



Eyes Over Puget Sound

An aerial photograph of a large body of water, likely Puget Sound, showing a central island with dense green forest and some buildings. The water is a deep blue-green color. A white wake is visible in the water.

Surface Conditions Report April 2011

Eyes Over Puget Sound



Observations between Olympia and Seattle

ftp://www.ecy.wa.gov/eap/Flight_Blog/

Contents:

In this April edition we highlight:

- **Satellite and Victoria Clipper data collected en route between Seattle and Victoria.**
- **Observations supported with mooring measurements made in Whidbey Basin.**

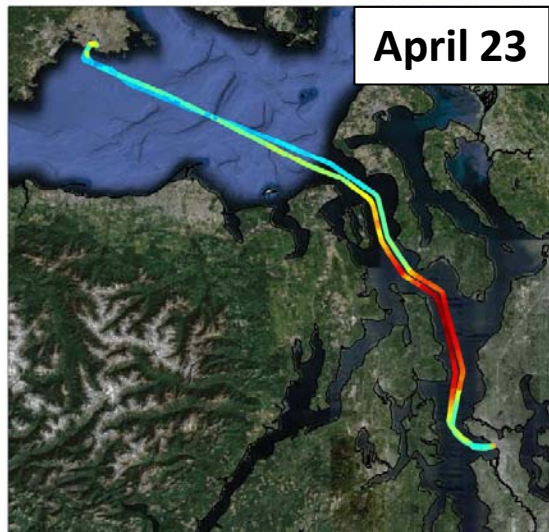
Flight information:

Due to La Niña and low cloud cover, aerial observations have been challenging this year. We anticipate that visibility will improve for May.

Victoria Clipper detects strong algal bloom in Main Basin of Puget Sound in April 2011

- Clear skies and fresh/nutrient-rich water from Whidbey Basin has stimulated a large algae bloom in central Puget Sound.
- Whidbey Basin water is noticeably more turbid and associated with increased colored dissolved organic matter (CDOM) fluorescence.

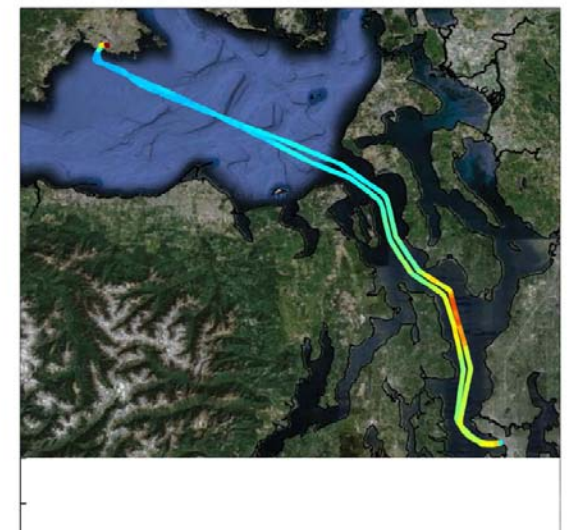
Algal Biomass (Chlorophyll Fluor.)



Water Clarity (Turbidity)



Freshwater Influence (CDOM Fluor.)



[Description of Ecology's Ferry Monitoring Program](http://www.turnerdesigns.com/newsletter/newsletter_0311_full.html#iia)

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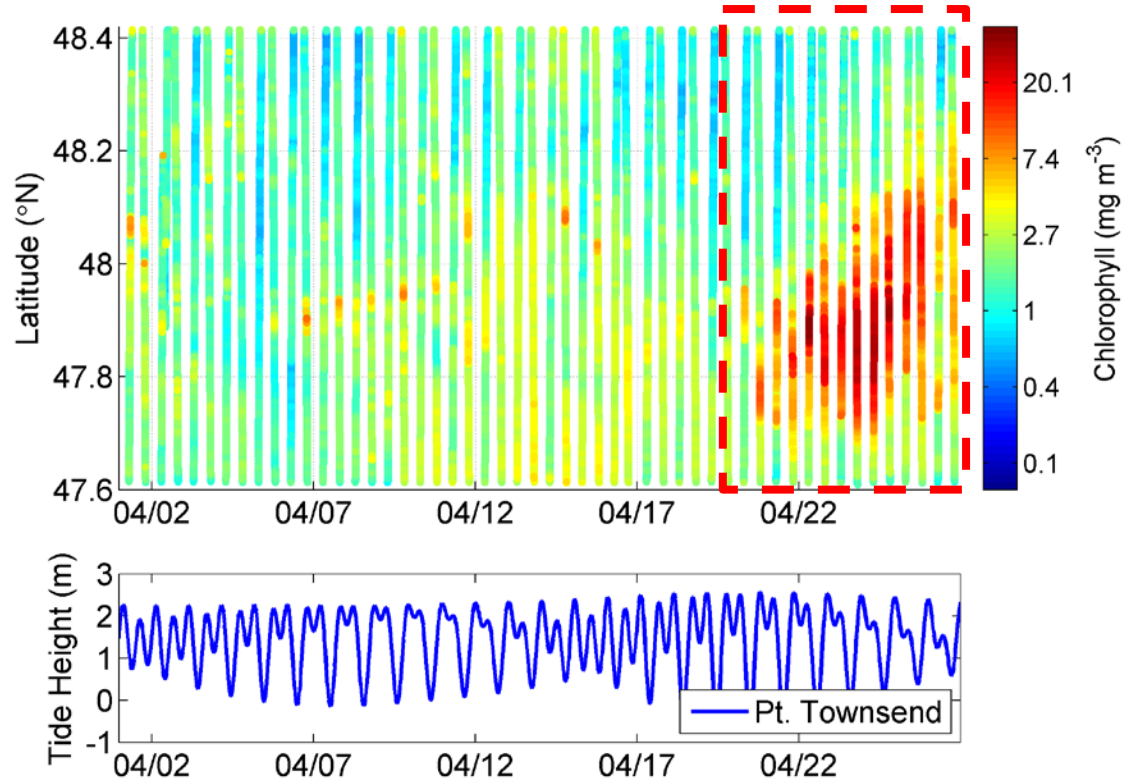
Additional Information: Brandon Sackmann, PhD (bsac461@ecy.wa.gov)

Possession Sound (a) bloom (↓) and frontal systems (↓) near Mukilteo-Clinton moving north with the tide (b, c)

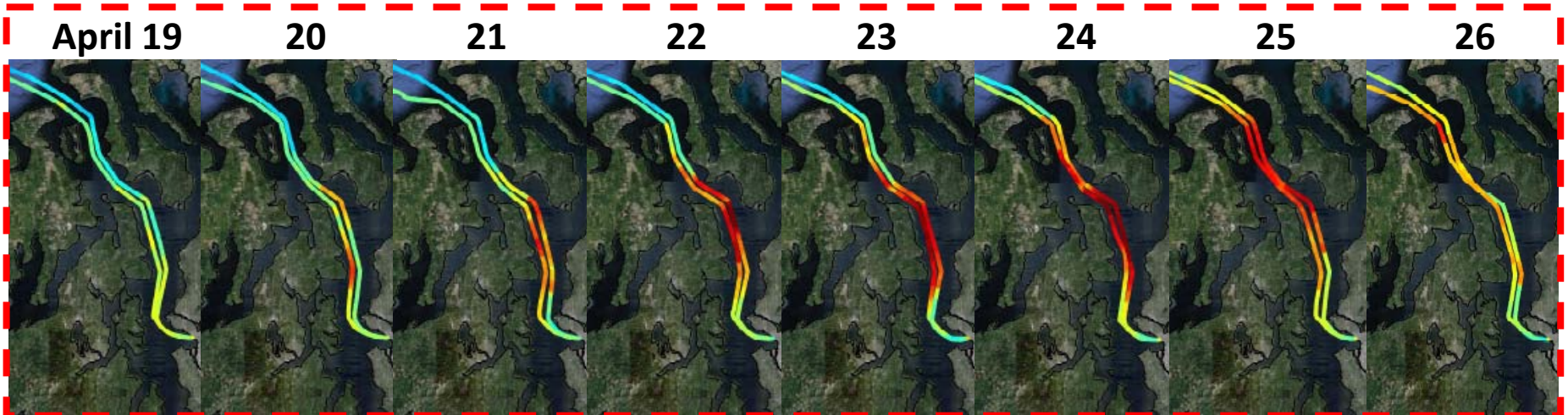
a)



Evolution of April 2011 spring bloom in Puget Sound

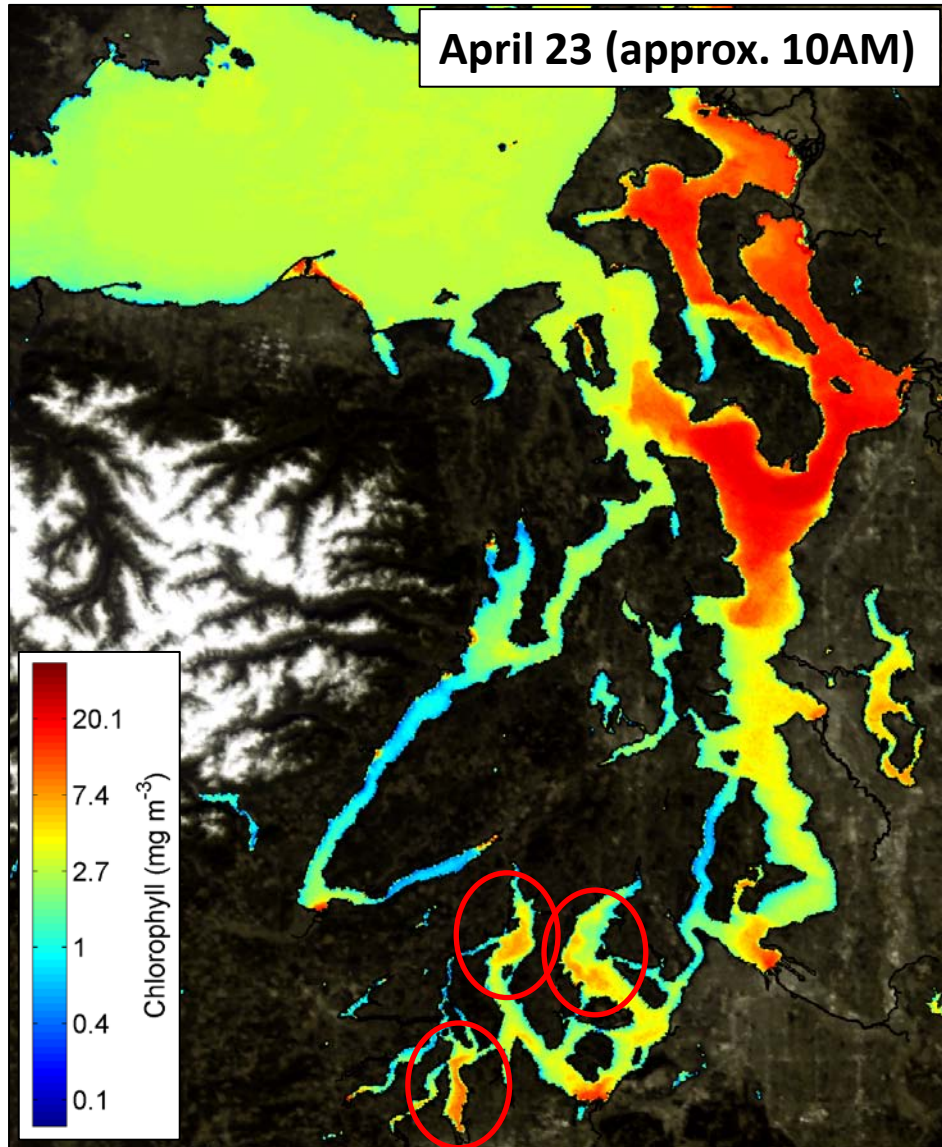


Daily snapshots...

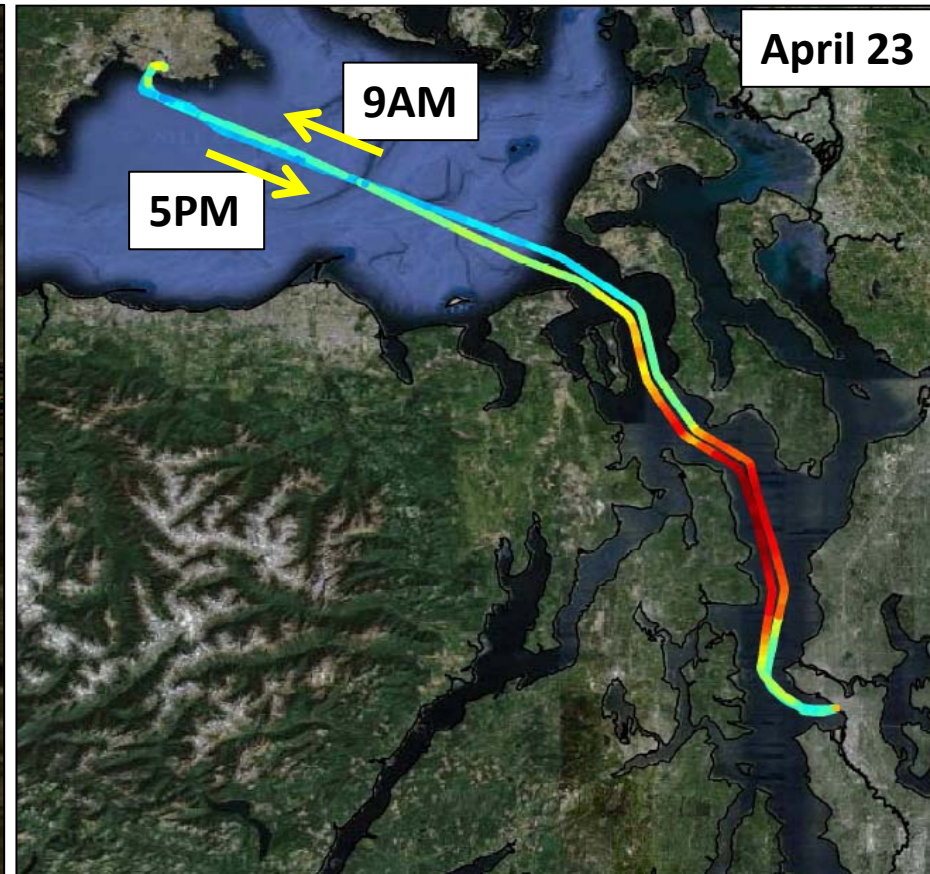


Satellite helps map spatial extent of spring bloom

MERIS Ocean Color – Chlorophyll

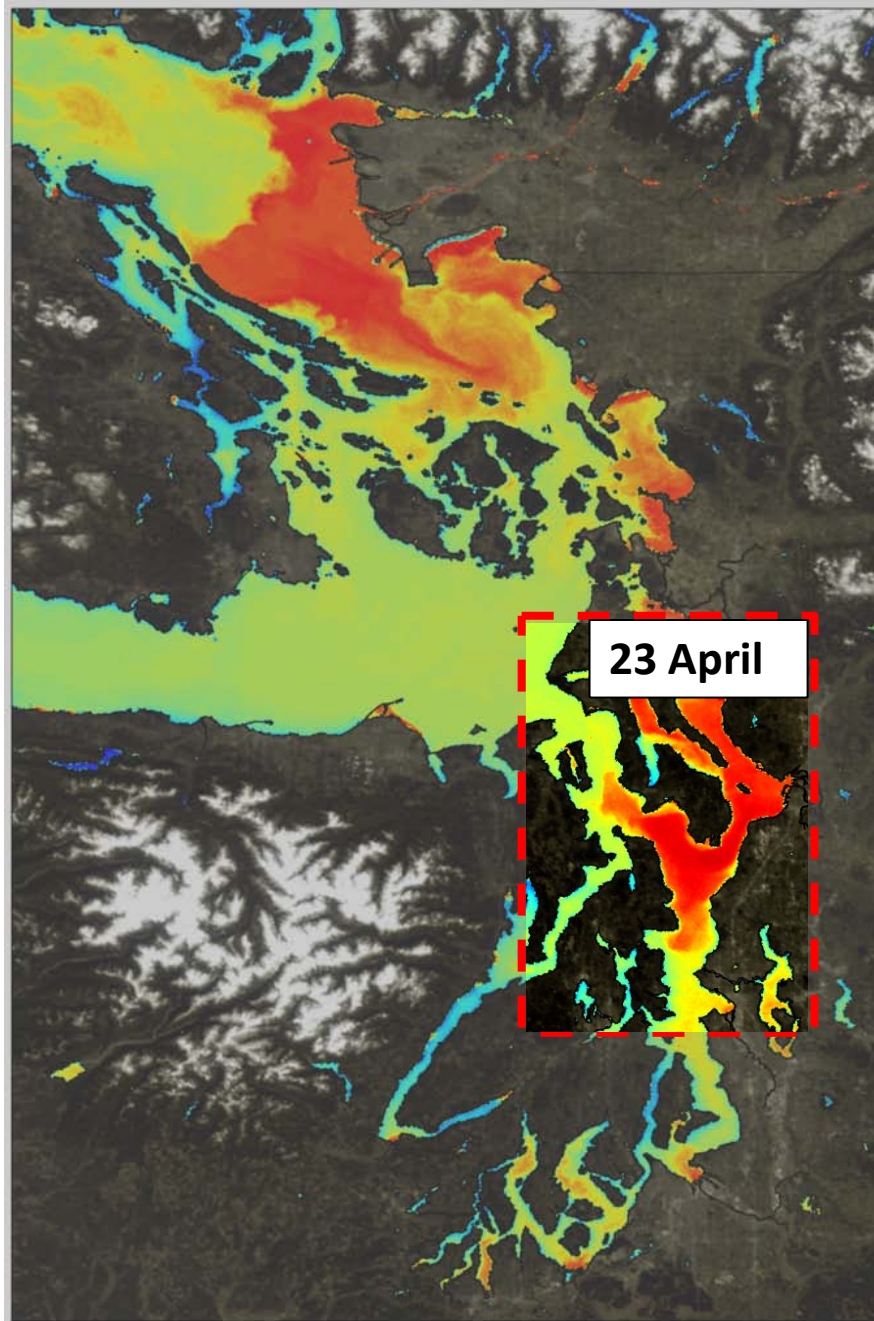


Victoria Clipper – Chlorophyll Fluorescence



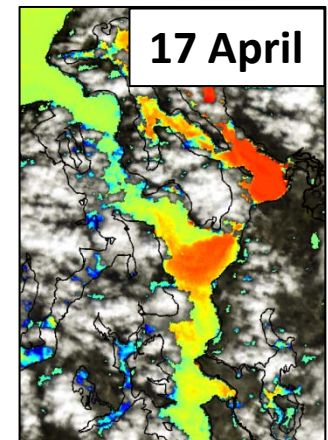
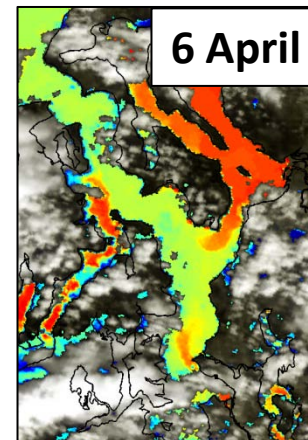
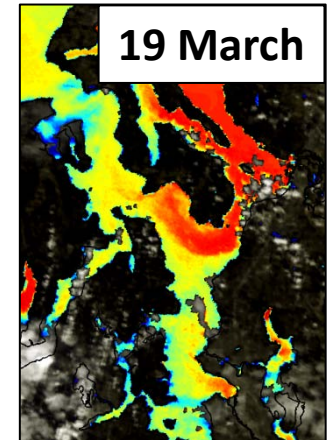
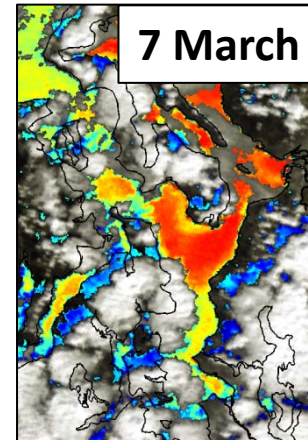
- Agreement between V. Clipper chlorophyll fluorescence and MERIS ocean color data.
- Smaller algae blooms seen in Carr, Case, and Budd Inlets.

MERIS Satellite Ocean Color – Chlorophyll



This year's early blooms

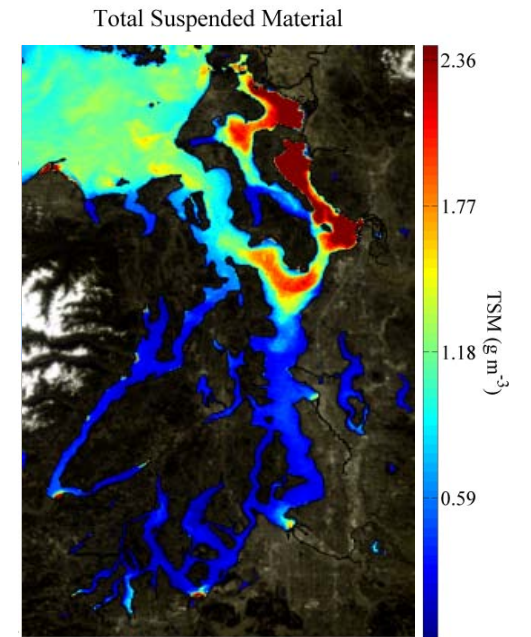
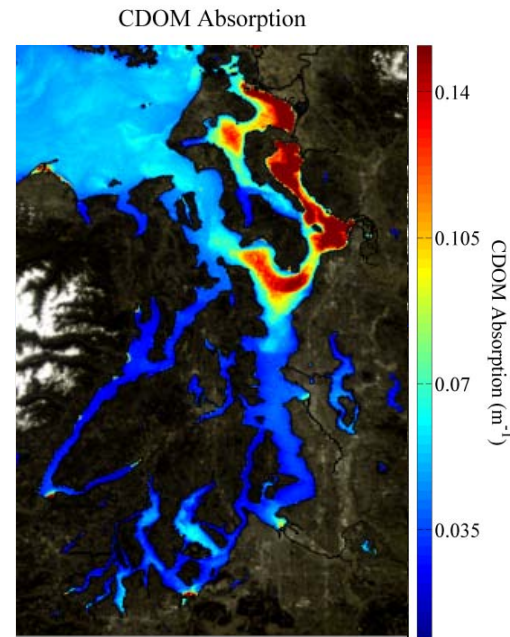
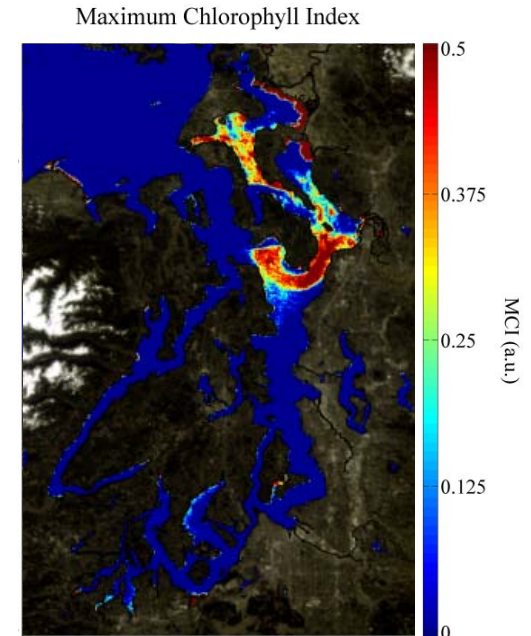
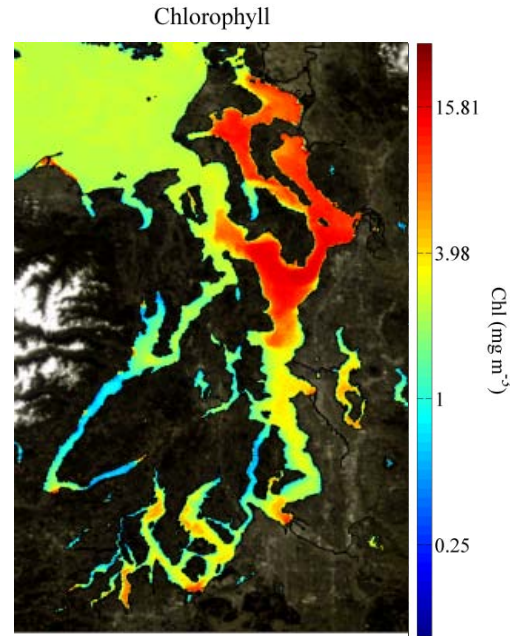
- Nutrient-rich water from Whidbey Basin often spreads through central sound.
- Fresh water leads to stratified conditions and encourages algae blooms.



Satellite products used to help assess water quality

- Chlorophyll, Maximum Chlorophyll Index (MCI, sensitive to high algae concentrations), CDOM Absorption, and Total Suspended Material reveal different information

MERIS True Color



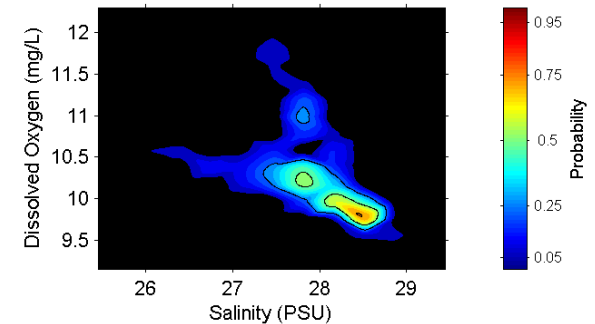
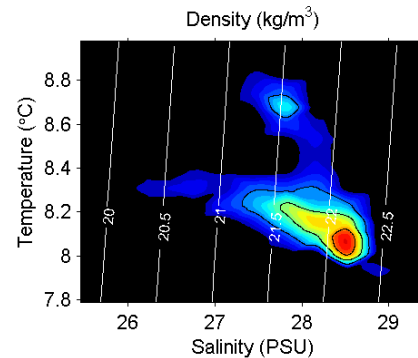
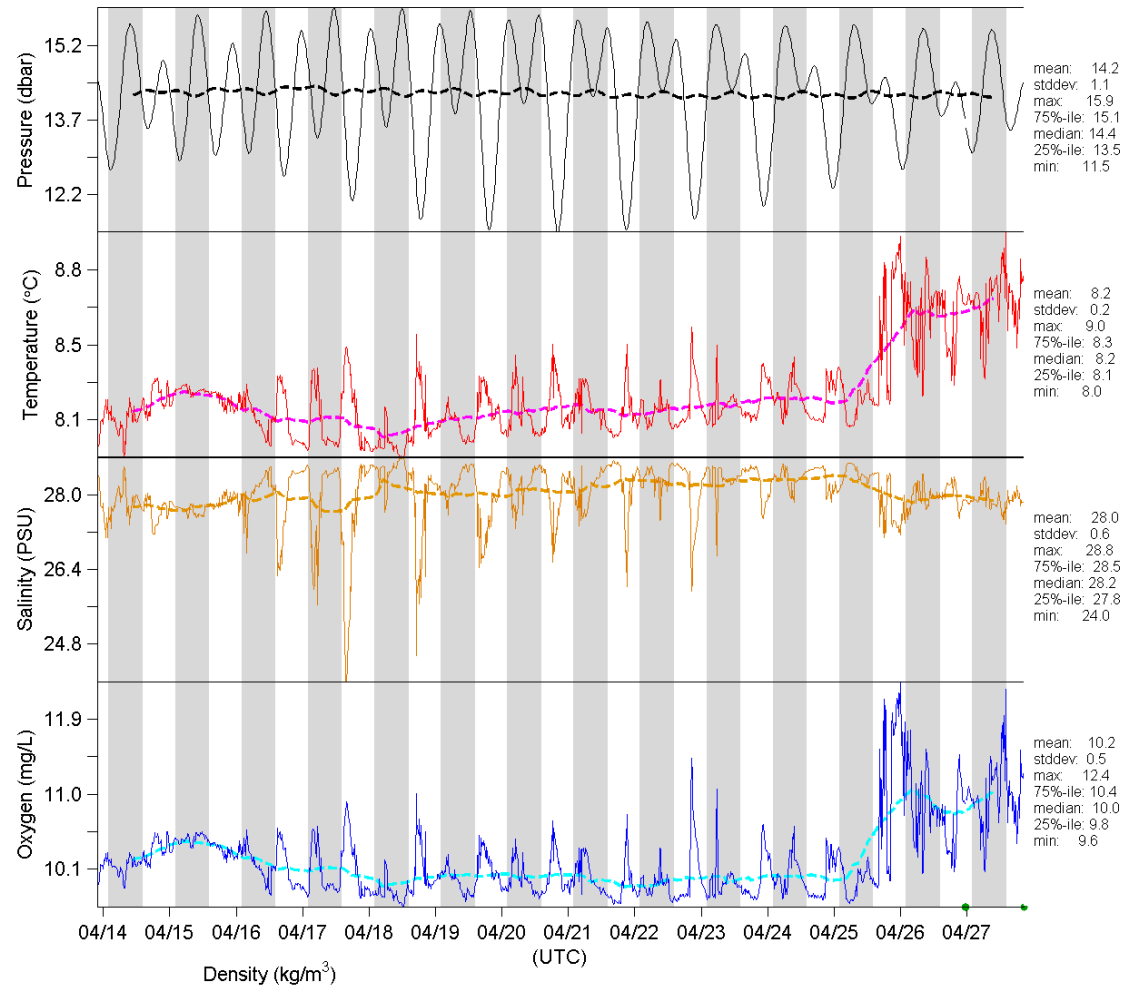
Ecology

Mooring data April 13-27, 2010 Possession Sound

Oxygen levels >10mg/L
in the surface layer
(0- 16m) in Possession
Sound support satellite
images showing a strong
spring bloom in Whidbey
Basin and Central Basin.

Warmer and sunnier
conditions on 4/26 give
rise to enhanced oxygen
production and algae
growth.

MUK01BR Mukilteo (Near Bottom, Rigid)



Top panels: Two-week time series and 24 h avg. (12/12 h day/night cycle in local time shown by gray bands).
Green dots superimposed onto x-axis are periods of missing data.
Bottom left: Probability of finding a specific density over the past two-week period. High probability shown in warm colors.
Bottom right: Dissolved oxygen concentration in relation to salinity. High probability shown in warm colors

<http://www.ecy.wa.gov/apps/eap/marinewq/moorings/MUK01.asp#tab1>



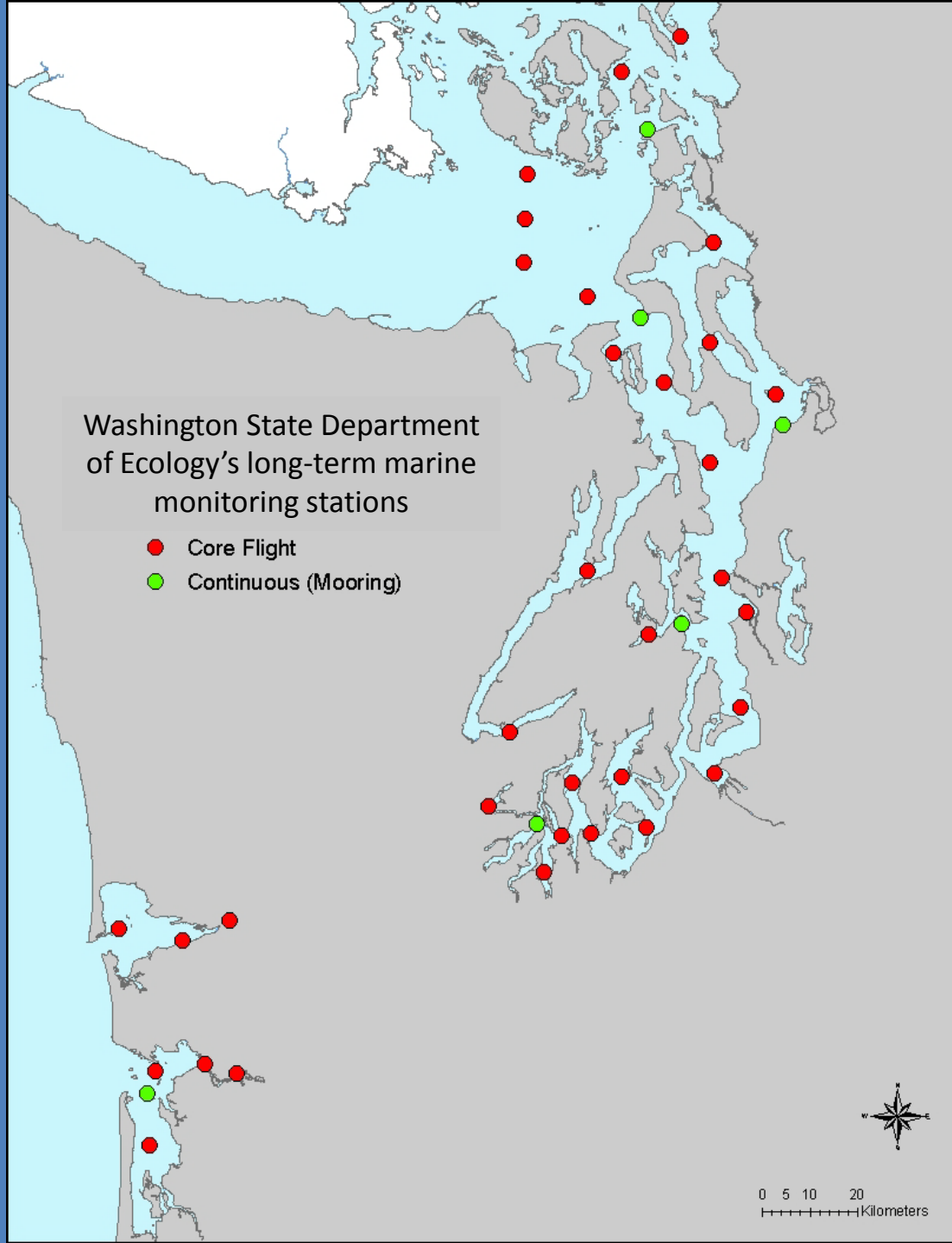
Long – Term Monitoring Network



Access

archived data
at:

http://www.ecy.wa.gov/apps/eap/marine_wq/mwdataset.asp



Real – Time Mooring Network



Access

archived data
at:

http://www.ecy.wa.gov/programs/eap/mar_wat/moorings.html