

Toronto Harbour AOC Plankton Sampling 2016



Fisheries and Oceans Canada
Pêches et Océans Canada

Great Lakes Laboratory for Fisheries and Aquatic Sciences
Ecosystem Research



Status Report

- Survey plan
- Sampling accomplished
- Preliminary results
- Final report will be available when taxonomy returns for phytoplankton and zooplankton in 2017
- This report will give recommendations about status of BUI 13



Degradation of phytoplankton and zooplankton populations

REQUIRES FURTHER ASSESSMENT

“When phytoplankton and zooplankton community structure does not significantly diverge from unimpacted control sites of comparable physical and chemical characteristics. Further, in the absence of community structure data, this use will be considered restored when phytoplankton and zooplankton bioassays confirm no significant toxicity in ambient waters” (IJC, 1991).

Existing Reports

- Currie and Koops (2014). Report on the feasibility of using MOE index plankton samples to evaluate BUI 13: Degradation of Phytoplankton and Zooplankton Populations for Toronto Harbour Area of Concern
- Currie, Bowen and Niblock (2015). A lower trophic ecosystem assessment during September 2013 of the Toronto Harbour Area of Concern.
- Currie, W.J.S. Bowen, K.L., Niblock, H.A. and Koops. M.A. 2015. Compilation and evaluation of historical data and samples to support assessment of phytoplankton and zooplankton populations in Great Lakes Areas of Concern. Can. Tech. Rep. Fish. Aquat. Sci. 3150: v + 152p.

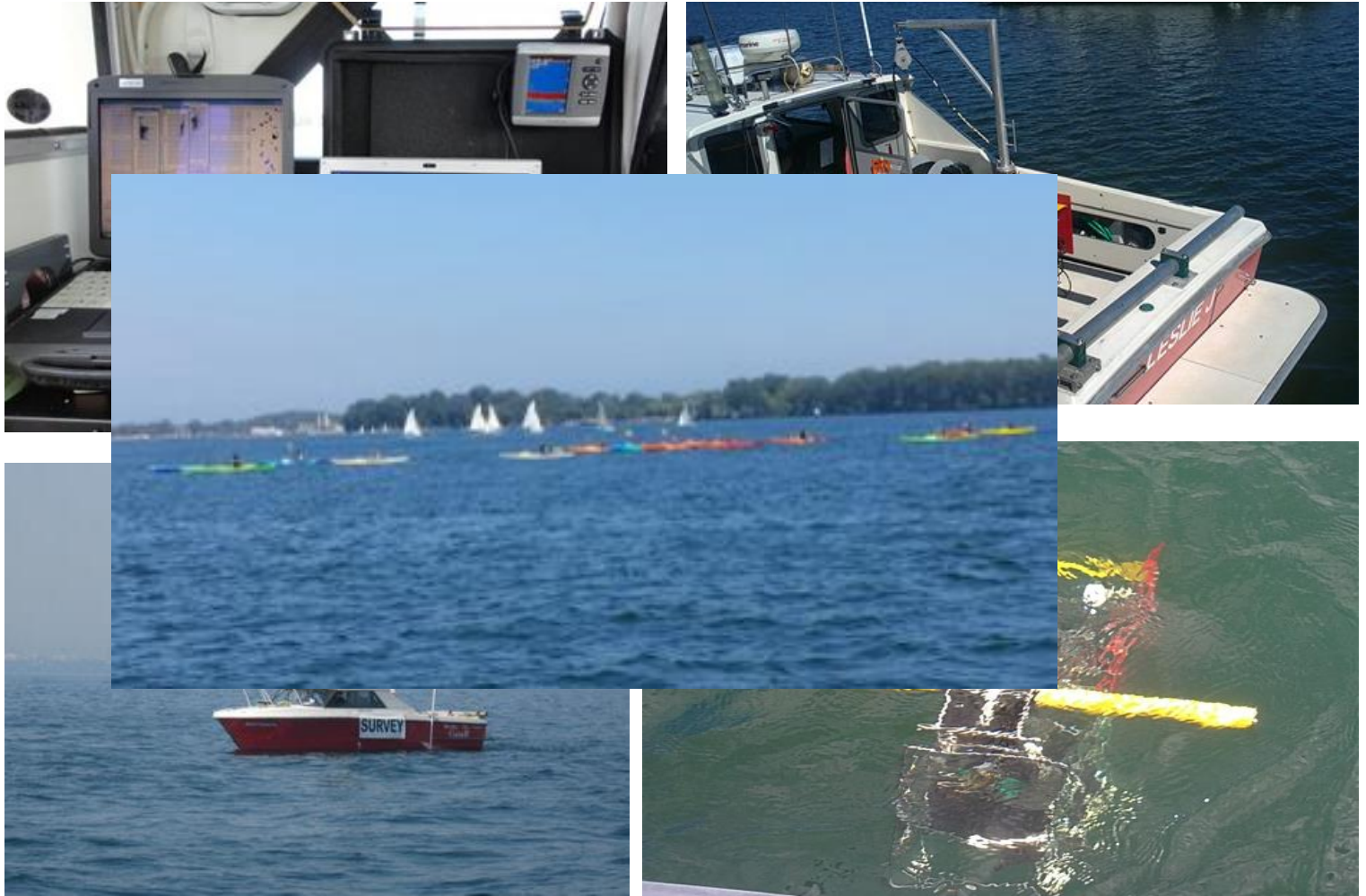
The 2016 Survey

- Currie et al. 2015 recommended a full growing season survey of Toronto Region
- Geographic scope limited to Humber Bay, Inner Harbour, Outer Harbour and Ashbridges Bay
- 11 stations for phytoplankton, zooplankton and microbial community collections
- Continuous tow of EXO2 sonde



Laser Optical Plankton Counter (LOPC) on an Acrobat Towbody

S*patially*
H*igh-*
R*esolution*
I*ntensive*
M*apping*
P*lankton*
A*rray*



YSI EXO2 sonde

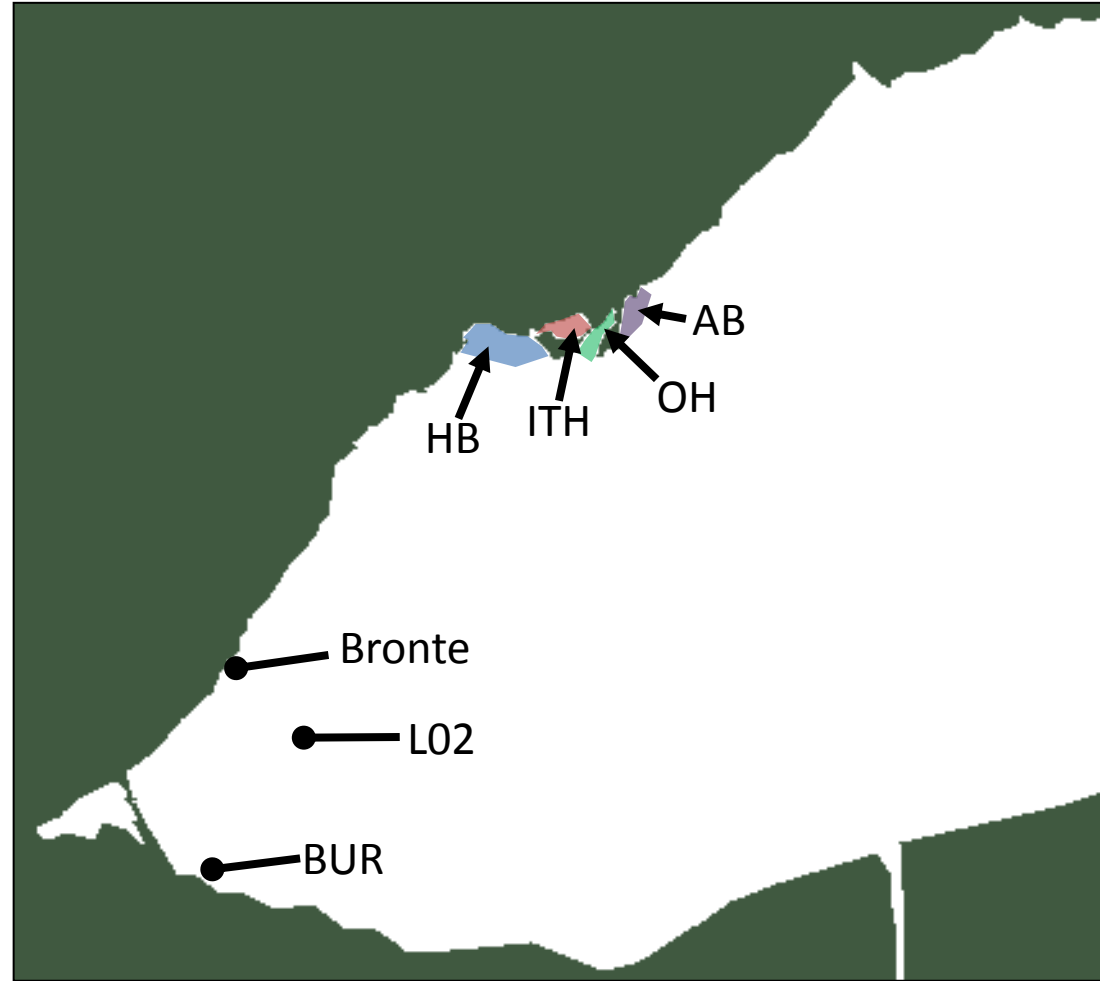
- Temperature
- Depth
- Conductivity
- pH
- Chlorophyll-a
- Phycocyanin
- fDOM (CDOM)
- Turbidity



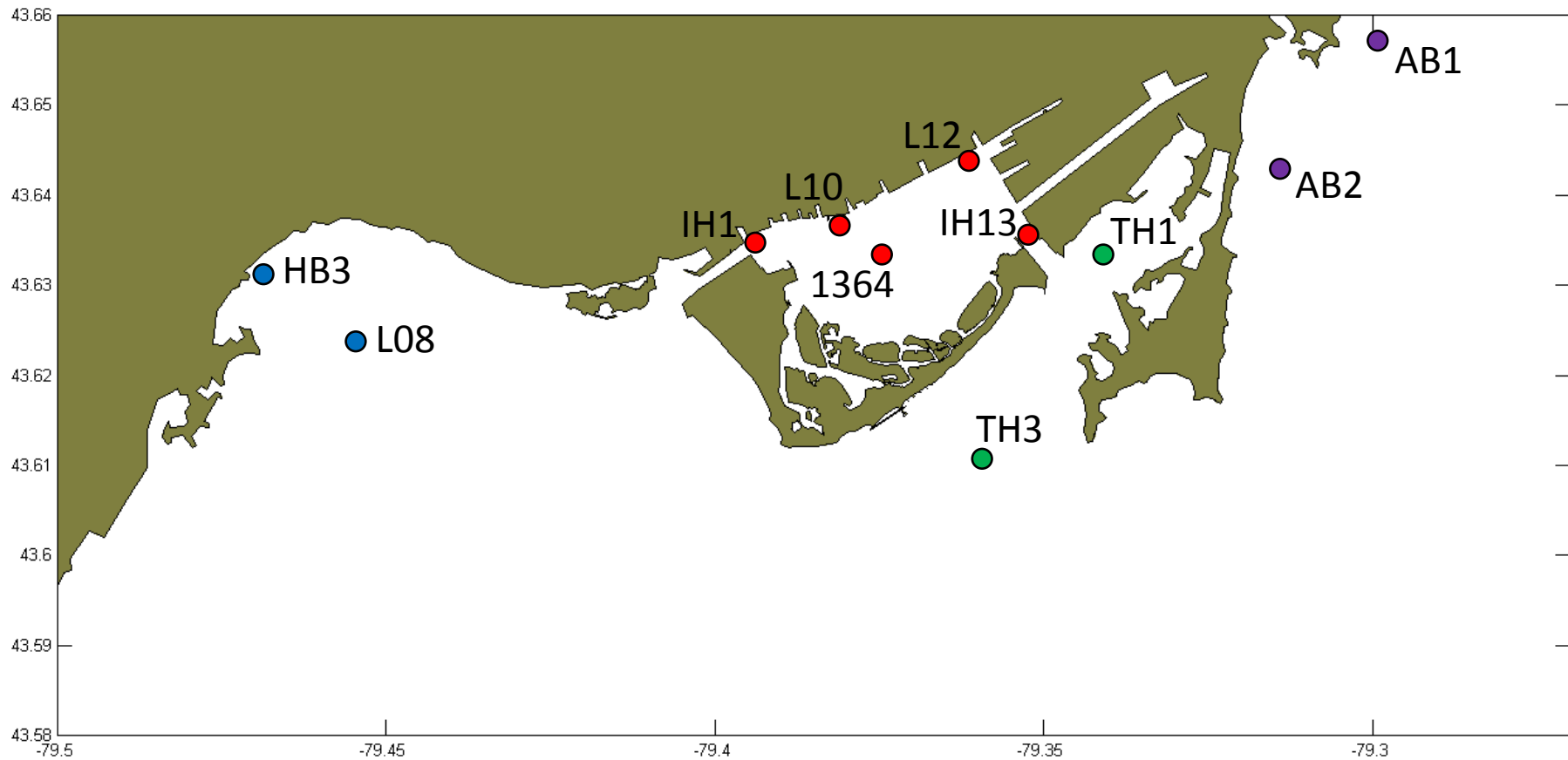
Georeferenced tow using depressor at mid-epilimnion depths 1.5-3 m.

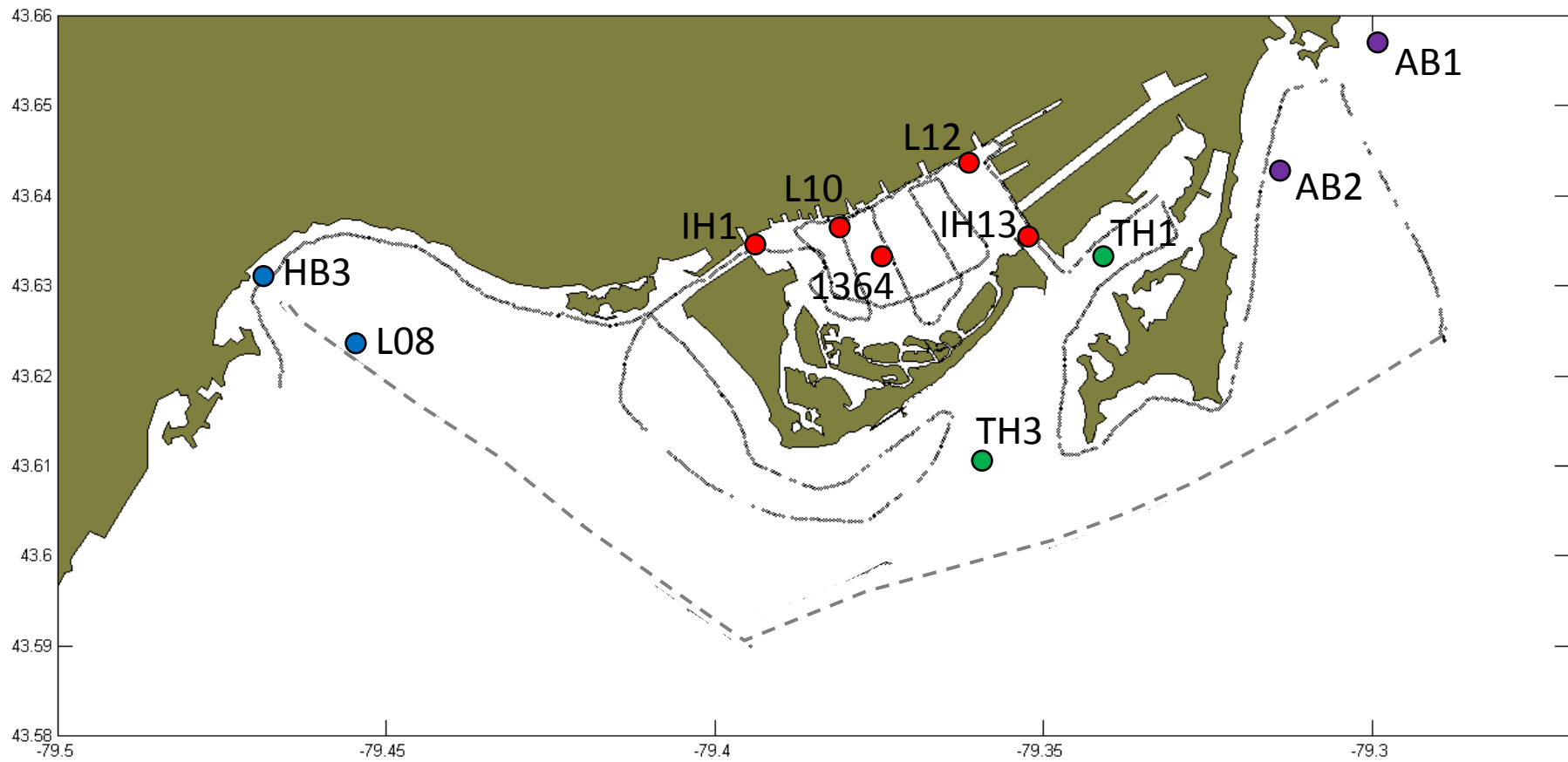
Toronto Sampling

- 11 stations
- Monthly sampling
May-Oct (Nov)
- Sampling day was
0730 till ~ 1930
- Days were selected
to have wave
heights < 0.5 m

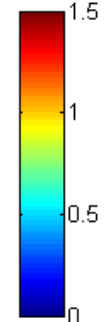
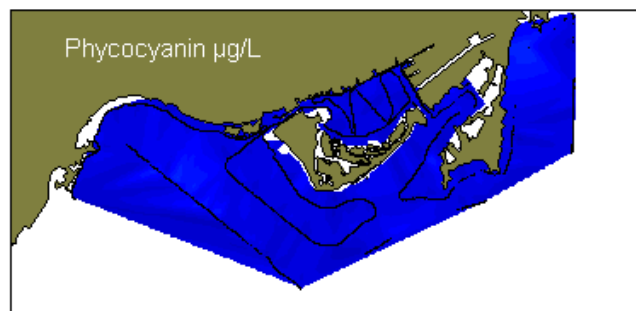
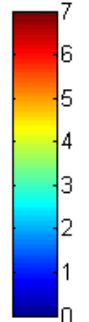
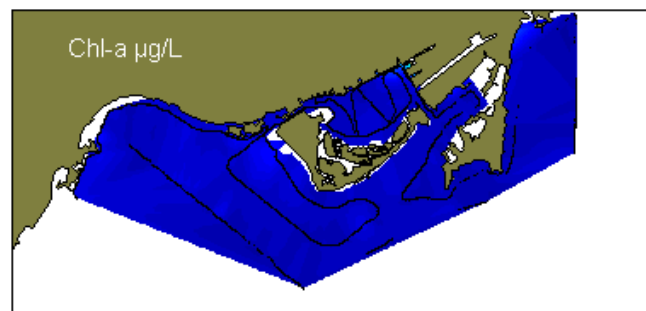
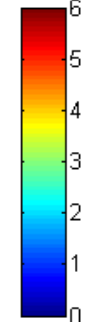
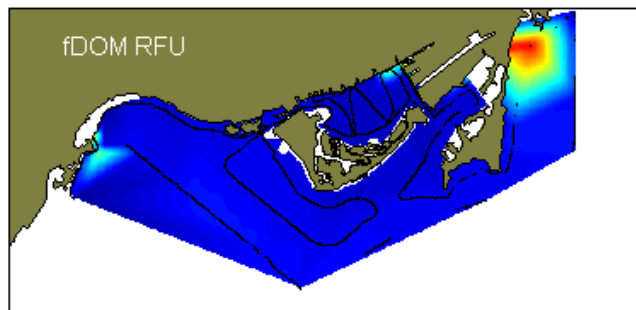
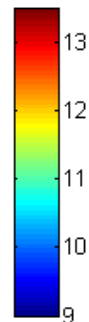
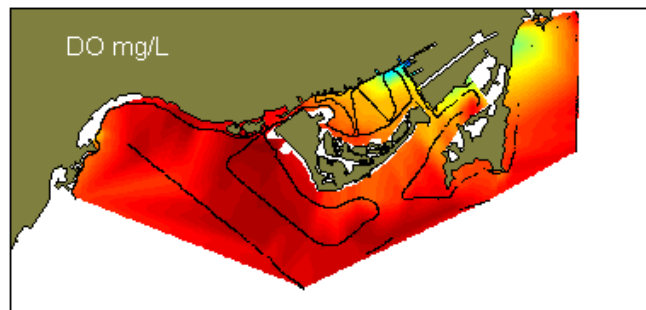
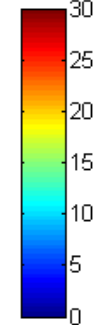
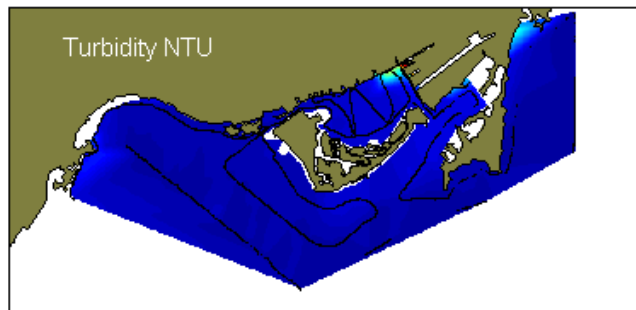
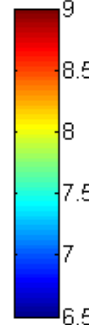
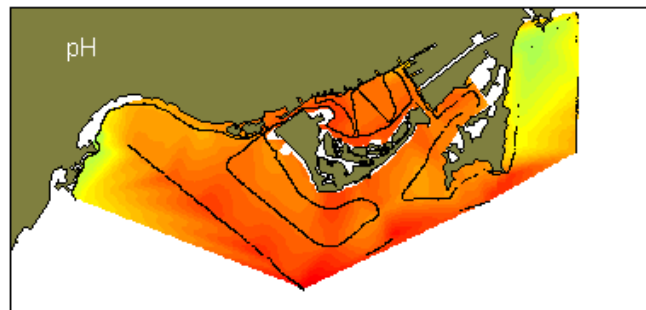
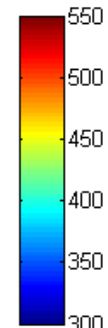
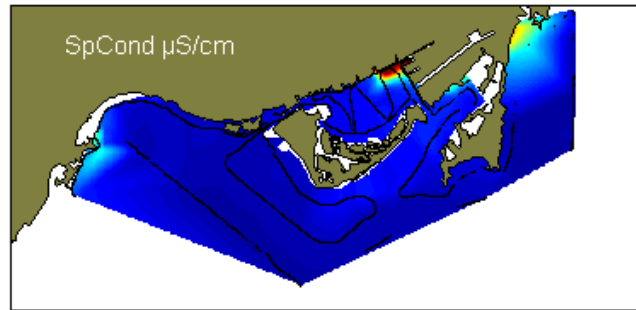
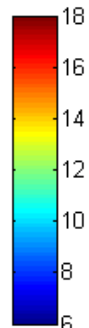
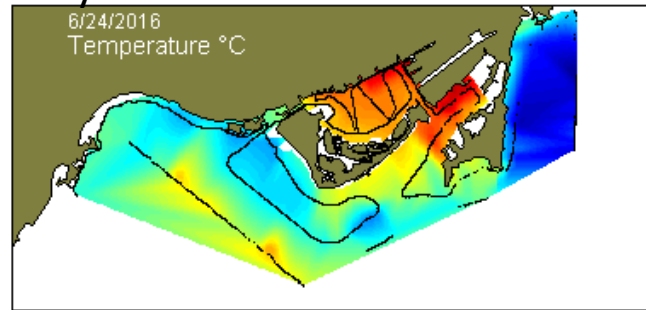


“Reference” station at Bronte added in addition to the Hamilton Nearshore Offshore Transect (HNOT) stations L02 and BUR also sampled monthly

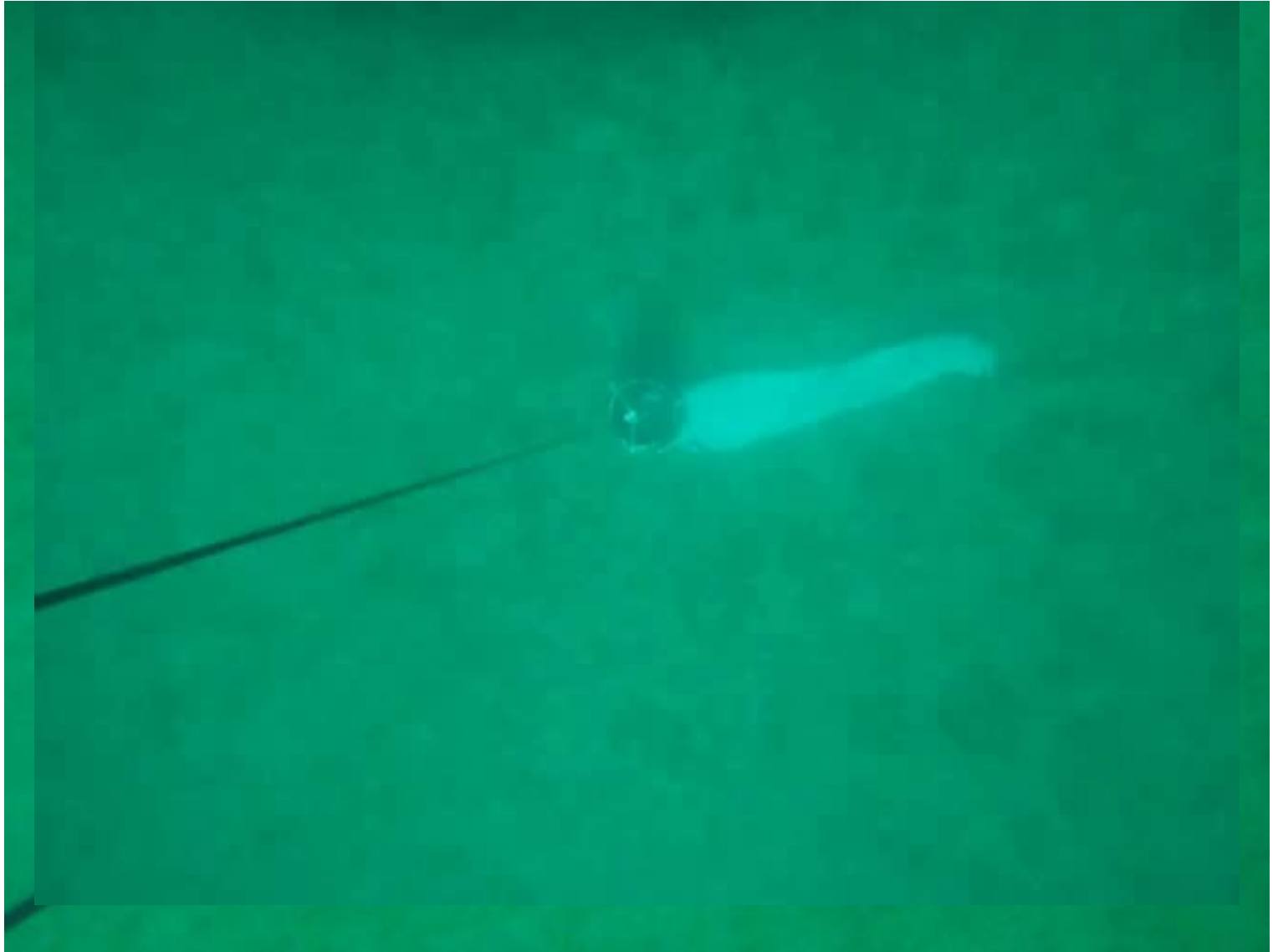




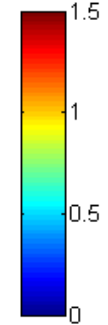
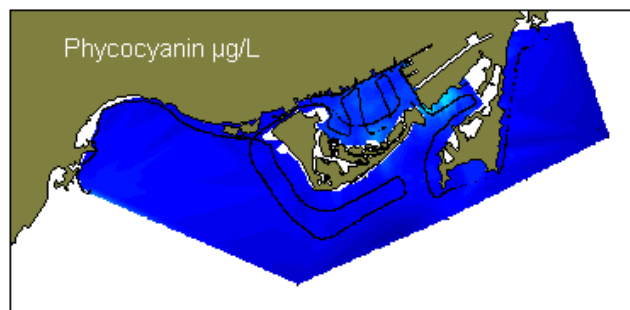
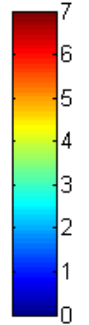
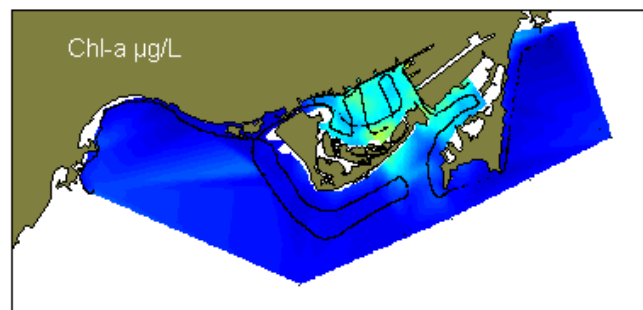
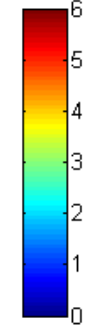
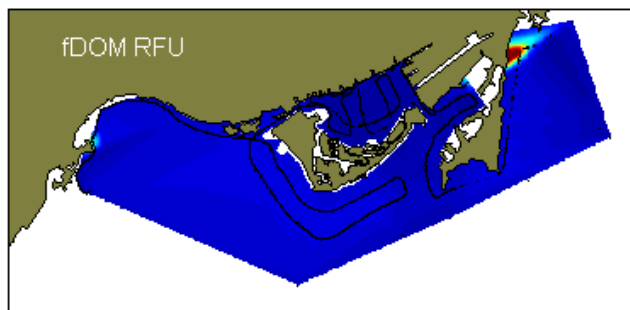
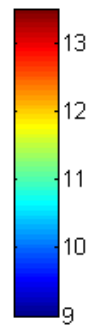
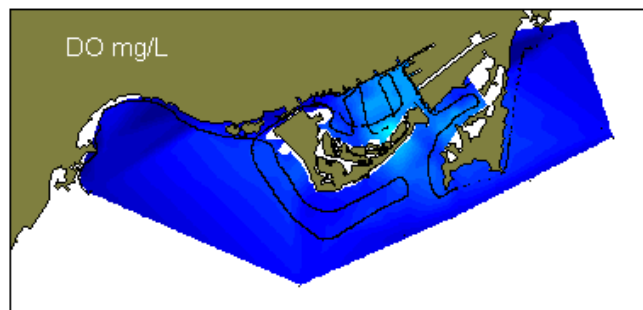
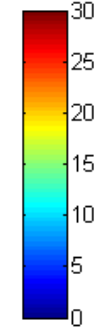
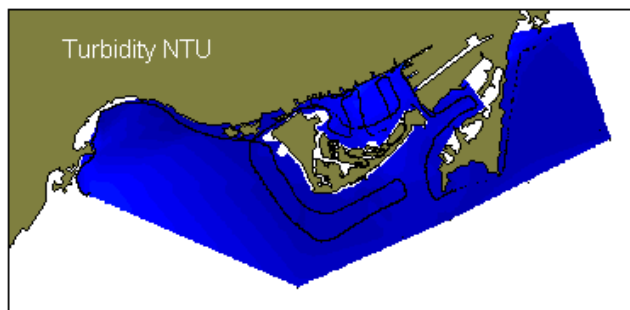
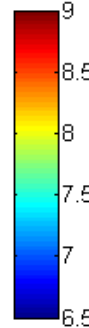
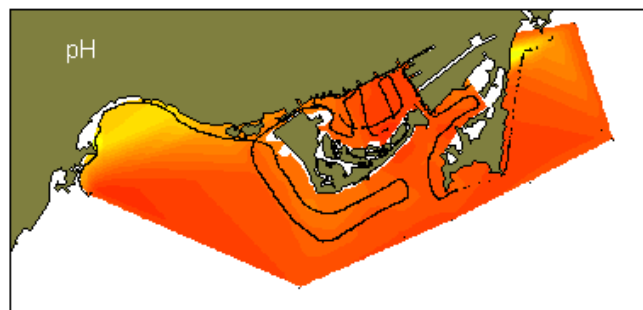
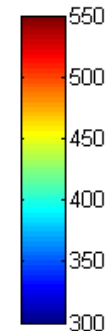
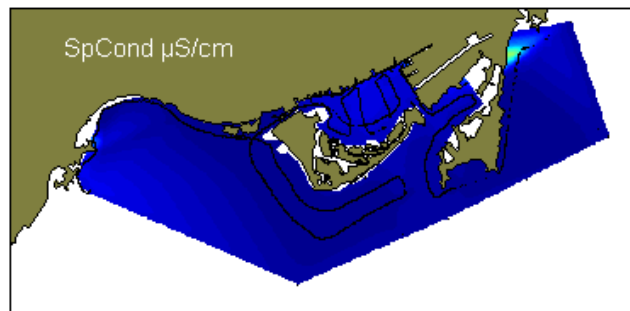
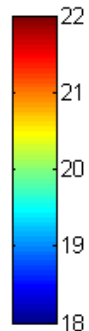
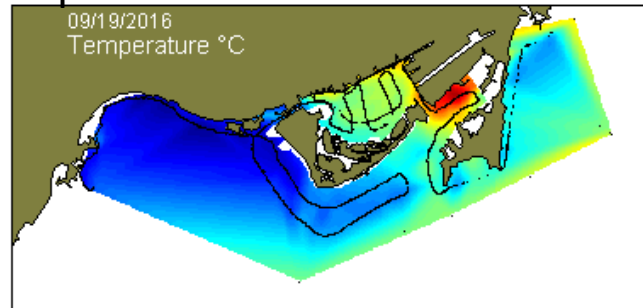
May 2016



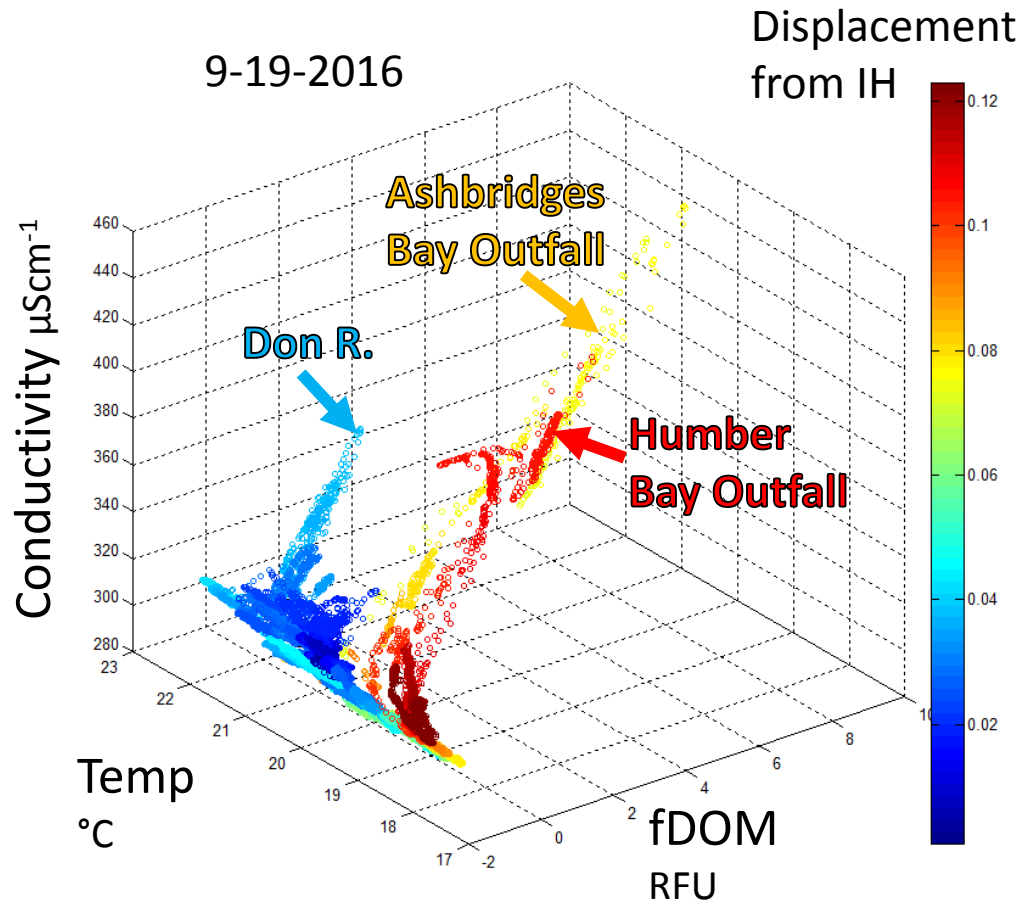
Ashbridges Bay June 2016



Sept 2016



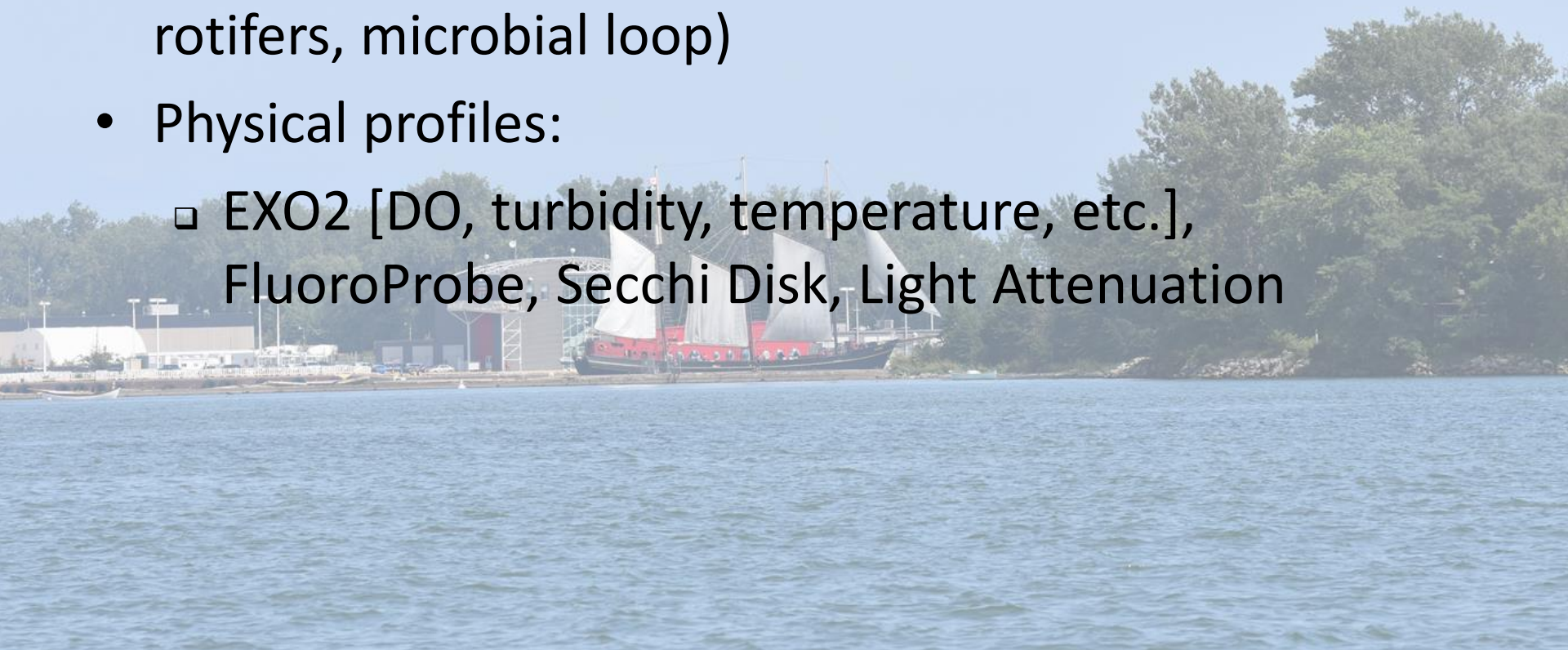
Ordination of towed data



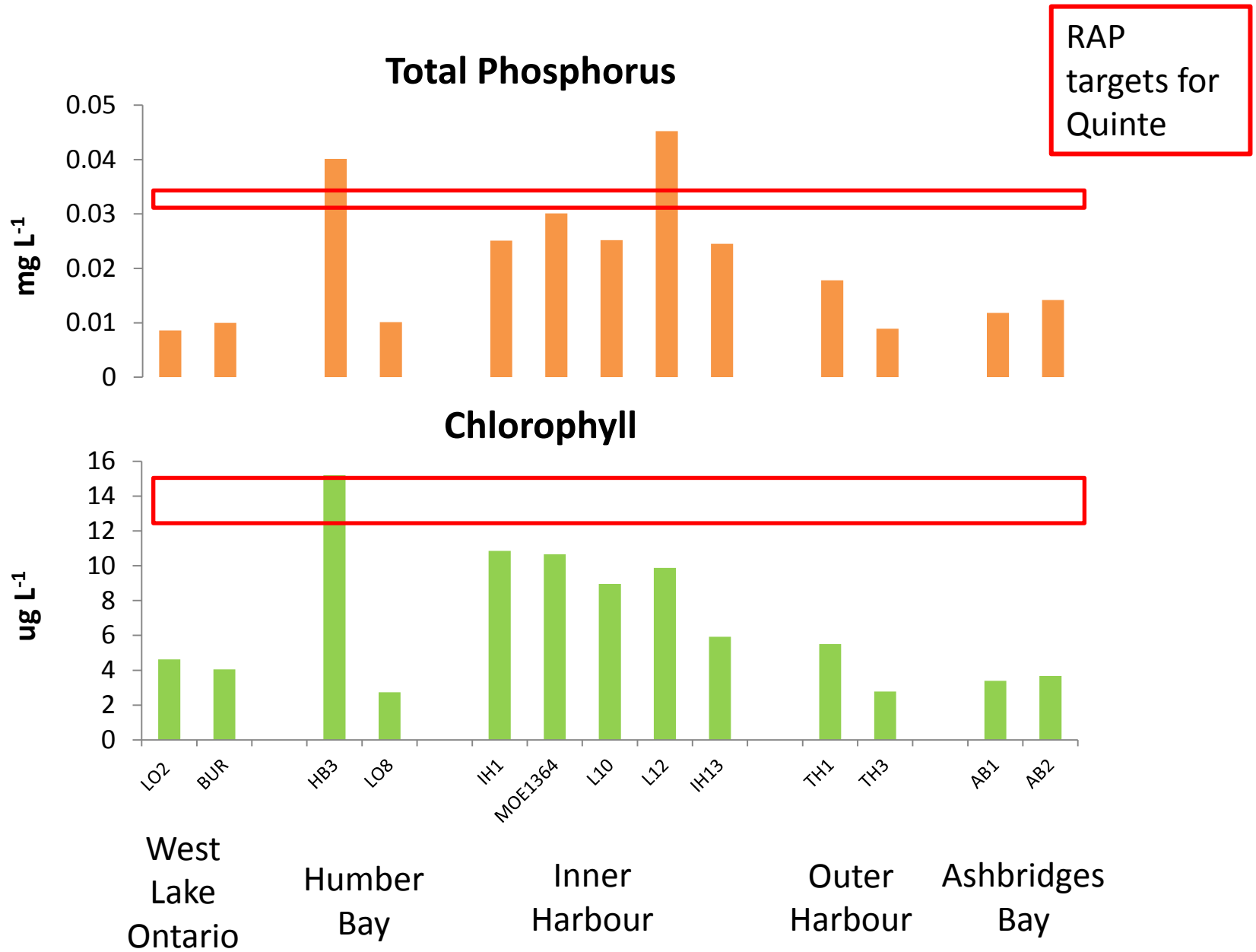
2016 Point Sampling

Parameters

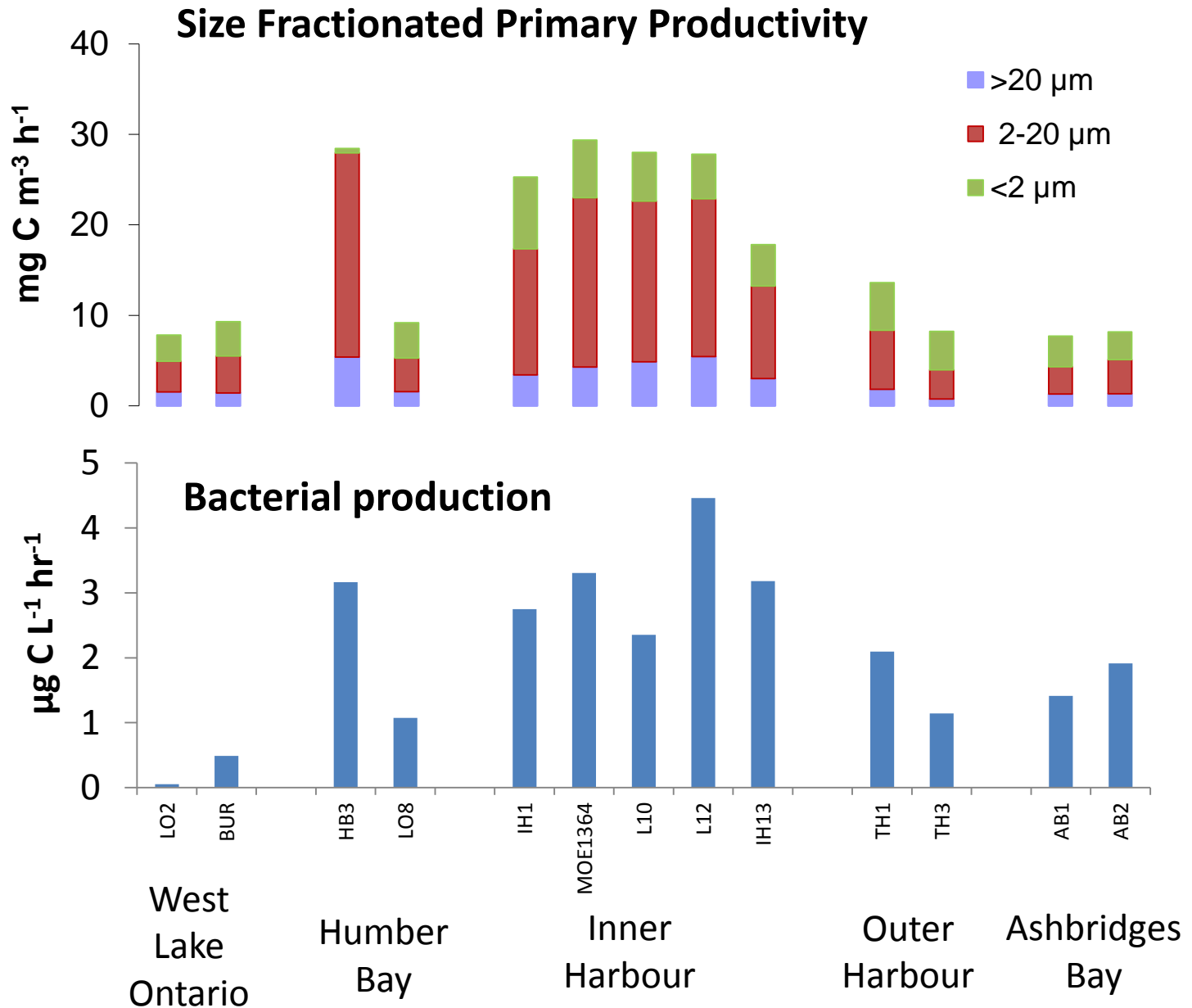
- Nutrients & Chlorophyll
- Productivity (phytoplankton and bacteria)
- Taxonomy (phytoplankton, zooplankton, rotifers, microbial loop)
- Physical profiles:
 - EXO2 [DO, turbidity, temperature, etc.], FluoroProbe, Secchi Disk, Light Attenuation



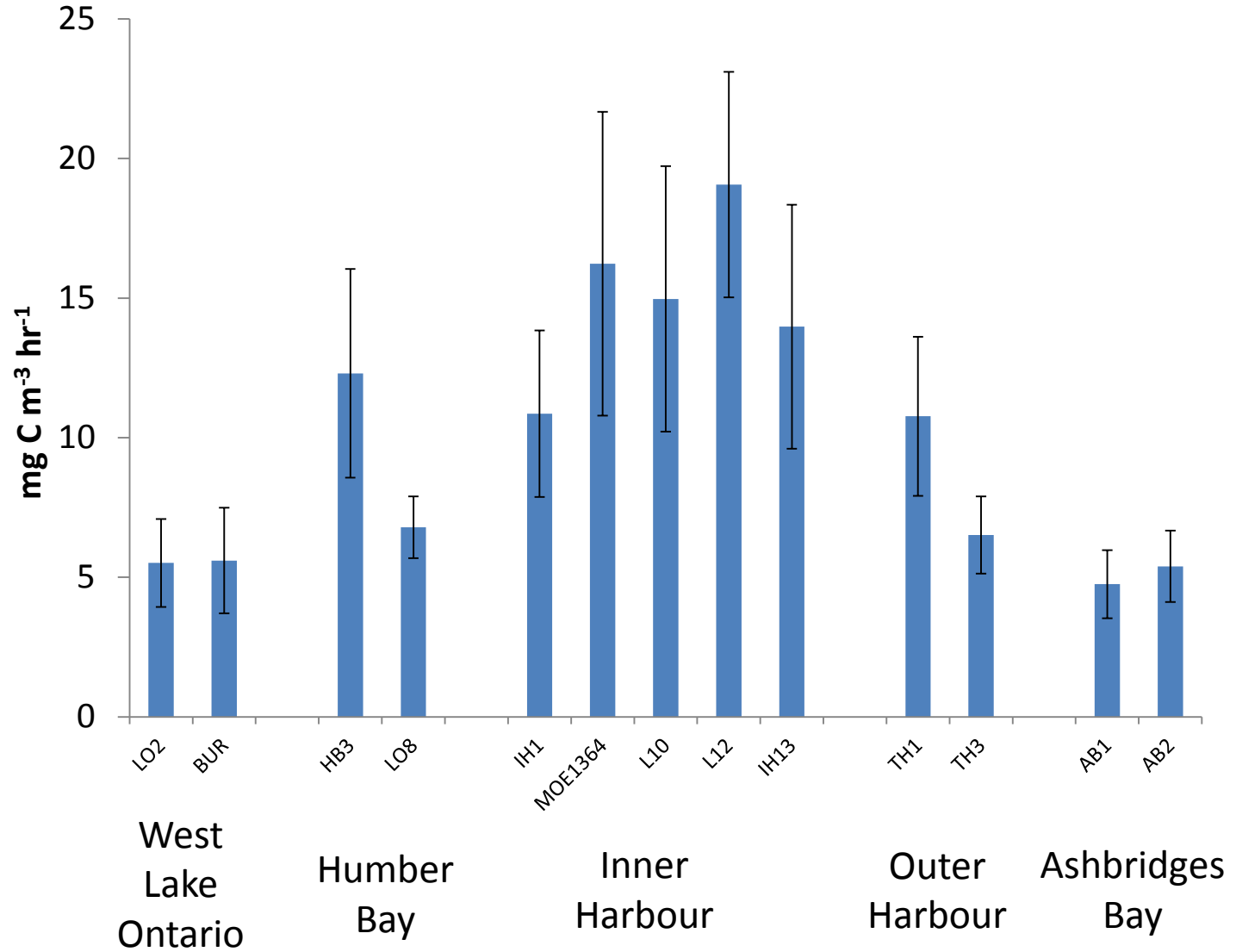
August 2016 Example



August 2016 Example



2016 Seasonal Average Productivity



Humber Bay

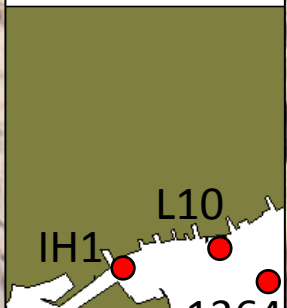


Ashbridges Bay



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August 2016



43.63

43.62

43.61

● L08

IH1

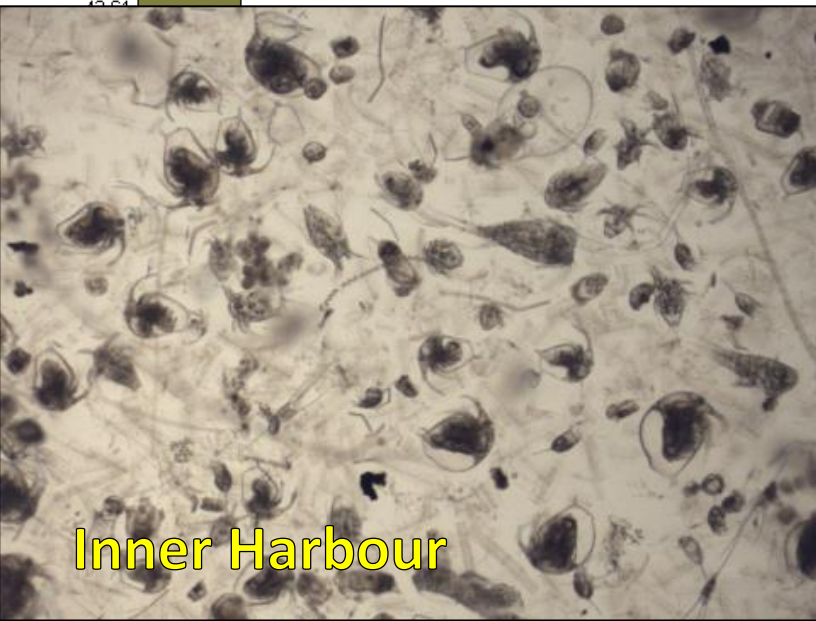
L10

1364

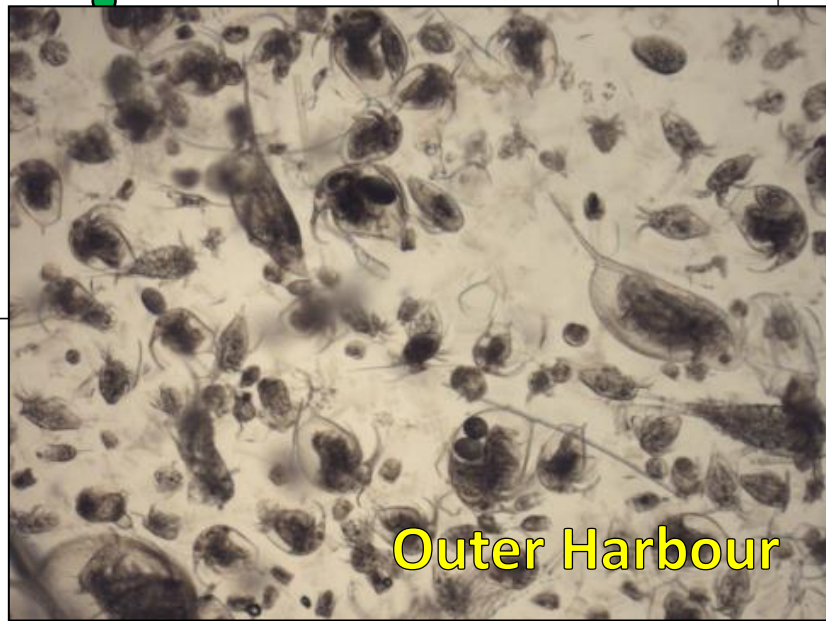
TH3

-79.4

Inner Harbour



Outer Harbour



Zooplankton and Rotifers

- Counts and taxonomy will be finalized April 2017
- Preliminary observation suggest that Toronto Inner Harbour has similar densities of rotifers to other sites, but is almost lacking in macrozooplankton
- Densities and composition of zooplankton will be compared between sites and the samples collected at Bronte and the HNOT stations

A Team Effort

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Robin Roson

Co-op Students

Mohi Munawar
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