Monitoring of harmful algal blooms in the Strait of Georgia by a Citizen Science program

PACIFIC SALMON FOUNDATION

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Citizen Scientist Program 2015 - 2017

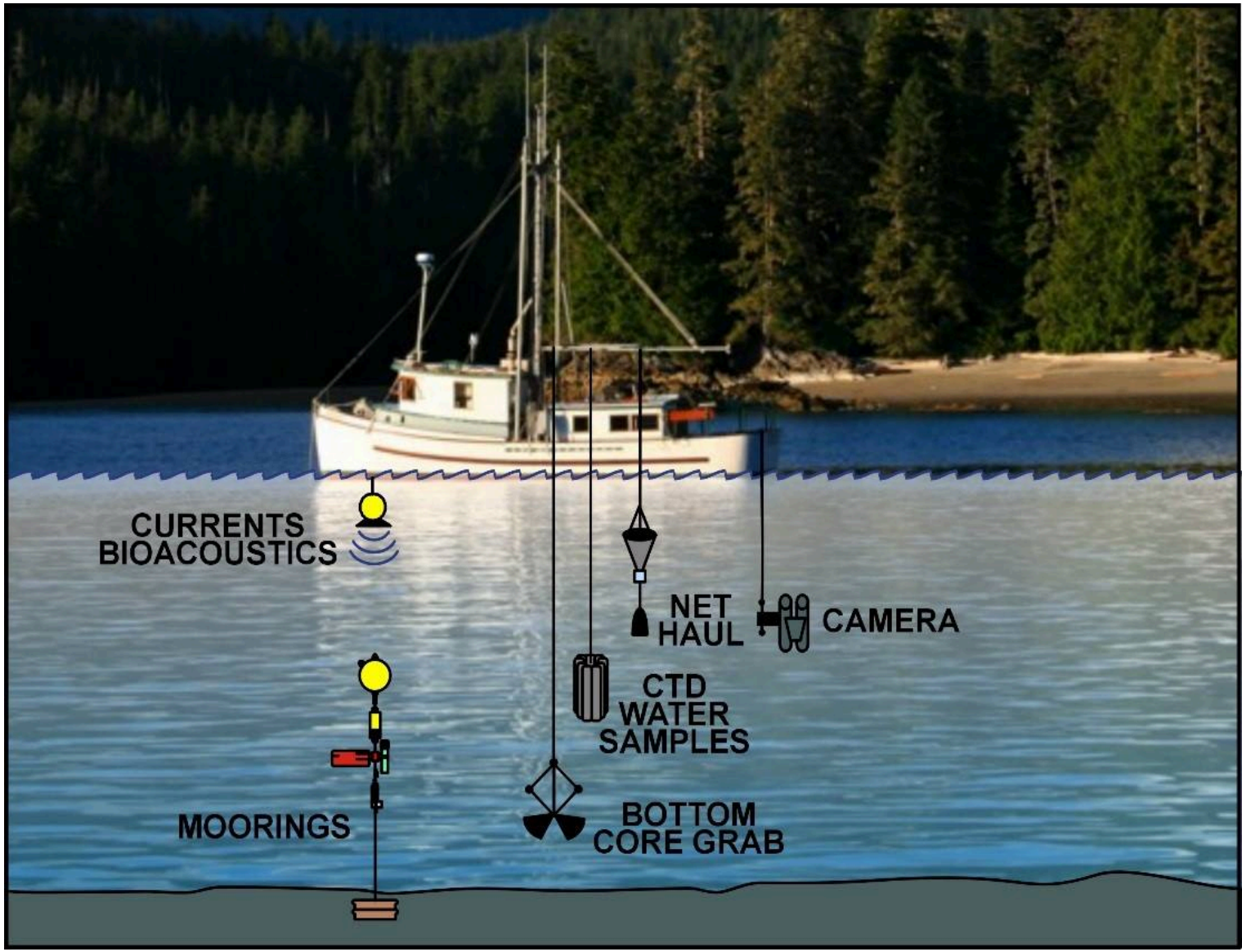
- Citizen science is defined as *"scientific work undertaken by members of the general public, often in collaboration with or under the direction of professional scientists and scientific institutions"*

Pacific Salmon Foundation + Ocean Networks Canada + Department of Fisheries and Oceans Canada

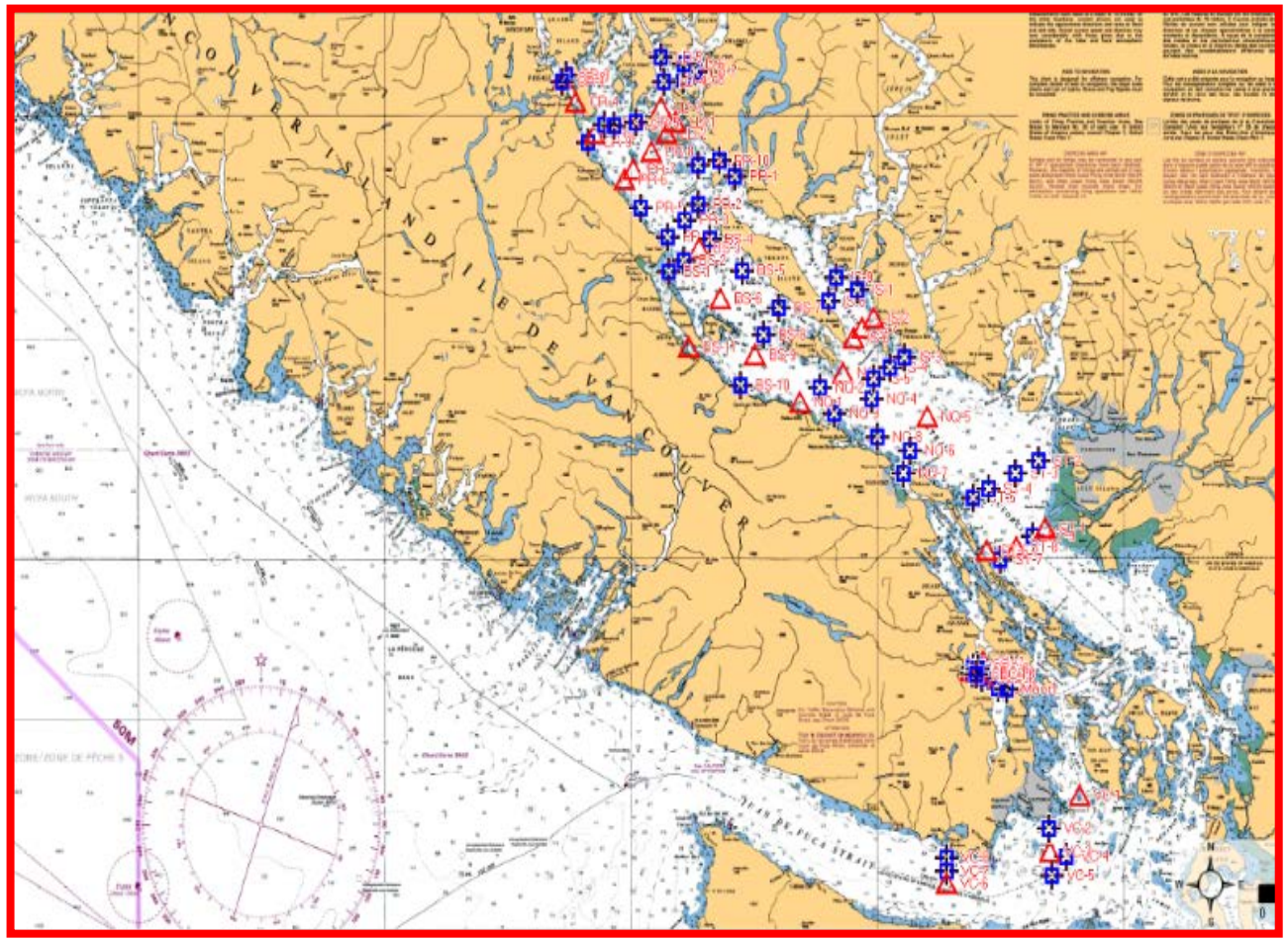
unique data on entire Strait of Georgia

Sampling

- Properties/samples that are measured/collected are: conductivity, temperature, depth, dissolved nutrients, fluorescence, oxygen, zooplankton, phytoplankton, turbidity.
- The majority of collected data could be found on the Ocean Networks Canada website.



Scale



- ~ 80 locations are sampled
- sampling every ~2 weeks
- From February to October

- Phytoplankton samples:
- ~1300 samples in 2015
- ~2000 samples in 2016

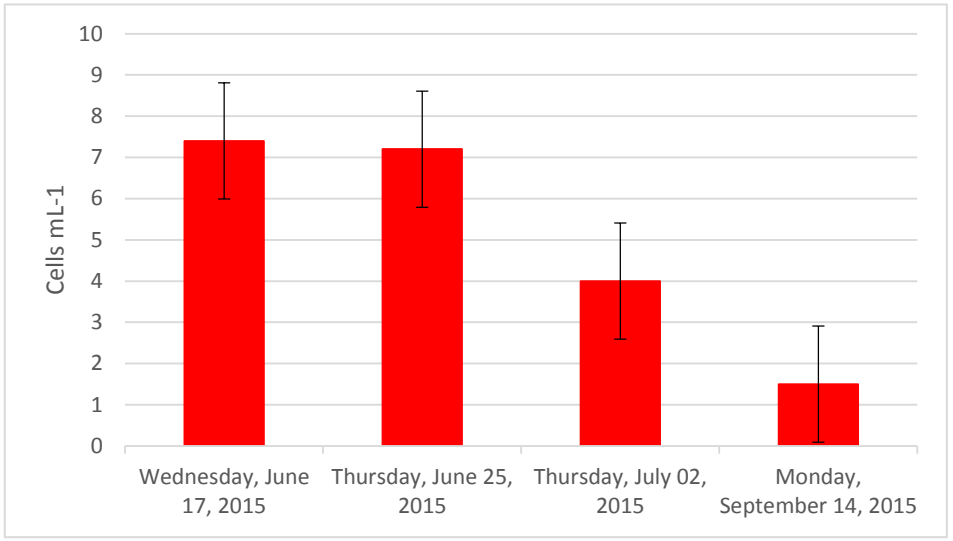
Phytoplankton sampling

- Most of the station sampling at the surface, 1 station at 0, 5, 10, 20 m
- Samples preserved with Lugol's Iodine, processed under light microscope
- Biomass and constituent groups are estimated, dominant species and known harmful to fish species (includes *Alexandrium* spp.) are enumerated

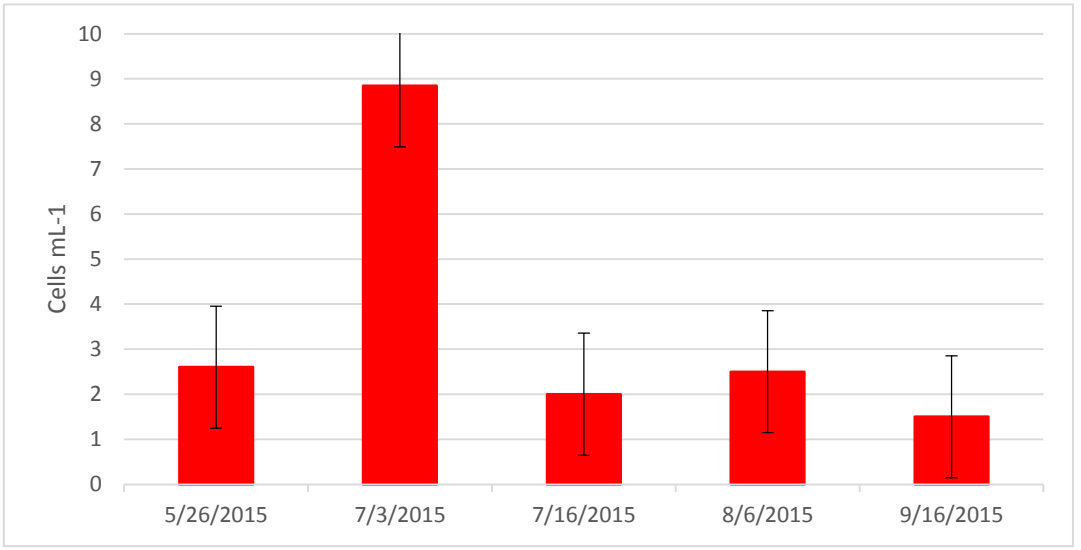
Observing non skeletal Dictyocha in the field Cowichan Bay, summer 2016

Results 2015

- 2015: the spring bloom was recorded extremely early (early March) with the dominant species being a diatom - *Skeletonema costatum*
- The majority of the phytoplankton biomass throughout the sampling season was comprised of diatoms, while the dinoflagellate contribution was unusually low and silicoflagellates and raphidophytes were almost absent
- Elevated levels of Alexandrium spp. were observed in Cowichan Bay and Ladysmith



Alexandrium spp. at the Ladysmith sites.

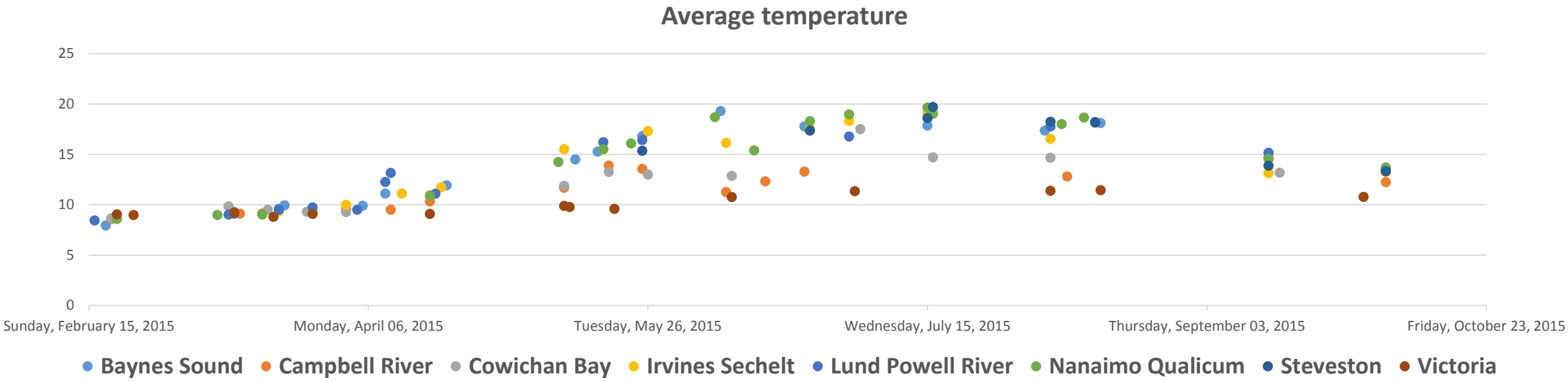


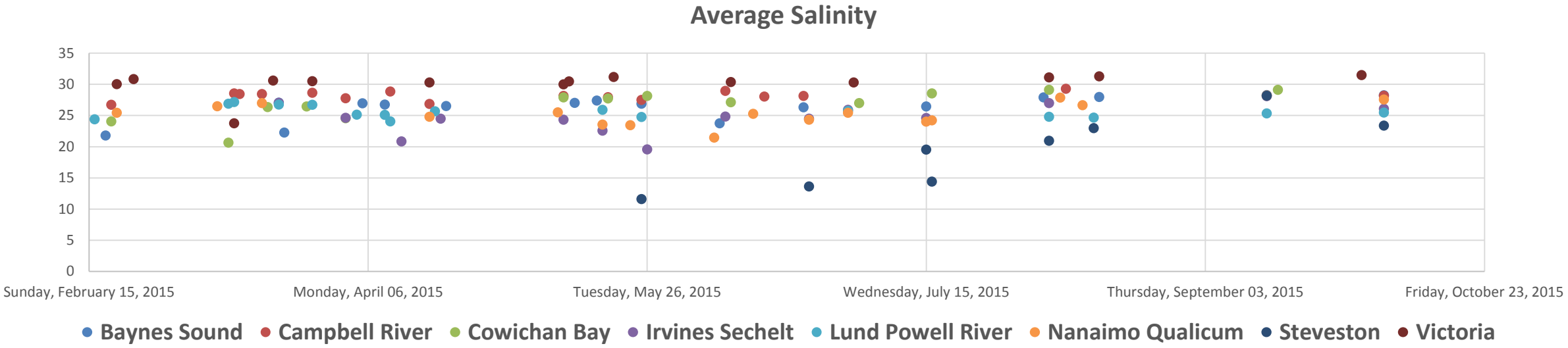
Alexandrium spp. at the Cowichan Bay sites.

Summary grid with the average biomass per area for the year 2015.

	February 18, 2015	March 12, 2015	March 20, 2015	March 27, 2015	April 4, 2015	April 11, 2015	April 18, 2015	May 11, 2015	May 18, 2015	May 25, 2015	June 9, 2015	June 16, 2015	June 24, 2015	July 1, 2015	July 15, 2015	August 6, 2015	August 14, 2015	September 14, 2015	October 5, 2015
Victoria	1.5			1.7			1.9	1.4	1.8	1.9	1.6			2.3	2.1	2.4	1.9	2.1	
Cowichan	1.5	3.3	2.2	2.0	2.2		1.5	2.1	2.1	2.0	1.8			2.5	2.9	2.7		2.4	
Nanaimo	1.5	3.6	3.0				2.2	1.8	1.8	2.0	1.6	1.8	1.5	1.5	1.6		1.6	1.5	1.6
Baynes			2.6		1.7	3.4	2.6		1.7	2.2		1.9			1.6	2.1	2.2	1.9	
Campbell	1.8	2.2	2.3	1.5	1.5	1.5	2.4	1.6	1.6	2.5	1.5	2.9	2.1	1.5	1.5	2.4			1.9
Lund	1.5	3.4	2.1	1.5	1.5	1.6	1.6	1.8	1.6	1.9	1.6			1.6	1.5	1.7	1.8	1.5	2.1
Powell	1.5	3.6	2.6	1.8	1.5	2.7	1.8	1.5	1.5	1.9	1.5			1.6	1.7	1.8	1.6	1.7	1.9
Irvine's		3.8	2.6		2.4	4.0	1.9	1.9	2.4	2.2	2.0	2.3	1.8	1.8	1.9	2.2	1.8		1.9
Steveston										2.3			2.0			2.1		1.9	1.6

Environmental data 2015



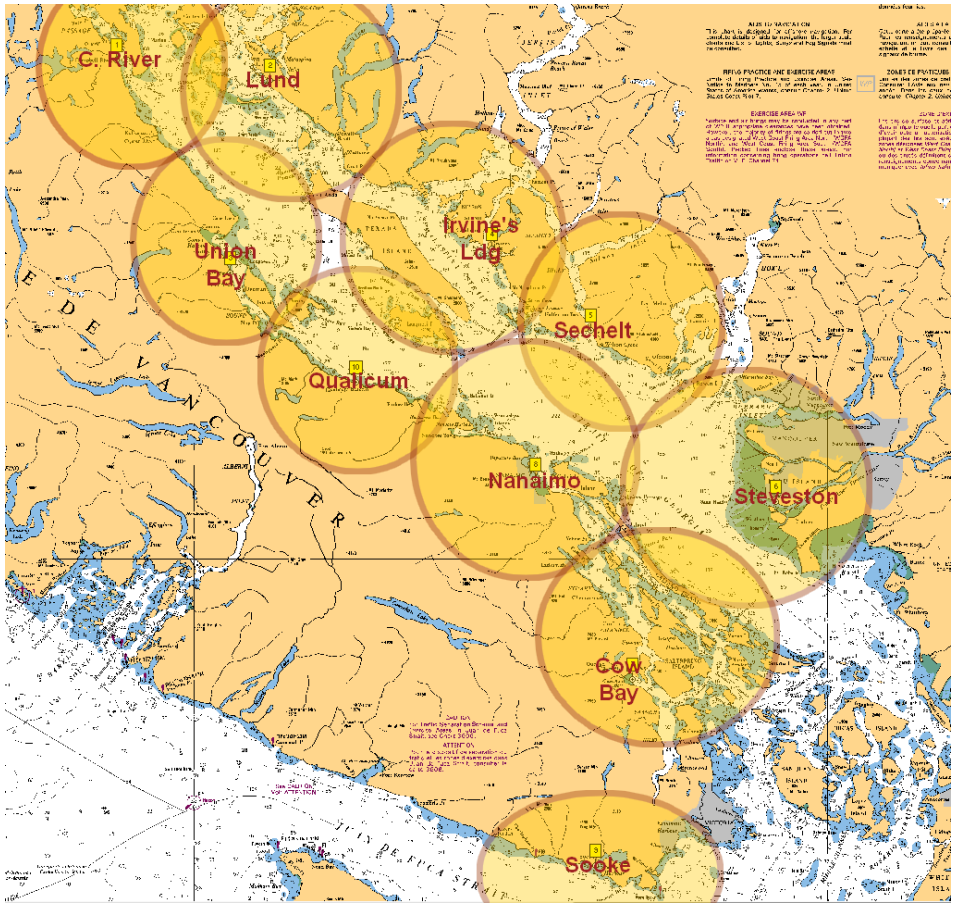


Results 2016

- The spring bloom was recorded several weeks later than in 2015 (late March, early April); there were a mixture of *Thalassiosira* spp., *Skeletonema costatum*, *Chaetoceros* spp. and its abundance in samples were often comparable
- Dinoflagellates started to appear in samples early; silicoflagellates blooms (non skeletal *Dictyocha*) in June, July
- Early *Alexandrium* spp. presence (March), not high concentrations but persistent (months) in some areas
- Blooms of *Rhizosolenia setigera*, *Ditylum brightwellii*, coccolithophores in summer

Examples of data applications

- Some areas are more likely to have certain species present (e.g. *Alexanrium* spp. is more common and abundant in Cowichan Bay and rare in Baynes Sound)
- It is possible to extract information from our data on local “windows of opportunity” for certain species
- Early warning system



Map of the Citizen Science sampling areas

Stay in touch

- Facebook page “**Phytoplankton - Citizen Science Program**” was created for informal communication between citizen scientists on the topics concerning phytoplankton in the Strait of Georgia

Thank you

- Environmental data – Ocean Networks Canada http://www.oceannetworks.ca/

- Phytoplankton data – Strait of Georgia data Center http://sogdatacentre.ca/

- Contacts:

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