were infested with 122 sea lice. The calculated prevalence for the total sample population was 16.8 %, sea lice abundance was 0.26 and the average intensity was 1.6 for the sample population collected in Quatsino Sound and Holberg Inlet in 2021.

Chum salmon smolts were captured in significantly greater numbers than any other species. A total of 3085 chum salmon were captured, representing 97.8 % of all captured salmonids. Of the 3085 chum captured, 417 were kept for lab analysis for sea lice infestation. A total of 55 chum smolts were found to be infested with a total of 67 lice resulting in a calculated prevalence of 13.2 %, abundance of 0.16 and an average intensity of 1.2 for the chum salmon sample population.

A total of 66 coho salmon were captured, representing 2.1 % of all captured samples. Of the 66 coho captured, 42 were kept for lab analysis for sea lice infestation. A total of 22 coho smolts were found to be infested with a total of 54 lice resulting in a calculated

prevalence of 52.4 %, abundance of 1.29 and an average intensity of 2.5 for the coho salmon sample population.

A total of three chinook salmon were captured, representing 0.1 % of all captured samples. All of the chinook salmon captured were kept for lab analysis for sea lice infestation. One chinook smolt was found to be infested with one louse resulting in a calculated prevalence of 33.3 %, abundance of 0.33 and an average intensity of 1.0 for the chinook salmon sample population.

A total of 27 *L. salmonis* sea lice of various life stages were identified on 27 juvenile salmon of all species and 95 *C. clemensi* sea lice were found on 60 juvenile salmon of all species analyzed in the lab. There were nine samples that were infested with at least one *L. salmonis* and *C. clemensi* sea louse.

For the chum salmon sample population, a total of 19 *L. salmonis* sea lice of various life stages were identified on 19 juvenile chum salmon and 48 *C. clemensi* sea lice were found on 40 of the juvenile chum salmon analyzed in the lab. There were four chum that were infested with at least one *L. salmonis* and *C. clemensi* sea louse.

For the coho salmon sample population, a total of eight *L. salmonis* sea lice of various life stages were identified on eight juvenile coho salmon and 46 *C. clemensi* sea lice were found on 19 juvenile coho salmon analyzed in the lab. There were five coho that were infested with at least one *L. salmonis* and *C. clemensi* sea louse.

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 2021 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
2018	2.5 %	0.02	1.00	3.1 %	0.03	1.00
2019	7.9 %	0.10	1.31	1.8 %	0.02	1.13
2020	12.3 %	0.20	1.59	30.8 %	0.54	1.74
2021	9.6%	0.10	1.20	4.6%	0.05	1.00

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## 1.0 Introduction

At the request of MOWI Canada West, 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 2021 on April 6 and May 7. These weeks were selected to coincide with the estimated peak outmigration dates of juvenile salmonids.

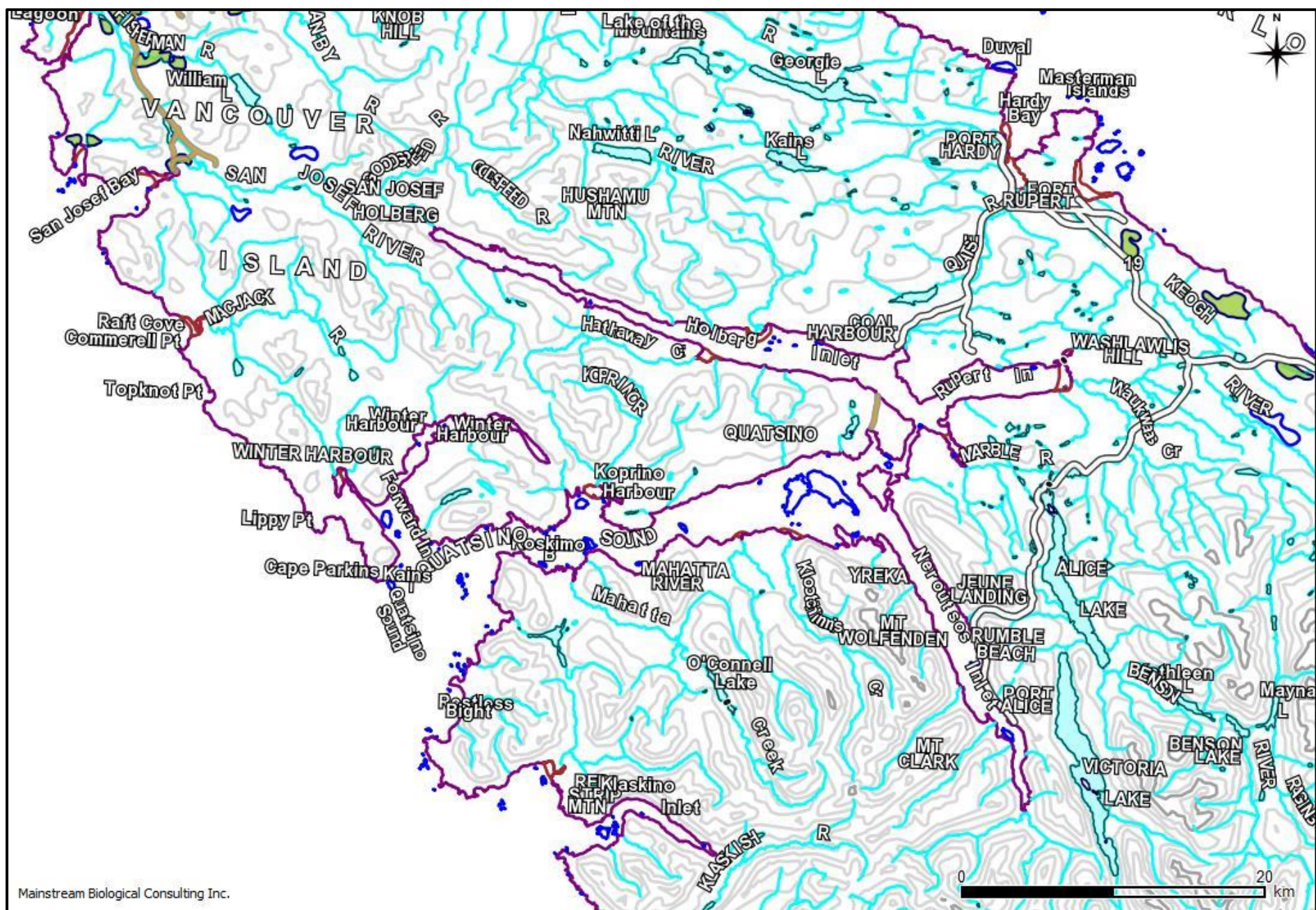
Parasitic copepods from the family Caligidae (sea lice) found in the coastal waters of British Columbia are divided into two genera: *Lepeophtheirus* and *Caligus*. Eleven species of *Lepeophtheirus* have been identified infesting fish in the Pacific Ocean, while only one species of *Caligus* (*Caligus clemensi*) 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 *Lepeophtheirus 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 nauplii stages before developing into an infectious free-swimming copepodid. At this point, the sea lice attach to their host and develop through a number of 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).

MOWI Canada West 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 2021. This represents the seventh year of wild juvenile salmonid monitoring in Quatsino Sound and Holberg Inlet conducted by MOWI Canada West, formerly Marine Harvest Canada. No Atlantic salmon have been captured or observed during sampling for juvenile salmonids at the 10 beach seine sites in Quatsino Sound completed in 2015 through to 2021.







## 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 MOWI Canada West aquaculture sites in the area (Figure 2). The sites were sampled twice in 2021 on April 6 and May 7.

### 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 2021.

Site #	Latitude	Longitude
1	50 34.754	127 38.271
2	50 34.544	127 36.322
3	50 34.405	127 35.811
4	50 28.830	127 46.438
5	50 28.033	127 47.477
6	50 28.293	127 51.116
7	50 27.530	127 52.157
8	50 27.470	127 53.736
9	50 28.917	127 53.436
10	50 29.698	127 52.555

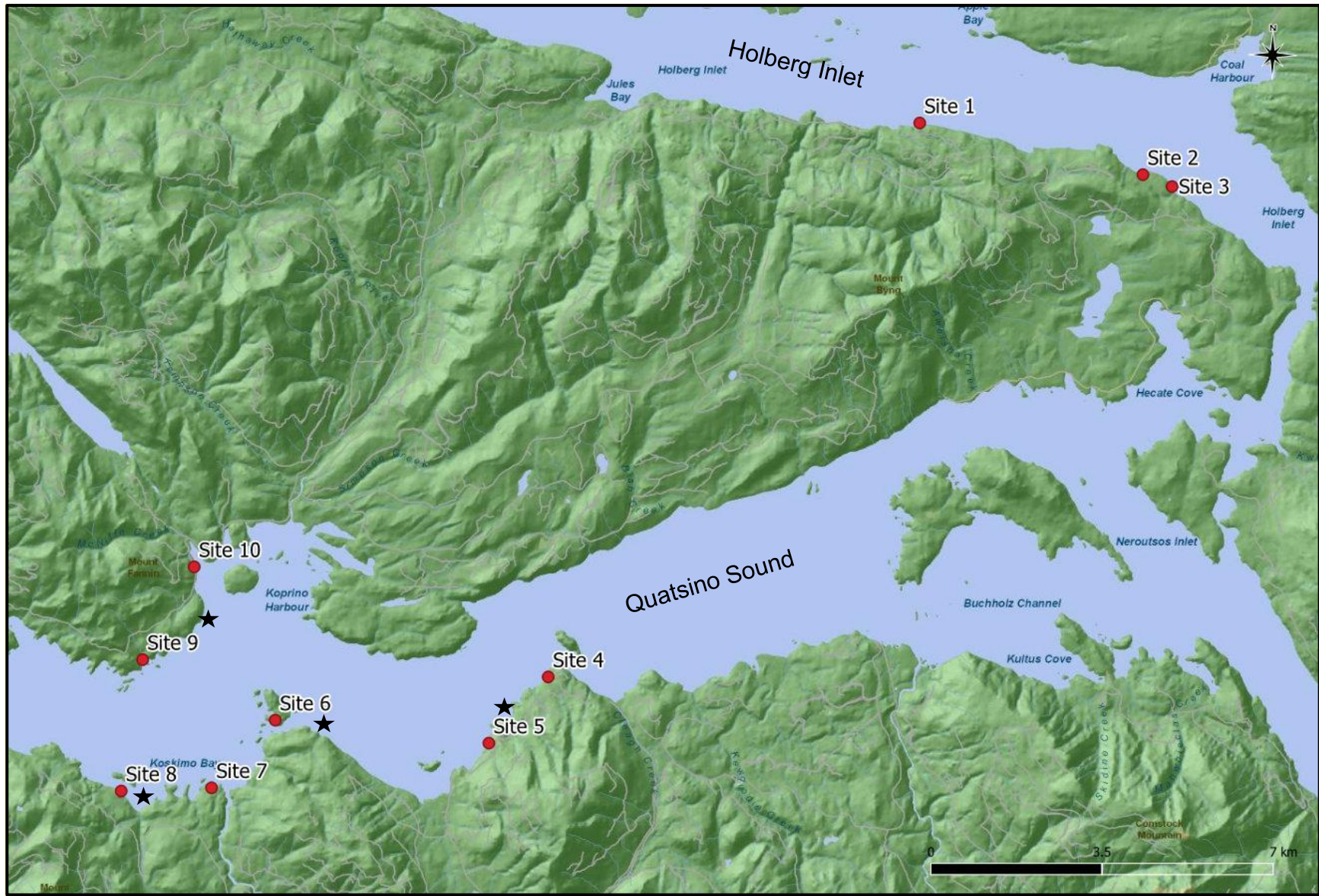


Figure 2: The locations of the 10 beach seine sites in Quatsino Sound and Holberg Inlet sampled in 2021. MOWI Canada West aquaculture site locations are indicated with a black star.

## 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 2021.

An 18ft Boston Whaler, powered by a 70 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 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 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 to record field data. 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, a sample of surface water was collected to measure salinity and water temperature data using an Oakton® SALT 6+ meter.

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 third crew member anchored the boat and the entire crew 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 whirl-pak 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 name (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;
- Water temperature (°C) and salinity (ppt) to one decimal place;
- Exact GPS coordinates; and
- The number of salmonid mortalities.

The retained fish from each site were packaged separately in re-sealable bags and labelled with the site name (Site 1-10), the date and sample numbers and species. Site sample bags were placed in a cooler with sufficient dry ice for storage. 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. Remaining sample gear was stored for transit between sites.

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 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 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 all salmon species captured. Abundance, as defined as the total number of sea lice observed compared to the total number of host fish examined, was also determined for all salmon species captured. 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 2021. 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 6.7 °C recorded at Site 1 and Site 2 on April 6, 2021, to a high of 10.1 °C recorded at Site 10 on May 7, 2021 (Table 2; Appendix I). Calculated weekly average surface water temperatures increased from 7.9 °C for April 6, 2021, to 9.5 °C for May 7, 2021.

Recorded surface water salinity ranged from a low of 14.3 ppt recorded at Site 10 on April 6, 2021, to a high of 31.2 ppt recorded at Site 9 on April 6, 2021 (Table 2; Appendix I). The calculated weekly average surface water salinity increased from 22.6 ppt for April 6, 2021, to 26.2 ppt for May 7, 2021.



Table 2: Water quality parameters collected at beach seine sites in Quatsino Sound and Holberg Inlet in 2021.

Site	06-Apr-21		07-May-21	
	Temp. (°C)	Salinity (ppt)	Temp. (°C)	Salinity (ppt)
1	6.7	22.2	9.2	25.7
2	6.7	18.9	9.5	26.2
3	7.9	26.3	9.5	25.5
4	7.7	23	9.1	29.4
5	7.9	28.2	9.4	29.9
6	7.1	17.3	9.6	29.9
7	7.9	19.3	9.5	18.4
8	8.5	25.2	9.5	29.3
9	9.2	31.2	9.3	29.2
10	9.8	14.3	10.1	18.5
<b>Average</b>	<b>7.9</b>	<b>22.6</b>	<b>9.5</b>	<b>26.2</b>

### 3.2 Fish Sample Composition

A total of 3151 fish were captured during beach seine sampling conducted in Quatsino Sound and Holberg Inlet, BC in 2021 with 463 samples 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 3085 chum salmon captured, 417 individual chum salmon (13.5 %) were retained and underwent lab analysis. Of the 62 coho salmon captured, 42 coho salmon (67.7 %) were retained and underwent lab analysis. All three of the chinook salmon captured and the one pink salmon captured underwent lab analysis (Table 3). No Atlantic salmon were captured during the two sampling events in April and May 2021 (Table 3).

Chum salmon smolts were captured in significantly greater numbers than any other species. A total of 3085 chum salmon were captured, representing 97.8 % of all captured salmonids (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 2021, and the percentage of the total capture population that they represent.

Common Name	Capture Totals (% of total capture population)	Collection Totals	Collection %
chum salmon	3085 (97.8 %)	417	13.5
coho salmon	62 (2.0 %)	42	67.7
chinook salmon	3 (0.1 %)	3	100.0
pink salmon	1 (0.03 %)	1	100.0
sockeye salmon	0	0	0.0
threespine stickleback	0	0	0.0
<b>All species</b>	<b>3151</b>	<b>463</b>	<b>14.7</b>

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 2021.

Site	Chum		Pink		Coho		Chinook		Capture Total	Sample Total
	Capture Total	Sample Total	Capture Total	Sample Total	Capture Total	Sample Total	Capture Total	Sample Total		
1	165	39	0	0	3	3	0	0	168	42
2	405	64	0	0	0	0	2	2	407	66
3	320	59	0	0	1	1	1	1	322	61
4	91	35	0	0	0	0	0	0	91	35
5	1541	60	0	0	51	31	0	0	1592	91
6	120	60	0	0	2	2	0	0	122	62
7	109	31	1	1	1	1	0	0	111	33
8	13	13	0	0	0	0	0	0	13	13
9	25	25	0	0	2	2	0	0	27	27
10	296	31	0	0	2	2	0	0	298	33
<b>Total</b>	<b>3085</b>	<b>417</b>	<b>1</b>	<b>1</b>	<b>62</b>	<b>42</b>	<b>3</b>	<b>3</b>	<b>3151</b>	<b>463</b>

### 3.3 Fish Sample Size Statistics

Summary statistics for the sample population of juvenile salmonids were completed for weight and fork length. This analysis was completed for chum salmon and coho salmon only as the sample population of chinook salmon was not of sufficient size 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 Quatsino Sound and Holberg Inlet in 2021. The weight of 417 chum smolts collected during the two sample events ranged from 0.3 g to 18.8 g and averaged 1.0 g (SD = 1.4). The fork length of the chum smolts ranged from 32 mm to 114 mm and averaged 42 mm (SD = 9). 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 2021. The weight of 42 coho smolts collected ranged from 3.5 g to 16.2 g and averaged 9.7 g (SD = 3.4). The fork length of the coho smolts ranged from 66 mm to 130 mm and averaged 90 mm (SD = 12). Coho salmon weight and length data was also summarized by month (Table 5).

Table 5: Average weights and lengths summarized by month of chum and coho salmon collected in Quatsino Sound and Holberg Inlet in 2021.

Species	Weight (g)		Length (mm)	
	April	May	April	May
Chum	0.47	1.52	37	48
Coho	9.88	9.57	91	90

### 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 2021 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 463 samples were collected at 10 sites in Quatsino Sound and Holberg Inlet in 2021 and were inspected for sea lice infestation. A total of 78 individuals in the sample population were found to be infested with 122 sea lice (Table 6). A total of 55 chum smolts, 22 coho salmon and one chinook salmon 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.

The sea lice prevalence in the sample population collected in Quatsino Sound and Holberg Inlet in 2021 was 16.8 % and the abundance was 0.26 (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 ranged from one louse found on 59 individuals to a maximum of eight lice found on one individual. The average intensity was calculated by dividing the total number of sea lice by the number of infested fish, which was 1.2 for chum salmon, 2.5 for coho salmon and 1.0 for chinook salmon (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 2021.

Species	Sample size (n)	Total number of lice observed	Total number of fish infested	Prevalence (%)	Abundance	Average Intensity
chum	417	67	55	13.2	0.16	1.2
coho	42	54	22	52.4	1.29	2.5
chinook	3	1	1	33.3	0.33	1.0
pink	1	0	0	0.0	0.00	-
<b>Total</b>	<b>463</b>	<b>122</b>	<b>78</b>	<b>16.8</b>	<b>0.26</b>	<b>1.6</b>

### 3.4.1 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 55 chum salmon were found to be infested with 67 sea lice. Sea lice counts of both sea lice species observed (*L. salmonis* and *C. clemensi*) were added together for the presentation of sea lice prevalence intensity and abundance on the chum salmon sample population (Table 7).

The chum salmon sample population sea lice infestation rates were summarized by site. 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=417) collected in Quatsino Sound and Holberg Inlet in 2021 was 13.2 %. 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 (20.3 %) than in April (6.5 %) 2021. The highest sea lice prevalence (43.3 %) was at Site 5 on May 7, 2021. Sea lice prevalence calculated by site for the total chum sample population was variable ranging from 0.0 % at Site 10 to a high of 26.7 % at Site 5.

A total of 67 sea lice were identified during laboratory analysis of retained chum salmon. The abundance of sea lice on the chum salmon sample population (n=417) collected in Quatsino Sound and Holberg Inlet in 2021 was 0.16. Sea lice abundance was calculated by week and by site and is presented in Table 7. Sea lice abundance was higher in chum salmon collected in May (0.26) than in April (0.07) 2021. The highest sea lice abundance (0.53) was at Site 5 on May 7, 2021. Sea lice abundance calculated by site for the total chum sample population was also variable ranging from 0.00 at Site 10 to a high of 0.32 at Site 5.

A total of 67 sea lice were identified on 55 chum during laboratory analysis of retained chum salmon. The intensity of sea lice on the infested chum salmon collected in Quatsino Sound and Holberg Inlet in 2021 was 1.2. Sea lice intensity was calculated by week and by site and is presented in Table 7. Sea lice intensity was higher in chum salmon collected in May (1.3) than in April (1.0) 2021. The highest sea lice intensity (1.7) was at Site 2 on May 7, 2021.

Table 7: The number of sea lice found on chum salmon collected in Quatsino Sound and Holberg Inlet in 2021 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		
	06-Apr-21							07-May-21									
	# 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
1	9	0	0.40	0	0.0	0.00	-	30	7	1.5	7	23.3	0.23	1.0	17.9	0.18	1.0
2	30	2	0.40	2	6.7	0.07	1.0	34	9	2.5	15	26.5	0.44	1.7	17.2	0.27	1.5
3	30	0	0.40	0	0.0	0.00	-	29	9	1.3	12	31.0	0.41	1.3	15.3	0.20	1.3
4	30	2	0.50	2	6.7	0.07	1.0	5	0	1	0	0.0	0.00	-	5.7	0.06	1.0
5	30	3	0.50	3	10.0	0.10	1.0	30	13	2.8	16	43.3	0.53	1.2	26.7	0.32	1.2
6	30	3	0.50	3	10.0	0.10	1.0	30	2	0.6	2	6.7	0.07	1.0	8.3	0.08	1.0
7	30	3	0.50	3	10.0	0.10	1.0	1	0	0.5	0	0.0	0.00	-	9.7	0.10	1.0
8	0	0	-	0	-	-	-	13	1	0.6	1	7.7	0.08	1.0	7.7	0.08	1.0
9	25	1	0.50	1	4.0	0.04	1.0	0	0	-	0	-	-	-	4.0	0.04	1.0
10	1	0	0.40	0	0.0	0.00	-	30	0	0.9	0	0.0	0.00	-	0.0	0.00	-
Total	215	14	0.50	14	6.5	0.07	1.0	202	41	1.5	53	20.3	0.26	1.3	13.2	0.16	1.2



### **3.4.2 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. A total of 22 coho salmon were found to be infested with 54 sea lice in the coho salmon sample population (n=42). Sea lice counts of both sea lice species observed (*L. salmonis* and *C. clemensi*) were added together for the presentation of sea lice prevalence intensity and abundance on the coho salmon sample population (Table 8). There were no coho salmon samples collected at Sites 2,4 or 8.

A total of 22 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=42) collected in Quatsino Sound and Holberg Inlet in 2021 was 52.4 %. Sea lice prevalence calculated by site and week for coho salmon is presented in Table 8. Sea lice prevalence calculated by site for the total coho sample population ranged from 0 % at Sites 1, 3, 9 and 10 to a high of 100 % at Site 7.

A total of 54 sea lice were identified during laboratory analysis of retained coho salmon. The abundance of sea lice on the coho salmon sample population (n=42) collected in Quatsino Sound and Holberg Inlet in 2021 was 1.29. Sea lice abundance was calculated by week and by site and is presented in Table 8. Sea lice abundance calculated by site for the total coho sample population was variable ranging from 0.0 at Sites 1, 3, 9 and 10 to a high of 2.00 at Site 6.

A total of 54 sea lice were identified on 22 coho during laboratory analysis of retained coho salmon. The intensity of sea lice on the infested coho salmon collected in Quatsino Sound and Holberg Inlet in 2021 was 2.5. Sea lice intensity was calculated by week and by site and is presented in Table 7. Sea lice intensity was the same in coho salmon collected in May (2.5) and in April (2.5) 2021. The highest sea lice intensity (4.0) was at Site 6 on April 6, 2021.

Table 8: The number of sea lice found on coho salmon collected in Quatsino Sound and Holberg Inlet in 2021 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 Coho Sample Population		
	06-Apr-21							07-May-21										
	# of Coho Analyzed	# of Infested Coho	Average Weight of Infested Coho (g)	# of Lice	Prevalence (%)	Abundance	Average Intensity	# of Coho Analyzed	# of Infested Coho	Average Weight of Infested Coho (g)	# of Lice	Prevalence (%)	Abundance	Average Intensity	Prevalence (%)	Abundance	Average Intensity	
1	3	0	15.7	0	0.0	0.00	-	0				-	-	-	0.0	0.00	-	
2	0	0			-	-	-					-	-	-	-	-	-	
3	1	0	14.9	0	0.0	0.00	-	0				-	-	-	0.0	0.00	-	
4	0				-	-	-	0				-	-	-	-	-	-	
5	1	0	4.9	0	0.0	0.00	-	30	20	9.7	49	66.7	1.63	2.5	64.5	1.58	2.5	
6	2	1	4.3	4	50.0	2.00	4.0	0				-	-	-	50.0	2.00	4.0	
7	1	1	8.4	1	100.0	1.00	1.0	0				-	-	-	100.0	1.00	1.0	
8	0				-	-	-	0				-	-	-	-	-	-	
9	1	0	4.8	0	0.0	0.00	-	1	0	6.1	0	0.0	0.00	-	0.0	0.00	-	
10	2	0	10.1	0	0.0	0.00	-					-	-	-	0.0	0.00	-	
Total	11	2	9.9	5	18.2	0.45	2.5	31	20	9.6	49	64.5	1.58	2.5	52.4	1.29	2.5	

### **3.4.3 Infestation Rates on Chinook Salmon**

A total of three chinook salmon were collected in Quatsino Sound and Holberg Inlet in 2021. One chinook salmon was found to be infested with one sea louse resulting in a species prevalence of 33.3 %, an abundance of 0.33 and an intensity of 1.0 (Table 6). The infested chinook salmon was collected at Site 2 on May 7, 2021.

### 3.5 Infestation by Sea Lice Species

A total of 27 *Lepeophtheirus salmonis* sea lice of various life stages were identified on 27 juvenile salmon of all species and 95 *Caligus clemensi* sea lice were found on 60 juvenile salmon of all species analyzed in the lab (Appendix III). There were 9 samples that were infested with at least one *L. salmonis* and *C. clemensi* sea louse.

#### 3.5.1 Infestation by Sea Lice Species on Chum Salmon

An analysis of the species of sea lice identified on the 55 infested chum salmon collected in Quatsino Sound and Holberg Inlet was completed and is presented in Table 9. A total of 19 *Lepeophtheirus salmonis* sea lice of various life stages were identified on 19 juvenile chum salmon and 48 *Caligus clemensi* sea lice were found on 40 of the juvenile chum salmon analyzed in the lab (Appendix III). Of the infested chum salmon, four were found to have at least one *L. salmonis* and *C. clemensi* sea louse. 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 2021.  
LEP = *Lepeophtheirus salmonis* CAL = *Caligus clemensi*

Life Stage <sup>1</sup>	06-Apr-21	07-May-21
LEP Co	2	5
LEP C1	1	7
LEP C2	0	3
LEP PAM	0	0
LEP PAF	0	1
LEP AM	0	0
LEP AF	0	0
<b>Total LEP</b>	<b>3</b>	<b>16</b>
CAL Co	7	9
CAL C1	4	16
CAL C2	0	6
CAL C3	0	2
CAL C4	0	1
CAL PAM	0	0
CAL PAF	0	1
CAL AM	0	0
CAL AF	0	2
<b>Total CAL</b>	<b>11</b>	<b>37</b>

<sup>1</sup> 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 2021 summarized by the 10 sites where beach seining was conducted. LEP = *Lepeophtheirus salmonis* CAL = *Caligus clemensi*

Site	Sample Week								Total		
	06-Apr-21				07-May-21						
	# 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	9	0	0	0	30	7	2	5	39	7	7
2	30	2	1	1	34	9	2	13	64	11	17
3	30	0	0	0	29	9	4	8	59	9	12
4	30	2	0	2	5	0	0	0	35	2	2
5	30	3	0	3	30	13	5	11	60	16	19
6	30	3	0	3	30	2	2	0	60	5	5
7	30	3	1	2	1	0	0	0	31	3	3
8	0	0	0	0	13	1	1	0	13	1	1
9	25	1	1	0	0	0	0	0	25	1	1
10	1	0	0	0	30	0	0	0	31	0	0
Total	215	14	3	11	202	41	16	37	417	55	67

### 3.5.2 Infestation by Sea Lice Species on Coho Salmon

The sea lice species found on the 22 infested coho salmon are presented in Table 11. A total of eight *Lepeophtheirus salmonis* sea lice were identified on eight juvenile coho salmon analyzed in the lab (Appendix III). A total of 46 *Caligus clemensi* sea lice were found on 19 juvenile coho salmon analyzed in the lab (Appendix III). Of the infested coho salmon, five were found to have at least one *L. salmonis* and *C. clemensi* sea louse. The sea lice species identified on coho salmon are also presented by site 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 2021. LEP = *Lepeophtheirus salmonis* CAL = *Caligus clemensi*

Life Stage <sup>1</sup>	06-Apr-21	07-May-21
LEP Co	1	5
LEP C1	0	1
LEP C2	0	0
LEP PAM	0	0
LEP PAF	0	1
LEP AM	0	0
LEP AF	0	0
<b>Total LEP</b>	<b>1</b>	<b>7</b>
CAL Co	4	1
CAL C1	0	22
CAL C2	0	12
CAL C3	0	2
CAL C4	0	0
CAL PAM	0	0
CAL PAF	0	0
CAL AM	0	4
CAL AF	0	1
<b>Total CAL</b>	<b>4</b>	<b>42</b>

<sup>1</sup> 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 2021 summarized by the 10 sites where beach seining was conducted. LEP = *Lepeophtheirus salmonis* CAL = *Caligus clemensi*

Site	Sample Week								Total		
	06-Apr-21				07-May-21						
	# of Coho Analyzed	# of Infested Coho	# of LEP	# of CAL	# of Coho Analyzed	# of Infested Coho	# of LEP	# of CAL	# of Coho Analyzed	# of Infested Coho	# of Lice
1	3	0	-	-	0	-	-	-	3	-	-
2	0	0	-	-	-	-	-	-	-	-	-
3	1	0	-	-	0	-	-	-	1	-	-
4	0	-	-	-	0	-	-	-	0	-	-
5	1	0	-	-	30	20	7	42	31	20	-
6	2	1	1	3	0	-	-	-	2	-	-
7	1	1	0	1	0	-	-	-	1	-	-
8	0	-	-	-	0	-	-	-	0	-	-
9	1	0	-	-	1	0	-	-	2	0	-
10	2	0	-	-	0	-	-	-	2	-	-
Total	11	2	1	4	31	20	7	42	42	22	54

### **3.5.3 Infestation by Sea Lice Species on Chinook Salmon**

There was one infested chinook salmon out of the three samples collected. The one infested chinook salmon was infested with one *C clemensi* copepidid. The infested fish was collected at Site 2 on May 7, 2021 in Holberg Inlet.

## 4.0 Conclusions

This report presents the data from the seventh year of beach seining and sea lice analysis conducted for wild juvenile salmonid monitoring in Quatsino Sound and Holberg Inlet, BC by MOWI Canada West. This report is limited to the summary and presentation of the data collected in 2021. A tabular comparison of water quality data and chum sea lice infestation data from 2015 to 2021 is presented in Appendix IV.

A total of 463 samples underwent lab analysis for sea lice infestation in 2021 including 417 chum, 42 coho, three chinook salmon and one pink salmon. Sea lice were found on each of the species analyzed in the lab except none were found on the single pink salmon sample. A total of 78 juvenile salmonids were found to be infested with sea lice in the total sample population, resulting in a calculated sea lice prevalence of 16.8 % in 2021. A total of 122 sea lice were found during laboratory analysis resulting in an abundance of 0.26 for the sample population.

Chum salmon smolts were captured in significantly greater numbers than any other species. A total of 3085 chum salmon were captured, representing 97.8 % of all captured samples. Of the 3085 chum captured, 417 were kept for lab analysis for sea lice infestation. A total of 55 chum smolts were found to be infested with a total of 67 lice resulting in a calculated prevalence of 13.2 %, abundance of 0.16 and an average intensity of 1.2 for the chum salmon sample population.

A total of 62 coho salmon were captured, representing 2.0 % of all captured samples. Of the 62 coho captured, 42 were kept for lab analysis for sea lice infestation. A total of 22 coho smolts were found to be infested with a total of 54 lice resulting in a calculated prevalence of 52.4 %, abundance of 1.29 and an average intensity of 2.5 for the coho salmon sample population.

A total of three chinook salmon were captured, representing 0.1 % of all captured samples. All of the chinook salmon captured were kept for lab analysis for sea lice infestation. One chinook smolt was found to be infested with one louse resulting in a calculated prevalence of 33.3 %, abundance of 0.33 and an average intensity of 1.0 for the chinook salmon sample population.

A total of 27 *Lepeophtheirus salmonis* sea lice of various life stages were identified on 27 juvenile salmon of all species and 95 *Caligus clemensi* sea lice were found on 60 juvenile salmon of all species analyzed in the lab. There were 9 samples that were infested with at least one *L. salmonis* and *C. clemensi* sea louse.

For the chum salmon sample population, a total of 19 *Lepeophtheirus salmonis* sea lice of various life stages were identified on 19 juvenile chum salmon and 48 *Caligus clemensi* sea lice were found on 40 of the juvenile chum salmon analyzed in the lab. There were four chum that were infested with at least one *L. salmonis* and *C. clemensi* sea louse.

For the coho salmon sample population, a total of eight *Lepeophtheirus salmonis* sea lice of various life stages were identified on eight juvenile coho salmon and 46 *Caligus clemensi* sea lice were found on 19 juvenile coho salmon analyzed in the lab. There were five coho that were infested with at least one *L. salmonis* and *C. clemensi* sea louse.

A comparison of the prevalence, abundance and average intensity of sea lice species found on chum salmon was completed for sample data from 2015 to 2021 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
2018	2.5 %	0.02	1.00	3.1 %	0.03	1.00
2019	7.9 %	0.10	1.31	1.8 %	0.02	1.13
2020	12.3 %	0.20	1.59	30.8 %	0.54	1.74
2021	9.6	0.10	1.20	4.6	0.05	1.00

## 5.0 References

- Hamre L.A., C Eichner, C.M.A. Caipang, S.T. Dalvin, J.E. Bron, F. Nilsen, G. Boxshall and R. Skern-Mauitzen. 2013. The Salmon Louse *Lepeophtheirus salmonis* (Copepoda: Caligidae) Life Cycle Has Only Two Chalimus Stages. PLoS ONE 8(9): e73539.
- 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. 2019. Wild Juvenile Salmonid Monitoring Program Quatsino Sound, BC 2019. 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 Groot, 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. Groot, 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 (deg C.)
			0.2m	0.2m
06-Apr-21	8:00	Site 1	22.2	6.7
06-Apr-21	8:25	Site 2	18.9	6.7
06-Apr-21	8:50	Site 3	26.3	7.9
06-Apr-21	9:46	Site 4	23.0	7.7
06-Apr-21	10:10	Site 5	28.2	7.9
06-Apr-21	10:35	Site 6	17.3	7.1
06-Apr-21	11:00	Site 7	19.3	7.9
06-Apr-21	11:20	Site 8	25.2	8.5
06-Apr-21	11:42	Site 9	31.2	9.2
06-Apr-21	12:02	Site 10	14.3	9.8
07-May-21	7:48	Site 1	25.7	9.2
07-May-21	8:08	Site 2	26.2	9.5
07-May-21	8:34	Site 3	25.5	9.5
07-May-21	9:27	Site 4	29.4	9.1
07-May-21	9:51	Site 5	29.9	9.4
07-May-21	10:26	Site 6	29.9	9.6
07-May-21	10:50	Site 7	18.4	9.5
07-May-21	11:10	Site 8	29.3	9.5
07-May-21	11:28	Site 9	29.2	9.3
07-May-21	11:56	Site 10	18.5	10.1

Appendix II – Capture and Collection Sample Totals

Date	Time	Site Name	Weather Comments	Tide Stage	Pink Captured	Pink Retained	Chum Captured	Chum Retained	Coho Captured	Coho Retained	Chinook Captured	Chinook Retained	Salmonid Mortalities	Comments
06-Apr-21	8:00	Site 1	Clear, Calm	High	0	0	9	9	3	3	0	0	0	Shiner Perch and Sand Lance
06-Apr-21	8:25	Site 2	Clear, Calm	High	0	0	212	30	0	0	0	0	2	
06-Apr-21	8:50	Site 3	Clear, Calm	High	0	0	135	30	1	1	0	0	0	
06-Apr-21	9:46	Site 4	Clear, Calm	High	0	0	86	30	0	0	0	0	0	Sculpin
06-Apr-21	10:10	Site 5	Light Overcast, Calm	High	0	0	41	30	1	1	0	0	0	
06-Apr-21	10:35	Site 6	Light Overcast, Calm	High	0	0	90	30	2	2	0	0	0	Striped Perch and Pipefish
06-Apr-21	11:00	Site 7	Light Overcast, Calm	High	1	1	108	30	1	1	0	0	0	Lingcod and Starry Flounder
06-Apr-21	11:20	Site 8	Light Overcast, Calm	Mid	0	0	0	0	0	0	0	0	0	Sculpin
06-Apr-21	11:42	Site 9	Light Rain	Mid	0	0	25	25	1	1	0	0	0	12 Sculpins
06-Apr-21	12:02	Site 10	Overcast, Calm	Mid	0	0	1	1	2	2	0	0	0	
07-May-21	7:48	Site 1	Overcast, Calm	Mid	0	0	156	30	0	0	0	0	0	Good Set!
07-May-21	8:08	Site 2	Clear, Calm	Mid	0	0	193	34	0	0	2	2	0	Perch, Gunnels + Sculpins
07-May-21	8:34	Site 3	Clear, Calm	Mid	0	0	185	29	0	0	1	1	0	Tube-snouts + Sculpins
07-May-21	9:27	Site 4	Light Rain, Overcast	Mid	0	0	5	5	0	0	0	0	0	Lots of Hang-ups and Boulders
07-May-21	9:51	Site 5	Overcast	Mid	0	0	1500	30	50	30	0	0	0	Herring ~100
07-May-21	10:26	Site 6	Light Rain, Overcast	High	0	0	30	30	0	0	0	0	0	
07-May-21	10:50	Site 7	Overcast	High	0	0	1	1	0	0	0	0	0	Lots of Flounders
07-May-21	11:10	Site 8	Rain	High	0	0	13	13	0	0	0	0	0	Lots of Hang-ups
07-May-21	11:28	Site 9	Overcast, Calm	High	0	0	0	0	1	1	0	0	0	Good Set
07-May-21	11:56	Site 10	Overcast, Calm	High	0	0	295	30	0	0	0	0	0	

Appendix III – Sea Lice Analysis Data

SAMPLE DATE	SITE	FISH SPECIES	LENGTH IN MM	WEIGHT IN G	LEP Co	LEP C1	LEP C2	LEP PAM	LEP PAF	LEP AM	LEP AF	TOT LEP	CAL Co	CAL C1	CAL C2	CAL C3	CAL C4	CAL PAM	CAL_PAF	CAL AM	CAL AF	TOT CAL
04-06-21	1	Chum	34	0.3								0										0
04-06-21	1	Chum	38	0.4								0										0
04-06-21	1	Chum	36	0.4								0										0
04-06-21	1	Chum	36	0.4								0										0
04-06-21	1	Chum	34	0.3								0										0
04-06-21	1	Chum	34	0.3								0										0
04-06-21	1	Chum	32	0.3								0										0
04-06-21	1	Chum	36	0.4								0										0
04-06-21	1	Chum	34	0.4								0										0
04-06-21	1	Coho	110	16.1								0										0
04-06-21	1	Coho	105	14.7								0										0
04-06-21	1	Coho	111	16.2								0										0
04-06-21	5	Coho	79	4.9								0										0
04-06-21	5	Chum	38	0.6								0										0
04-06-21	5	Chum	39	0.6								0										0
04-06-21	5	Chum	37	0.4								0										0
04-06-21	5	Chum	39	0.6								0										0
04-06-21	5	Chum	36	0.4								0										0
04-06-21	5	Chum	40	0.6								0										0
04-06-21	5	Chum	35	0.3								0										0
04-06-21	5	Chum	38	0.5								0	1									1
04-06-21	5	Chum	36	0.5								0										0
04-06-21	5	Chum	35	0.5								0										0
04-06-21	5	Chum	37	0.5								0										0
04-06-21	5	Chum	34	0.4								0										0
04-06-21	5	Chum	38	0.5								0	1									1
04-06-21	5	Chum	37	0.5								0										0
04-06-21	5	Chum	37	0.6								0										0
04-06-21	5	Chum	33	0.4								0										0
04-06-21	5	Chum	40	0.6								0										0
04-06-21	5	Chum	35	0.4								0										0
04-06-21	5	Chum	38	0.6								0										0
04-06-21	5	Chum	40	0.6								0										0
04-06-21	5	Chum	36	0.5								0										0
04-06-21	5	Chum	40	0.6								0										0
04-06-21	5	Chum	38	0.5								0										0
04-06-21	5	Chum	54	1.6								0										0
04-06-21	5	Chum	40	0.5								0	1									1
04-06-21	5	Chum	38	0.6								0										0
04-06-21	5	Chum	37	0.4								0										0

SAMPLE DATE	SITE	FISH SPECIES	LENGTH IN MM	WEIGHT IN G	LEP Co	LEP C1	LEP C2	LEP PAM	LEP PAF	LEP AM	LEP AF	TOT LEP	CAL Co	CAL C1	CAL C2	CAL C3	CAL C4	CAL PAM	CAL_PAF	CAL AM	CAL AF	TOT CAL
04-06-21	5	Chum	37	0.4								0										0
04-06-21	5	Chum	37	0.5								0										0
04-06-21	5	Chum	38	0.6								0										0
04-06-21	3	Coho	109	14.9								0										0
04-06-21	3	Chum	36	0.3								0										0
04-06-21	3	Chum	37	0.4								0										0
04-06-21	3	Chum	37	0.4								0										0
04-06-21	3	Chum	39	0.5								0										0
04-06-21	3	Chum	35	0.4								0										0
04-06-21	3	Chum	38	0.4								0										0
04-06-21	3	Chum	35	0.3								0										0
04-06-21	3	Chum	36	0.4								0										0
04-06-21	3	Chum	35	0.4								0										0
04-06-21	3	Chum	37	0.6								0										0
04-06-21	3	Chum	36	0.3								0										0
04-06-21	3	Chum	34	0.3								0										0
04-06-21	3	Chum	38	0.4								0										0
04-06-21	3	Chum	40	0.5								0										0
04-06-21	3	Chum	38	0.5								0										0
04-06-21	3	Chum	35	0.4								0										0
04-06-21	3	Chum	36	0.4								0										0
04-06-21	3	Chum	32	0.3								0										0
04-06-21	3	Chum	33	0.4								0										0
04-06-21	3	Chum	37	0.5								0										0
04-06-21	3	Chum	35	0.5								0										0
04-06-21	3	Chum	36	0.4								0										0
04-06-21	3	Chum	37	0.4								0										0
04-06-21	3	Chum	34	0.4								0										0
04-06-21	3	Chum	37	0.4								0										0
04-06-21	3	Chum	35	0.4								0										0
04-06-21	3	Chum	36	0.4								0										0
04-06-21	3	Chum	35	0.4								0										0
04-06-21	3	Chum	35	0.3								0										0
04-06-21	3	Chum	37	0.5								0										0
04-06-21	7	Chum	38	0.6								0										0
04-06-21	7	Chum	39	0.5								0										0
04-06-21	7	Chum	35	0.5								0										0
04-06-21	7	Chum	38	0.4								0										0
04-06-21	7	Chum	37	0.4								0										0
04-06-21	7	Chum	39	0.5								0										0
04-06-21	7	Chum	39	0.5								0										0
04-06-21	7	Chum	38	0.5								0										0

SAMPLE DATE	SITE	FISH SPECIES	LENGTH IN MM	WEIGHT IN G	LEP Co	LEP C1	LEP C2	LEP PAM	LEP PAF	LEP AM	LEP AF	TOT LEP	CAL Co	CAL C1	CAL C2	CAL C3	CAL C4	CAL PAM	CAL_PAF	CAL AM	CAL AF	TOT CAL
04-06-21	7	Chum	38	0.5								0										0
04-06-21	7	Chum	34	0.3								0										0
04-06-21	7	Chum	40	0.5	1							1										0
04-06-21	7	Chum	38	0.5								0										0
04-06-21	7	Chum	37	0.5								0										0
04-06-21	7	Chum	39	0.6								0										0
04-06-21	7	Chum	38	0.5								0										0
04-06-21	7	Chum	42	0.8								0	1									1
04-06-21	7	Chum	35	0.4								0										0
04-06-21	7	Chum	39	0.6								0										0
04-06-21	7	Chum	35	0.5								0										0
04-06-21	7	Chum	37	0.4								0										0
04-06-21	7	Chum	37	0.5								0										0
04-06-21	7	Chum	39	0.5								0	1									1
04-06-21	7	Chum	37	0.4								0										0
04-06-21	7	Chum	37	0.6								0										0
04-06-21	7	Chum	37	0.4								0										0
04-06-21	7	Chum	38	0.4								0										0
04-06-21	7	Chum	33	0.3								0										0
04-06-21	7	Chum	37	0.5								0										0
04-06-21	7	Chum	36	0.4								0										0
04-06-21	7	Chum	39	0.5								0										0
04-06-21	7	Coho	94	8.4								0	1									1
04-06-21	7	Pink	32	0.2								0										0
04-06-21	4	Chum	37	0.5								0										0
04-06-21	4	Chum	39	0.6								0										0
04-06-21	4	Chum	38	0.6								0										0
04-06-21	4	Chum	39	0.6								0	1									1
04-06-21	4	Chum	40	0.6								0										0
04-06-21	4	Chum	38	0.5								0										0
04-06-21	4	Chum	38	0.5								0										0
04-06-21	4	Chum	37	0.6								0										0
04-06-21	4	Chum	38	0.6								0										0
04-06-21	4	Chum	37	0.5								0										0
04-06-21	4	Chum	40	0.7								0										0
04-06-21	4	Chum	36	0.5								0										0
04-06-21	4	Chum	40	0.7								0										0
04-06-21	4	Chum	38	0.5								0										0
04-06-21	4	Chum	36	0.5								0										0
04-06-21	4	Chum	37	0.5								0										0
04-06-21	4	Chum	38	0.6								0	1									1
04-06-21	4	Chum	33	0.4								0										0

SAMPLE DATE	SITE	FISH SPECIES	LENGTH IN MM	WEIGHT IN G	LEP Co	LEP C1	LEP C2	LEP PAM	LEP PAF	LEP AM	LEP AF	TOT LEP	CAL Co	CAL C1	CAL C2	CAL C3	CAL C4	CAL PAM	CAL_PAF	CAL AM	CAL AF	TOT CAL
04-06-21	4	Chum	37	0.4								0										0
04-06-21	4	Chum	37	0.5								0										0
04-06-21	4	Chum	38	0.5								0										0
04-06-21	4	Chum	39	0.5								0										0
04-06-21	4	Chum	36	0.5								0										0
04-06-21	4	Chum	36	0.4								0										0
04-06-21	4	Chum	39	0.5								0										0
04-06-21	4	Chum	38	0.4								0										0
04-06-21	4	Chum	36	0.6								0										0
04-06-21	4	Chum	36	0.5								0										0
04-06-21	4	Chum	36	0.4								0										0
04-06-21	4	Chum	37	0.5								0										0
04-06-21	9	Chum	39	0.5								0										0
04-06-21	9	Chum	37	0.4								0										0
04-06-21	9	Chum	37	0.5								0										0
04-06-21	9	Chum	35	0.4								0										0
04-06-21	9	Chum	38	0.4								0										0
04-06-21	9	Chum	37	0.4								0										0
04-06-21	9	Chum	37	0.5								0										0
04-06-21	9	Chum	37	0.5								0										0
04-06-21	9	Chum	39	0.5	1							1										0
04-06-21	9	Chum	40	0.5								0										0
04-06-21	9	Chum	38	0.5								0										0
04-06-21	9	Chum	35	0.4								0										0
04-06-21	9	Chum	37	0.6								0										0
04-06-21	9	Chum	38	0.5								0										0
04-06-21	9	Chum	37	0.5								0										0
04-06-21	9	Chum	40	0.5								0										0
04-06-21	9	Chum	35	0.4								0										0
04-06-21	9	Chum	36	0.4								0										0
04-06-21	9	Chum	38	0.5								0										0
04-06-21	9	Chum	36	0.4								0										0
04-06-21	9	Chum	39	0.5								0										0
04-06-21	9	Chum	41	0.5								0										0
04-06-21	9	Chum	36	0.3								0										0
04-06-21	9	Chum	38	0.4								0										0
04-06-21	9	Chum	38	0.5								0										0
04-06-21	9	Coho	72	4.8								0										0
04-06-21	6	Chum	37	0.4								0										0
04-06-21	6	Chum	35	0.4								0										0
04-06-21	6	Chum	35	0.4								0										0
04-06-21	6	Chum	39	0.5								0										0

SAMPLE DATE	SITE	FISH SPECIES	LENGTH IN MM	WEIGHT IN G	LEP Co	LEP C1	LEP C2	LEP PAM	LEP PAF	LEP AM	LEP AF	TOT LEP	CAL Co	CAL C1	CAL C2	CAL C3	CAL C4	CAL PAM	CAL_PAF	CAL AM	CAL AF	TOT CAL
04-06-21	6	Chum	40	0.6								0										0
04-06-21	6	Chum	39	0.5								0										0
04-06-21	6	Chum	36	0.5								0										0
04-06-21	6	Chum	36	0.5								0										0
04-06-21	6	Chum	37	0.5								0										0
04-06-21	6	Chum	38	0.5								0										0
04-06-21	6	Chum	37	0.5								0		1								1
04-06-21	6	Chum	41	0.6								0										0
04-06-21	6	Chum	37	0.4								0										0
04-06-21	6	Chum	39	0.4								0		1								1
04-06-21	6	Chum	35	0.4								0										0
04-06-21	6	Chum	39	0.5								0										0
04-06-21	6	Chum	37	0.5								0										0
04-06-21	6	Chum	39	0.5								0										0
04-06-21	6	Chum	41	0.7								0										0
04-06-21	6	Chum	37	0.4								0										0
04-06-21	6	Chum	38	0.6								0										0
04-06-21	6	Chum	39	0.5								0										0
04-06-21	6	Chum	37	0.4								0										0
04-06-21	6	Chum	35	0.5								0		1								1
04-06-21	6	Chum	35	0.4								0										0
04-06-21	6	Chum	39	0.5								0										0
04-06-21	6	Chum	37	0.5								0										0
04-06-21	6	Chum	38	0.5								0										0
04-06-21	6	Chum	39	0.6								0										0
04-06-21	6	Chum	37	0.5								0										0
04-06-21	6	Coho	66	3.5								0										0
04-06-21	6	Coho	76	5.1	1							1	3									3
04-06-21	10	Coho	76	5.4								0										0
04-06-21	10	Coho	104	14.8								0										0
04-06-21	10	Chum	37	0.4								0										0
04-06-21	2	Chum	38	0.5								0										0
04-06-21	2	Chum	41	0.6								0										0
04-06-21	2	Chum	37	0.4								0										0
04-06-21	2	Chum	34	0.4								0										0
04-06-21	2	Chum	39	0.5		1						1										0
04-06-21	2	Chum	35	0.4								0										0
04-06-21	2	Chum	34	0.3								0										0
04-06-21	2	Chum	37	0.4								0										0
04-06-21	2	Chum	38	0.4								0										0
04-06-21	2	Chum	37	0.4								0										0
04-06-21	2	Chum	34	0.4								0										0

SAMPLE DATE	SITE	FISH SPECIES	LENGTH IN MM	WEIGHT IN G	LEP Co	LEP C1	LEP C2	LEP PAM	LEP PAF	LEP AM	LEP AF	TOT LEP	CAL Co	CAL C1	CAL C2	CAL C3	CAL C4	CAL PAM	CAL_PAF	CAL AM	CAL AF	TOT CAL
04-06-21	2	Chum	36	0.4								0										0
04-06-21	2	Chum	36	0.4								0										0
04-06-21	2	Chum	35	0.4								0										0
04-06-21	2	Chum	43	0.8								0										0
04-06-21	2	Chum	40	0.7								0										0
04-06-21	2	Chum	34	0.4								0										0
04-06-21	2	Chum	36	0.4								0										0
04-06-21	2	Chum	37	0.5								0										0
04-06-21	2	Chum	37	0.4								0										0
04-06-21	2	Chum	35	0.4								0										0
04-06-21	2	Chum	36	0.4								0										0
04-06-21	2	Chum	35	0.4								0										0
04-06-21	2	Chum	36	0.5								0		1								1
04-06-21	2	Chum	34	0.3								0										0
04-06-21	2	Chum	40	0.6								0										0
04-06-21	2	Chum	36	0.4								0										0
04-06-21	2	Chum	37	0.4								0										0
04-06-21	2	Chum	38	0.4								0										0
04-06-21	2	Chum	39	0.6								0										0
05-07-21	8	Chum	47	1.1								0										0
05-07-21	8	Chum	37	0.5								0										0
05-07-21	8	Chum	42	1.0								0										0
05-07-21	8	Chum	40	0.5								0										0
05-07-21	8	Chum	38	0.5								0										0
05-07-21	8	Chum	39	0.6								0										0
05-07-21	8	Chum	35	0.4								0										0
05-07-21	8	Chum	38	0.5								0										0
05-07-21	8	Chum	39	0.6								0										0
05-07-21	8	Chum	37	0.5								0										0
05-07-21	8	Chum	40	0.6								0										0
05-07-21	8	Chum	39	0.5	1							1										0
05-07-21	8	Chum	38	0.6								0										0
05-07-21	1	Chum	52	1.6								0										0
05-07-21	1	Chum	52	1.6								0										0
05-07-21	1	Chum	46	1.1								0		1								1
05-07-21	1	Chum	39	0.6								0										0
05-07-21	1	Chum	52	1.5								0	1									1
05-07-21	1	Chum	53	1.6								0										0
05-07-21	1	Chum	51	1.4								0										0
05-07-21	1	Chum	47	1.2								0										0
05-07-21	1	Chum	52	1.5								0										0
05-07-21	1	Chum	50	1.6								0		1								1



SAMPLE DATE	SITE	FISH SPECIES	LENGTH IN MM	WEIGHT IN G	LEP Co	LEP C1	LEP C2	LEP PAM	LEP PAF	LEP AM	LEP AF	TOT LEP	CAL Co	CAL C1	CAL C2	CAL C3	CAL C4	CAL PAM	CAL_PAF	CAL AM	CAL AF	TOT CAL
05-07-21	1	Chum	53	2.0								0										0
05-07-21	1	Chum	57	1.8								0										0
05-07-21	1	Chum	38	0.6								0		1								1
05-07-21	1	Chum	55	1.8	1							1										0
05-07-21	1	Chum	53	1.8								0										0
05-07-21	1	Chum	37	0.5								0										0
05-07-21	1	Chum	54	1.9								0										0
05-07-21	1	Chum	52	1.6								0		1								1
05-07-21	1	Chum	56	2.4								0										0
05-07-21	1	Chum	45	1.1								0										0
05-07-21	1	Chum	51	1.8								0										0
05-07-21	1	Chum	51	1.9								0										0
05-07-21	1	Chum	55	2.1								0										0
05-07-21	1	Chum	47	1.3								0										0
05-07-21	1	Chum	46	1.2								0										0
05-07-21	1	Chum	46	1.3								0										0
05-07-21	1	Chum	51	1.6		1						1										0
05-07-21	1	Chum	51	1.8								0										0
05-07-21	1	Chum	50	1.7								0										0
05-07-21	1	Chum	44	1.0								0										0
05-07-21	3	Chum	55	1.8								0										0
05-07-21	3	Chum	37	0.5								0										0
05-07-21	3	Chum	51	1.5			1					1		1								1
05-07-21	3	Chum	52	1.6								0										0
05-07-21	3	Chum	50	1.3								0		1								1
05-07-21	3	Chum	50	1.4								0										0
05-07-21	3	Chum	47	1.2	1							1		1								1
05-07-21	3	Chum	55	1.6								0										0
05-07-21	3	Chum	50	1.3								0										0
05-07-21	3	Chum	47	1.3			1					1										0
05-07-21	3	Chum	54	1.8		1						1										0
05-07-21	3	Chum	40	0.7								0										0
05-07-21	3	Chum	50	1.3								0										0
05-07-21	3	Chum	45	1.0								0										0
05-07-21	3	Chinook	40	0.7								0										0
05-07-21	3	Chum	45	1.1								0		1								1
05-07-21	3	Chum	41	0.8								0										0
05-07-21	3	Chum	49	1.3								0										0
05-07-21	3	Chum	38	0.5								0										0
05-07-21	3	Chum	49	1.5								0										0
05-07-21	3	Chum	37	0.4								0										0
05-07-21	3	Chum	45	1.1								0										0

SAMPLE DATE	SITE	FISH SPECIES	LENGTH IN MM	WEIGHT IN G	LEP Co	LEP C1	LEP C2	LEP PAM	LEP PAF	LEP AM	LEP AF	TOT LEP	CAL Co	CAL C1	CAL C2	CAL C3	CAL C4	CAL PAM	CAL_PAF	CAL AM	CAL AF	TOT CAL
05-07-21	3	Chum	50	1.4								0										0
05-07-21	3	Chum	49	1.3								0										0
05-07-21	3	Chum	55	1.7								0		2								2
05-07-21	3	Chum	57	2.3								0	1									1
05-07-21	3	Chum	55	1.9								0	1									1
05-07-21	3	Chum	49	1.2								0										0
05-07-21	3	Chum	43	1.0								0										0
05-07-21	3	Chum	43	1.0								0										0
05-07-21	2	Chum	50	1.4								0										0
05-07-21	2	Chum	45	1.1								0										0
05-07-21	2	Chum	45	1.1								0										0
05-07-21	2	Chum	46	1.2								0										0
05-07-21	2	Chum	44	1.0								0										0
05-07-21	2	Chum	47	1.2								0										0
05-07-21	2	Chum	54	1.7								0										0
05-07-21	2	Chum	45	1.0								0										0
05-07-21	2	Chum	45	1.0								0										0
05-07-21	2	Chum	37	0.6								0										0
05-07-21	2	Chum	43	0.8								0										0
05-07-21	2	Chum	45	1.0								0	1									1
05-07-21	2	Chum	43	0.9		1						1										0
05-07-21	2	Chum	36	0.5								0										0
05-07-21	2	Chum	57	2.0								0										0
05-07-21	2	Chum	37	0.5								0										0
05-07-21	2	Chum	44	1.0								0										0
05-07-21	2	Chum	48	1.3								0										0
05-07-21	2	Chum	47	1.1								0										0
05-07-21	2	Chum	49	1.4								0										0
05-07-21	2	Chum	44	1.1								0										0
05-07-21	2	Chum	44	1.0		1						1										0
05-07-21	2	Chum	49	1.4								0										0
05-07-21	2	Chum	46	1.1								0										0
05-07-21	2	Chum	54	1.8								0										0
05-07-21	2	Chum	48	1.2								0			1							1
05-07-21	2	Chum	48	1.3								0	1									1
05-07-21	2	Chum	32	0.6								0										0
05-07-21	2	Chum	44	1.0								0										0
05-07-21	2	Chum	50	1.4								0		1								1
05-07-21	2	Chum	98	12.5								0	1									1
05-07-21	2	Chum	87	9.9								0										0
05-07-21	2	Chum	114	18.8								0	2								1	3
05-07-21	2	Chum	88	8.9								0	1	3	1							5

SAMPLE DATE	SITE	FISH SPECIES	LENGTH IN MM	WEIGHT IN G	LEP Co	LEP C1	LEP C2	LEP PAM	LEP PAF	LEP AM	LEP AF	TOT LEP	CAL Co	CAL C1	CAL C2	CAL C3	CAL C4	CAL PAM	CAL_PAF	CAL AM	CAL AF	TOT CAL
05-07-21	2	Chinook	44	1.3								0										0
05-07-21	2	Chinook	41	1.0								0	1									1
05-07-21	5	Chum	49	1.4								0										0
05-07-21	5	Chum	45	1.0								0										0
05-07-21	5	Chum	64	3.4								0										0
05-07-21	5	Chum	54	1.9								0							1			1
05-07-21	5	Chum	86	7.0					1			1										0
05-07-21	5	Chum	62	3.1								0										0
05-07-21	5	Chum	60	2.5								0				1						1
05-07-21	5	Chum	69	3.9								0			1							1
05-07-21	5	Chum	60	2.6								0										0
05-07-21	5	Chum	62	3.5								0										0
05-07-21	5	Chum	51	1.6								0			1							1
05-07-21	5	Chum	62	3.0	1							1										0
05-07-21	5	Chum	58	2.4								0										0
05-07-21	5	Chum	61	2.7								0										0
05-07-21	5	Chum	63	3.3								0				1						1
05-07-21	5	Chum	63	3.2								0										0
05-07-21	5	Chum	49	1.6								0										0
05-07-21	5	Chum	63	3.0	1							1										0
05-07-21	5	Chum	61	3.2								0					1					1
05-07-21	5	Chum	58	2.5								0										0
05-07-21	5	Chum	56	2.4								0										0
05-07-21	5	Chum	67	4.1								0										0
05-07-21	5	Chum	59	2.5								0										0
05-07-21	5	Chum	65	3.6								0										0
05-07-21	5	Chum	57	2.3								0										0
05-07-21	5	Chum	61	2.9								0			1							1
05-07-21	5	Chum	61	2.9								0		1								1
05-07-21	5	Chum	59	2.8			1					1									1	1
05-07-21	5	Chum	59	2.4		1						1		1	1							2
05-07-21	5	Chum	51	1.7								0										0
05-07-21	5	Coho	85	7.8								0										0
05-07-21	5	Coho	90	9.6					1			1			1							1
05-07-21	5	Coho	91	10.6								0										0
05-07-21	5	Coho	89	9.2								0		1								1
05-07-21	5	Coho	130	12.8								0		1	1	1						3
05-07-21	5	Coho	83	7.5								0										0
05-07-21	5	Coho	99	12.1	1							1								1	1	2
05-07-21	5	Coho	86	7.5								0										0
05-07-21	5	Coho	84	7.4								0		1						1		2
05-07-21	5	Coho	83	7.6	1							1										0

SAMPLE DATE	SITE	FISH SPECIES	LENGTH IN MM	WEIGHT IN G	LEP Co	LEP C1	LEP C2	LEP PAM	LEP PAF	LEP AM	LEP AF	TOT LEP	CAL Co	CAL C1	CAL C2	CAL C3	CAL C4	CAL PAM	CAL_PAF	CAL AM	CAL AF	TOT CAL
05-07-21	5	Coho	86	9.2		1						1		3								3
05-07-21	5	Coho	98	12.5								0		1								1
05-07-21	5	Coho	87	8.8								0										0
05-07-21	5	Coho	99	12.2	1							1										0
05-07-21	5	Coho	94	10.8								0										0
05-07-21	5	Coho	83	8.3	1							1	1	3								4
05-07-21	5	Coho	89	9.4								0		1						1		2
05-07-21	5	Coho	81	6.5								0		1	1							2
05-07-21	5	Coho	87	8.2								0										0
05-07-21	5	Coho	80	6.8								0		2	3							5
05-07-21	5	Coho	87	8.6	1							1										0
05-07-21	5	Coho	89	8.3								0										0
05-07-21	5	Coho	83	8.4								0										0
05-07-21	5	Coho	75	5.1								0		2	5	1						8
05-07-21	5	Coho	91	11.4								0										0
05-07-21	5	Coho	97	11.4								0		1								1
05-07-21	5	Coho	100	14.9								0		1								1
05-07-21	5	Coho	101	15.8								0			1							1
05-07-21	5	Coho	98	12.7								0								1		1
05-07-21	5	Coho	86	9.3								0		4								4
05-07-21	4	Chum	45	0.9								0										0
05-07-21	4	Chum	40	0.5								0										0
05-07-21	4	Chum	45	1.0								0										0
05-07-21	4	Chum	43	0.7								0										0
05-07-21	4	Chum	52	1.6								0										0
05-07-21	7	Chum	40	0.5								0										0
05-07-21	9	Coho	82	6.1								0										0
05-07-21	6	Chum	39	0.5								0										0
05-07-21	6	Chum	38	0.5								0										0
05-07-21	6	Chum	40	0.6								0										0
05-07-21	6	Chum	38	0.5								0										0
05-07-21	6	Chum	42	0.7								0										0
05-07-21	6	Chum	39	0.6								0										0
05-07-21	6	Chum	38	0.6								0										0
05-07-21	6	Chum	41	0.7								0										0
05-07-21	6	Chum	40	0.7								0										0
05-07-21	6	Chum	40	0.6								0										0
05-07-21	6	Chum	42	0.7								0										0
05-07-21	6	Chum	37	0.5								0										0
05-07-21	6	Chum	50	1.4								0										0
05-07-21	6	Chum	39	0.5								0										0
05-07-21	6	Chum	35	0.5								0										0

SAMPLE DATE	SITE	FISH SPECIES	LENGTH IN MM	WEIGHT IN G	LEP Co	LEP C1	LEP C2	LEP PAM	LEP PAF	LEP AM	LEP AF	TOT LEP	CAL Co	CAL C1	CAL C2	CAL C3	CAL C4	CAL PAM	CAL_PAF	CAL AM	CAL AF	TOT CAL
05-07-21	6	Chum	39	0.6		1						1										0
05-07-21	6	Chum	42	0.8								0										0
05-07-21	6	Chum	42	0.8								0										0
05-07-21	6	Chum	37	0.5								0										0
05-07-21	6	Chum	42	0.8								0										0
05-07-21	6	Chum	40	0.6								0										0
05-07-21	6	Chum	39	0.6								0										0
05-07-21	6	Chum	38	0.6								0										0
05-07-21	6	Chum	40	0.6								0										0
05-07-21	6	Chum	40	0.6								0										0
05-07-21	6	Chum	48	1.3		1						1										0
05-07-21	6	Chum	38	0.6								0										0
05-07-21	6	Chum	38	0.5								0										0
05-07-21	6	Chum	37	0.5								0										0
05-07-21	6	Chum	37	0.5								0										0
05-07-21	10	Chum	35	0.4								0										0
05-07-21	10	Chum	47	1.2								0										0
05-07-21	10	Chum	39	0.6								0										0
05-07-21	10	Chum	47	1.4								0										0
05-07-21	10	Chum	41	0.7								0										0
05-07-21	10	Chum	38	0.6								0										0
05-07-21	10	Chum	45	1.1								0										0
05-07-21	10	Chum	40	0.7								0										0
05-07-21	10	Chum	49	1.4								0										0
05-07-21	10	Chum	45	1.2								0										0
05-07-21	10	Chum	48	1.2								0										0
05-07-21	10	Chum	39	0.5								0										0
05-07-21	10	Chum	47	1.1								0										0
05-07-21	10	Chum	42	0.8								0										0
05-07-21	10	Chum	40	0.7								0										0
05-07-21	10	Chum	38	0.7								0										0
05-07-21	10	Chum	41	0.7								0										0
05-07-21	10	Chum	40	0.7								0										0
05-07-21	10	Chum	38	0.7								0										0
05-07-21	10	Chum	40	0.6								0										0
05-07-21	10	Chum	41	0.7								0										0
05-07-21	10	Chum	42	0.9								0										0
05-07-21	10	Chum	48	1.3								0										0
05-07-21	10	Chum	39	0.6								0										0
05-07-21	10	Chum	48	1.4								0										0
05-07-21	10	Chum	45	1.0								0										0
05-07-21	10	Chum	39	0.6								0										0

SAMPLE DATE	SITE	FISH SPECIES	LENGTH IN MM	WEIGHT IN G	LEP Co	LEP C1	LEP C2	LEP PAM	LEP PAF	LEP AM	LEP AF	TOT LEP	CAL Co	CAL C1	CAL C2	CAL C3	CAL C4	CAL PAM	CAL_PAF	CAL AM	CAL AF	TOT CAL
05-07-21	10	Chum	44	1.0								0										0
05-07-21	10	Chum	44	1.0								0										0
05-07-21	10	Chum	43	0.8								0										0

## Appendix IV – 2015-2021 Comparisons

Surface water temperature comparison between data collected in Quatsino Sound and Holberg Inlet between 2015 and 2021.

Site	April Temp. (°C)							May Temp. (°C)						
	2015	2016	2017	2018	2019	2020	2021	2015	2016	2017	2018	2019	2020	2021
1	8.7	11.1	9.2	11.8	9.3	7.9	6.7	11.6	10.8	12.3	10.0	14.4	10.2	9.2
2	8.0	11.2	8.5	11.8	8.7	6.3	6.7	11.9	11.1	12.5	10.0	11.5	9.9	9.5
3	8.4	11.0	8.5	10.0	8.5	6.3	7.9	12.5	11.2	12.4	11.8	13.4	11.4	9.5
4	9.7	9.8	8.9	11.6	9.2	7.7	7.7	11.6	11.0	12.5	10.4	11.3	10.2	9.1
5	9.6	10.0	9.1	9.8	9.4	8.1	7.9	11.2	11.2	13.1	9.9	13.1	10.5	9.4
6	10.5	9.9	9.1	11.3	9.8	7.7	7.1	12.1	11.6	12.8	11.3	17.4	11.2	9.6
7	10.1	9.9	9.0	10.1	11.1	8.3	7.9	12.3	11.0	12.9	12.6	14.6	11.3	9.5
8	10.0	9.6	9.0	9.5	10.6	8.4	8.5	12.7	11.1	12.5	11.7	16.2	11.2	9.5
9	10.0	9.3	9.0	9.3	11.2	8.9	9.2	11.9	11.2	12.9	12.1	11.8	11.6	9.3
10	10.4	8.1	8.5	9.6	13.7	9.2	9.8	13.5	11.1	12.7	14.2	16.2	13.1	10.1
<b>Average</b>	<b>9.5</b>	<b>10.0</b>	<b>8.8</b>	<b>10.5</b>	<b>10.3</b>	<b>8.1</b>	<b>7.9</b>	<b>12.1</b>	<b>11.1</b>	<b>12.7</b>	<b>11.4</b>	<b>14.0</b>	<b>11.1</b>	<b>9.5</b>

Surface water salinity comparison between data collected in Quatsino Sound and Holberg Inlet between 2015 and 2021.

Site	April Salinity (ppt)							May Salinity (ppt)						
	2015	2016	2017	2018	2019	2020	2021	2015	2016	2017	2018	2019	2020	2021
1	14.0	22.3	21.9	23.0	27.3	14.1	22.2	27.5	27.9	22.1	30.4	28.3	24.9	25.7
2	13.8	21.0	23.7	23.1	26.2	11.4	18.9	28.4	27.8	21.7	30.1	28.2	13.5	26.2
3	18.1	21.0	22.3	21.0	23.5	20.2	26.3	28.0	27.7	21.1	27.9	23.3	25.5	25.5
4	26.2	26.6	28.8	25.7	18.1	29.2	23.0	30.2	29.5	25.5	32.0	31.0	30.2	29.4
5	26.5	27.7	29.0	28.5	30.5	31.7	28.2	29.8	29.3	24.5	30.4	23.1	31.0	29.9
6	27.2	27.8	28.6	25.9	25.2	30.3	17.3	30.3	29.6	25.2	32.4	26.1	31.4	29.9
7	24.3	27.5	28.4	27.5	32.6	31.0	19.3	29.9	29.0	24.9	17.0	24.5	28.5	18.4
8	20.2	24.2	28.3	28.4	26.3	26.0	25.2	30.4	29.4	23.8	32.4	28.6	26.6	29.3
9	26.5	13.8	28.1	26.4	24.3	31.7	31.2	30.4	29.5	24.4	32.3	16.6	24.5	29.2
10	26.3	9.2	21.0	27.1	13.4	24.5	14.3	29.8	25.5	20.1	29.7	17.2	11.3	18.5
<b>Average</b>	<b>22.3</b>	<b>22.1</b>	<b>26.0</b>	<b>25.7</b>	<b>24.7</b>	<b>25.0</b>	<b>22.6</b>	<b>29.5</b>	<b>28.5</b>	<b>23.3</b>	<b>29.5</b>	<b>24.7</b>	<b>24.7</b>	<b>26.2</b>

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 2021.

Species	Sample size							Total # of fish infested							Prevalence						
	(n)														(%)						
	2015	2016	2017	2018	2019	2020	2021	2015	2016	2017	2018	2019	2020	2021	2015	2016	2017	2018	2019	2020	2021
chum	177	235	479	325	441	302	417	37	36	16	18	43	110	55	20.9	15.3	3.3	5.5	9.8	36.4	13.2
coho	21	1	58	37	35	79	42	7	0	6	13	5	44	22	33.3	0	10.3	35.1	14.3	55.7	52.4
pink	1	2	0	0	7	0	1	0	1	0	0	1	-	0	0	50	-	-	14.3	-	-
chinook	12	19	0	6	6	5	3	2	9	0	0	1	2	1	16.7	47.4	-	0	16.7	40	33.3
sockeye	0	0	0	31	2	0	0	0	0	0	2	2	-	-	-	-	-	6.5	100	-	-
TSB	7	0	1	0	0	0	0	4	0	1	0	0	-	-	57.1	-	100	-	-	-	-
<b>Total</b>	<b>218</b>	<b>257</b>	<b>538</b>	<b>399</b>	<b>491</b>	<b>386</b>	<b>463</b>	<b>50</b>	<b>46</b>	<b>23</b>	<b>33</b>	<b>52</b>	<b>156</b>	<b>78</b>	<b>22.9</b>	<b>17.9</b>	<b>4.3</b>	<b>8.3</b>	<b>10.6</b>	<b>40.4</b>	<b>16.9</b>

Species	Sample size							Total # of lice observed							Abundance						
	(n)																				
	2015	2016	2017	2018	2019	2020	2021	2015	2016	2017	2018	2019	2020	2021	2015	2016	2017	2018	2019	2020	2021
chum	177	235	479	325	441	302	417	80	54	16	18	55	221	67	0.45	0.23	0.03	0.06	0.12	0.73	0.16
coho	21	1	58	37	35	79	42	12	0	11	54	33	240	54	0.57	0	0.19	1.46	0.94	3.04	1.29
pink	1	2	0	0	7	0	1	0	1	0	-	1	-	0	0	0.5	-	-	0.14	-	-
chinook	12	19	0	6	6	5	3	2	14	0	0	1	2	1	0.17	0.74	-	0	0.17	0.4	0.33
sockeye	0	0	0	31	2	0	0	0	0	0	2	5	-	-	-	-	-	0.06	2.5	-	-
TSB	7	0	1	0	0	0	0	5	0	2	-	-	-	-	0.71	-	2	-	-	-	-
<b>Total</b>	<b>218</b>	<b>257</b>	<b>538</b>	<b>399</b>	<b>491</b>	<b>386</b>	<b>463</b>	<b>99</b>	<b>69</b>	<b>29</b>	<b>74</b>	<b>95</b>	<b>463</b>	<b>122</b>	<b>0.45</b>	<b>0.27</b>	<b>0.05</b>	<b>0.19</b>	<b>0.19</b>	<b>1.2</b>	<b>0.26</b>



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 2021.

Site	Sample Month													
	April													
	Prevalence (%)							Abundance						
	2015	2016	2017	2018	2019	2020	2021	2015	2016	2017	2018	2019	2020	2021
1	6.6	0	0	0	0	0	0.0	0.07	0	0	0	0	0	0.00
2	0	3.3	3.3	0	0	-	6.7	0	0.03	0.3	0	0	-	0.07
3	3.3	0	0	0	10	10.3	0.0	0.03	0	0	0	0.1	0.17	0.00
4	40	-	3.3	0	0	23.3	6.7	0.8	-	0.03	0	0	0.37	0.07
5	-	0	0	10	10	16.7	10.0	-	0	0	0.1	0.1	0.17	0.10
6	-	-	0	0	9.1	15.4	10.0	-	-	0	0	0.09	0.15	0.10
7	0	26.7	0	-	4.8	-	10.0	0	0.4	0	-	0.05	-	0.10
8	41.9	-	0	-	-	50	-	1.1	-	0	-	-	0.5	-
9	-	10	3.3	0	-	-	4.0	-	0.17	0.03	0	-	-	0.04
10	-	3.3	0	0	3.2	13.3	0.0	-	0.03	0	0	0.03	0.13	0.00
TOTAL	17.1	6.9	1.5	2.8	4.3	16.7	6.5	0.39	0.1	0.01	0.3	0.04	0.22	0.07

Site	Sample Month													
	May													
	Prevalence (%)							Abundance						
	2015	2016	2017	2018	2019	2020	2021	2015	2016	2017	2018	2019	2020	2021
1	31.3	20	0	0	3.3	-	23.3	0.5	0.33	0	0	0.03	-	0.23
2	0	33.3	3.3	0	9.7	26.7	26.5	0	0.03	0.03	0	0.1	0.47	0.44
3	17.2	-	0	12.9	30	59.3	31.0	0.17	-	0	0.13	0.5	1.26	0.41
4	-	-	3.3	-	-	7.1	0.0	-	-	0.03	-	-	0.18	0.00
5	-	-	3.3	0	33.3	73.3	43.3	-	-	0.03	0	0.43	1.5	0.53
6	-	-	0	9.4	23.3	53.3	6.7	-	-	0	0.09	0.33	1.53	0.07
7	-	-	3.2	-	0	-	0.0	-	-	0.03	-	0	-	0.00
8	50	-	23.3	9.7	6.3	50	7.7	2.5	-	0.23	0.1	0.06	1.33	0.08
9	60	65.5	0	10	3.4	58.1	-	2.6	1	0	0.1	0.03	0.97	-
10	-	-	6.7	6.7	6.9	100	0.0	-	-	0.07	0.07	0.07	2.33	0.00
TOTAL	26.4	48.9	4.7	6.9	14.7	48.4	20.3	0.54	0.74	0.05	0.07	0.2	1.04	0.26

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, 2017, 2018, 2019, 2020 and 2021.

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

Life Stage <sup>1</sup>	Number of Lice						
	2015	2016	2017	2018	2019	2020	2021
LEP Co	2	3	6	3	4	82	7
LEP C1	12	6	2	2	2	59	8
LEP C2	21	9	0	5	3	18	3
LEP PAM	0	6	0	0	0	3	0
LEP PAF	2	0	0	0	0	0	1
LEP AM	1	1	0	0	0	0	0
LEP AF	0	0	0	0	0	0	0
<b>TOTAL LEP</b>	<b>38</b>	<b>25</b>	<b>8</b>	<b>10</b>	<b>9</b>	<b>162</b>	<b>19</b>
CAL Co	2	3	1	0	6	15	16
CAL C1	24	18	6	6	25	33	20
CAL C2	7	4	1	1	4	7	6
CAL C3	4	2	0	0	5	1	2
CAL C4	5	2	0	0	2	1	1
CAL PAM	0	0	0	1	1	1	0
CAL PAF	0	0	0	0	1	0	1
CAL AM	0	0	0	0	2	0	0
CAL AF	0	0	0	0	0	1	2
<b>TOTAL CAL</b>	<b>42</b>	<b>29</b>	<b>8</b>	<b>8</b>	<b>46</b>	<b>59</b>	<b>48</b>

<sup>1</sup> 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 2021 summarized by the 10 sites where beach seining was conducted. LEP = *Lepeophtheirus salmonis* CAL = *Caligus clemensi*

Site	April													
	# of LEP							# of CAL						
	2015	2016	2017	2018	2019	2020	2021	2015	2016	2017	2018	2019	2020	2021
1	0	0	0	0	0	0	0	2	0	0	0	0	0	0
2	0	1	1	0	0	-	1	0	0	0	0	0	-	1
3	1	0	0	0	3	3	0	0	0	0	0	0	2	0
4	2	-	1	0	2	11	0	2	-	0	0	0	0	2
5	-	0	0	2	1	1	0	-	0	0	1	1	0	3
6	-	-	0	0	0	2	0	-	-	0	0	0	0	3
7	0	2	0	-	0	-	1	0	10	0	-	1	-	2
8	23	-	0	-	-	2	0	11	-	0	-	-	0	0
9	-	2	0	0	-	-	1	-	3	1	0	-	-	0
10	-	1	0	0	0	3	0	-	0	0	0	1	1	0
<b>TOTAL</b>	<b>26</b>	<b>6</b>	<b>2</b>	<b>2</b>	<b>6</b>	<b>22</b>	<b>12</b>	<b>15</b>	<b>13</b>	<b>1</b>	<b>1</b>	<b>3</b>	<b>3</b>	<b>12</b>

Site	May													
	# of LEP							# of CAL						
	2015	2016	2017	2018	2019	2020	2021	2015	2016	2017	2018	2019	2020	2021
1	1	3	0	0	0	-	2	15	2	0	0	1	-	5
2	0	0	1	0	1	1	2	0	1	0	0	2	13	13
3	3	-	0	0	0	17	4	2	-	0	4	15	17	8
4	-	-	1	-	-	2	0	-	-	0	-	-	3	0
5	-	-	1	0	2	36	5	-	-	0	0	11	9	11
6	-	-	0	3	0	35	2	-	-	0	0	10	11	0
7	-	-	1	-	0	-	0	-	-	0	-	0	-	0
8	2	-	1	1	0	8	1	3	-	6	2	1	0	0
9	6	16	0	3	0	29	0	7	13	0	0	1	1	0
10	-	-	1	1	0	12	0	-	-	1	1	2	2	0
<b>TOTAL</b>	<b>12</b>	<b>19</b>	<b>6</b>	<b>8</b>	<b>3</b>	<b>140</b>	<b>12</b>	<b>27</b>	<b>16</b>	<b>7</b>	<b>7</b>	<b>43</b>	<b>56</b>	<b>12</b>

A comparison of sea lice infestation rates on chum salmon collected in Quatsino Sound and Holberg Inlet between 2015 and 2021.

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
2018	2.5 %	0.02	1.00	3.1 %	0.03	1.00
2019	7.9 %	0.10	1.31	1.8 %	0.02	1.13
2020	12.3 %	0.20	1.59	30.8 %	0.54	1.74
2021	9.6%	0.10	1.20	4.6%	0.05	1.00