

**ADDENDUM TO “SEA LICE PRESENCE AND PATHOGENICITY IN THE CAMPBELL RIVER AND
SUNSHINE COAST FARMING REGIONS OF BRITISH COLUMBIA” (BC-CAHS 2010):**

SEA LICE PRESENCE AND FARM PRODUCTION ON 120 FARMS IN BRITISH COLUMBIA

COMPILED BY
B.C. CENTRE FOR AQUATIC HEALTH SCIENCES
MARCH 2011

A. ASSESSMENT OF SEA LICE DATA FROM 120 FARMS OPERATING IN BRITISH COLUMBIA

- A.1 The original document included all farms located in the Sunshine Coast and Campbell River Regions (BC-CAHS, October 2010).
- A.2 In December 2010, the Cohen Commission ordered the release of data from 120 farms throughout BC. This addendum includes sea lice levels and production data from those 120 farms during March-July and is categorized by seven regions, based on fish health zones.
 - A.2.1 The Southwest Vancouver Island Region, fish health zone 2-3, entails farms operated out of Tofino and Barkley Sound.
 - A.2.2 The Northwest Vancouver Island Region, fish health zone 2-4, entails farms operated out of Gold River, Tahsis and Coal Harbour.
 - A.2.3 The Sunshine Coast Region, fish health zone 3-1, entails farms located on the Sunshine Coast.
 - A.2.4 The Campbell River Region includes farms in fish health zone 3-2 with the addition of three farms from zone 3-3; Shaw Point, Althorp and Hardwick. These farms are included in this region due to their closer proximity to farms in the Campbell River region than farms in the Broughton Region.
 - A.2.5 The Broughton Region includes farms in fish health zone 3-3 with the addition of one farm from zone 3-4 (Wehlis Bay) and with the deletion of three farms that were included in the Campbell River Region: Shaw Point, Althorp and Hardwick. Farms vary slightly from fish health zones due to their proximity to each region.
 - A.2.6 The Port Hardy Region includes farms in fish health zone 3-4 with the deletion of Wehlis, which was included in the Broughton Region due to its closer proximity to that region.
 - A.2.7 The Klemtu Region, fish health zone 3-5, entails farms operated out of Klemtu.
- A.3 British Columbia Ministry of Agriculture and Lands (BCMAL) audit results for quarter 2 (April-June) are included in tables. Data are based on results from fish health zones only, not regions as described above.

B. Sea Lice and Production Data from Farms Operating in the Southwestern Vancouver Island Region (Tofino and Barkley Sound)

- B.1 For farms located in the Southwestern Vancouver Island region (2004 to 2010), the number operating at any one time ranged from 11 to 16.
- B.2 The number of farms raising Atlantic salmon increased and stabilized at about 11 after 2004 and the number of farms raising Pacific salmon ranged from three to six.
- B.3 Production peaked for Atlantics in 2007 at 6.1 million fish in April. Production for Pacific Salmon peaked in 2004 at 1.5 million.

Table 1. Number of Fish (millions) and Farms Stocked in the Southwestern Vancouver Island Region

			March	April	May	June	July
2004	#Fish	Pacific	0.9	1.1	1.5	1.5	1.3
		Atlantic	2.2	2.8	2.7	2.6	2.2
	#Farms	Pacific	5	6	6	6	6
		Atlantic	6	7	7	7	6
2005	#Fish	Pacific	1.1	1.1	1.2	1.2	1.2
		Atlantic	4.4	4.2	3.9	3.6	3.3
	#Farms	Pacific	4	4	5	5	5
		Atlantic	10	10	9	9	9
2006	#Fish	Pacific	0.6	0.5	0.7	0.7	0.7
		Atlantic	4.6	5.5	5.3	5.0	4.9
	#Farms	Pacific	4	4	4	4	4
		Atlantic	9	11	11	10	11
2007	#Fish	Pacific	0.5	0.5	0.6	0.6	0.6
		Atlantic	5.4	6.1	5.9	5.6	5.2
	#Farms	Pacific	3	3	4	4	4
		Atlantic	11	13	12	12	11
2008	#Fish	Pacific	0.6	0.5	0.7	0.7	0.6
		Atlantic	4.6	4.5	5.0	5.2	4.7
	#Farms	Pacific	4	4	5	5	5
		Atlantic	9	9	10	11	10
2009	#Fish	Pacific	0.6	0.6	0.7	0.7	0.7
		Atlantic	4.7	5.5	5.9	5.6	5.1
	#Farms	Pacific	3	3	4	4	4
		Atlantic	10	12	12	12	11
2010	#Fish	Pacific	0.7	0.6	0.8	0.8	0.5
		Atlantic	5.3	5.7	5.8	5.5	5.1
	#Farms	Pacific	4	4	4	4	3
		Atlantic	11	12	12	11	10

Table 2. Average number of motile (adult and pre-adult, males and females) lice per fish on farmed Atlantic salmon reported in the Southwestern Vancouver Island area March through July 2004-2010. Mean values are shown in bold, and range of values (lowest and highest) are also shown. BCMAL audit results for fish health zone 2-3 quarter 2 (April-June) are provided –in cases where 2 values are provided, the first is for populations in seawater for less than one year and the second is for populations in sea for greater than one year. Average abundance of motile (adult and pre-adult, males and females) lice per fish on Pacific salmon farmed in 2004 are provided as well. After 2004, reporting was not required as levels were low and there was no need to treat.

<i>Lepeophtheirus salmonis</i>					
	March	April	May	June	July
2004 avgs:	0.57	0.10	0.09	1.31	0.49
low	0	0.05	0	0	0
high	1.65	0.20	0.25	5.00	2.50
BCMAL			0.05		
2005 avgs:	1.83	0.98	1.04	0.39	0.49
low	0	0.05	0	0	0
high	6.05	3.25	3.75	1.85	1.85
BCMAL			0.73		
2006 avgs:	1.19	2.92	2.61	1.56	2.28
low	0.30	0.30	0.25	0.05	0.20
high	4.55	7.05	4.55	4.80	8.55
BCMAL			1.19/2.29		
2007 avgs:	1.10	1.39	1.05	0.67	0.54
low	0	0.05	0	0	0
high	3.45	3.10	3.35	1.80	1.60
BCMAL			2.07/2.83		
2008 avgs:	0.63	0.72	1.39	1.39	0.27
low	0	0	0	0	0
high	3.10	5.20	6.85	7.25	0.95
BCMAL			0.27/0.69		
2009 avgs:	0.84	0.53	0.45	0.47	0.26
low	0.15	0	0	0	0
high	3.50	1.35	2.10	2.50	1.60
BCMAL			0.08/0.42		
2010 avgs:	0.64	0.43	0.22	0.19	0.12
low	0	0	0	0	0
high	3.55	2.60	1.25	1.00	0.70
BCMAL			No data		

Caligus clemensi

	March	April	May	June	July
2004 avgs:	0.03	0.02	0.06	1.94	0.22
low	0	0	0	0	0
high	0.10	0.05	0.10	9.00	0.70
BCMAL		0			
2005 avgs:	0.24	0.17	0.21	0.25	0.14
low	0	0	0	0	0
high	2.40	1.15	0.90	1.40	0.50
BCMAL		0.28			
2006 avgs:	0.12	0.09	0.21	0.14	0.54
low	0	0	0	0	0
high	0.45	0.35	0.70	0.75	1.10
BCMAL		0.10/0.05			
2007 avgs:	0.11	0.10	0.25	0.11	0.16
low	0	0	0	0	0
high	0.75	0.75	2.65	0.70	1.10
BCMAL		0.05/0.09			
2008 avgs:	0.04	0.10	0.12	0.13	0.01
low	0	0	0	0	0
high	0.20	1.50	0.75	0.85	0.1
BCMAL		0.06/0.26			
2009 avgs:	0.24	0.30	0.14	0.44	0.17
low	0	0	0	0	0
high	1.20	1.65	0.90	7.60	3.65
BCMAL		0.01/0.29			
2010 avgs:	0.27	0.41	0.09	0.06	0.01
low	0	0	0	0	0
high	6.20	3.90	1.00	0.60	0.20
BCMAL		No data			

Lepeophtheirus salmonis on farmed Pacific Salmon

	March	April	May	June	July
2004 avgs:	0.07	No data	No data	0	No data
low	0.00			0	
high	0.30			0	
BCMAL		No data			

Caligus clemensi

	March	April	May	June	July
2004 avgs:	0	No data	No data	0.01	No data
low	0			0.00	
high	0			0.10	
BCMAL		No data			

- B.4 For farms analyzed in the Southwestern Vancouver Island Region, the government audit values were below levels reported by farms in all years except for *L. salmonis* counts in 2007 and *C. clemensi* counts in 2005 and for year 2 fish in 2008.
- B.5 Average motile *L. salmonis* for the March-June period during which the threshold (<3) is in effect, was adhered to for area but not necessarily by individual farms in every month.
- B.6 Lowest mean *L. salmonis* abundance levels occurred in 2004 (0.51) and 2008 (0.88). Highest mean *L. salmonis* abundance levels occurred in 2009 (2.21) followed by 2006 (2.11).

C. Sea Lice and Production Data from Farms Operating in the Northwestern Vancouver Island Region (Gold River, Tahsis and Coal Harbour)

- C.1 For farms located in the Northwestern Vancouver Island Region (2004 to 2010), the number operating at any one time ranged from 7 to 11.
- C.2 Pacific Salmon were only farmed in this region in 2004 and 2005, with very low numbers in 2005.
- C.3 Production for Atlantics was highest in 2008, averaging 6.3 million across months.

Table 3. Number of Fish (millions) and Farms Stocked in the North West Vancouver Island Region

			March	April	May	June	July
2004	#Fish	Pacific	1.7	1.6	1.6	1.5	1.5
		Atlantic	3.8	2.7	3.3	2.3	3.0
	#Farms	Pacific	4	4	4	4	4
		Atlantic	7	6	7	6	8
2005	#Fish	Pacific	0.3	0.1	0	0	0
		Atlantic	2.6	3.0	3.0	4.9	3.2
	#Farms	Pacific	2	1	0	0	0
		Atlantic	7	7	7	9	7
2006	#Fish	Atlantic	3.3	3.3	4.0	4.2	3.8
	#Farms	Atlantic	7	7	8	8	9
2007	#Fish	Atlantic	5.1	5.0	5.0	7.1	5.4
	#Farms	Atlantic	9	9	9	12	10
2008	#Fish	Atlantic	5.1	6.5	6.4	6.7	6.7
	#Farms	Atlantic	9	10	11	11	11
2009	#Fish	Atlantic	5.7	5.4	5.4	6.1	5.3
	#Farms	Atlantic	9	10	10	10	10
2010	#Fish	Atlantic	6.6	5.7	5.6	6.0	5.3
	#Farms	Atlantic	10	7	7	8	8

Table 4. Average number of motile (adult and pre-adult, males and females) lice per fish on farmed Atlantic salmon reported in the North Western Vancouver Island area March through July 2004-2010. Mean values are shown in bold, and range of values (lowest and highest) are also shown. BCMAL audit results for fish health zone 2-4 quarter 2 (April-June) are provided –in cases where 2 values are provided, the first is for populations in seawater for less than one year and the second is for populations in sea for greater than one year. Average abundance of motile (adult and pre-adult, males and females) lice per fish on Pacific salmon farmed in 2004 are provided as well. After 2004, reporting was not required as levels were low and there was no need to treat.

Lepeophtheirus salmonis

	March	April	May	June	July
2004 avgs:	6.52	1.41	0.28	0.20	0.45
low	0	0	0	0	0
high	25.50	9.50	2.60	1.25	1.60
BCMAL			0.7		
2005 avgs:	0.43	0.39	0.33	0.40	0.56
low	0	0	0	0	0
high	2.40	1.10	1.20	1.05	1.10
BCMAL			0.03		
2006 avgs:	0.50	0.63	0.99	0.74	0.77
low	0	0	0	0	0.15
high	1.35	1.70	2.85	3.55	2.35
BCMAL			0.50/1.83		
2007 avgs:	0.51	0.24	0.35	0.70	0.42
low	0	0	0	0	0
high	3.30	1.15	1.45	2.35	2.05
BCMAL			0.40/0.82		
2008 avgs:	0.55	0.43	0.43	0.50	0.85
low	0	0	0	0	0
high	1.85	2.10	1.85	2.90	4.40
BCMAL			0.75/0.86		
2009 avgs:	1.14	0.69	0.54	0.44	0.39
low	0	0	0	0	0.05
high	3.20	3.25	1.90	1.70	1.75
BCMAL			0.10/1.09		
2010 avgs:	0.99	0.32	0.27	0.45	0.60
low	0	0	0	0	0.10
high	3.95	1.05	0.65	1.50	1.80
BCMAL			No data		

Caligus clemensi

	March	April	May	June	July
2004 avgs:	0.05	0.02	0	0	0.08
low	0	0	0	0	0
high	1.00	0.30	0.05	0	0.70
BCMAL		0.03			
2005 avgs:	0.00	0.00	0.02	0.02	0.09
low	0	0	0	0	0
high	0	0	0.15	0.10	0.55
BCMAL		0.23			
2006 avgs:	0.29	0.26	0.08	0.05	0.20
low	0	0	0	0	0
high	2.15	2.05	0.55	0.30	1.15
BCMAL		0.12/0.18			
2007 avgs:	0.25	0.04	0.04	0.07	0.21
low	0	0	0	0	0
high	2.70	0.75	0.55	0.75	1.35
BCMAL		0/0.13			
2008 avgs:	0.00	0.01	0.00	0.01	0.01
low	0	0	0	0	0
high	0	0.15	0	0.05	0.05
BCMAL		0.01/0.02			
2009 avgs:	0.01	0.11	0.00	0.02	0.01
low	0	0	0	0	0
high	0.15	1.70	0	0.20	0.05
BCMAL		0.10/0			
2010 avgs:	0.13	0.08	0.31	0.15	0.07
low	0	0	0	0	0
high	1.50	1.00	2.35	1.20	0.55
BCMAL		No data			

Lepeophtheirus salmonis on farmed Pacific Salmon

	March	April	May	June	July
2004 avgs:	0.14	No data	0.10	0.02	No data
low	0		0.07	0	
high	0.16		0.13	0.04	
BCMAL		No data			

Caligus clemensi

	March	April	May	June	July
2004 avgs:	0	No data	0	0	No data
low	0		0	0	
high	0		0	0	
BCMAL		No data			

- C.4 For farms analyzed in the Northwestern Vancouver Island region, the government audit values were below levels reported by farms in all years except for *L. salmonis* counts in year 2 fish in 2006, 2007 and 2008 and *C. clemensi* counts in 2005.
- C.5 Across the region, average motile *L. salmonis* for the March-June period during which the threshold (<3) is in effect, was adhered to for the area except in March, 2004. Individual farms were not necessarily under threshold every month.
- C.6 Lowest mean *L. salmonis* abundance levels occurred in 2005 (0.42) and 2007 (0.45). Highest mean *L. salmonis* abundance levels occurred in 2004 (1.77) followed by 2006 (0.73).

D. Sea Lice and Production Data from Farms Operating in the Sunshine Coast Region

- D.1 For farms located in the Sunshine Coast region (2004 to 2010), the number of farms operating at any one time ranged from 2 to 3.
- D.2 In 2004, the number of farms raising Atlantic and Pacific Salmon were equal; from 2005 to 2009, two farms were operating with Pacific and one with Atlantic. In 2010, two farms were operating with Atlantic salmon.
- D.3 Production remained fairly constant throughout the years, ranging from 0.4 to 1.0 million for Pacific (2004 to 2009) and 0.1 to 0.7 million for Atlantics (all years).

Table 5. Number of Fish (millions) and Farms Stocked in the Sunshine Coast Region

			March	April	May	June	July
2004	#Fish	Pacific	0.3	0.3	0.3	0.3	0.3
		Atlantic	0.2	0.1	0.1	0.1	0.1
	#Farms	Pacific	1	1	1	1	1
		Atlantic	1	1	1	1	1
2005	#Fish	Pacific	0.5	0.6	0.8	0.8	0.8
		Atlantic	0.2	0.2	0.2	0.2	0.2
	#Farms	Pacific	2	2	2	2	2
		Atlantic	1	1	1	1	1
2006	#Fish	Pacific	0.6	0.6	0.8	0.7	0.6
		Atlantic	0.2	0.1	0.1	0.1	0.1
	#Farms	Pacific	2	2	2	2	2
		Atlantic	1	1	1	1	1
2007	#Fish	Pacific	0.4	0.5	0.5	0.6	0.5
		Atlantic	0.2	0.2	0.2	0.2	0.2
	#Farms	Pacific	2	2	2	2	2
		Atlantic	1	1	1	1	1
2008	#Fish	Pacific	0.6	1.0	1.0	1.0	1.0
		Atlantic	0.2	0.2	0.2	0.2	0.2
	#Farms	Pacific	2	2	2	2	2
		Atlantic	1	1	1	1	1
2009	#Fish	Pacific	0.4	0.4	0.4	0.4	0.4
		Atlantic	0.3	0.3	0.3	0.3	0.3
	#Farms	Pacific	2	2	2	2	2
		Atlantic	1	1	1	1	1
2010	#Fish	Atlantic	0.7	0.7	0.7	0.7	0.6
	#Farms	Atlantic	2	2	2	2	2

Table 6. Average number of motile (adult and pre-adult, males and females) lice per fish on farmed Atlantic salmon reported in the Sunshine Coast region March through July 2009-2010. Mean values are shown in bold, and range of values (lowest and highest) are also shown. BCMAL audit results for fish health zone 3-1 quarter 2 (April-June) are provided –in cases where 2 values are provided, the first is for populations in seawater for less than one year and the second is for populations in sea for greater than one year. Average abundance of motile (adult and pre-adult, males and females) lice per fish on Pacific salmon farmed in 2004 are provided as well. After 2004, reporting was not required as levels were low and there was no need to treat.

Lepeophtheirus salmonis

	March	April	May	June	July
2009 avgs:	No data	No data	0.02	0	No data
low			0	0	
high			0.10	0	
BCMAL			0.67		
2010 avgs:	0.63	0.12	0.55	0.02	0
low	0.55	0.10	0.15	0	0
high	0.70	0.15	0.90	0.05	0
BCMAL			No data		

Caligus clemensi

	March	April	May	June	July
2009 avgs:	No data	No data	0	0	No data
low			0	0	
high			0	0	
BCMAL			0		
2010 avgs:	0	0.05	0	0.60	0.05
low	0	0	0	0.20	0
high	0	0.15	0	1.15	0.10
BCMAL			No data		

Lepeophtheirus salmonis on farmed Pacific Salmon

	March	April	May	June	July
2004 avgs:	No data	0	No data	No data	No data
low		0			
high		0			
BCMAL		No data			

Caligus clemensi

2004 avgs:	No data	0	No data	No data	No data
low		0			
high		0			
BCMAL		No data			

- D.4 When analyzing the data from the Sunshine Coast region, the dataset for lice and BCMAL audit results is fairly sparse; however, reported lice counts were consistently low, ranging from 0 to 1.15.
- D.5 Average motile *L. salmonis* for the March-June period during which the threshold (<3) is in effect, was adhered to for area and by individual farms in every month.

E. Sea Lice and Production Data from Farms Operating in the Campbell River Region

- E.1 For farms located in the Campbell River region (2004 to 2010), the number of farms operating at any one time ranged from 13 to 19.
- E.2 The number of farms raising Pacific salmon decreased after 2005 while the number of farms raising Atlantics increased. From 2008 onwards, the farms analyzed exclusively farmed Atlantics.
- E.3 Production peaked for Atlantics in 2007 at 9.8 million fish in April. Production for Pacific Salmon peaked in 2004 at 5.0 million in March.

Table 7. Number of Fish (millions) and Farms Stocked in the Campbell River Region

			March	April	May	June	July
2004	#Fish	Pacific	5.0	4.9	4.6	4.2	4.8
		Atlantic	3.2	3.8	4.4	4.3	4.1
	#Farms	Pacific	7	7	7	7	8
		Atlantic	6	6	7	7	7
2005	#Fish	Pacific	4.4	4.1	3.8	3.3	2.9
		Atlantic	5.6	7.5	7.4	7.2	6.9
	#Farms	Pacific	7	7	7	7	6
		Atlantic	9	12	12	12	12
2006	#Fish	Pacific	1.8	1.5	1.2	1.0	0.8
		Atlantic	5.6	6.4	7.3	7.2	7.0
	#Farms	Pacific	4	4	2	2	2
		Atlantic	11	12	13	13	12
2007	#Fish	Pacific	0.5	0.3	0.2	0	0
		Atlantic	7.2	8.4	8.1	8.1	8.1
	#Farms	Pacific	1	1	1	0	0
		Atlantic	14	16	15	15	14
2008	#Fish	Atlantic	8.7	9.3	8.8	8.6	9.8
	#Farms	Atlantic	15	17	16	16	17
2009	#Fish	Atlantic	7.0	8.0	8.1	7.3	6.7
	#Farms	Atlantic	15	16	15	14	13
2010	#Fish	Atlantic	7.3	7.3	8.0	7.2	7.1
	#Farms	Atlantic	14	14	15	14	14

Table 8. Average number of motile (adult and pre-adult, males and females) lice per fish on farmed Atlantic salmon reported in the Campbell River region March through July 2004-2010. Mean values are shown in bold, and range of values (lowest and highest) are also shown. BCMAL audit results for fish health zone 3-2 quarter 2 (April-June) are provided –in cases where 2 values are provided, the first is for populations in seawater for less than one year and the second is for populations in sea for greater than one year. Average abundance of motile (adult and pre-adult, males and females) lice per fish on Pacific salmon farmed in 2004 are provided as well. After 2004, reporting was not required as levels were low and there was no need to treat.

Lepeophtheirus salmonis

	March	April	May	June	July
2004 avgs:	0.57	0.93	0.70	0.94	0.85
low	0	0	0	0	0
high	1.95	2.65	3.05	2.70	3.05
BCMAL			1.23		
2005 avgs:	1.88	2.74	1.27	1.02	0.28
low	0.40	0.20	0	0	0
high	5.45	9.45	5.30	6.30	1.10
BCMAL			0.74		
2006 avgs:	1.84	1.37	1.34	1.52	0.79
low	0	0	0	0	0
high	7.00	9.55	9.00	5.80	4.15
BCMAL			1.30		
2007 avgs:	0.39	0.70	1.09	0.68	0.32
low	0	0	0	0	0
high	2.65	4.20	7.70	3.40	2.95
BCMAL			0.03/0.80		
2008 avgs:	1.67	2.58	1.48	1.08	0.86
low	0	0	0	0	0
high	7.45	14.95	9.60	4.80	6.15
BCMAL			0.54/1.59		
2009 avgs:	1.94	0.35	0.47	0.60	0.96
low	0	0	0	0	0
high	11.00	2.60	2.85	2.10	3.45
BCMAL			0.28/0.45		
2010 avgs:	0.34	0.75	0.69	0.52	1.05
low	0	0	0	0	0
high	1.40	4.75	6.50	2.05	3.10
BCMAL			No data		

Caligus clemensi

	March	April	May	June	July
2004 avgs:	0.21	0.15	0.75	0.71	0.25
low	0	0	0	0	0
high	1.60	1.48	5.10	4.80	1.85
BCMAL		0.03			
2005 avgs:	0.90	1.66	1.00	0.32	0.03
low	0	0	0	0	0
high	10.05	9.20	8.45	2.80	0.35
BCMAL		0.36			
2006 avgs:	0.03	0.06	0.11	0.39	0.23
low	0	0	0	0	0
high	0.35	0.55	0.70	6.00	2.40
BCMAL		0.12/0.11			
2007 avgs:	0.32	0.60	1.07	0.67	0.35
low	0	0	0	0	0
high	4.00	3.90	8.40	4.55	2.95
BCMAL		0.02/0.05			
2008 avgs:	0.18	0.26	0.20	0.32	0.35
low	0	0	0	0	0
high	1.40	2.50	1.40	2.65	4.60
BCMAL		0.02/0.05			
2009 avgs:	0.65	0.25	0.56	0.35	3.38
low	0	0	0	0	0
high	6.25	2.90	4.45	3.10	27.75
BCMAL		0.32/0.07			
2010 avgs:	1.01	1.41	0.60	0.64	1.05
low	0	0	0	0	0
high	5.40	9.10	2.15	3.55	5.25
BCMAL		No data			

Lepeophtheirus salmonis on farmed Pacific Salmon

	March	April	May	June	July
2004 avgs:	1.14	0.22	No data	0.56	No data
low	0.23	0.18		0.01	
high	2.50	0.24		3.10	
BCMAL		No data			

Caligus clemensi

	March	April	May	June	July
2004 avgs:	0.04	0	No data	0	No data
low	0	0		0	
high	0.40	0		0	
BCMAL		No data			

- E.4 For the farms analyzed in the Campbell River region, government audit values were below levels reported by farms in all years except for *L. salmonis* counts in 2004.
- E.5 Average motile *L. salmonis* for the March-June period during which the threshold (<3) is in effect, was adhered to for area but not necessarily by individual farms in every month.
- E.6 Lowest mean *L. salmonis* abundance levels occurred in 2007 (0.64) and 2010 (0.67). Highest mean *L. salmonis* abundance levels occurred in 2008 (1.53) followed by 2005 (1.44).

F. Sea Lice and Production Data from Farms Operating in the Broughton Region

- F.1 For the farms located in the Broughton Archipelago region (2004 to 2010), the number of farms operating at any one time ranged from 10 to 14.
- F.2 All farms raised Atlantic salmon in this area.
- F.3 Production peaked in 2007 at 8.2 million fish in April and averaged 7.6 million that year. The average production in the next highest year, 2008 was 6.8 million.

Table 9. Number of Fish (millions) and Farms Stocked in the Broughton Region

			March	April	May	June	July
2004	#Fish	Atlantic	4.9	5.4	5.2	4.9	5.2
	#Farms	Atlantic	13	12	12	10	11
2005	#Fish	Atlantic	6.8	6.4	6.2	6.7	5.7
	#Farms	Atlantic	14	14	13	13	11
2006	#Fish	Atlantic	6.8	6.7	6.2	5.1	5.2
	#Farms	Atlantic	13	14	12	10	10
2007	#Fish	Atlantic	7.1	7.7	8.2	8.0	7.2
	#Farms	Atlantic	15	14	13	13	13
2008	#Fish	Atlantic	6.6	6.6	7.0	6.4	7.4
	#Farms	Atlantic	13	12	12	11	12
2009	#Fish	Atlantic	7.1	6.5	7.1	6.4	5.6
	#Farms	Atlantic	14	13	13	12	12
2010	#Fish	Atlantic	4.9	4.8	3.9	4.8	5.6
	#Farms	Atlantic	11	11	11	11	12

Table 10. Average number of motile (adult and pre-adult, males and females) lice per fish on farmed Atlantic salmon reported in the Broughton region March through July 2004-2010. Mean values are shown in bold, and range of values (lowest and highest) are also shown. BCMAL audit results for fish health zone 3-3 quarter 2 (April-June) are provided –in cases where 2 values are provided, the first is for populations in seawater for less than one year and the second is for populations in sea for greater than one year.

Lepeophtheirus salmonis

	March	April	May	June	July
2004 avgs:	2.13	5.34	7.64	4.90	2.23
low	0	0	0	0.10	0
high	7.76	22.70	44.52	38.10	6.90
BCMAL			0.45		
2005 avgs:	1.14	1.57	1.98	1.60	1.50
low	0.05	0	0.05	0.10	0
high	3.85	7.30	11.10	7.75	8.40
BCMAL			1.11		
2006 avgs:	1.52	0.99	0.93	0.48	0.42
low	0	0	0	0	0
high	9.60	8.80	5.80	2.25	3.30
BCMAL			0.83/0.24		
2007 avgs:	0.62	0.49	0.53	0.26	0.29
low	0	0	0	0	0
high	7.15	1.90	2.85	1.10	1.40
BCMAL			0.37/0.11		
2008 avgs:	0.57	0.48	0.50	0.15	0.14
low	0	0	0	0	0
high	4.40	3.15	3.60	0.45	0.55
BCMAL			0.09/0.04		
2009 avgs:	0.36	0.10	0.16	0.09	0.11
low	0	0	0	0	0
high	2.55	1.05	0.90	0.35	0.50
BCMAL			0.10/0.09		
2010 avgs:	0.34	0.87	0.73	0.49	0.35
low	0	0	0	0	0
high	1.35	4.00	3.10	1.85	1.45
BCMAL			No data		

Caligus clemensi

	March	April	May	June	July
2004 avgs:	0.42	0.12	0.81	0.46	0.09
low	0	0	0	0	0
high	6.68	0.75	8.10	6.15	0.60
BCMAL		0.38			
2005 avgs:	0.45	0.48	0.58	0.23	0.19
low	0	0	0	0	0
high	1.60	3.05	3.50	1.50	2.85
BCMAL		0.21			
2006 avgs:	0.13	0.15	0.41	0.05	0.15
low	0	0	0	0	0
high	0.85	0.95	2.90	0.40	1.35
BCMAL		0/0			
2007 avgs:	0.11	0.17	0.17	0.43	0.29
low	0	0	0	0	0
high	1.15	1.25	1.10	2.35	1.90
BCMAL		0.40/0.13			
2008 avgs:	0.15	0.15	0.12	0.08	0.02
low	0	0	0	0	0
high	1.25	0.90	0.75	0.65	0.15
BCMAL		0.19/0.02			
2009 avgs:	0.12	0.05	0.13	0.18	0.24
low	0	0	0	0	0
high	0.95	0.55	1.45	3.05	2.10
BCMAL		0.28/0.30			
2010 avgs:	0.09	1.25	0.83	0.31	0.41
low	0	0	0	0	0
high	0.60	9.75	6.40	1.40	2.50
BCMAL		No data			

- F.4 For farms analyzed in the Broughton Archipelago region, the government audit values were below levels reported by farms in all years, except *C. clemensi* counts in 2008 and 2009.
- F.5 Average motile *L. salmonis* for the March-June period during which the threshold (<3) is in effect, was adhered to for the area except in April-June, 2004. Individual farms may have reported higher numbers than threshold in some months.
- F.6 Lowest mean *L. salmonis* abundance levels occurred in 2009 (0.17) and 2008 (0.37). Highest mean *L. salmonis* abundance levels occurred in 2004 (4.45) followed by 2005 (1.56).

G. Sea Lice and Production Data from Farms Operating in the Port Hardy Region

G.1 For farms located in the Port Hardy region (2004 to 2010), the number of farms operating at any one time ranged from 2 to 7.

G.2 All farms raised Atlantic salmon in this area.

G.3 Production peaked in 2006 at 4.7 million fish in July.

Table 11. Number of Fish (millions) and Farms Stocked in the Port Hardy Region

			March	April	May	June	July
2004	#Fish	Atlantic	0.7	1.1	1.9	1.9	1.8
	#Farms	Atlantic	2	3	4	4	4
2005	#Fish	Atlantic	1.5	1.5	1.5	1.5	1.5
	#Farms	Atlantic	4	4	4	4	4
2006	#Fish	Atlantic	4.1	3.9	4.1	4.1	4.7
	#Farms	Atlantic	6	6	6	6	7
2007	#Fish	Atlantic	3.9	3.8	3.8	3.8	3.7
	#Farms	Atlantic	7	7	7	7	7
2008	#Fish	Atlantic	2.7	2.6	2.3	1.9	1.7
	#Farms	Atlantic	6	5	5	3	2
2009	#Fish	Atlantic	2.6	3.1	3.1	3.1	3.1
	#Farms	Atlantic	4	5	5	5	5
2010	#Fish	Atlantic	2.2	3.7	3.4	3.1	2.9
	#Farms	Atlantic	5	7	7	6	5

Table 12. Average number of motile (adult and pre-adult, males and females) lice per fish on farmed Atlantic salmon reported in the Port Hardy region March through July 2004-2010. Mean values are shown in bold, and range of values (lowest and highest) are also shown. BCMAL audit results for fish health zone 3-4 quarter 2 (April-June) are provided –in cases where 2 values are provided, the first is for populations in seawater for less than one year and the second is for populations in sea for greater than one year.

Lepeophtheirus salmonis

	March	April	May	June	July
2004 avgs:	No data	No data	No data	1.99	0.29
low				0.55	0.05
high				5.65	0.90
BCMAL			1.92		
2005 avgs:	1.84	0.46	0.23	0.70	0.88
low	0.05	0	0	0.10	0.05
high	9.10	2.45	0.80	1.15	2.00
BCMAL			0.36		
2006 avgs:	0.97	0.57	1.03	0.60	0.77
low	0	0	0	0.10	0.20
high	2.40	1.95	3.05	1.35	2.15
BCMAL			0.1/4.95		
2007 avgs:	0.88	0.90	1.17	1.09	0.98
low	0	0.10	0	0	0.05
high	4.00	2.30	2.40	2.60	3.20
BCMAL			0/0.83		
2008 avgs:	3.00	2.34	0.81	0.56	0.27
low	0	0.15	0	0.05	0.05
high	8.70	5.20	3.20	2.00	0.60
BCMAL			0.10/0.52		
2009 avgs:	1.38	1.73	0.85	0.54	0.44
low	0.15	0.20	0.15	0	0.10
high	4.30	4.60	1.90	1.80	1.25
BCMAL			0.1/2.21		
2010 avgs:	3.84	1.46	0.66	0.11	0.30
low	0.10	0	0	0	0
high	9.75	4.35	4.70	0.35	1.40
BCMAL			No data		

Caligus clemensi

	March	April	May	June	July
	No data	No data	No data		
2004 avgs:				0.03	0.01
low				0	0
high				0.30	0.05
BCMAL			0		
2005 avgs:	0.04	0.00	0.00	0.04	0.05
low	0	0	0	0	0
high	0.40	0	0.05	0.30	0.45
BCMAL			0		
2006 avgs:	0	0	0.02	0.09	0.03
low	0	0	0	0	0
high	0	0	0.20	0.65	0.25
BCMAL			0.05/0.37		
2007 avgs:	0.03	0.03	0.05	0.16	0.66
low	0	0	0	0	0
high	0.40	0.65	0.55	1.00	1.75
BCMAL			0/0.07		
2008 avgs:	0.15	0.05	0.04	0.14	0.14
low	0	0	0	0	0
high	0.70	0.35	0.10	0.60	0.50
BCMAL			0.01/0		
2009 avgs:	0.42	0.06	0.10	0.44	0.53
low	0	0	0	0	0
high	2.20	0.45	0.30	1.85	3.45
BCMAL			1.37/0.23		
2010 avgs:	0.26	0.18	0.06	0.13	1.22
low	0	0	0	0	0
high	1.90	0.80	0.70	0.60	4.15
BCMAL			No data		

- G.4 For farms analyzed in the Port Hardy region, the government audit values were below levels reported by farms in all years except *L. salmonis* counts for year 2 fish in 2006 and 2009 and *C. clemensi* counts for year 2 fish in 2006 and year 1 fish in 2009.
- G.5 Average motile *L. salmonis* for the March-June period during which the threshold (<3) is in effect, was adhered to for the area except in March of 2008 and 2010. Individual farms may have reported higher numbers than threshold in some months.
- G.6 Lowest mean *L. salmonis* abundance levels occurred in 2006 (0.79) and 2005 (0.82). Highest mean *L. salmonis* abundance levels occurred in 2008 (1.40) followed by 2010 (1.28).

H. Sea Lice and Production Data from Farms Operating in the Klemtu Region

- H.1 For farms located in the Klemtu region (2004 to 2010), the number of farms operating at any one time ranged from 1 to 2.
- H.2 In 2004, one of the farms analyzed raised Atlantic salmon and one raised Pacific salmon. Atlantics were raised exclusively from 2005 onwards.
- H.3 Production for Atlantics was highest in 2009 and 2010 at 1.2 million fish.

Table 13. Number of Fish (millions) and Farms Stocked in the Klemtu Region

			March	April	May	June	July
2004	#Fish	Pacific	0.5	0.5	0.5	0.5	0.5
		Atlantic	0.003	0.003	0.003	0.003	0.003
	#Farms	Pacific	1	1	1	1	1
		Atlantic	1	1	1	1	1
2006	#Fish	Atlantic	1.0	1.0	1.0	1.0	1.0
	#Farms	Atlantic	2	2	2	2	2
2007	#Fish	Atlantic	0.9	0.9	0.9	0.9	0.9
	#Farms	Atlantic	2	2	2	2	2
2008	#Fish	Atlantic	0.3	0.2	0.1	0	0
	#Farms	Atlantic	2	1	1	0	0
2009	#Fish	Atlantic	1.2	1.2	1.2	1.2	1.2
	#Farms	Atlantic	1	1	1	1	1
2010	#Fish	Atlantic	1.2	1.2	1.2	1.2	1.2
	#Farms	Atlantic	1	1	1	1	1

Table 14. Average number of motile (adult and pre-adult, males and females) lice per fish on farmed Atlantic salmon reported in the Klemtu region March through July 2006-2010. Mean values are shown in bold, and range of values (lowest and highest) are also shown. BCMAL audit results for fish health zone 3-5 quarter 2 (April-June) are provided –in cases where 2 values are provided, the first is for populations in seawater for less than one year and the second is for populations in sea for greater than one year. Average abundance of motile (adult and pre-adult, males and females) lice per fish on Pacific salmon farmed in 2004 are provided as well. After 2004, reporting was not required as levels were low and there was no need to treat.

Lepeophtheirus salmonis

	March	April	May	June	July
2006 avgs:	0.17	0.05	0.10	0.04	0.08
low	0.10	0	0.05	0	0
high	0.20	0.20	0.25	0.10	0.15
BCMAL		No data			
2007 avgs:	0.11	0.15	0.16	0.65	0.50
low	0	0	0	0.30	0.05
high	0.20	0.30	0.30	0.95	1.05
BCMAL		0.03			
2008 avgs:	0.82	2.10	No data	No data	No data
low	0.25	2.00			
high	1.30	2.20			
BCMAL		0.02/0.02			
2009 avgs:	No data	0.03	0.03	0.02	0.05
low	No data	0	0	0	0.05
high	No data	0.05	0.05	0.05	0.05
BCMAL		0.02/No data			
2010 avgs:	0.60	0.20	0.25	0.07	0.05
low	0.45	0.10	0.20	0	0.05
high	0.75	0.35	0.30	0.15	0.05
BCMAL		No data			

Caligus clemensi

	March	April	May	June	July
2006 avgs:	0.03	0.09	0.05	0.10	0.03
low	0	0	0	0	0
high	0.10	0.20	0.15	0.25	0.15
BCMAL	No data				

2007 avgs:	0.23	0.21	0.53	0.12	0.18
low	0	0	0	0	0
high	0.55	0.50	1.50	0.45	0.45
BCMAL	0.02				

2008 avgs:	0.10	0.03	No data	No data	No data
low	0	0			
high	0.20	0.10			
BCMAL	0.17/0.20				

2009 avgs:	No data	0.13	0	0	0
low		0	0	0	0
high		0.25	0	0	0
BCMAL	0.20/No data				

2010 avgs:	0.25	0.07	0.03	0.07	0
low	0.20	0	0	0.05	0
high	0.30	0.10	0.05	0.10	0
BCMAL	No data				

Lepeophtheirus salmonis on farmed Pacific Salmon

	March	April	May	June	July
2004 avgs:	No data	No data	No data	0.34	No data
low				0.22	
high				0.40	
BCMAL	No data				

Caligus clemensi

	March	April	May	June	July
2004 avgs:	No data	No data	No data	0	No data
low				0	
high				0	
BCMAL	No data				

- H.4 For farms analyzed in the Klemtu region, the government audit values were below levels reported by farms in all years except for *C. clemensi* counts in 2008 and 2009.
- H.5 Average motile *L. salmonis* for the March-June period during which the threshold (<3) is in effect, was adhered to for area and by individual farms in every month.
- H.6 Lowest mean *L. salmonis* abundance levels occurred in 2009 (0.01) and 2007 (0.07). Highest mean *L. salmonis* abundance levels occurred in 2008 (1.13) followed by 2010 (0.16).