

October 24th and 25th 2016

Can seals predict human illness? Integrating wildlife and environmental information with shellfish marine biotoxin data for public health purposes

The Pinnacle Hotel at the Pier, North Vancouver

Marine Biotoxin Workshop

What is the workshop about?

Last summer, high levels of domoic acid (DA), a neurologic toxin, were reported in BC shellfish. This led to the closure of commercial shellfish beds and the imposition of restrictions on self-harvesting by First Nations. Given the high reported levels of these biotoxins, there is a concern that populations in BC who engage in self-harvesting of wild shellfish and/or consume large quantities of

shellfish may be at risk of toxic exposures. In the absence of regular and broad-based monitoring of shellfish along BC's coasts, an alternative would be to utilize information about marine wildlife mortality or illness events that may have been caused by marine biotoxins; data would be gathered by agencies and institutions focusing on the marine environment and by coastal communities.



What are the objectives?

- To explore the potential sources of data on environmental factors, wildlife mortality events or unusual findings that may be associated with marine biotoxins or other hazards of public health relevance;
- To discuss potential avenues for collaboration between organizations or communities that collect such data, including data-sharing agreements, that would allow the subsequent development of suitable indicators for these hazards to be derived from the data.

Who is this for?

This workshop will bring together:

- environmental and wildlife marine scientists
- researchers
- First Nations
- public health
- industry
- provincial, public and federal stakeholders

Key questions the workshop will cover:

1. How aware are we of the risks?
2. How can communities be better informed?
3. What are the opportunities for monitoring and data sharing?
4. How can we further the use of traditional knowledge?
5. What information is available about shellfish poisoning in BC? What information is missing? Can we collate information into an alert system?



Discussion topics:

- Recognize useful environmental indicators as predictors for human and wildlife health risks
- Identify traditional/current diets of First Nations of most concern to be impacted by harmful algal blooms
- Describe testing methods for clinical and wildlife toxicity assessments
- Consider if current monitoring programs for harmful algal blooms are meeting needs
- Propose methods to create or enhance environmental monitoring networks
- Recommend how to optimize risk communication to self-harvesters
- Identify opportunities for data sharing and collaboration
- Reflect on evidence to propose reducing exposure to traditional diets for First Nations populations most at risk such as during pregnancy

How to register

This workshop is by invitation only. There is no registration fee for this workshop; however, travel and accommodation costs are not included. To register, please complete the [registration form](#).

[Marine Biotoxin Workshop web page](#)

<http://www.bccdc.ca/health-info/food-your-health/fish-shellfish/marine-biotoxin-workshop>

[Marine Biotoxin Workshop registration form](#)

<http://www.bccdc.ca/resource-gallery/Documents/Educational%20Materials/EH/FPS/Fish/Marine%20Biotoxin%20Workshop%20Reg%20Form-fill-ext.pdf>

Information about the Hotel

Pinnacle Hotel at the Pier

www.pinnaclepierhotel.com

ADDRESS: 138 Victory Ship Way, North Vancouver

GETTING THERE: two blocks west of the sea-bus terminal and Lonsdale Quay in North Vancouver.

[Driving directions link](#)

FROM YVR AIRPORT: take Canada-Line sky-train to Waterfront terminal, then transfer to sea-bus.

[Directions from airport link](#)

HARBOUR AIR: from Nanaimo, fly to Vancouver Coal Harbour, and transfer to sea-bus. Book on-line reservations at <http://www.harbour-air.com>

PARKING: available in the underground hotel lot. Note your stall # and register this with registration desk in the morning if you are not staying at the hotel; parking is complimentary.

Guests staying overnight at the hotel will have parking added to their room charge.

ACCOMMODATIONS:

Group ID Code: 160786 - delegates must quote group code when making room reservations

Guest rooms will be held until **Friday, Sep 23, 2016**.

Hotel Reservation Phone: 604.986.7437

Toll Free Reservation: 1.877.986.7437

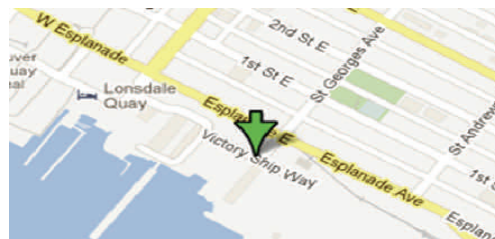
Reservation Email: info@pinnacleatthepier.com

Rates:

\$144.00 per night, Mountain Side—Deluxe King or Double Double

\$174.00 Harbour View —Deluxe King or Double Double

(Guest room charges are subject to 2% Municipal Hotel Tax, 5% GST and 8% PST)



Agenda

Monday, October 24, 2016		
11:00 am	Registration Open	<i>Pinnacle Ballroom 2 & 3</i>
Welcome and introductions to workshop		
12:00 noon	Gloria Nahanee Squamish Nation Elder	Welcoming and Lunch
Lunch Break and Networking		
1:30 pm	Dr. Pablo Romero-Barrios Linda Pillsworth Mark Matthew	Welcome
Opening Presentations		
Panel: why are we concerned about marine biotoxins?		
	Dr. Tom Kosatsky	Overview: populations impacts and recent observations
	Ross Wilson Wayne Paige, Jr	Importance of shellfish and marine foods to nutrition and traditional diet of First Nations - perspectives from Metlakatla and Cowichan
	Dr. Reza Afshari	Domoic acid exposure among the First Nation population in BC
	Open Discussion	
3:00 pm	Nutrition Break	
Opening Presentations		
Panel: environmental impacts and current monitoring		
3:20 pm	Dr. Ian Perry & Dr. Angelica Peña	Recent environmental conditions in southern BC marine waters, and unusual algal blooms
	Open Discussion	Monitoring of marine biotoxins in BC shellfish
	Open Discussion	Facilitated discussion to review our questions, gaps and needs of community research, industry and public health
5:30 pm	Reception and Networking	<i>Pier Salon</i>

Agenda

Tuesday, October 25, 2016

7:30 am Breakfast *Pinnacle Ballroom 2 & 3*

Dietary exposure to biotoxins in the community and environment

8:30 am Dr. Laurie Chan The importance of shellfish in the traditional diet of First Nation Communities: findings from the First Nations Food, Nutrition and Environment Study

Dr. Kathi Lefebvre Environmental exposure risks and effects of domoic acid in marine mammals and humans

Open Discussion Facilitated discussion

10:00 am Nutrition Break

Environmental and wildlife impacts

10:20 am Dr. Martin Haulena Epidemiology and clinical signs associated with acute and long term effects of domoic acid toxicity in marine mammals along the west coast of North America

Nicky Haigh Phytoplankton sampling and its role in marine biotoxin monitoring

Dr. Vera Trainer An unprecedented toxic algal bloom linked to anomalous ocean conditions and implications for First Nations health

Open Discussion Facilitated discussion

12:00 noon Lunch Break

Networks in the community

1:00 pm Lara Hoshizaki Coastal First Nations Regional Monitoring System

Linda Pillsworth Local Environmental Observer Network: the eyes, ears and voice of environmental change

Panel Discussion Community environmental monitoring networks

2:30 pm Nutrition Break

Break-out groups Group reflection and prioritization

4:30 pm Gloria Nahanee Squamish Nation Elder Adjournment and closing prayer

Speaker Biographies and Abstracts



Dr. Reza Afshari
MD, MPH, PhD

Reza is a senior scientist-toxicologist with Environmental Health Services at the BCCDC since June 2015 and adjunct Professor at UBC. He conducted his MD (natural toxicities), MPH (Surveillance of poisoning) and PhD (toxicity of opioids) degrees in the field of toxicology and epidemiology. He has published over 200 articles, abstracts and editorials, and written six books. Exposure to trace elements, chemical and medicinal overdoses, drug abuse and medical education have been his main field of research. He has given scientific lectures in 24 countries. He was elected as the President of Asia Pacific Association of Medical Toxicology (APAMT) 2013-2014.



Dr. Laurie Chan
BSc, M. Phil, PhD

Laurie is a Professor and holder of the Canada Research Chair in Toxicology and Environmental Health with the University of Ottawa. His research interests focus on toxicology, environmental health, nutrition and the environment of indigenous peoples; chemical, biological and biochemical processes involved in the metabolism and toxicity of environmental and nutritional contaminants; effects of trace element deficiency; effects of contaminants in the ecosystem; and risk assessment.

Domoic Acid Exposure Among the First Nation Population in BC

Domoic acid induced Amnesic Shellfish Poisoning was recognised three decades ago in Canada. Since then, major toxicological advances have been made and more information is available on shellfish consumptions. Data gaps exist on the potential health impacts related to the different frequencies of shellfish consumption, portion sizes and chronic low dose exposure among the First Nation populations. In addition, population that could be at risk including pregnant women, breastfeed neonates and elderlies have considerably increased in the past three decades. Revisiting the current toxicology regulatory approach suggests potential pitfalls. In the light of recent developments, we are hopeful that a new review would be opened by the Health Canada to update the current regulation and to address the circumstances related to non-commercial shellfish consumption which are outside the regulatory system.

The importance of shellfish in the traditional diet of First Nation Communities: findings from the First Nations Food, Nutrition and Environment Study

Seafood like shellfish is an important component of the traditional diet of First Nations communities. We will present results obtained from the First Nations Food, Nutrition and Environment Study (FNFNES) collected from 1,103 participants; from 21 randomly selected communities in British Columbia in 2008 on the consumption patterns of traditional foods, the overall dietary quality, and the associated food safety and environmental concerns.

Speaker Biographies and Abstracts



Nicky Haigh

Nicky Haigh is the Manager of the Harmful Algae Monitoring Program (HAMP) and CEO of Microthalassia Consultants Inc. She and Dr. Ian Whyte

developed HAMP to help the BC finfish aquaculture industry with issues of harmful algae monitoring, management and mitigation. She works with BC shellfish growers, academia, government agencies, and fish farm companies in Panama, Australia, and Mexico. Nicky has helped salmon farmers to develop a long-term database of phytoplankton species abundance and diversity, identified new fish-killing species of phytoplankton in BC, and increased the competence of fish-farming personnel and shellfish growers on monitoring and identification of harmful

algae species. She is the author of the HAMP Harmful Plankton Handbook (updated annually), and the Plankton Identification Handbook for Shellfish Growers on the West Coast of Canada, and in 2007 earned the 'Certificate of Proficiency in Identification of Harmful Marine Microalgae' from the Intergovernmental Oceanographic Commission of UNESCO in Denmark.

Phytoplankton sampling and its role in marine biotoxin monitoring

Nicky will provide an overview of how her lab works in partnerships with industry and the community to monitor harmful algal blooms (HAB). A review of other countries HAB response programs, such as phytoplankton sampling, will be discussed in the context of how these could inform and support current (CFIA program) shellfish biotoxin monitoring. Nicky will also provide an update on what was seen in BC last year from her program.



Dr. Martin Haulena ***DVM, MSc, Dipl. ACSM***

Martin is a staff veterinarian with the Vancouver Aquarium, a position he also held at the Marine Mammal Center in Sausalito, CA for nine years. Martin graduated from the Ontario Veterinary College in 1993 and completed a Master's degree in pathobiology from the University of Guelph in 1999. His special interests are in the medical management of aquatic animals—particularly marine mammals—with emphasis on innovative diagnostic methods such as MRI's, endoscopy and sonography, developing safe anesthetic protocols and improving surgical techniques.

Epidemiology and clinical signs associated with acute and long term effects of domoic acid toxicity in marine mammals along the west coast of North America

Since being first diagnosed as a significant cause of mortality in free-ranging California sea lions in 1998, domoic acid toxicity has affected thousands of individual marine mammals of various species. New research has shown that long term effects can persist in individual animals affecting their survival even after surviving initial exposure. This presentation will address the clinical signs in intoxicated animals and discuss the changing epidemiology of this important One Health issue.

Speaker Biographies and Abstracts



Lara Hoshizaki
Coastal First Nations



Dr. Tom Kosatsky
MD, PhD

Tom is Medical Director for the Environmental Health Services at the BCCDC, Scientific Director with the National Collaborating Centre for Environmental Health (NCCEH) and Clinical Professor at the University of British Columbia (UBC). Tom has particular expertise in the development of innovative environmental health surveillance tools and identifying quality evidence to support environmental public health activities across Canada. Prior to his March 2008 arrival in BC, Tom was a consultant in environmental health for the Montreal Public Health program and Associate Professor of Epidemiology at McGill University. Tom, a trained occupational physician, has also worked for the US Centers for Disease Control (CDC) and for the World Health Organization (WHO).

Overview: Population impacts and recent observations

Domoic acid, produced by microscopic marine organisms, and concentrated in clams and mussels, has been associated with sudden and sometimes lethal nervous system poisoning. Recent studies indicate that long-term consumption of lower than poisoning levels of domoic acid may be associated with loss of full neurologic function. While domoic acid has been found occasionally in Pacific Coast shellfish, more affected shellfish with higher levels of domoic acid have been found in recent years. Can toxicity in marine mammals provide an early warning for human consumers? How should consumption advice be crafted and communicated to long term consumers, and pregnant and elderly consumers at extra-high risk. These are the focus of our workshop.



Speaker Biographies and Abstracts



**Dr. Kathi A.
Lefebvre
PhD**

Kathi is a research biologist with NOAA, currently working on developing a novel antibody-based biomarker for toxicity of chronic exposure to a common seafood toxin. She received a B.A. in Biology from Whitworth College in 1989, an M.S. in Marine Science from Moss Landing Marine Laboratories in 1995, and a Ph.D. in Biology from the University of California at Santa Cruz in 2001. She began working at the Northwest Fisheries Science Center as a Post-doctoral Fellow in 2001. Kathi's research focuses on the effects of naturally occurring marine seafood toxins on wildlife and human health.

Her research encompasses four main topics:

- 1) pathways of trophic transfer of algal toxins through marine food webs
- 2) assessment of acute and chronic exposure risks
- 3) identification of physiological health impacts related to low level chronic exposure, and
- 4) development of biomarkers of chronic exposure and disease.

Environmental exposure risks and effects of domoic acid in marine mammals and humans

Toxins can be found through-out the food web, ingestion of foods contaminated with domoic acid are issues for marine mammals and humans consuming them. Both chronic low level and acute exposure to domoic acid can cause a range of effects, and these will be discussed from the perspective of biomedical laboratory models looking at the mechanisms of toxicity.



**Mark Matthew
BA**

Mark is our facilitator for this workshop. Mark is a member of the Simpcw First Nation from the Interior region. After completing his Bachelors of Business Administration with Thompson Rivers University, Mark held various positions in sales/marketing. He made the move into health in

2007 working with Interior Health Authority as their Aboriginal Contracts Advisor. Mark's employment with the First Nations Health Council/Authority began in October of 2008 and throughout the many transitions and evolutions of the organization he has continued to be involved in the engagement and planning with a major focus on the work of the Community Engagement Hub initiative. He is now a Manager of Engagement and Coordination with FNHA.



**Wayne Paige Jr
Cowichan First Nation**

Speaker Biographies and Abstracts



Dr. Ian Perry
PhD

Ian is a senior research scientist with Fisheries and Oceans Canada (DFO), at the Pacific Biological Station in Nanaimo, BC. His research expertise includes environmental influences on the distributions and recruitment of marine organisms; the structure and function of marine ecosystems; developing ecosystem-based approaches to marine resources management; the human dimensions of marine ecosystem changes; and scientific leadership of international and inter-governmental programs on marine ecosystems and global change. He currently heads the Ecosystem Approaches Program at the Pacific Biological Station, and is one of two co-leads for the DFO Strait of Georgia Ecosystem Research Initiative.

Recent environmental conditions in southern BC marine waters, and unusual algal blooms

The past few years have seen very unusual ocean conditions off the coast of British Columbia, in particular exceptionally warm water lasting for 2-3 years. These unusual ocean conditions influenced the weather experienced in BC during 2014 and 2015, and impacted marine biological ecosystems on regional and local scales, including exceptional blooms of phytoplankton, unusually high abundances of gelatinous zooplankton, and range extensions northwards of plankton and fish species more commonly found further south. Occurrences of unusual phytoplankton blooms have continued in 2016. This presentation will provide an overview of ocean conditions off BC's coast over the past few years, with a focus on unusual plankton blooms, and ask whether this is the "new normal" under a changing climate.



Linda Pillsworth
BTech, CPHI(C)

Linda Pillsworth is the Manager of Environmental Public Health Services with First Nations Health Authority. With 16 years of experience in this field she and her team of 38 EHOs, technicians, and program experts support the promotion of healthy environments, and the prevention of health risks through inspection, assessment, monitoring and capacity-building programs to First Nation communities. The last 10 years spent serving First Nations communities has progressively enriched her understanding of First Nations connections to land, reliance on traditional food systems, and the

importance of both to the physical, mental, cultural, and spiritual health of individuals and communities. Through strong collaborations and partnerships with communities and regional, provincial, and federal agencies, her goal is to create opportunities to enhance public health and environment systems to better support the holistic well-being of communities. Linda is supported by her husband and 2 lively boys, ages 8 and 4.

Local Environmental Observer Network: the eyes, ears and voice of environmental change

The purpose of the LEO Network is to increase understanding about environmental change and to help identify healthy and effective ways to adapt to those changes. Observers connect with indigenous and scientific experts, thereby integrating traditional, local, and scientific forms of knowledge.

Speaker Biographies and Abstracts



Dr. Pablo Romero-Barrios
DVM, MSc

Pablo is a veterinary epidemiologist who recently joined the BCCDC as a senior scientist in food safety.

He has been working in the interface between veterinary

science and public health for almost 20 years. Prior to his arrival at the BCCDC he worked for different institutions in Canada and abroad, including the European Food Safety Authority and the Food and Agriculture Organization of the United Nations. He is interested in the epidemiology of foodborne diseases, risk assessment, risk prioritisation and cost benefit analyses.



Dr. Vera Trainer
PhD

Vera is the Supervisory Oceanographer for the Marine Biotoxin program at the

Northwest Fisheries Science Center in Seattle WA. Current research activities include refinement of analytical methods for both marine toxin and toxigenic species detection, assessment of environmental conditions that influence toxic bloom development and understanding shellfish susceptibility to toxins in their environment. She directs the North Pacific Marine Science Organization (PICES) Harmful Algal Bloom International project focusing on bringing sustainable methods to developing Nations for assessing seafood safety. Trainer is the lead investigator of the Puget Sound Monitoring Program for harmful algal blooms and *Vibrio* (SoundToxins).

Dr. Trainer received her BS in Biology from Indiana University of Pennsylvania, and both her MS in Biological Oceanography, and PhD in Biochemistry and Molecular Biology at the University of Miami, with postgraduate studies in the Pharmacology Department at the University of Washington.

An unprecedented toxic algal bloom linked to anomalous ocean conditions and implications for First Nations health

The spring 2015 bloom of *Pseudo-nitzschia* resulted in the largest recorded outbreak of domoic acid along the west coast of North America. This affected marine mammals, razor clams, rock and Dungeness crab fisheries. Data from vessel sampling and laboratory analysis will be presented to describe the extent of the outbreak. In addition, Vera will describe the effects of domoic acid on memory and health in First Nations based on studies conducted by her colleague, Dr. Lynn Grattan.



Ross Wilson
Metlakatla First Nation



This workshop was made possible through funding and sponsorship from:



BC Centre for Disease Control
An agency of the Provincial Health Services Authority

The BC Centre for Disease Control provides provincial and national leadership in disease surveillance, detection, treatment, prevention and consultation.

www.bccdc.ca



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Health through wellness

The First Nations Health Authority is establishing a strong foundation that will allow us to innovate, transform and redesign health service delivery with guidance from BC First Nations in the coming years.

www.fnha.ca



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The Ministry of Health has overall responsibility for ensuring that quality, appropriate, cost effective and timely health services are available for all British Columbians.

<http://www2.gov.bc.ca/gov/content/health>

To register for this workshop, please visit our website:

<http://www.bccdc.ca/health-info/food-your-health/fish-shellfish/marine-biotoxin-workshop>

and complete the registration form to reserve your place.

