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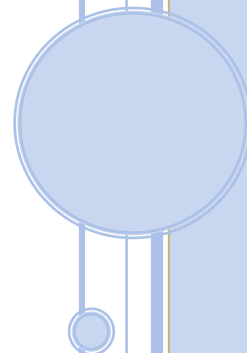
Reported by: BC Centre for Aquatic Health Sciences.

Report Date: Sept. 20, 2018.

Client Ref. no:

Submitter (company): Marine Harvest Canada.

Details of submission: 1353 frozen juvenile salmonids were submitted from the Klemtu area for sea lice assessment.



Juvenile Salmonid Sea Lice Assessment 2018: Klemtu

In 2005, the Kitasoo/Xaixais First Nation established a Juvenile Salmonid Sea Lice Assessment Program to establish sea lice infection levels on juvenile salmonids migrating through their traditional territory. 2018 marks the 14th year of the program.

Sampling took place in April, May and June of 2018. Sampling in early spring enables a better assessment of sea lice levels on juvenile salmonids as they emerge from rivers and move into their first few weeks in the near shore marine environment.

The methodology of sampling and assessment can be found in previous reports (Kitasoo Fisheries Wild Juvenile Pacific Salmon Sea Lice Monitoring Program – 2016).

In 2018, there were a total of 1353 juvenile salmonids assessed but 50 of the fish did not have any submission information (data for these fish are not included in the report). Fish were examined for two species of sea lice: 1) *Lepeophtheirus salmonis* (*L. salmonis*) sometimes referred to as the 'salmon louse' since it is most commonly found on salmon in the ocean, and 2) *Caligus clemensi* (*C. clemensi*) found on many different fish species in the ocean.

Wild juvenile salmon were sampled by beach seine from near-shore zones at sites in the region of Mathieson and Finlayson Channels where salmon farming is present and in Laredo Inlet, located to the west where there are no salmon farms (Control) Figure 1. In 2018, the data from 'new sites' was combined with the Near Farm sites. In total, 4 areas are represented; Control, Upstream, Near Farms, and Downstream.

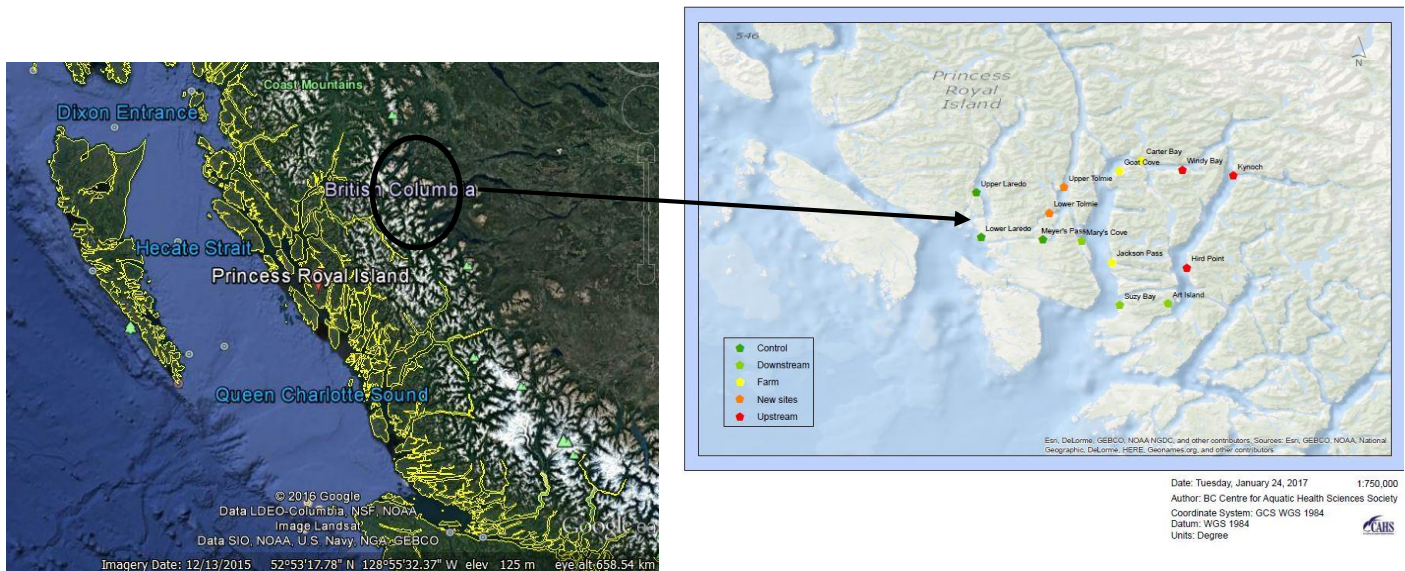


Figure 1. Sampling sites used in 2018 including areas: Control, Upstream, Near Farm/New sites, and Downstream.

Juvenile Salmonid Sea Lice Assessment 2018: Klemtu

The three most common terms used to describe sea lice distribution are: prevalence, abundance, and intensity. As identified in a Pacific Salmon Forum publication: “Protocols & Guidelines: A Reference Manual for Research Involving Wild/Cultured Fish Interactions with Sea Lice”, the definitions are as follows:

Prevalence is defined as the number of hosts infected with one or more sea lice divided by the number of hosts examined.

Abundance is defined as the total number of lice divided by the total number of hosts examined.

Intensity is defined as the number of lice on a single salmon. (Total number of lice divided by the number of hosts infected).

Year	N=	<i>Lepeophtheirus salmonis</i>			<i>Caligus clemensi</i>		
		Prevalence	Abundance	Average Intensity	Prevalence	Abundance	Average Intensity
2005	943	4%	0.0	1.1	13%	0.2	1.2
2006	1758	5%	0.1	1.1	4%	0.0	1.1
2007	1132	4%	0.0	1.0	5%	0.1	1.1
2008	1512	1%	0.0	1.0	2%	0.0	1.0
2009	1675	5%	0.1	1.2	1%	0.0	1.2
2010	1852	14%	0.2	1.5	9%	0.1	1.3
2011	2031	1%	0.0	1.0	9%	0.2	1.7
2012	2203	2%	0.0	1.2	3%	0.0	1.1
2013	2204	21%	0.8	3.7	10%	0.2	1.9
2014	1989	8%	0.1	1.1	4%	0.1	1.3
2015	1155	61%	3.0	4.9	14%	0.2	1.5
2016	1355	7%	0.1	1.2	10%	0.1	1.3
2017	1702	14%	0.2	1.2	8%	0.1	1.5
2018	1303	6%	0.1	1.2	5%	0.1	1.1

Table 1. Summary of Prevalence, Abundance, and Average Intensity 2005 – 2018

Table 1 illustrates the overall sea lice prevalence, abundance, and intensity on wild juvenile salmonids. 2018 has an overall prevalence of *L. salmonis* of 6% and an overall prevalence of *C. clemensi* of 5%. Both parameters are lower than the 2017 results.

Juvenile Salmonid Sea Lice Assessment 2018: Klemtu

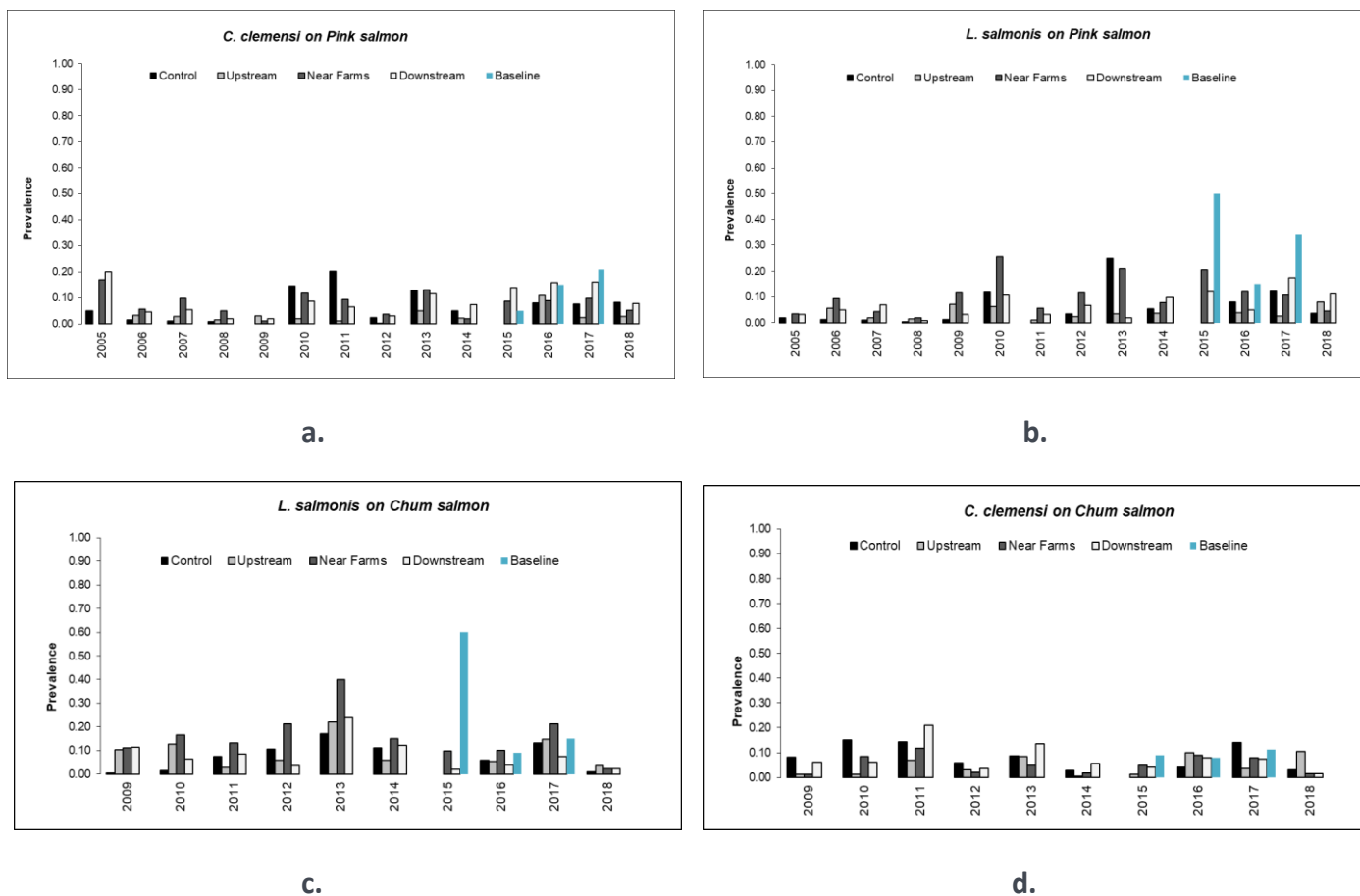


Figure 2. Summary of *L. salmonis* and *C. clemensi* prevalence on Pink (a and b) and Chum (c and d) salmon by area.

Figure 2 summarizes the prevalence of *L. salmonis* and *C. clemensi* on Pink and Chum juvenile salmonids sampled in 2009-2018.

Juvenile Salmonid Sea Lice Assessment 2018: Klemtu

Area	Site	Month	Total Fish	No. of each species		<i>Lepeophtheirus salmonis</i>		<i>Caligus clemensi</i>	
						Prevalence	Average Intensity	Prevalence	Average Intensity
				Pink	Chum				
Control	Lower Laredo	no samples	-	-	-	-	-	-	-
	Meyers Pass	no samples	-	-	-	-	-	-	-
		May	76	55	21	3%	1.0	13%	1.1
	Upper Laredo	May	100	28	72	2%	1.0	0%	0.0
Upstream	Hird Point	April	25	16	9	0%	0.0	0%	0.0
		May	50	45	5	2%	1.0	2%	1.0
	Kynoch	April	25	23	2	4%	0.0	0%	0.0
		May	25	19	6	16%	1.0	12%	1.0
	Windy Bay	April	24	9	15	8%	1.0	0%	0.0
		May	75	26	49	16%	1.2	4%	1.0
Near Farm	Carter	April	24	21	3	0%	0.0	0%	0.0
		May	52	42	10	2%	1.0	0%	0.0
		June	25	25	0	4%	1.0	0%	0
	Goat Cove	April	25	13	11	0%	0.0	4%	1.0
		May	50	14	11	12%	1.0	12%	1.2
		June	25	23	2	16%	1	4%	1.0
	Jackson Pass	April	25	22	3	4%	1.0	0%	0.0
		May	75	62	13	4%	1.8	9%	1.0
	Lower Tolmie	April	25	25	0	4%	1.0	4%	1.0
		May	50	32	18	0%	0	2%	1.0
		June	50	49	1	12%	1.0	0.1	1.0
	Upper Tolmie	April	25	14	11	0%	0.0	0.0	0.0
		May	50	25	0	6%	0.0	10%	1.0
		June	50	32	18	2%	0%	2%	1.0
Downstream	Arthur Is.	April	25	15	10	0%	0.0	0%	0.0
		May	50	45	5	10%	1.6	2%	1.0
		June	25	25	0	20%	1.2	12%	1.3
	Mary's Cove	April	26	17	9	4%	1.0	0%	0.0
		May	75	63	12	5%	1.0	13%	1.1
		June	25	25	0	0%	0.0	0%	0.0
	Suzy Bay	April	25	21	4	0%	0.0	0%	0.0
		May	50	30	20	2%	1	4%	1.0
		June	26	25	1	46%	1.2	23%	1.2

Table 2. Summary of Prevalence and Intensity by area and by month for 2018.

Table 2 illustrates the prevalence and intensity of *L. salmonis* and *C. clemensi* by month at each site sampled in each area.

Juvenile Salmonid Sea Lice Assessment 2018: Klemtu

		<i>Lepeophtheirus salmonis</i>			<i>Caligus clemensi</i>		
				Average			Average
Area	N=	Prevalence	Abundance	Intensity	Prevalence	Abundance	Intensity
Control	176	2%	0.0	1.0	6%	0.1	1.1
Upstream	224	9%	0.1	1.1	3%	0.0	1.0
Near Farm	576	5%	0.1	1.2	5%	0.1	1.0
Downstream	327	9%	0.1	1.2	7%	0.1	1.1

Table 3. Summary of Prevalence, Abundance, and Average Intensity of *L. salmonis* and *C. clemensi* area.

Table 3 summarizes the prevalence, abundance, and intensity of both types of sea lice and tabulates the parameters by area.

	April		May		June	
	Temp. (°C)	Salinity (ppt)	Temp. (°C)	Salinity (ppt)	Temp. (°C)	Salinity (ppt)
Control	-	-	17.1	24.1	-	-
Upstream	15.7	23.8	17.2	21.1	-	-
Farm	13.4	25.5	15.6	23.4	11.8	21.0
Downstream	13.4	25.7	15.0	25.5	11.9	24.1

Table 4. Summary of mean temperature and salinity at 1.0m by zone and month.

Table 4 outlines the environmental parameters of Temperature and Salinity for each area and month.