



## Workshops and Reports

In collaboration with the Freshwater Institute and the Gordon and Betty Moore Foundation, Tides Canada also supports a series of annual aquaculture innovation workshops.

### **Aquaculture Innovation Workshop No. 6 Vancouver, British Columbia October 27-28, 2014**

#### **Program and Attendee List**

- [Aquaculture Innovation Workshop – Program](#)
- [Aquaculture Innovation Workshop – Attendees List](#)

#### **Presentations**

- [RAS 101: An Introductory Overview of the Basic Technical, Biological and Economic Elements of a Land Based Recirculating Aquaculture System and Presentation of an Economic Model Comparing Open Net and Land Based Aquaculture](#)  
Steven Summerfelt and Brian Vinci
- [Aquaculture's Role in Sustainable and Healthy Food Systems: Public Health, Environment and Policy Considerations](#)  
Dr. Jillian P. Fry
- [Independent Aquaculture Regulatory Review for Nova Scotia: The Process, Conclusions and Recommendations of the Doelle-Lahey Panel](#)  
Bill Lahey
- ['Namgis First Nation's "Kuterra" Project: Report on Performance](#)  
Hereditary Chief Bill Cranmer and Garry Ullstrom
- [The Diversified RAS Farm](#)  
Justin Henry
- [AgriMarine's Floating Semi-closed Containment Systems: Update on the Lois Lake Steelhead Farm and Other Projects](#)  
Robert Walker and Stephen Robinson
- [The Business Of Aquaculture – Vertical Integration, Optimizing Value from the Fish Product and Creating Value from the Waste Stream](#)  
Norman McCowan
- [Developments in Recirculating Aquaculture Systems for Salmon Grow-out in Europe and Asia](#)  
Bjarne Hald Olsen
- [Financing Aquaculture](#)  
Panel Discussion

- [White Paper on Feed Ingredients and the Reduction of Dependence on Marine Harvested Products for Aquaculture Feeds & Presentation](#) | [Paper](#)  
Wendy Sealey
- [Enterra Feed: Commercializing a Natural Insect-Based Process that Imitates Nature to Grow Renewable Food for Animals and Plants: Natural Protein, Oils And Organic Fertilizer](#)  
Brad Marchant
- [Land Based RAS and Open Pen Salmon Aquaculture: Comparative Environmental Assessment](#)  
Brian Vinci
- [Off-flavors in Recirculated Aquaculture Systems: Status on Current Knowledge on Organisms Producing Off-flavors and a Recent Example of Mitigation of Off-flavor Problems in a Recirculated, Experimental System](#)  
Niels Jorgensen
- [Nofima Atlantic Salmon in Closed-Containment Systems Research Update](#)  
Bendik Fyhn Terjesen
- [Freshwater Institute RAS Grow-out and Depuration Research Update](#)  
Steven Summerfelt
- [Taste of BC Aquafarm Report on Ozonation and Enhanced Waste Treatment](#)  
Steve Atkinson
- [Taste of BC Aquafarm Report on Ozonation and Enhanced Waste Treatment](#)  
Steven Summerfelt
- [Biosecurity Considerations in Water Recirculating Aquaculture Systems Design](#)  
Brian Vinci
- ["Wasted" Waste: Exploring the Potential of Utilizing Kuterra's Effluent Stream in a De-Coupled Aquaponics System](#)  
Andrew Riseman, W. Vandrsteen and Erin Latham
- [Design and Engineering Panel Discussion](#)
- [CO2 Removal](#)  
KC Hosler
- [CO2 Removal and Stripping Column Ventilation at Bell Aquaculture](#) Steven Summerfelt, Jacob Bartlett, Jamie Thompson, Brian Vinci, and Norman McCowan
- [Improving Water Quality and Reducing Water Discharge in RAS using AquaPonic and Membrane Technology](#)  
Thomas M. Losordo



- [Large-Scale Biosolids Dewatering](#)  
Bjarne Hald Olsen
- [AIW 6 Wrap Up Presentation](#)  
Eric Patel



**Aquaculture Innovation Workshop No. 5**  
**Shepherdstown, West Virginia**  
**September 4-6, 2013**

**Summary Notes, Program and Attendees List**

- [Aquaculture Innovation Workshop – Summary Notes](#)
- [Aquaculture Innovation Workshop – Program](#)
- [Aquaculture Innovation Workshop – Attendees List](#)

**Presentations**

- [Effects of Water Salinity and Exercise on Atlantic Salmon Performance as Post-Smolts in Land-Based Closed-Containment Systems](#)  
Bendik Fyhn Terjesen
- [UBC InSEAS Research Program to Determine Optimal Rearing Conditions for Salmon Growth in RAS](#)  
Jeffrey Richards
- [Effects of Water Exchange Rate and Biofiltration on Circulating Hormones in Water Recirculation Aquaculture Systems Containing Sexually Maturing Atlantic Salmon](#)  
Chris Good
- [Atlantic Salmon Growout Trials in Freshwater Closed-Containment Systems at the Conservation Fund Freshwater Institute](#)  
Steven Summerfelt
- [Occurrence of Off-Flavors in Water and Fish \(Rainbow Trout\) in RAS in Denmark and Procedures for Reduction of the Off-Flavors](#)  
Niels Jorgensen
- [Effects of H<sub>2</sub>O<sub>2</sub> Disinfection and Aeration Column Packing on Off-Flavor Depuration Kinetics of 4 kg Atlantic Salmon Purged in Replicated Partial Reuse Systems](#)  
John Davidson
- [Microbial Water Quality in RAS – Concepts and Examples](#)  
Lars-Flemming Pedersen
- [Denitrification Woodchip Bioreactors for Treatment of Nitrate](#)  
Laura Christianson
- [Water Quality Control in RAS: The Importance of an Anaerobic Treatment Stage for Removing Nitrate, Phosphate, and Off-Flavor Compounds](#)  
Jaap van Rijn
- [Land Based RAS and Open Pen Salmon Aquaculture: Comparative Economic and Environmental Assessment](#)  
Trond Rosten and Brian Vinci

- [Assessment of Atlantic Salmon Farming in Floating Closed-Containment Systems](#)  
Svein Martinsen
- [Update on Government Aquaculture Strategies, Including RAS](#)  
Jeff Silverstein
- [Report on the Standing Committee of Fisheries and Oceans – Closed Containment Salmon Aquaculture](#)  
Rodney Weston
- [Updates on Land-Based Closed-Containment Systems For Salmon](#)  
Steven Summerfelt
- [Coho Salmon Production Systems at Aquaseed's SweetSpring Salmon in Washington State](#)  
Jim Terry
- [Nanaimo Land Based Steelhead Model Aquafarm](#)  
Steve Atkinson
- ['Namgis First Nation Land Based Atlantic Salmon RAS Project](#)  
Chief Bill Cranmer, Eric Hobson and Jackie Hildering
- [Trends for Atlantic Salmon Production in Land Based Systems in Chile](#)  
German Merino
- [Developing Yellow Tail King Fish Farming In Land-Based Closed-Containment Systems](#)  
Andries Kamstra
- [Challenges in Construction and Operation at Extremely Remote RAS Locations – Case Study, Finmark, Norway](#)  
Ivar Warrer-Hansen
- [Retrospective Assessment of Construction Costs for the First 400 tonne/yr Atlantic Salmon Growout Module at the Namgis' First Nations](#)  
Gary Robinson and Andrew Wright
- [RAS Design Innovations and Opportunities for New Technologies](#)  
Marius Haegh
- [Update on Atlantic Sapphire – Langsand Laks and RAS Design Innovations and Opportunities for New Technologies](#)  
Bjarne Hald Olsen
- [Opportunities in Aquaponics](#)  
Dave Haider, Tom Losordo and Huy Tran

**RAS Producers Workshop  
Richmond, British Columbia  
April 22 and 23, 2013**

**Program and Attendees List**

- [RAS Producers Workshop – Program](#)
- [RAS Producers Workshop – Attendees List](#)

**Presentations**

- [Atlantic Salmon Growout Trials in Freshwater Closed-Containment Systems at the Conservation Fund Freshwater institute](#)  
Steven Summerfelt and Thomas Waldrop
- [The 'Namgis First Nation Land Based Recirculating Aquaculture System Atlantic Salmon Demonstration Project Update](#)  
Garry Ullstrom
- [Taste of BC Nanaimo Land Based Steelhead Model Aquafarm Update](#)  
Steve Atkinson
- [Tastee Choice Rebrand](#)  
Blake Hoss
- [Niman Ranch Compassionate Family Farmers Raising Animals with Respect for the Land](#)  
Jeff Tripician
- [The 2012 Survey of Consumer Trust in the Food Supply](#)  
Charlie Arnot
- [Depuration and Slaughter Techniques to Optimize Atlantic Salmon Product Quality from Land-based Closed Containment Systems Study](#)  
John Davidson



**Aquaculture Innovation Workshop No. 4  
Comox, British Columbia  
November 5 and 6, 2012**

**Program and Attendees List**

- [Aquaculture Innovation Workshop – Program](#)
- [Aquaculture Innovation Workshop – Attendees List](#)

**Presentations**

- [Progress Update on Two Atlantic Salmon Grow-out Trials in Freshwater Closed Containment Systems](#)  
Steven Summerfelt, TCFFI
- [Depuration and Slaughter Techniques to Optimize Atlantic Salmon Product Quality from Land-Based Closed Containment Systems Study](#)  
John Davidson, TCFFI
- [Studies on Long-Term Carbon Dioxide Exposure During Salmonid Grow-Out in Water Recirculation Aquaculture Systems](#)  
Christopher Good, TCFFI
- [UBC InSEAS Research Program to Determine Optimal Conditions for Fish Rearing](#)  
Colin Brauner, UBC
- ['Namgis First Nation's Land Based Atlantic Salmon RAS Project](#)  
Garry Ullstrom, K'udas Limited Partnership
- [Sustainable Blue](#)  
Jeremy Lee, Sustainable Blue
- [Coho Salmon Production Systems at Aquaseed's SweetSpring Salmon in Washington](#)  
Jim Terry, SweetSpring Salmon
- [Atlantic Sapphire – Langsand Laks, Denmark, and Virginia, USA](#)  
Thue Holm, Atlantic Sapphire
- [Atlantic Salmon in RAS in Norway](#)  
Frode Mathisen, Greig Seafood Ltd.
- [Environmental Performance of a 3,300 mt Land Based Salmon Farm](#)  
Brian Vinci, TCFFI
- [Use of Single-Sex and Triploid Stocks to Eliminate Early Maturation of Atlantic Salmon](#)  
Tillmann Benfey, University of New Brunswick

- [Breeding Atlantic Salmon for Rapid Growth and Late Maturation and the Potential to Produce all Female Salmon Eggs](#)  
Thoralf Solberg, SalmoBreed AS
- [Strategies for Significant Heat Loss Reduction in RAS systems Using Modern Energy Recovery Equipment](#)  
Andrew Wright, SOS Marine Conservation Foundation
- [Process Modelling and Energy Optimization in RAS Design](#)  
Karl Williaume, WorleyParsons
- [Creating Value from the Waste Stream – Sustainable Aquaculture and Bioproducts Production](#)  
David Brune, University of Missouri
- [Developments in Sustainable Ingredients for Aquaculture Feed](#)  
Jason Mann, Ewos
- [Canada's Organic Standards](#)  
Justin Henry, Target Marine





**Aquaculture Innovation Workshop No. 3  
Seattle, Washington  
May 15 and 16, 2012**

Program and Attendees List

- [Aquaculture Innovation Workshop – Program](#)
- [Aquaculture Innovation Workshop – Attendees List](#)

**Presentations**

- [Progress Update on Two Atlantic Salmon Grow-out Trials in Freshwater Closed Containment Systems](#)  
Steven Summerfelt, Director, Aquaculture Systems Research, TCFFI and Thomas Waldrop
- [Depuration and Slaughter Techniques to Optimize Atlantic Salmon Product Quality from Land-Based Closed Containment Systems Study](#)  
John Davidson, Senior Research Associate, Aquaculture Systems Research, TCFFI, Thomas Waldrop, Kevin Schrader, Brett Kenney, Gary Burr, William Wolters, and Steven Summerfelt
- [‘Namgis First Nation – K’udas Land Based Atlantic Salmon Recirculating Aquaculture System Project](#)  
Eric Hobson, President, SOS; Gary Ullstrom, Senior Financial Officer, ‘Namgis First Nation and Cathal Dinneen, Operations Manager, K’udas Project
- [Atlantic Sapphire – 1000 ton Salmon Production in Denmark – Langsand Laks](#)  
Thue Holm, CEO
- [Aquaseed’s SweetSpring Salmon](#)  
Greg Hudson, VP, Operations; Jim Terry, Technical Service Manager, Jeff Hudson, Food Fish Manager, and Per Heggelund
- Sustainable Blue  
Jeremy Lee, President
- [Global Update](#)  
Steven Summerfelt, Aquaculture Systems Research, TCFFI
- [The Branding Revolution of Commodity Products – Strategies for Creating and Optimizing your Brand](#)  
Katherine Bryar, Senior Consultant, Pacific Marketing Consulting
- [Market Panel Discussion](#)  
Tobias Aguirre, Executive Director, FishWise; Dane Chauvel, President and Founder, Organic Ocean; Guy Dean, Vice President and Chief Sustainability Officer, Albion Fisheries Ltd.; Don Sollows, Director Seafood, Sysco and Mike McDermid, Partner Relations Manager, Vancouver Aquarium’s Ocean Wise Program

- [Benchmarking: How, Why, and What Does it Mean?](#)  
John Volpe, Associate Professor, University of Victoria
- [Seafood Watch 2.0: Navigating New Waters – An Introduction to the Revised Seafood Watch Aquaculture Criteria](#)  
Scott Wallace, Sustainable Fisheries Analyst, David Suzuki Foundation
- [The SAD: Aquaculture Stewardship Council and Closed Containment Farmed Salmon](#) (NOTE: This session will also include a brief update on the status of Canada's National Organic Standard)  
Jay Ritchlin, Director, Marine and Freshwater Conservation, David Suzuki Foundation
- [Strategic Use of Nutritional Labelling](#)  
Myron Roth, Industry Specialist, Aquaculture and Seafood, BC Ministry of Agriculture
- [Producers' Panel Discussion](#)  
Josh Goldman, Founder/CEO, Australis Aquaculture (Barrumundi); Per Heggelund, President, Aquaseed (SweetSpring Coho Salmon); Thue Holm, CEO, Atlantic Sapphire (Atlantic Salmon) and Norman McCowan, President, Bell Aquaculture (Yellow Perch)



**Aquaculture Innovation Workshop No. 2**  
**Campbell River, British Columbia**  
**September 26 and 27, 2011**

**Program and Attendees List**

- [Aquaculture Innovation Workshop – Program](#)
- [Aquaculture Innovation Workshop – Attendees List](#)

**Presentations**

- [Recent Research on the Effects of NO3-N, CO2, O2 x Swimming Speed, and Strain x Photoperiod on Salmonid Performance, Health, and Welfare](#)  
By Christopher Good, TCFFI, Aquaculture Veterinary Researcher
- [Research on Atlantic Salmon Welfare and Performance in RAS at Nofima Centre for Recirculation in Aquaculture](#)  
By Jelena Kolarevic, NOFIMA MARINE, Researcher
- [Salmon Aquaculture GHG Emissions – A Preliminary Comparison of Land-Based Closed Containment and Open Ocean Net-Pen Aquaculture](#)  
By Andrew Wright, SOS Solutions Advisory Committee, Technology Advisor
- [Advances in Feed Formulations and Feed Specifics for Closed Containment Systems](#)  
By Brad Hicks, Taplow Feeds, Executive Vice President; and Gavin Shaw, Skretting North America Product Manager
- [Status of Floating Closed-Containment Systems](#)  
By Sean Wilton, Agrimarine Holdings
- ['Namgis First Nation – Land Based Salmon Recirculating Aquaculture System Project](#)  
By Garry Ullstrom, Namgis First Nation; KC Hosler, PR Aqua; and Steven Summerfelt, Technical Advisory Committee, Tides Canada Salmon Aquaculture Innovation Fund
- [Marine Harvest Canada – Land-based Atlantic Salmon Grow-out Employing Recirculating Aquaculture System](#)  
By Clare Backman, Marine Harvest Canada; David Jackson, WorleyParsons Canada; and Linda Coady, Chair, Tides Canada Project Review Board
- [Aquaseed's Sweetspring Salmon](#)  
By Per Heggelund, Aquaseed Sweetspring Salmon
- [Atlantic Sapphire – 1000 ton Salmon production in Denmark – Langsand Laks](#)  
By Thue Holm, CEO Atlantic Sapphire
- [From the Vision to the Market: The Target Marine Story of White Sturgeon and Sunshine Coast Caviar](#)  
By Justin Henry, Target Marine Hatcheries, General Manager

- [Progress Update on Two Atlantic Salmon Growout Trials in Freshwater Closed-Containment Systems at the Freshwater Institute \(Granny Painter Room\)](#)  
By Steven Summerfelt and Thomas Waldrop, TCFFI
- [Presentation on behalf of AquaOptima: Design and Economics of a RAS Farm for Atlantic Salmon in China](#)  
By Steven Summerfelt, TCFFI
- [University of British Columbia's InSEAS Research Facility](#)  
By Colin Brauner, University of British Columbia, Department of Zoology
- [Trends in Retailing from a Supplier Perspective: Increasing Demand, Retailer Requests, and Consumer Trend](#)  
By Guy Dean, Albion Fisheries Ltd.
- [The Sustainable Seafood Policy Era: Understanding the North American Major Buyers' Sustainability Commitments, Shifting Needs and Seafood Buying Policies](#)  
By Kelly Roebuck, Living Ocean's Society, Sustainable Seafoods Campaign Manager
- [The History of Salmon Aquaculture](#)  
By Brad Hicks, Taplow Feeds, Executive Vice President
- [The Canadian Model Farm Initiative](#)  
By Daniel Stechey, Canadian Aquaculture Systems
- [Department of Fisheries and Oceans National Strategic Planning Initiative Update on Emerging Technologies & the New Federal Regulatory Regime for Aquaculture in the Pacific Region](#)  
By Alistair Struthers, Fisheries and Oceans Canada, Aquaculture Management Directorate, Sector Strategies Team Leader
- [Update on Emerging Marine Aquaculture Technologies in the US and the new NOAA Aquaculture Policy](#)  
By John Colt, National Oceanic and Atmospheric Administration, Research Biologist



**Aquaculture Innovation Workshop No. 1**  
**Shepherdstown, West Virginia**  
**January 2011**

**Summary Notes, Program, and Attendees List**

- [Aquaculture Innovation Workshop – Summary Notes](#)
- [Aquaculture Innovation Workshop – Program](#)
- [Aquaculture Innovation Workshop – Attendees List](#)

**Presentations**

- [Biotechnology: Extending the Green Revolution](#)  
By Elliot Entis
- [Innovation and Emerging Technologies](#)  
By Michael Rubino
- [Innovation and Emerging Technologies: A Major Pillar of the New National Aquaculture Strategic Action Plan Initiative in Canada](#)  
By Eric Gilbert
- [Aquaculture Production Systems – Advances in Water, Genetics, Health, and Nutrition](#)  
By Jeff Silverstein
- [Advances in Closed-Containment Systems for Salmonids](#)  
By Steven Summerfelt
- [Fish Health and Welfare in Closed-Containment Systems](#)  
By Christopher Good
- [Atlantic Salmon Breeding Program and Research on Harvest Quality](#)  
By William Wolters
- [Sustainable Feed](#)  
By Frederic Barrows
- [Status, Challenges, and Opportunities of Floating Closed-Containment Systems](#)  
By Sean Wilton
- [Aquaculture Innovation – A Producer's Perspective](#)  
By Per Heggelund