



## Final Report July 8, 2010

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# Sea Lice 2010

8<sup>th</sup> International Sea Lice Conference – May 9-12, 2010

[www.sealice2010.com](http://www.sealice2010.com)



## 1. Introduction

Victoria, British Columbia, Canada, was the host city for the 8<sup>th</sup> International Sea Lice Conference - Sea Lice 2010. The conference took place at the Inn at Laurel Point the only carbon neutral hotel in British Columbia. The Inn features an award winning chef and spectacular views of Victoria harbour from the Terrace Room where the Opening Reception, dinner and lunches were held.

Since the first conference in Paris in 1992, there have been 6 additional conferences: Trondheim '97, Amsterdam '98, Dublin '99, Aberdeen '01, St. Andrews (Canada) '03 and Puerto Varas '08, reflecting the global reach and interest in sea lice biology, research and management.

Sea Lice 2010 followed the 7th International Sea Lice Conference held in Puerto Varas, Chile, March 2008 which attracted 150 delegates from all the major salmon farming nations, as well as other regions such as Asia and Australia where seasonal sea lice epidemics are a concern in non-salmonid fish farming. There was a good representation from academia, industry, and regulators and topics covered included epidemiology, modeling, molecular genetics and genomics, wild-farm fish interactions, integrated pest management, resistance and regulatory policy.

## 2. Conference Goal and Objectives

The goal of the International Sea Lice Conference series is to bring together international research groups, aquaculture industry, environmental and other interested groups, and regulatory agencies to foster collaboration and communication on sea lice research and Sea Lice 2010 was organized to meet this goal.

The objectives of Sea Lice 2010 were:

- To increase the sea lice knowledge base in Canada through peer reviewed presentations and balanced science-based debate
- To support collaboration between the Canadian industry and international experts to maintain existing relationships and develop new connections that will facilitate the exchange of information now and in the future
- To support the development of management protocols and techniques for the Canadian aquaculture industry
- To determine the scope of and to identify future critical research needs for the enhancement of the Canadian aquaculture industry by formulating a statement on future research recommendations

## 3. Attendance

The conference was attended by 227 delegates from 11 countries setting a new record for the sea lice conference series. The series has come a long way from the first conference which had only 50 delegates. Organizers of the first conference were concerned that there wouldn't be enough interest to dedicate a whole conference to sea lice so it was organised within a larger crustacean biology symposium.

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## 4. Program

There has been an evolution of program topics since the first conference where sea lice biology and chemotherapy dominated. The 2010 program at reflected the evolution of the science, new discoveries that have been made and emergence of new issues and fish/environmental interactions, mathematical modelling and molecular genetics were dominant themes.

The Sea Lice 2010 program schedule was developed to provide opportunities for delegate interaction and networking, as well as ensuring the presentations were well organized. There were no concurrent sessions so attendees could realize full value from each presentation. Poster presentations were encouraged and a dedicated time was allotted for participants to view the posters with the authors present.

The final program for Sea Lice 2010, including both oral and poster presentations, is available on the conference website [www.sealice2010.com](http://www.sealice2010.com). Research scientists, veterinarians, biologists, students and regulators together presented a total of 45 oral and 34 poster presentations on a wide range of topics.

## Scientific Review Committee

The response to the Call for Papers was overwhelming. 103 abstract submissions were received and there were far more requests for oral presentations than could be accommodated. Each abstract was sent to at least 3 representatives of the conference Scientific Review Committee for evaluation on scientific merit, originality of the research, and whether the topic was in line with the goals of Sea Lice 2010.

<b>Name</b>	<b>Institute</b>	<b>Country</b>
Geoff Boxshall	Natural History Museum	UK
Sandra Bravo	University Austral de Chile	Chile
James Bron	University of Stirling	Scotland
Mark Costello	University of Auckland	New Zealand
Richard Endris	Schering Plough Animal Health	USA
Tony Farrell	University of British Columbia	Canada
Fu Ci Guo	Novartis Animal Health	Canada
Larry Hammell	University of Prince Edward Island	Canada
Peter Andreas Heuch	National Veterinary Institute	Norway
Tor Einar Horsberg	Norwegian School of Veterinary Science	Norway
Dave Jackson	Marine Institute	Ireland
Stewart Johnson	Fisheries & Oceans Canada	Canada
Simon Jones	Fisheries & Oceans Canada	Canada
Ben Koop, Co-Chair	University of Victoria	Canada
Martin Krkosek	University of Washington	USA
Barbara Nowak	University of Tasmania	Australia
Crawford Revie, Co-chair	University of Prince Edward Island	Canada
Gordon Ritchie	Marine Harvest	Norway
Myron Roth	British Columbia Ministry of Agriculture & Lands	Canada
Sonja Saksida	BC Centre for Aquatic Health Sciences	Canada
Peter R. Smith	National University of Ireland	Ireland
Dario Stucchi	Fisheries & Oceans Canada	Canada
Chris Todd	University of St. Andrews	Scotland
Jim Treasurer	Ardtoe Marine Laboratory	Scotland

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## Key Note Presentations

### **Chief Andy Thomas, Esquimalt Nation**

Victoria is located in the Traditional Territory of the Esquimalt and Songhees Nations. In recognition of this, the conference was opened by an address from Chief Andy Thomas, hereditary leader of the Esquimalt Nation who stressed the need to be good stewards of the land and not to forget old relationships.

### **Dr. Geoff Boxshall, Natural History Museum London, UK**

Dr. Geoff Boxshall, Natural History Museum London, delivered the opening plenary paper titled “*Sea Lice Biology & Emerging Issues*” focusing on the need to re-think some old paradigms like the number of stages in the sea lice life cycle, ideas which were in line with Chief Thomas' comments.

### **Dr. Hor Einar Horsberg, Norwegian School of Veterinary Medicine, Norway**

The issue of resistance to chemotherapeutants was the subject of the plenary presentation by Dr. Hor Einar Horsberg. This was the dominant theme at the conference and continues to be important in the local media.

### **Robert Poulin, University of Otago, New Zealand**

In his plenary address on “*The Evolution of Lice in Salmon Farms*”, Robert Poulin, University of Otago, commented on the need to use current and local information. Models have come a long way and are powerful tools; however, more work is needed on the assumptions used to ensure models as effective management tools.

### **Dr. Richard Beamish, Fisheries and Oceans Canada**

The closing plenary address was given by Dr. Richard Beamish, Fisheries and Oceans Canada, on the status of Pacific salmon stocks. Dr. Beamish provided a detailed and interesting summary from someone who has studied the cyclical ups and downs of salmon stocks on both sides of the Pacific for many years.

## Technical Presentations

There were several presentations on farm-wild fish interactions and to date this area of research has focused on near-shore observations and effects from salmon farms. A presentation from the Marine Institute in Ireland considered the effects on sea lice population dynamics from sources far removed from the near shore environments and indicated more research is needed on off-shore effects on lice population dynamics in order to understand sea lice from a "big picture" perspective.

Molecular genetics was also a key area of research presented at the conference and this field has brought much insight and change in our understanding of sea lice. Papers ranged from understanding speciation, the movement of genes between lice populations, to understanding what turns sea lice genes on and off. At this year's conference the top student poster award was given to Amber Messmer, University of Victoria, for her work using molecular markers to understand sea lice population structures – a critical area of research in our understanding of gene flow between lice populations from wild and farm salmon.

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Many presentations were on epidemiology and modeling indicating that this is also an area of interest around world. Mathematical models were presented from Scotland, Norway and British Columbia.

Research results on other caligid copepods were presented. The economic importance of copepod species on salmon is evident; however researchers are also looking at other species such as tuna, sturgeon and rock cod and file fish that are affected by copepods.

### 5. Conference Proceedings

Conference Proceedings from Sea Lice 2010 will be published in a Special Issue of the journal *AQUACULTURE*, to be edited by Dr. Myron Roth (Managing Guest Editor), Ministry of Agriculture and Lands, British Columbia, Canada, and Dr. Peter Smith (Associate Editor), National University of Ireland, Galway. The entire proceedings will be made available for free access on-line for a limited time following publication to facilitate dissemination of the conference findings as widely as possible.

### 6. Mathematical Modelling Symposium and Workshop

<http://www.watershed-watch.org/http://www.mitacs.ca/>Conference delegates had an opportunity to attend the Modelling Workshop on May 12<sup>th</sup> and 13<sup>th</sup> following the conference, organized by Martin Krkosek, Crawford Revie, and Ben Koop and sponsored by Watershed Watch and Mathematics of Information Technology and Complex Systems (MITACS).

The objectives of the workshop were to introduce a range of modelling techniques that have been, or could be, applied to the study of sea lice populations in both farmed and wild settings; and to explore the ways in which existing modelling research in the area can be extended or modified to provide better descriptive and predictive results. The workshop was aimed at both biologists interested in modelling techniques used in sea lice research and quantitative scientists interested in applying models to understand sea lice biology and management and it provided an overview of the use of various types of models used in sea lice research for the 37 participants.

### 7. Conference Logo "Salmon Louse"

Commissioned to Doug LaFortune, the concept behind the "Sea Lice Conference Logo" was to create a design that speaks to the interaction and interrelationships between sea lice, fish and people. The focus of the conference is sea lice and in the logo design the sea lice body forms the boundary of the image. In their natural life cycle, sea lice infect many different fish, salmon were chosen because of their importance to British Columbia. The Sea Lice 2010 conference was about knowledge, understanding, collaboration and sharing and people have the third position in this three-way relationship and are central in the design.

Doug LaFortune is one of the most widely known names in west coast Indian art. Born in Bellingham, Washington USA, he was raised in the Cowichan Valley on Vancouver Island and his family is of Coast Salish ancestry.

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A limited number of prints were prepared specifically for purchase by Sea Lice 2010 delegates. Each print was numbered, signed by the artist, and included information about the artist and the concept behind the design.

## 8. Conference Support

The Sea Lice 2010 Organizing Committee gratefully acknowledges the generous sponsorship of many companies, institutions and agencies. Please see the website for links to the home web pages of the partners and sponsors <http://www.sealice2010.com/main.php?site=sponsors>.

### Partners

The Organizing Committee of Sea Lice 2010 was pleased to partner with the following, who provided significant financial support necessary to deliver the 8th International Sea Lice Conference.

- University of Victoria
- Fisheries and Oceans Canada
- Intervet/Schering-Plough
- Novartis Animal Health

### Sponsors

The Organizing Committee gratefully acknowledges financial contributions from the following sponsors.

- Pacific Salmon Forum
- British Columbia Salmon Farmers Association
- British Columbia Ministry of Agriculture and Lands
- Genome British Columbia
- Province of New Brunswick
- Marine Harvest International
- Cooke Aquaculture
- Watershed Watch Society
- MITACS (Mathematics of Information Technology and Complex Systems)

## 9. Student Awards and Bursaries

Graduate students are an important part of the International Sea Lice conferences and as such were encouraged to attend and present their research in many ways, including through a student poster contest and with travel awards. Student awards and bursaries were presented at a special session on Day 2 of the conference.

The student poster awards and bursaries were made available by the generous contribution of the following institutions and companies.

- University of Victoria
- Fisheries and Oceans Canada
- Marine Harvest International
- Intervet/Schering-Plough
- Novartis Animal Health

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## Student Poster Awards

The Organizing Committee was pleased to initiate a Student Poster Contest to encourage students to attend and present their research. A 1st place award of \$500 and 3 runner-up awards of \$100 each were awarded. All posters where the first or presenting author was a student currently enrolled at an academic institute were eligible.

Prize	Student	Institute	Award
1 <sup>st</sup> Place	Amber Messmer	University of Victoria	\$500
Runner Up	Samantha Munroe	Acadia University	\$100
Runner Up	Colin Novak	Vancouver Island University	\$100
Runner Up	Amanda Stull	Vancouver Island University	\$100

**1st Place Winner:** Assessment of population structure in Pacific *Lepeophtheirus salmonis* using fine scale genetic markers. A M Messmer, E Rondeau, D Sanderson, S Jantzen, G Macdonald, W S Davidson, B F Koop

## Student Bursaries

The conference organizing committee awarded a total of \$7,225.00 in \$425 bursaries to each of the following students. Awards were used to offset travel costs associated with attending the conference. To be considered for a bursary, a student needed to demonstrate a need for financial support and make a contribution to the conference program.

## Student Bursary Award Recipients and Sponsors

Student	Institute	Sponsor
Michael Price	University of Victoria	Intervet/Schering-Plough
Jamie Ashander	University of Alberta	Intervet/Schering-Plough
Okechukwu Igboeli	University of PEI	Fisheries and Oceans Canada
Jong Leong	University of Victoria	Intervet/Schering-Plough
Amber Messmer	University of Victoria	Fisheries and Oceans Canada
Ben Sutherland	University of Victoria	Fisheries and Oceans Canada
Laura Braden	University of Victoria	Novartis Animal Health
Amanda Stull	Vancouver Island University	Novartis Animal Health
Colin Novak	Vancouver Island University	Novartis Animal Health
Danielle Lewis	Vancouver Island University	Marine Harvest International
Yamila Carpio	University of Havana	University of Victoria
Remylee Martin	Vancouver Island University	Marine Harvest International
Marie Sandeman-Allen	Vancouver Island University	Marine Harvest International
Zoe Gallagher	University of BC	University of Victoria
Mike Sackville	University of BC	University of Victoria
Laura Nendick	University of BC	Intervet/Schering-Plough
Jessica Stephenson	University of Stirling	Novartis Animal Health

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Cooke Aquaculture independently provided travel support to Jessica Stephenson, University of Stirling, Yamila Carpio, University of Havana and Okechukwu Igboeli, University of Prince Edward Island.

## 10. Social Events and Tours

### Opening Reception

The Opening Reception was held at the Inn at Laurel Point, Sunday May 9<sup>th</sup> evening. All delegates were welcomed at this informal social evening organized for networking and interacting with colleagues and research partners and meeting important new contacts.

### May 11<sup>th</sup> Evening Reception

A reception on May 11<sup>th</sup> was organized for Sea Lice 2010 delegates attending the conference evening session. Featuring beverages and light food this event was held prior to the May 11<sup>th</sup> evening session.

### Dinner

All delegates and guests were provided with a spectacular dinner on the evening of Monday May 10<sup>th</sup> at the Inn at Laurel Point, which included guest speaker Dr. Brian Harvey, a fisheries biologist and author of *The End of the River*, ECW Press.

### Dinner Presentation: *From Galileo to Geisha*

What's happened to science? Biologist and writer Brian Harvey provided a presentation on how he spent the first half of his career "practicing science" in developing countries and then back home when he was asked to review the research on sea lice he ended up rethinking what it means to be a scientist.

## 11. Conference Organization and Planning

The Sea Lice 2010 organizing and planning was initiated in the fall of 2008 with the forming of the Local Organizing Committee who had the responsibility to ensure a successful event that met the goals of the Sea Lice series.

### Local Organizing Committee

Myron Roth, Ministry of Agriculture and Lands

Ben Koop, University of Victoria

Simon Jones, Fisheries and Oceans Canada

Linda Hiemstra, Mel Mor Science, Conference Manager

### Volunteers

Volunteers are an essential part of conferences and the following volunteers contributed a great deal to the success of Sea Lice 2010 by developing and maintaining the conference website, preparing delegate packages, and processing delegate registrations onsite.

University of Victoria

Stuart Jantzen

Jong Leong

Amber Messmer

Niko Rebenich

Eric Rondeau

Ben Sutherland

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University of Stirling  
Jessica Stephenson

## 12. Promotion and Advertising

The conference was promoted through various conference announcement sites and regular email announcements sent to a database of people interested in sea lice. The database was developed for this conference and used a “hot button” link from the website to easily add names to the database. Up to date information was provided on a comprehensive and detailed website developed by students and hosted by the University of Victoria.

## 13. Next Conference in the Sea Lice Series

During the final session at Sea Lice 2010, expressions of interest were solicited for the next sea lice conference. Groups from Bergen Norway and Maine USA were interested. A discussion was also held on whether the next event should be in 2012 or 2013. Each delegate was provided the opportunity to vote on the place and the year for the next conference via the Sea Lice 2010 website. The results of this vote were to hold the next event at Bergen Norway in 2012.

## 14. Finances

Accounting for the Sea Lice 2010 conference was administered by the University of Victoria and all funds were held and payments made through a conference account at the university.

Financial report to July 7, 2010

Financial Statement	Amounts	Subtotals	Overage/Deficit
<b>Revenue</b>			
Registration and Print Sales	\$81,914.00		
Sponsorship	\$92,317.00	\$174,231.00	
<b>Expenses</b>			
Registration and Delegate Expenses	\$33,792.86		
Catering and Room Expenses	\$59,256.20		
Program and Proceedings	\$11,961.00		
Key Note Speakers	\$ 5,278.44		
Conference Management	\$39,780.00		
Advertising and website	\$ 6,250.00		
Logo and prints	\$ 5,567.44		
Insurance, Signage and Other Expenses	\$ 909.81		
Travel, early planning for Sea Lice 2012	\$11,435.25	\$174,231.00	\$ 0.00

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See you in Bergen Norway  
for  
Sea Lice 2012