

# General Information on the Course on Phytoplankton Monitoring and Information Networking

By David Cassis

## Introduction and general information

The course on phytoplankton monitoring and information networking will take place at the Lund Hotel on April 18<sup>th</sup> from 9am to 4pm. During the morning Nicky Haigh and David Cassis will introduce the participants to general phytoplankton ecology, field sampling, simple microscope use and recognition of the main harmful algae that can affect the industry. In the afternoon the attendees will be given information on how to prevent damage by adjusting the timing of their operations, use of phytoplankton guides and other online resources, and will be introduced to networking options and response protocols at the farm, farm group, and network level.

This workshop has the objectives of training BC shellfish growers on best respond to harmful algae blooms. This will be accomplished by means of training participating growers in necessary skills for phytoplankton monitoring and data sharing. Once the participants have received the training they will be connected through an online network. By the end of this workshop they should be able to maintain a phytoplankton monitoring station, recognize harmful algae in water samples, communicate analysis results within a network, and respond adequately to harmful algal blooms.

All attendees will be provided with a booklet that contains basic information on phytoplankton ecology and taxonomy of harmful algae, sampling, analysis and event response protocols, a list of selected online resources, as well as instructions on how to access the prepared networking options. Materials, including sampling equipment and a microscope, will need to be acquired independently. A list is provided in this document. It is also recommended that they purchase a copy of the book "Plankton Identification Handbook for Shellfish Growers on the West Coast of Canada" (\$20 + tax) from Nicky Haigh, who will be at the workshop, or can be contacted at [nixy@telus.net](mailto:nixy@telus.net) and (250) 740-6354.

The list of materials included is particularly tailored to shellfish growers. The equipment listed is adequate for sampling from docks, rafts or small boats. The microscope and analysis materials were selected so they can be used in any location with electricity (to power the microscope). Included in the list are a refractometer and a thermometer probe that can be used to quickly and accurately measure the salinity from discrete samples and the temperature throughout the water up to 15m in depth.

The selected online resources include general information on phytoplankton and harmful algae, centered on the species and groups present in British Columbia. Within the list are several freely available (phyto- and zoo-) plankton identification guides, which are based mostly on photographs and line drawings. This list also includes sampling guides used by other current monitoring programmes.

## **Schedule**

**9 - 9:30AM BCSGA AGM**

**9:30-10:15 Introduction to ecology of plankton and plankton sampling**

**10:15 - 10:30 coffee break**

**10:30 - 11AM Plankton sampling demonstration**

**11AM - 12:00PM Introduction to microscopes and sample analysis**

**12:00 - 1PM lunch**

**1PM - 2PM Harmful algae species - talk and microscope**

**2PM - 2:30PM Using plankton monitoring for shellfish site husbandry**

**2:30-3:30 PM Networking and online resources**

**3:30 - 4PM sum-up and discussion**

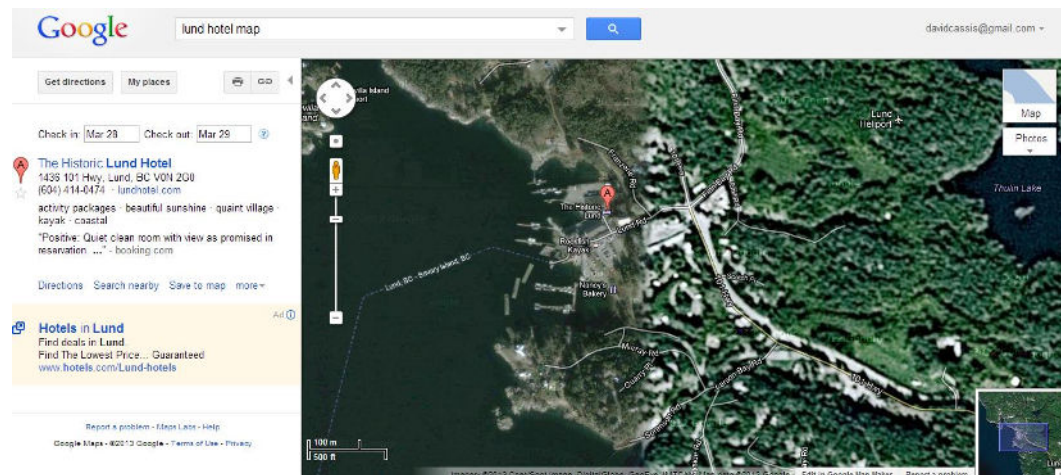
## Venue

Time: 9am to 4pm

Location: Lund Hotel; 1436 101 Highway, Lund, BC V0N 2G0

(604) 414-0474

Map and information [http://lundhotel.com/site/location\\_map.html](http://lundhotel.com/site/location_map.html)



## Recommended Materials

Materials	Quantity	Supplier	Model	Price per unit
Microscope	1	Amscope	B490BM	300*
Plankton net	1	Dynamic Aqua	PN 20	115
Sedgewick-rafter counting cell	1	Dynamic Aqua	15084	46
Lugol iodine solution	1/2 liter	Dynamic Aqua	C10603	37
Slides	1 box	Dynamic Aqua	501000	5,95
Coverslips	1 box	Dynamic Aqua	604000	5
Pipettes	1 box	Dynamic Aqua	E55021	8
Amber sample bottles	1 box (of 1 dozen)	Dynamic Aqua		35
Guide	1	Nicky Haigh		20
		<b>Total without optional equipment</b>		<b>571,95</b>
<b>Optional</b>				
Thermometer probe	1	Dynamic Aqua	Clinefinder	175
Refractometer (salinity)	1	Dynamic Aqua	STX 3	115

\* Several options exist for microscopes ranging in price from around \$270 upwards. Please contact David Cassis [davidcassis@gmail.com](mailto:davidcassis@gmail.com) if you need more information.

Links to suppliers:

Amscope <http://store.amscope.com/b490b-m.html>

Dynamic Aqua Supply:

<http://www.dynamicaqua.com/plankton.html#simplestudent>

<http://www.dynamicaqua.com/microscope.html#sedgewick>

<http://www.dynamicaqua.com/solutions.html>

<http://www.dynamicaqua.com/microscope.html#slides>

<http://www.dynamicaqua.com/microscope.html#cover>

<http://www.dynamicaqua.com/pipettes.html>

<http://www.dynamicaqua.com/thermometers.html#cline>

<http://www.dynamicaqua.com/refractometers.html>

## Selected online resources

- Phyto'pedia, the visual encyclopedia of common plankton in BC. A new resource that compiles ecological and taxonomic information with high quality images in accessible language. Centered on phytoplankton and counts with seasonal images.  
<http://www.eos.ubc.ca/research/phytoplankton/>

- Cupp's Marine plankton diatoms of the west coast of North America. A thorough guide of the diatoms of the west coast made mostly with clear line drawings. An excellent resource despite a few outdated names. <http://www.slideshare.net/guestb1774c/ee-cupp-diatoms>
- A list of species common in the west coast with nice images prepared by the Kudela Lab at the University of California Santa Cruz <http://oceandatacenter.ucsc.edu/PhytoGallery/>
- A guide of common species with annotated images prepared by the Global Ballast Water Management Programme <http://globallast.imo.org/monograph%20%20phytoplankton%20catalogue.pdf>
- Good general guide for the plankton prepared by Robert Perry - UCLA OceanGLOBE & Malibu High School [http://www.msc.ucla.edu/oceanglobe/pdf/guide\\_plankton1.pdf](http://www.msc.ucla.edu/oceanglobe/pdf/guide_plankton1.pdf)
- A general explanation about phytoplankton and harmful algae blooms with images prepared by Gregg W. Langlois and Patricia Smith [http://pubs.usgs.gov/circ/c1198/chapters/123-132\\_Phytoplankton.pdf](http://pubs.usgs.gov/circ/c1198/chapters/123-132_Phytoplankton.pdf) This is a chapter of the book Beyond the Golden Gate—Oceanography, Geology, Biology, and Environmental Issues in the Gulf of the Farallones. Edited by Herman A. Karl, John L. Chin, Edward Ueber, Peter H. Stauffer, and James W. Hendley II. 2001. This is a book on oceanography and marine biology that can be downloaded for free here <http://pubs.usgs.gov/circ/c1198/>
- NOAA's harmful algal bloom hunter's handbook. A complete guide with activities, general information, photo identification [http://www.nwfsc.noaa.gov/hab/outreach/pdf\\_files/habhunthdbk.pdf](http://www.nwfsc.noaa.gov/hab/outreach/pdf_files/habhunthdbk.pdf)
- Harmful Plankton Project, a user-friendly guide to harmful phytoplankton in EU waters created by A Kraberg and DJS Montagnes <http://www.liv.ac.uk/hab/intro.htm> A complete guide to harmful algae with ecological and taxonomic information as well as images.
- Simple key for common zooplankton prepared by the University of Georgia Marine Education Center and Aquarium. [http://georgiaseagrant.uga.edu/images/uploads/media/Zooplankton\\_key.pdf](http://georgiaseagrant.uga.edu/images/uploads/media/Zooplankton_key.pdf)
- An easy to use image-based zooplankton key of prepared by the University of New Hampshire, Durham <http://cfb.unh.edu/cfbkey/html/index.html>
- Overview of the plankton in the Pacific north coast integrated management area (PNCIMA) [http://www.pncima.org/media/documents/pncima-publications/pncima\\_eoar\\_328842\\_d\\_plankton.pdf](http://www.pncima.org/media/documents/pncima-publications/pncima_eoar_328842_d_plankton.pdf)



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