

**From:** Tompkins, Arlene  
**Sent:** Wednesday, December 23, 2009 10:38 AM  
**To:** Richards, Laura <Laura.Richards@dfo-mpo.gc.ca>  
**Cc:** Saunders, Mark <Mark.Saunders@dfo-mpo.gc.ca>; Hargreaves, Brent <Brent.Hargreaves@dfo-mpo.gc.ca>  
**Subject:** FW: Sea lice Briefing Note (Fraser sockeye)  
**Attach:** Sea lice impacts on 2009 Fraser sockeye return - V2 - 24 Dec 2009.doc

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Laura

Here is the revised BN, all edits have been accepted.

Note, previous BN 2009-507-00143 (ten factors) needs to be attached.

Arlene

-----Original Message-----

**From:** Hargreaves, Brent  
**Sent:** December 23, 2009 10:06 AM  
**To:** Tompkins, Arlene  
**Cc:** Saunders, Mark  
**Subject:** RE: Sea lice Briefing Note (Fraser sockeye)

Hi Arlene.

I have reviewed the revisions Laura suggested and I agree with them.

In the attached version (V2) of this BN I have accepted all the suggested edits.

I also edited the final (transmittal) cover page of this BN to reflect Laura's the new title for this BN.

I do not have a copy of final version of the previous (disease) BN that Laura wants to attach to this current BN, so this will need to be attached by someone else.

Brent

<<...>>

-----Original Message-----

**From:** Richards, Laura  
**Sent:** December 23, 2009 9:27 AM  
**To:** Tompkins, Arlene; Hargreaves, Brent  
**Cc:** Saunders, Mark  
**Subject:** RE: Sea lice Briefing Note (Fraser sockeye)

This note is very well done. I have suggested some revisions mostly related to changes in the final version of the previous BN. See attached. << File: Sea lice impacts on 2009 Fraser sockeye return - 23 Dec 2009.doc >>

Dr. Laura Richards  
Regional Director Science | Directrice régionale des sciences  
Fisheries and Oceans Canada | Pêches et Océans Canada  
Pacific Biological Station | Station biologique du Pacifique  
3190 Hammond Bay Rd, Nanaimo, BC, Canada V9T 6N7

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Government of Canada | Gouvernement du Canada

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**From:** Tompkins, Arlene  
**Sent:** December 22, 2009 4:07 PM  
**To:** Richards, Laura  
**Cc:** Hargreaves, Brent; Saunders, Mark  
**Subject:** FW: Sea lice Briefing Note (Fraser sockeye)

Laura  
Draft briefing note for your review.  
Arlene

-----Original Message-----

**From:** Hargreaves, Brent  
**Sent:** December 22, 2009 3:29 PM  
**To:** Saunders, Mark  
**Cc:** Tompkins, Arlene  
**Subject:** Sea lice Briefing Note (Fraser sockeye)

Mark:

As you requested, attached is my first draft of the Briefing Note regarding potential impacts of sea lice from fish farms on Fraser sockeye.

Brent Hargreaves

<< File: Sea lice impacts on 2009 Fraser sockeye return - 22 Dec 2009.doc >>

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FILE # xxxxx

MEMORANDUM FOR THE MINISTER

**POTENTIAL CAUSES OF POOR RETURNS OF FRASER RIVER  
SOCKEYE SALMON; WITH FOCUS ON SEA LICE IMPACTS**

(Information Only)

**SUMMARY**

- In a previous briefing note, ten factors were listed which could have led to the poor returns of Fraser sockeye in 2009. This note elaborates on the potential impacts of sea lice.
- The most likely time when sea lice could have impacted the survival of these sockeye was in 2007, when the juvenile sockeye first entered the ocean.
- Analyses of preliminary data DFO recently obtained from fish farms in the Discovery Islands region indicates that sea lice impacts likely did not contribute significantly to the low return of Fraser sockeye in 2009.
- DFO has requested more extensive sea lice and fish disease data from the fish farms operating in all areas of the BC coast.
- DFO staff will analyze these additional data to assess if either sea lice or disease from fish farms in any location in BC could have significantly contributed to the low returns of Fraser sockeye in 2009.

**Background**

- A previous briefing note (2009-507-00143, copy attached) identified a number of possible factors which could have contributed to the poor returns of Fraser sockeye in 2009. These factors were:

- Most likely – toxic algal blooms in the Strait of Georgia, low food abundance in Queen Charlotte Sound and disease,
  - Possible – predation by Humboldt squid, interception by US fisheries, **sea lice from farms in Discovery Passage**,
  - Unlikely – pollution in Fraser River, Canadian fisheries, predation on juvenile salmon in the Strait of Georgia, low food abundance in the Strait of Georgia.
- Work is continuing in Pacific Region to assess each of these factors and further information will be provided as it becomes available. Science teams have been formed to focus on each of three high profile and/or likely causes; a disease-related event, interactions with aquaculture (sea lice), and low food abundance in Queen Charlotte Sound (as well as in the Strait of Georgia).
  - This note describes the potential impacts of sea lice. A previous note (MECTS 2009-507-00157) considered one emerging disease factor, and a forthcoming note will describe the progress on food abundance.
  - The impact of sea lice from commercial fish farms has been identified by various groups as possibly a major contributing factor to the low return of Fraser sockeye in 2009.
  - In a letter to The Globe and Mail, in August 2009, Paul Sprout, RDG Pacific Region, stated: "Sea lice from fish farms are not the explanation for this year's extremely poor marine survival of Fraser River sockeye."
  - Most recently, one of the main conclusions from a two-day "think tank" meeting of salmon experts, organized by Simon Fraser University and the Pacific Fisheries Resource Conservation Council, was that a better understanding was still required of the potential for transmission of sea lice and disease from farmed salmon to wild salmon.
  - Sea lice naturally infect all species of Pacific salmon. Historically, and long before any fish farming began in BC, most adult salmon that returned to spawn throughout BC have been infected with sea lice. Infection of the adult fish by sea lice has rarely resulted in any mortality or fish health concerns.
  - The most likely time when sea lice from fish farms could have impacted the survival of the Fraser sockeye that returned in 2009 was in 2007, when the juvenile sockeye first entered the ocean.
  - To examine this possibility DFO focused on fish farms in the Discovery Islands region of BC, because this area was identified by various environmental groups as the area of most concern for juvenile Fraser sockeye.
  - Under BC Provincial regulations all fish farms in BC have been required since 2003 to regularly monitor and report sea lice infection levels of farmed salmon.
  - Independent audits (fish sampling) of sea lice infections on all fish farms are routinely

conducted by the BC Province to confirm the sea lice infection data that are provided by the fish farm companies.

### **Analysis / DFO Comment**

- With assistance from the Province of BC, DFO obtained sea lice data from the companies that operate fish farms in the Discovery Islands region.
- The data were compared for sea lice infection levels that occurred on the fish farms in the Discovery Islands from 2004-2008, for the period from April – June when most juvenile sockeye from the Fraser River were likely migrating past the fish farms in this region.
- The sea lice levels on age-1 farmed fish in 2007 were the lowest observed from 2004 - 2008.
- The sea lice levels on age-2 farmed fish in 2007 were similar to the levels that occurred in 2006, and substantially lower than the levels that occurred in 2004, 2005 and 2008.
- Overall, these results indicate that nothing unusual occurred regarding sea lice infections on the fish farms operating in the Discovery Islands region during April – June in 2007.
- While we cannot rule out the possibility that sea lice contributed to some mortality of juvenile sockeye in 2007, analysis of these preliminary data indicates that any mortality should have been similar to previous years. Thus, sea lice on fish farms operating in the Discovery Islands region likely cannot account for the unusually poor return of adult sockeye to the Fraser River in 2009.
- The sea lice data DFO used for this preliminary analyses represent the averaged results for all the fish farms that were operating in the region designated under provincial regulations as BC MAL Area 3.2 (Discovery Islands). So the sea lice levels on some individual fish farms may have been higher than these averaged results indicate.
- The current DFO results are restricted to fish farms in the Discovery Islands region, and do not provide any information about sea lice levels on fish farms located in other regions of BC that might have impacted Fraser sockeye.

### **Recommendations / Next Steps**

- DFO has requested more extensive sea lice and fish disease data from industry for all fish farms in BC.
- DFO staff will analyze these additional data to assess if either sea lice or disease from fish farms in any location in BC could have significantly contributed to the low returns

of Fraser sockeye in 2009.

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Claire Dansereau  
Deputy Minister

B. Hargreaves/ M. Saunders/ A. Tompkins / L. Richards/ A. Thomson/ P. Sprout

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MECTS # 2009-xxx-xxxxx  
EKME # xxxxxxxxxv1  
FILE / FICHER xxxx-x

To: Claire Dansereau, Deputy Minister Date: 23 December 2009  
Pour

Object: **POTENTIAL CAUSES OF POOR RETURNS OF FRASER RIVER  
SOCKEYE SALMON; WITH FOCUS ON SEA LICE IMPACTS**  
\_(for the Minister's Information)

From: Paul Sprout, Regional Director General, Pacific Region

Via: Assistant Deputy Minister, Science

Your Signature  
Votre signature

Information

For Comments  
Observations

Material for the Minister  
Documents pour la Ministre

Remarks: L. Richards, Regional Director Science, Pacific Region

**DISTRIBUTION:**

S. Johal, A/Team Leader, Executive Secretariat

Drafting Officer : Laura Richards 250-756-7177

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