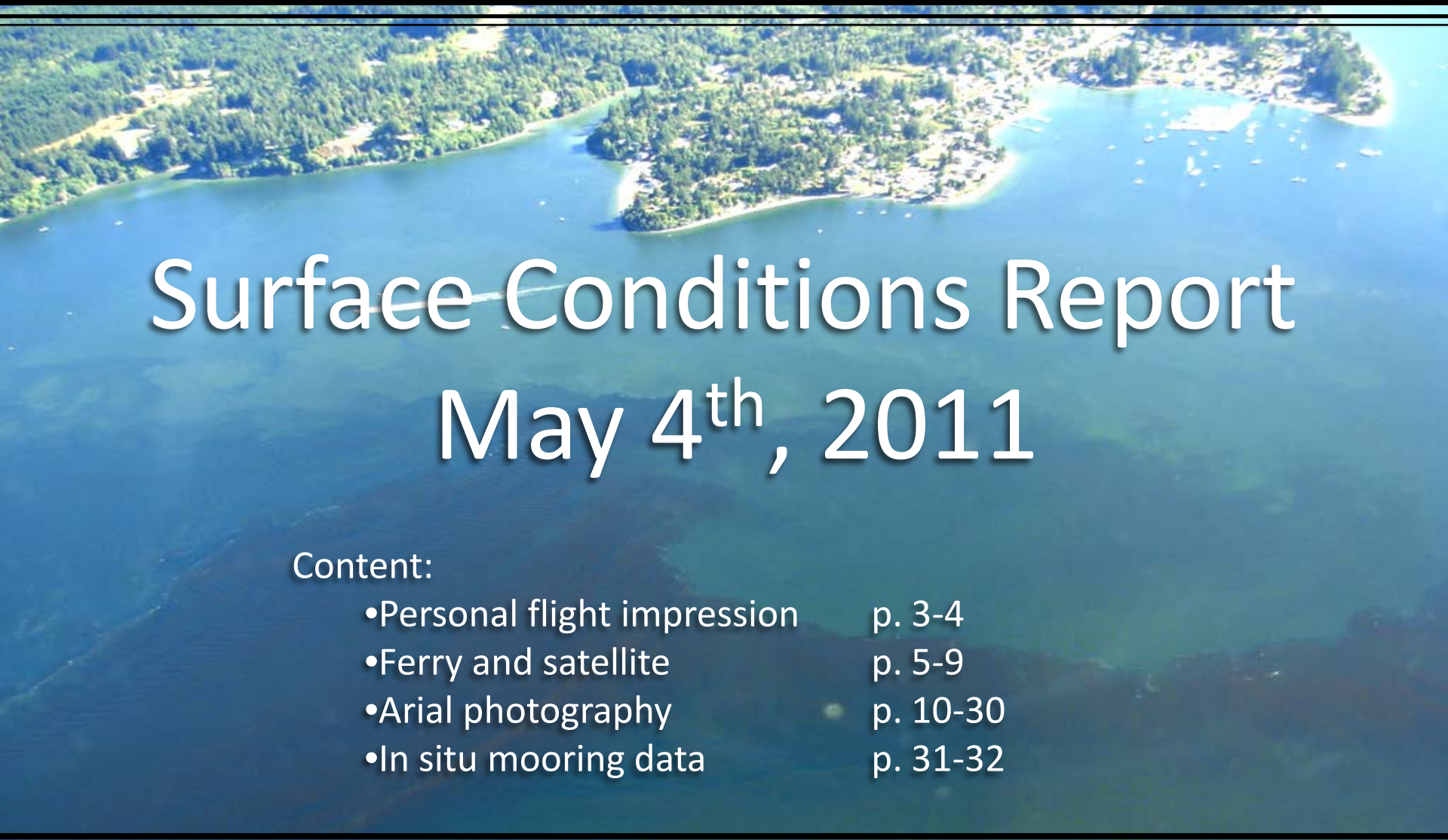
Publication No. 11-03-074

DEPARTMENT OF ECOLOGY State of Washington

Eyes Over Puget Sound



Surface Conditions Report
May 4th, 2011

Content:

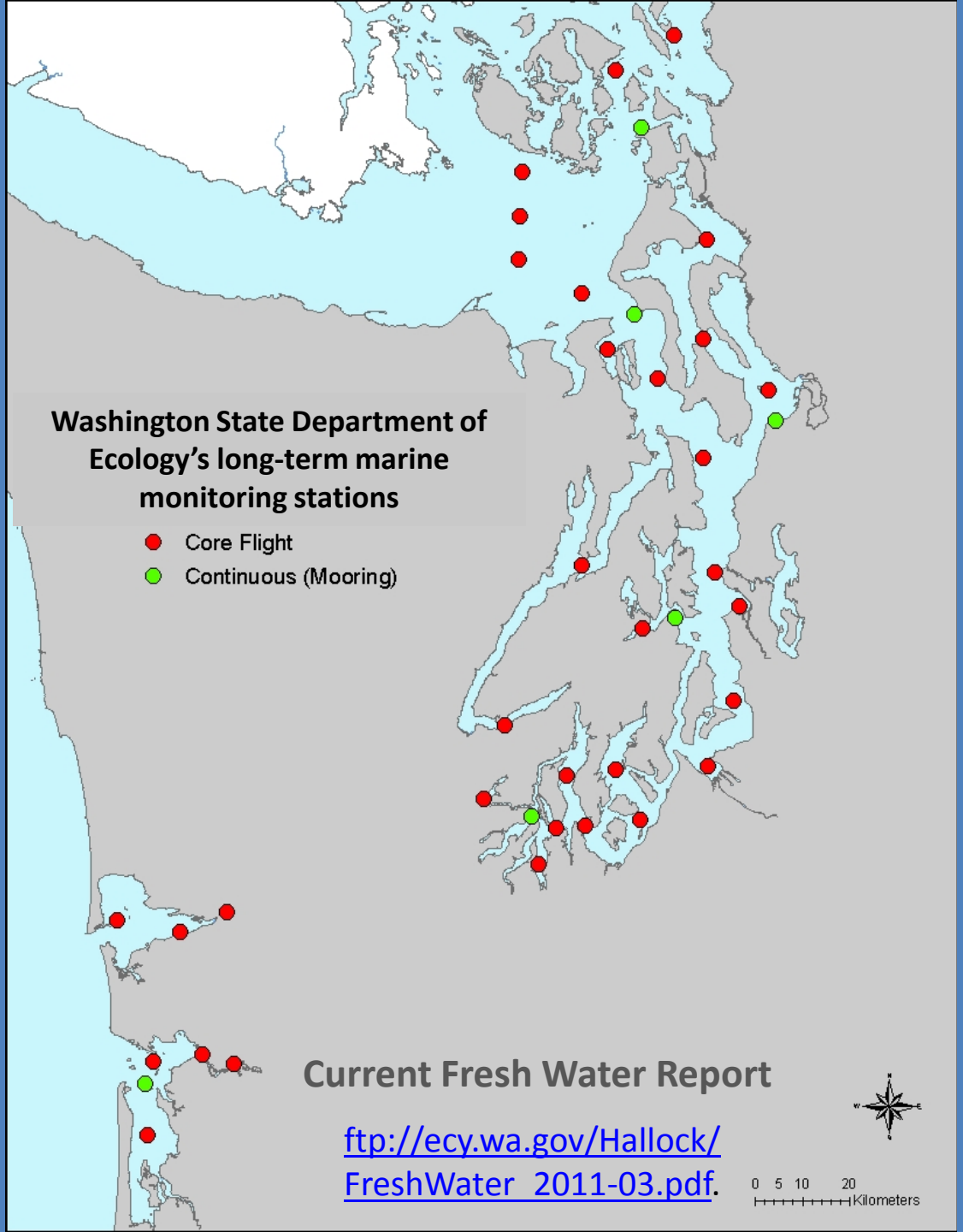
Up to date conditions of visible water quality conditions in Puget Sound and the Straits

Long – Term Monitoring Network

DEPARTMENT OF ECOLOGY
State of Washington

Access archived data at:

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



Real – Time Sensor Network

Ferry and satellite :
brandon.sachmann@ecy.wa.gov

Access archived data at:

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

Marine Flight 4: South Sound; 5-4-2011

Wednesday May 4th was a beautiful day to sample, it was the first time this year it didn't feel like winter! The waters were calm with little to no wind at most stations. We did notice very green water and small circular phytoplankton just large enough to notice with the naked eye. The only event of note was being circled by a Black Hawk helicopter in Carr Inlet. They have some amazing maneuvering capacity! All in all it was a great way to start off May sampling.

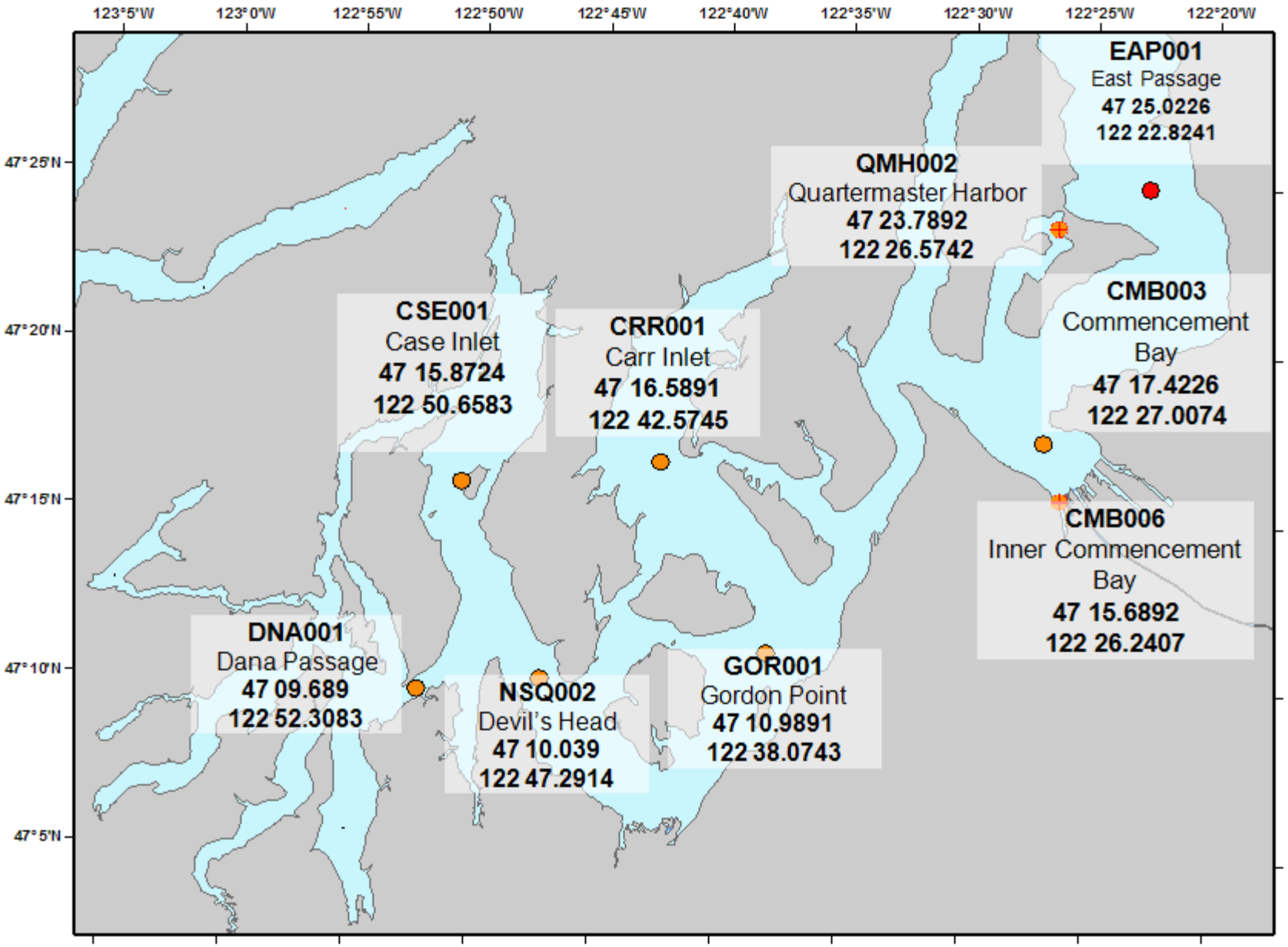
Surface water dynamics between Nisqually and Gordon Point

Getting buzzed by a Black Hawk helicopter in Carr Inlet

Commencement Bay, Tacoma

Lilli pond galore near Island View Ra off HWY 3 near Grapeview

2010 Marine Flight 4 – South Sound



Ferry and Satellite observation in Main Basin

DEPARTMENT OF ECOLOGY State of Washington

Contact: brandon.sackmann@ecy.wa.gov

Date: Wednesday, May 4, 2011

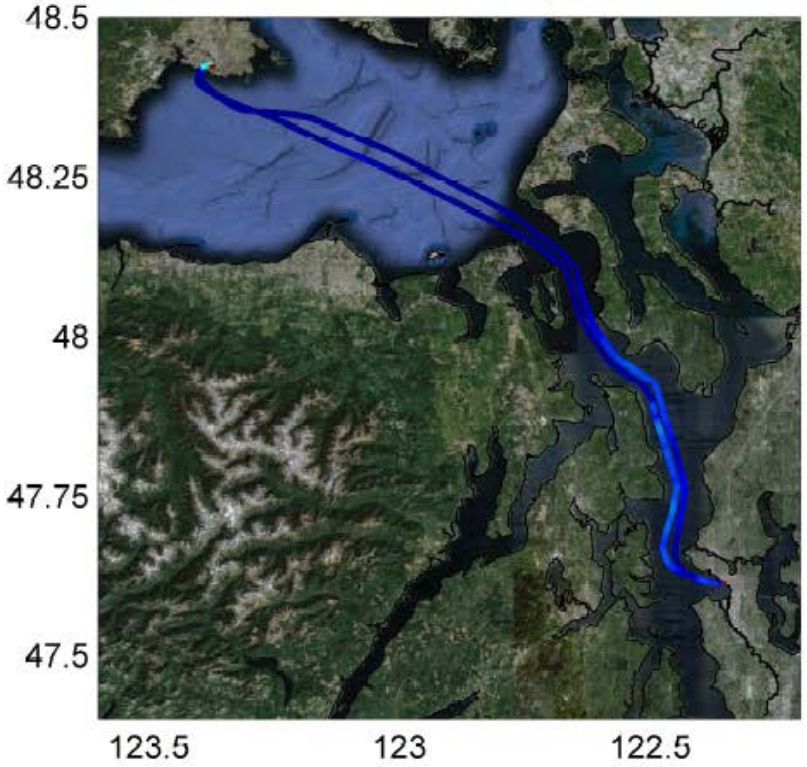
Conditions: High cloud cover limited satellite image analysis

Observation: Ferry and satellite images confirm center of algae bloom in the Main Basin between West Point and the Triple Junction and indication of a bloom in Carr Inlet.

Victoria Clipper Surface Transect May 4, 2011

Puget Sound is beginning to warm while algal blooms intensify in the main basin

Sea Surface Temperature



Sea surface temperature (SST) is the water temperature close to the surface (2-3 m below). Warm colors show higher SST.

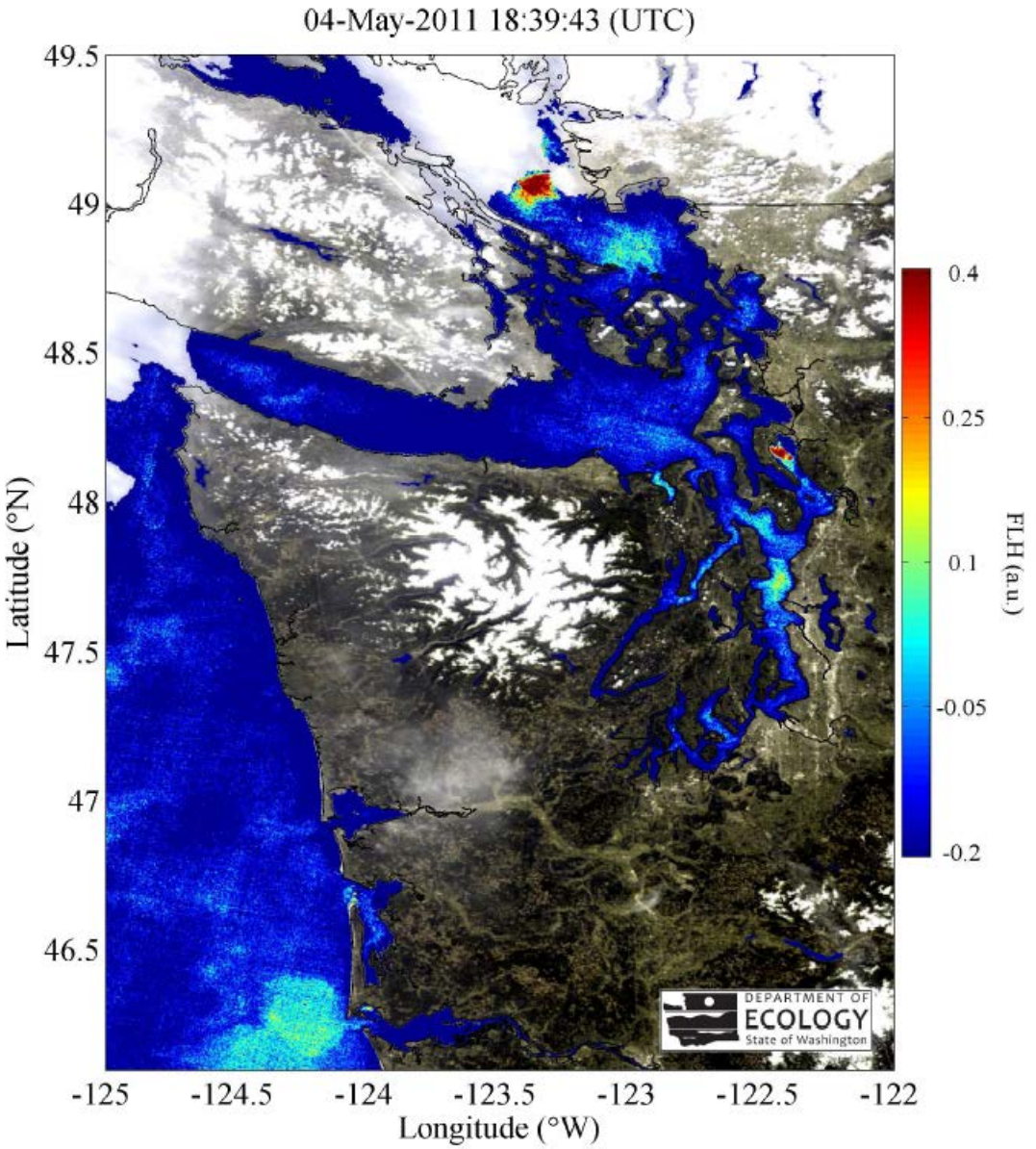
Algal Biomass (Chlorophyll Fluor.)

Chlorophyll a fluorescence gives an estimate of algal concentration/biomass. Warm colors show larger concentrations.

Satellite (Spatial Context)

Image from 5/4/11 confirm center of algae bloom in the Main Basin between West Point and the Triple Junction.

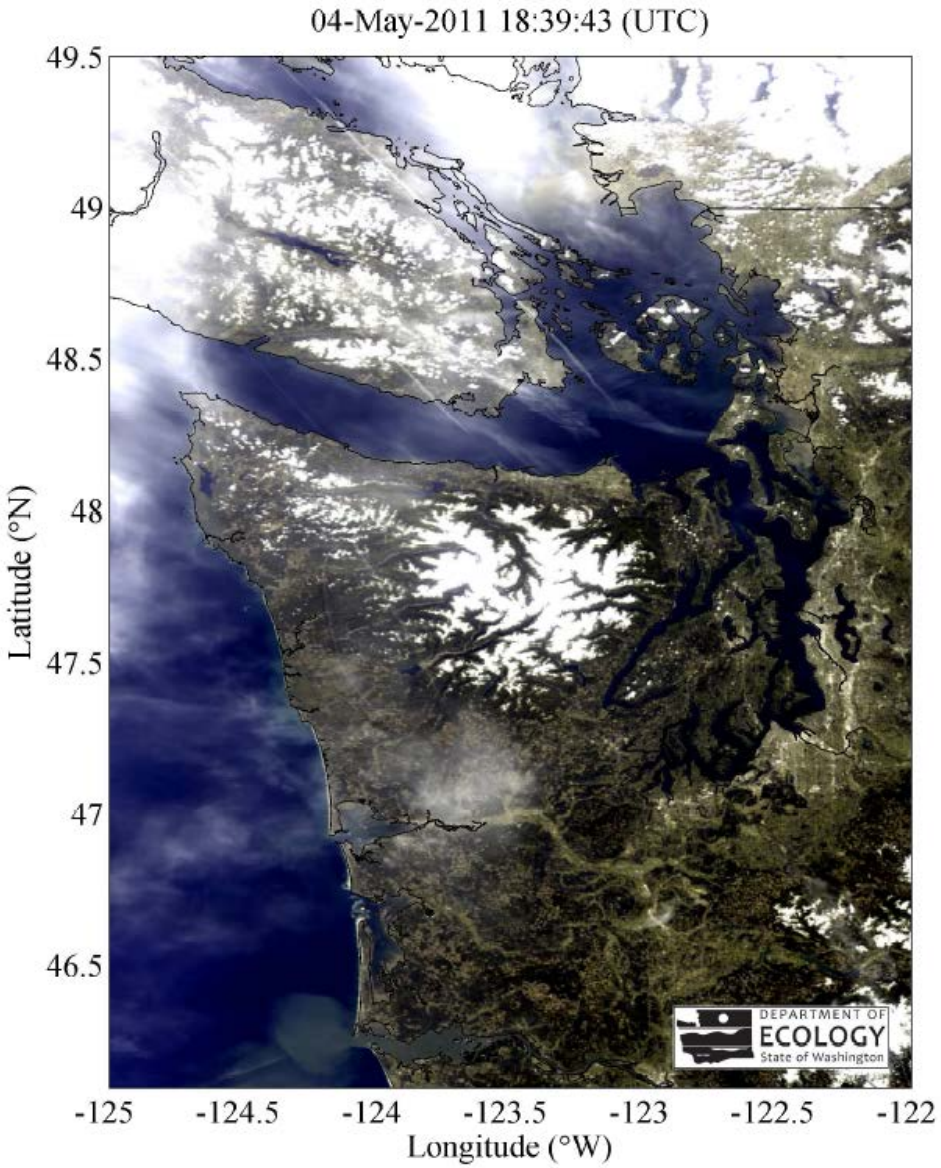
Fluorescent line height (FLH) products was least affected by high cloude cover



Satellite
(data quality)

High cloud cover during May 4, 2011 created uncertainties in the satellite products.

Fluorescent line height (FLH) product was least affected

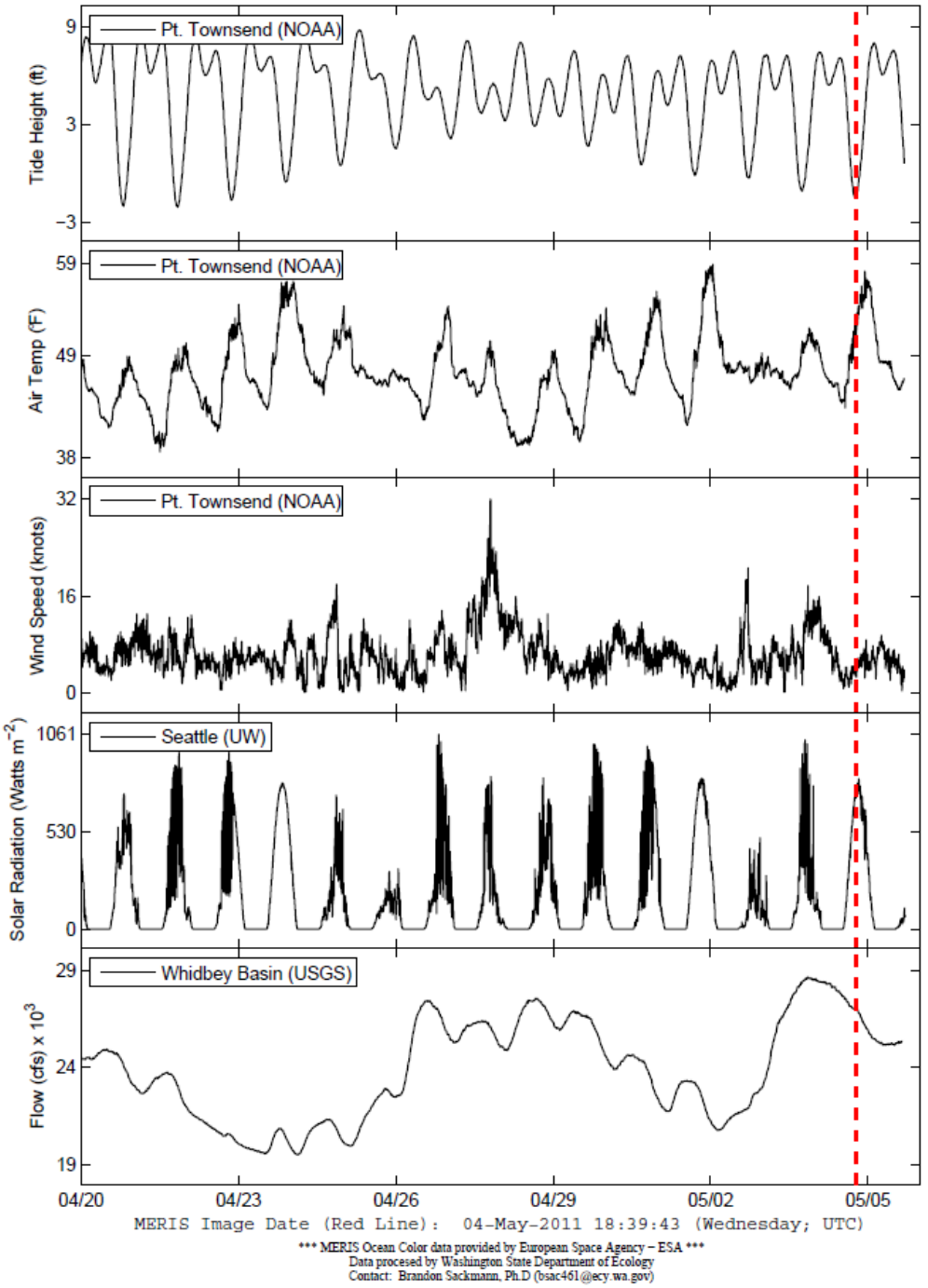


Satellite

(Temporal context)

Bloom likely got started on 2nd of May consistent with metreological data showing a nice clear day on 1 May

Red line indicates reporting day of satellite images (May 4th, 2011)



Flight observations between Olympia and Seattle

DEPARTMENT OF ECOLOGY State of Washington

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

Date:	Wednesday, May 4, 2011
Morning 8:07 AM:	Seattle via Main Basin, Colvos Passage, Carr Inlet, Case Inlet, Dana Passage, Budd Inlet into Olympia
Evening 5:26 PM:	Olympia via Dana Passage, Anderson Island, Nisqually, Gordon Point, Commencement Bay, Quartermaster Harbor, Central Basin, Westpoint/Seattle
Conditions:	Altitude 2500 ft, calm, sunny, no clouds but hazy

Summary observation: May 4, 2011

Comment: Oil sheen in Colvos Passage, multiple blooms in South Sound and Main Basin.

Algae bloom in Quartermaster Harbor

Long oil sheen in Colvos Passage

Front

Mixing and Fronts:
Fronts between Nisqually past Anderson Island (South Sound), fronts and mixing in Tacoma Narrows

Plume

Suspended sediment:
Fronts between Nisqually past Anderson Island (South Sound), and near some shorelines in Main Basin

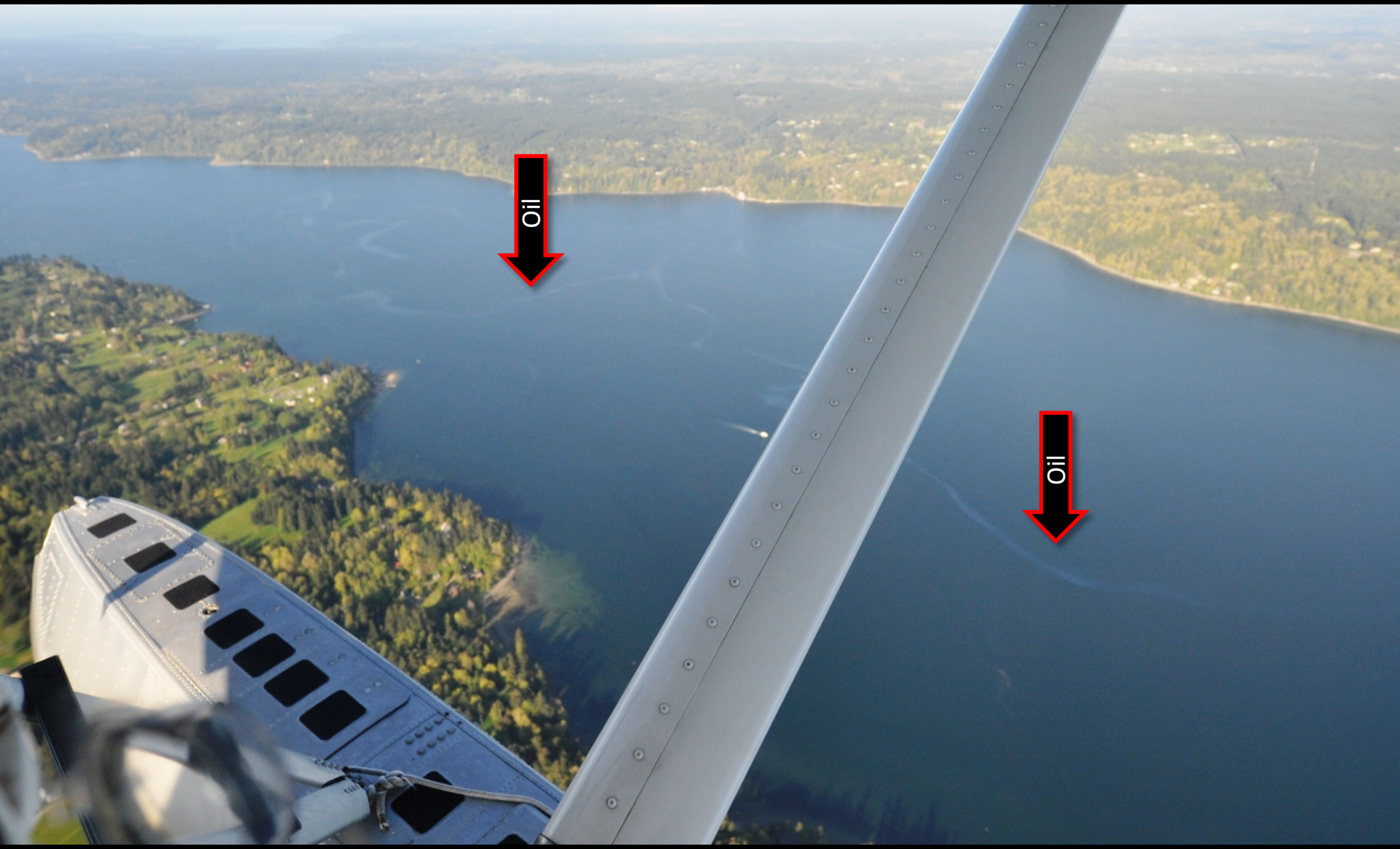
Bloom

Visible blooms:
Multicolored in South Sound (Eld, Budd, Case and Carr Inlet) also visible in central Main Basin and Quartermaster Harbor

Debris

Debris *(anything floating at surface):*
Moderate occurrence associated mainly with fronts

Morning flight from Seattle to Olympia at 250 ft altitude

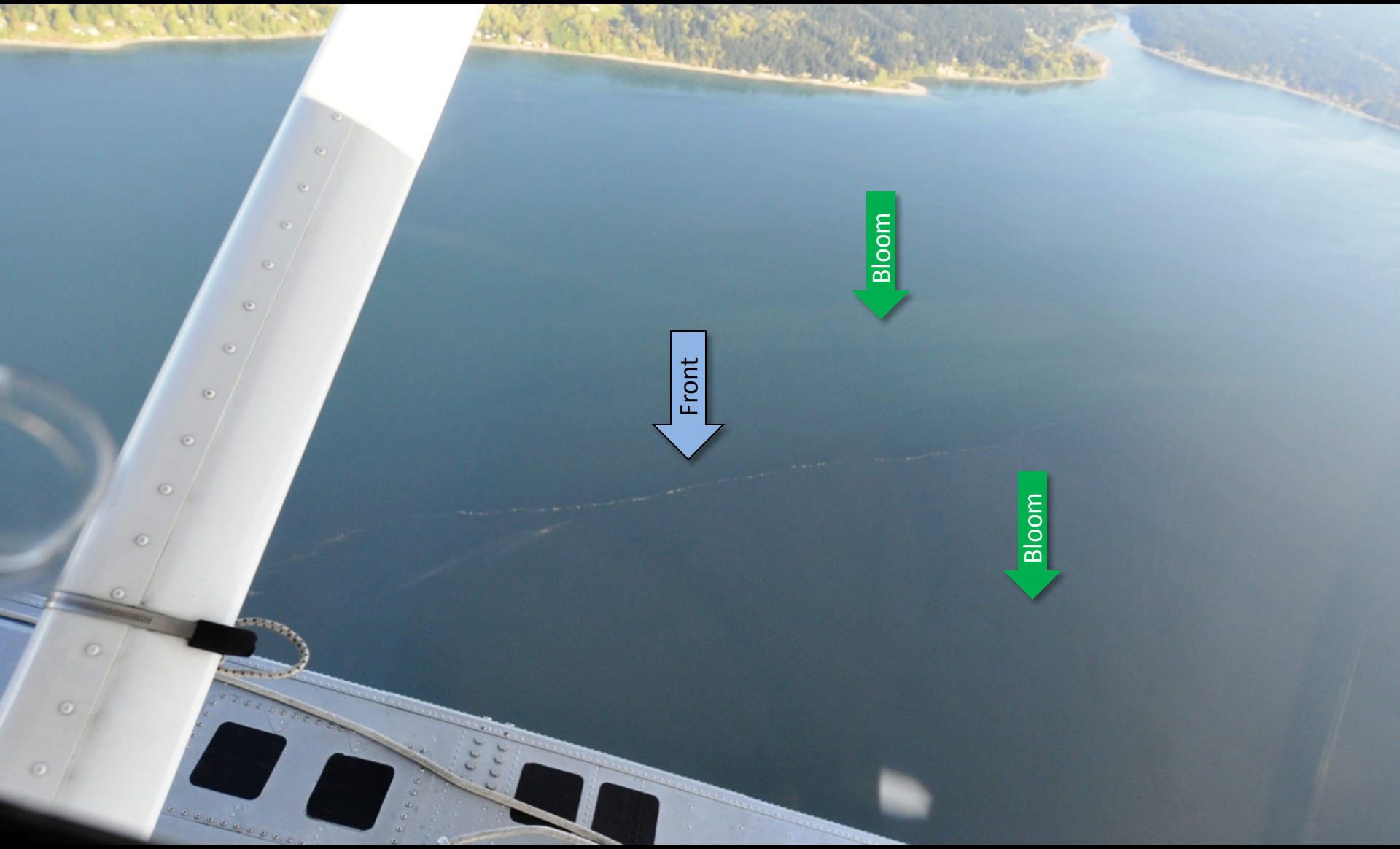


Long oil sheen in the northern reaches of Colvos Passage at 8:20 AM

Morning flight from Seattle to Olympia at 250 ft altitude

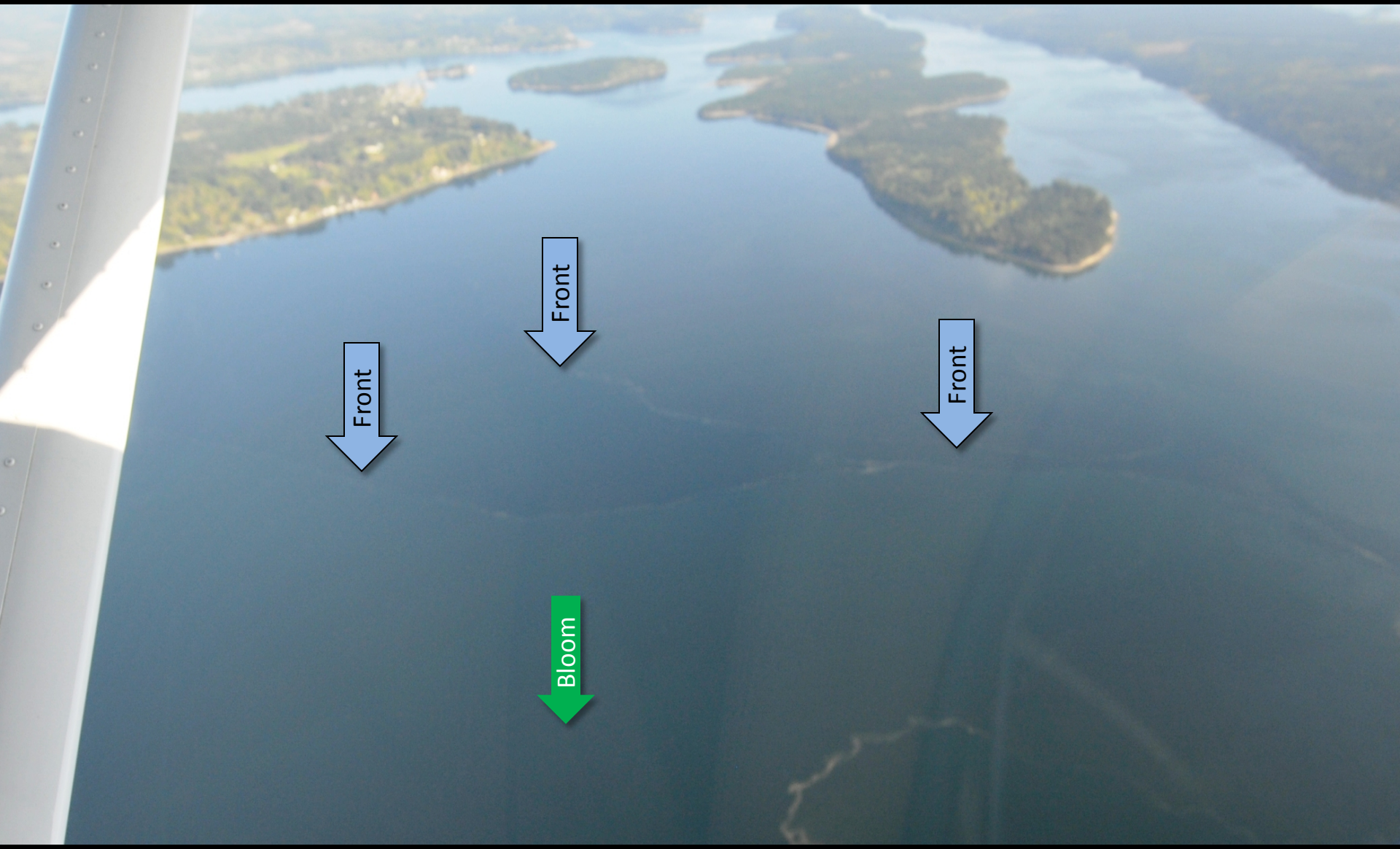
A strong bright green algae bloom at 8:30 AM in, Lay Inlet , near Rosedale , Carr Inlet 8:35 AM

Morning flight from Seattle to Olympia at 250 ft altitude



Two optically disting algae blooms separated by a front in Carr Inlet across Kopachuck State Park at 8:30 AM

Morning flight from Seattle to Olympia at 250 ft altitude



Watermasses with blooms and separated by debris meeting near Boston Harbor (near Olympia) and entering Dana Passage at 8:45 AM. Unfortunately very hazy!

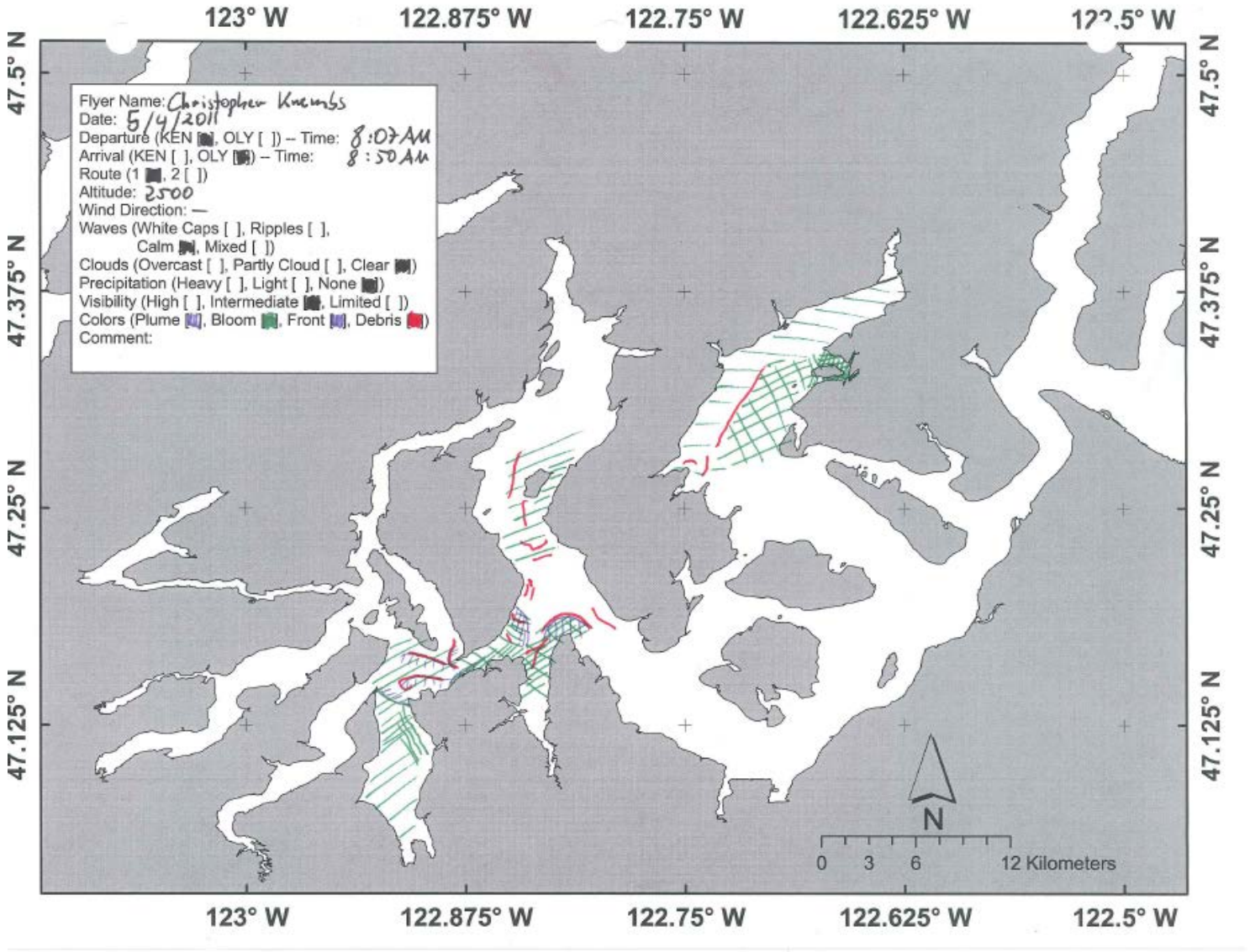
Morning flight from Seattle to Olympia at 250 ft altitude

Layers and lines of algae blooms in northern Budd Inlet (near Olympia) 8:47 AM

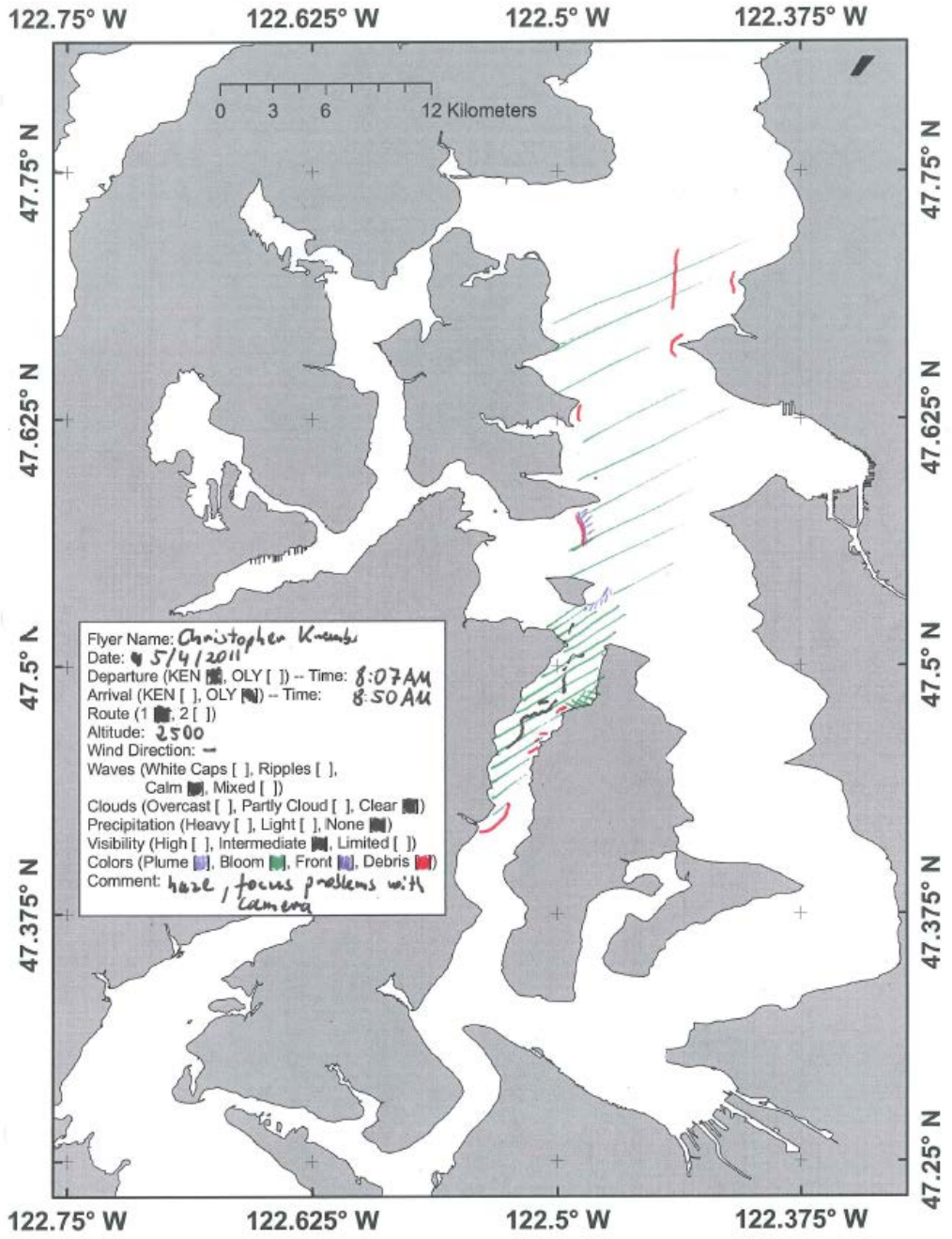
Morning flight from Seattle to Olympia at 250 ft altitude

Layers and lines of algae blooms or plume? in northern Budd Inlet (near Olympia) 8:47 AM

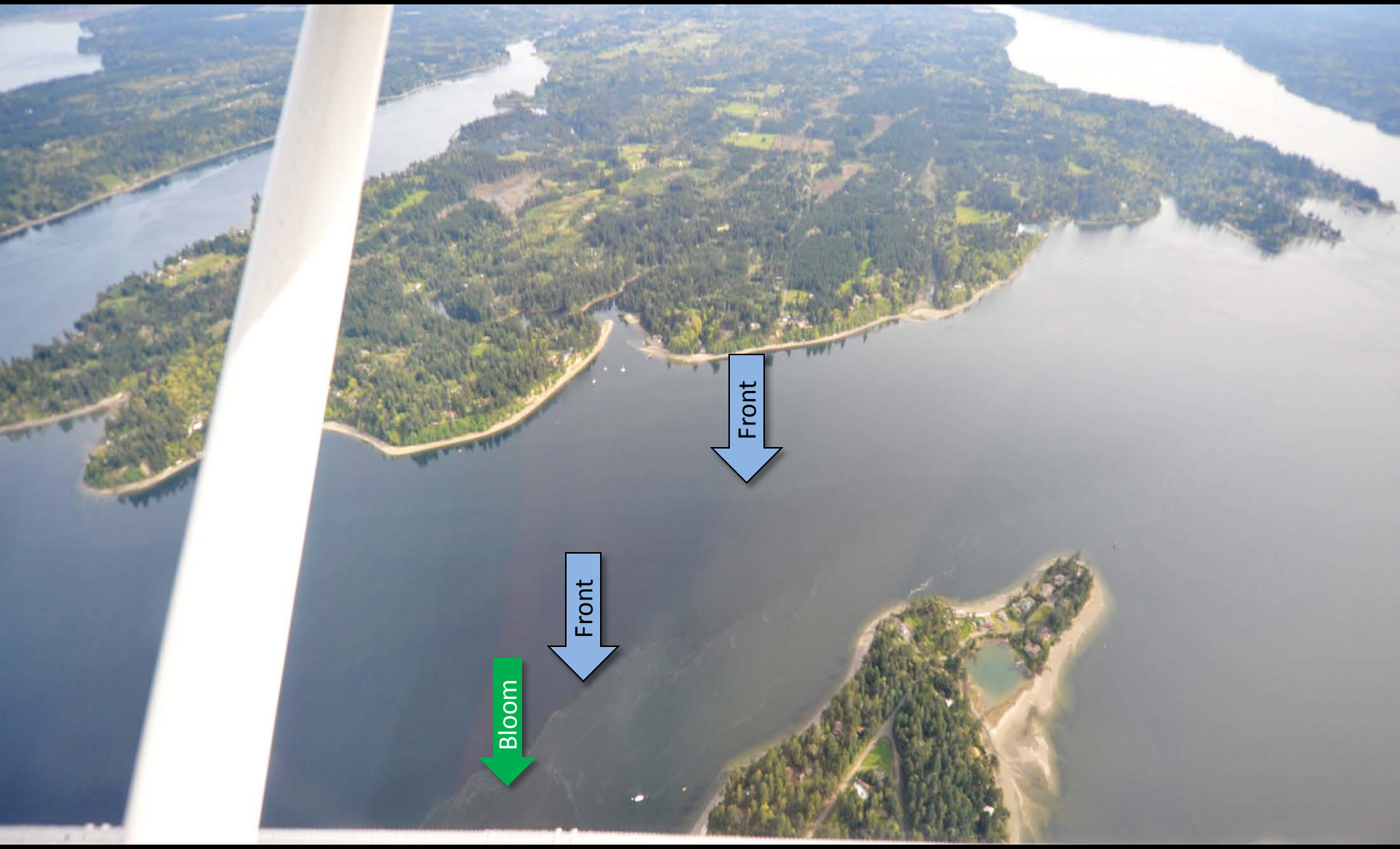
South Sound: AM



Central Sound AM

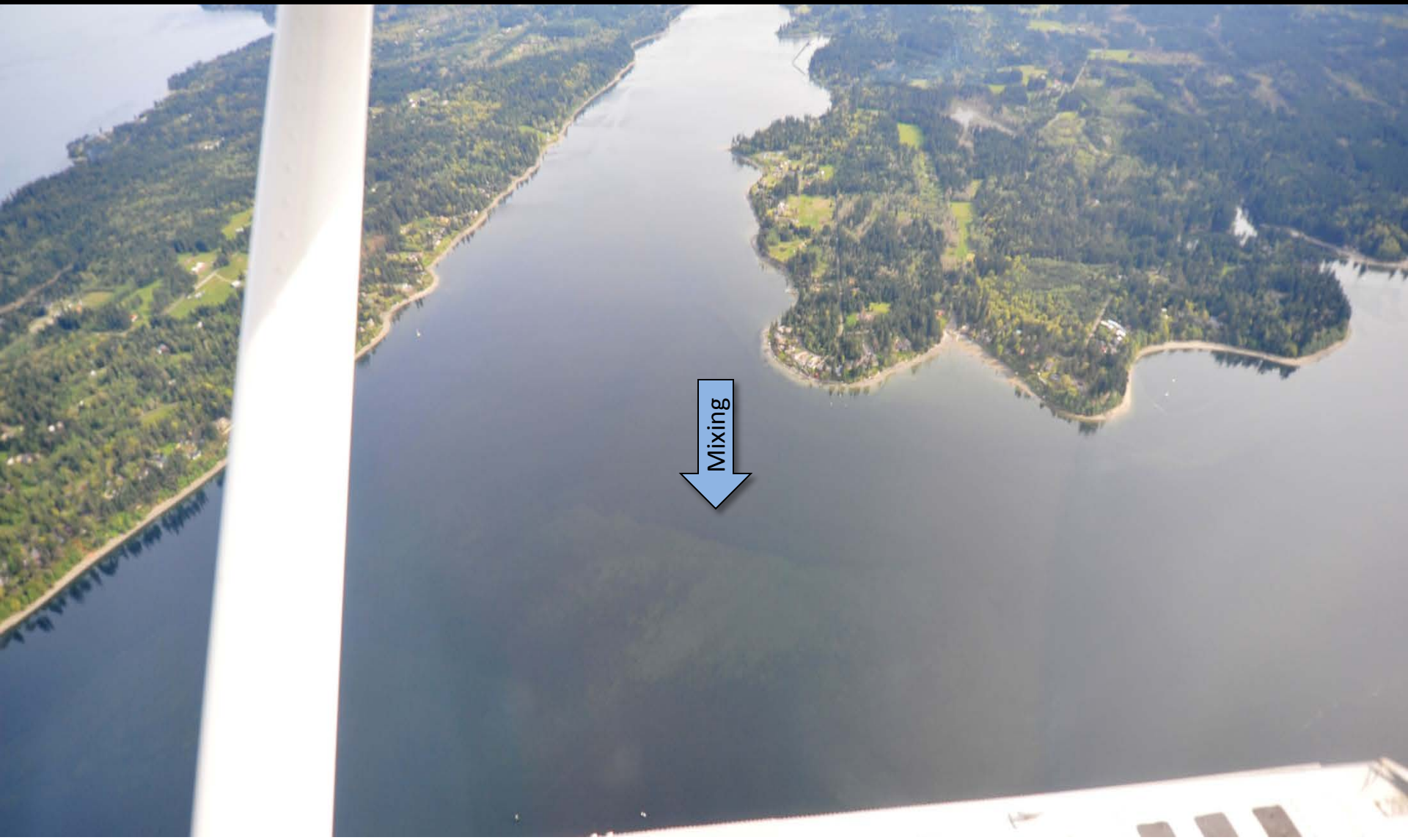


Evening flight from Olympia to Seattle at 2500 ft altitude



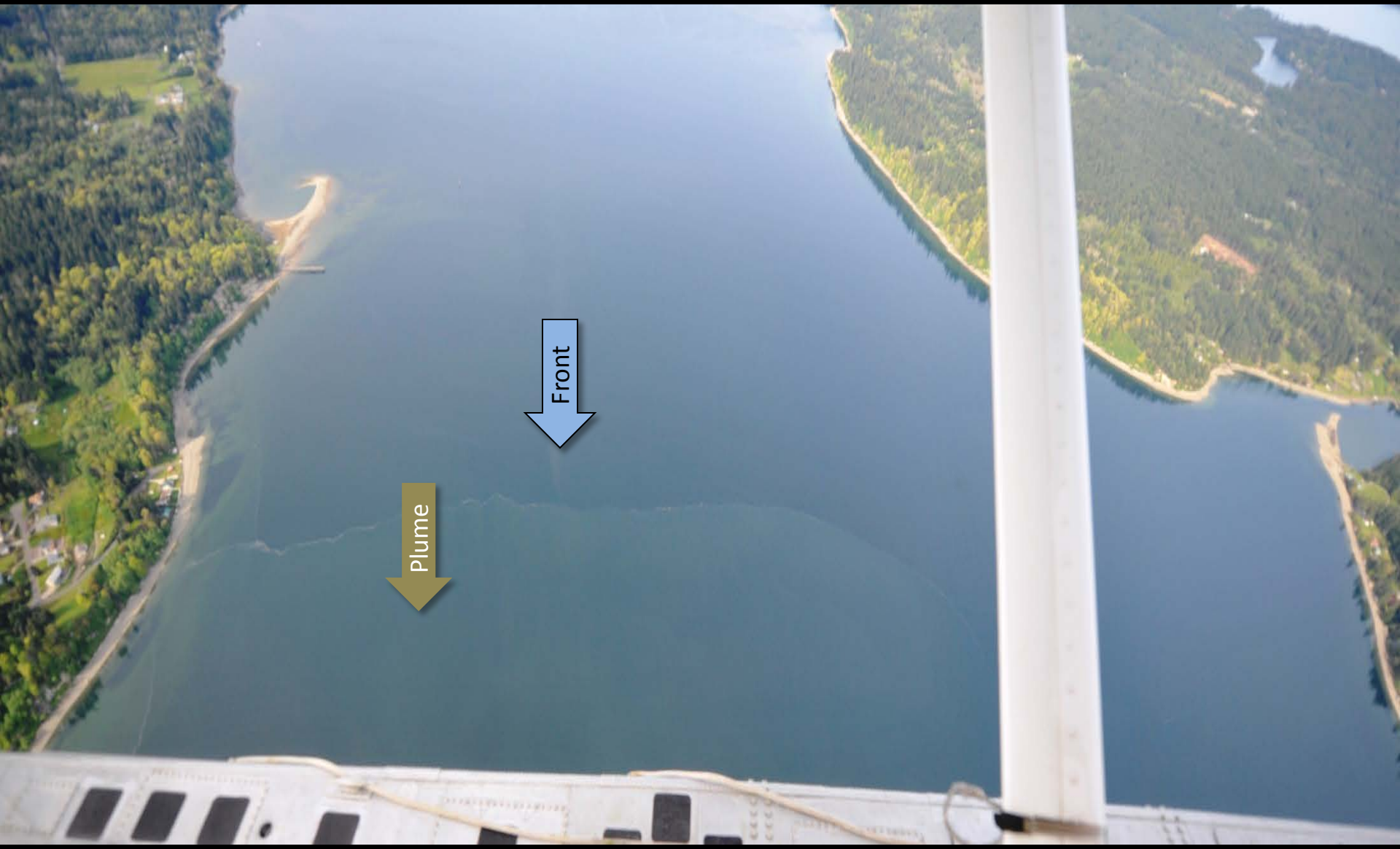
Dana Passage, with contrasting water colors meeting high algae bloom during flood tide 4: 30 PM

Evening flight from Olympia to Seattle at 2500 ft altitude



Mixing over shoal in Henderson Inlet, 4:30 PM

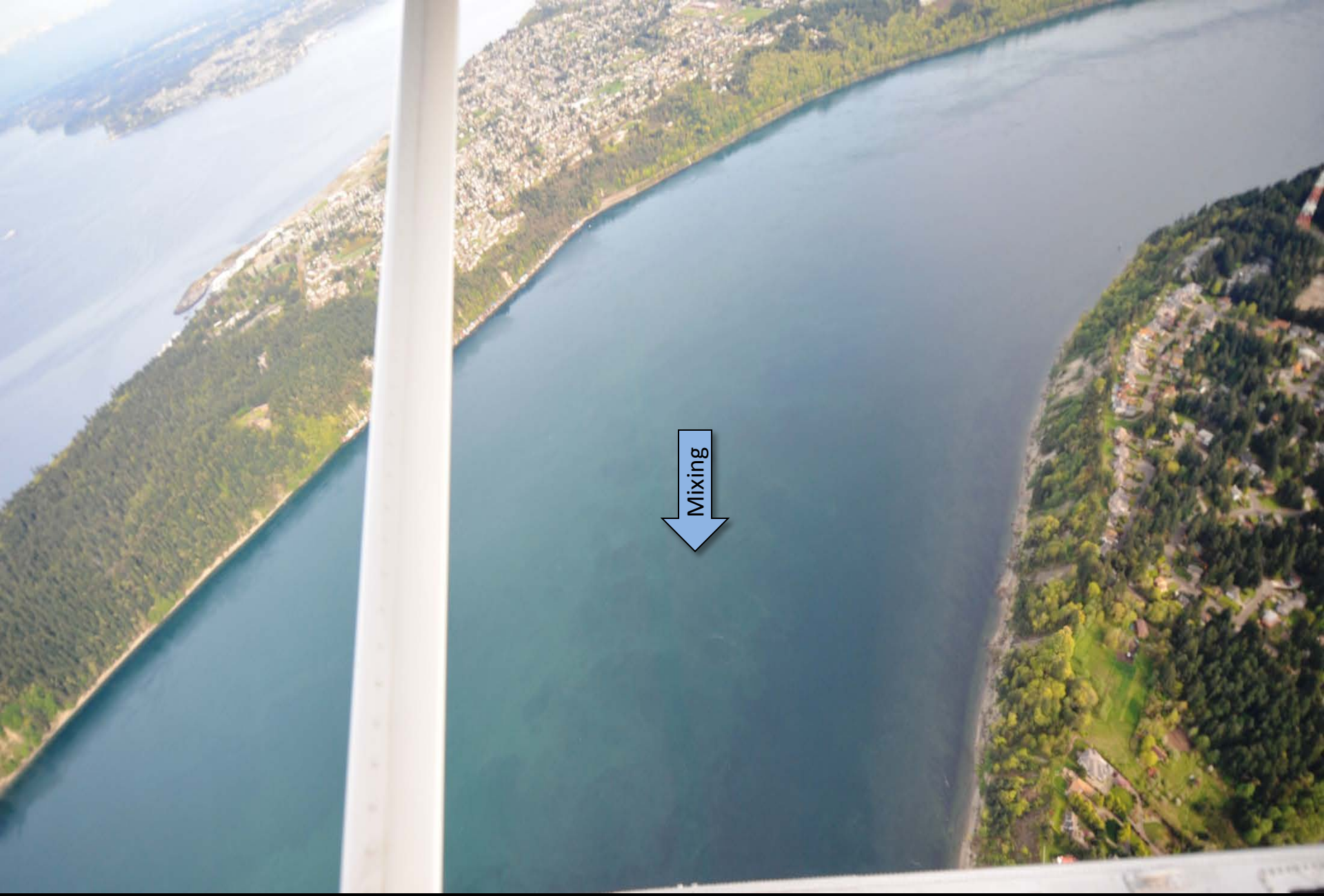
Evening flight from Olympia to Seattle at 2500 ft altitude



Nisqually River plume (front) extending past Anderson Island (right Amsterdam Bay) into Case Inlet

Narrow band of Nisqually River plume extending past Anderson Island and breaking and dissipating against shore line with eddies

Tacoma Narrows, (Day Island). Mixing of incoming tide with water from Carr Inlet confirming an algae bloom, 4:45 PM



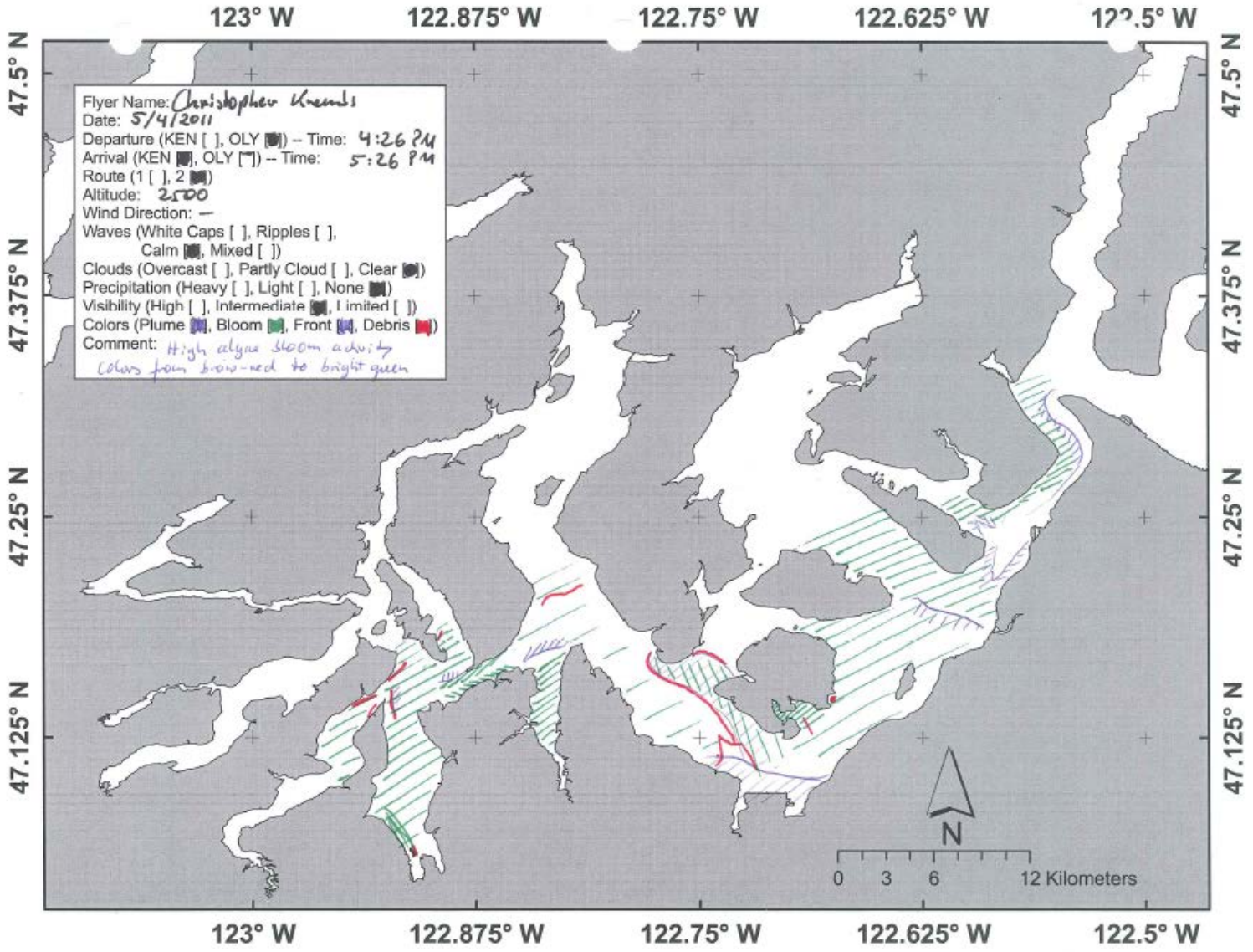
Tacoma Narrow (Point Defiant) Mixing of two separate water masses during incoming tide, 4:48PM

Evening flight from Olympia to Seattle at 2500 ft altitude

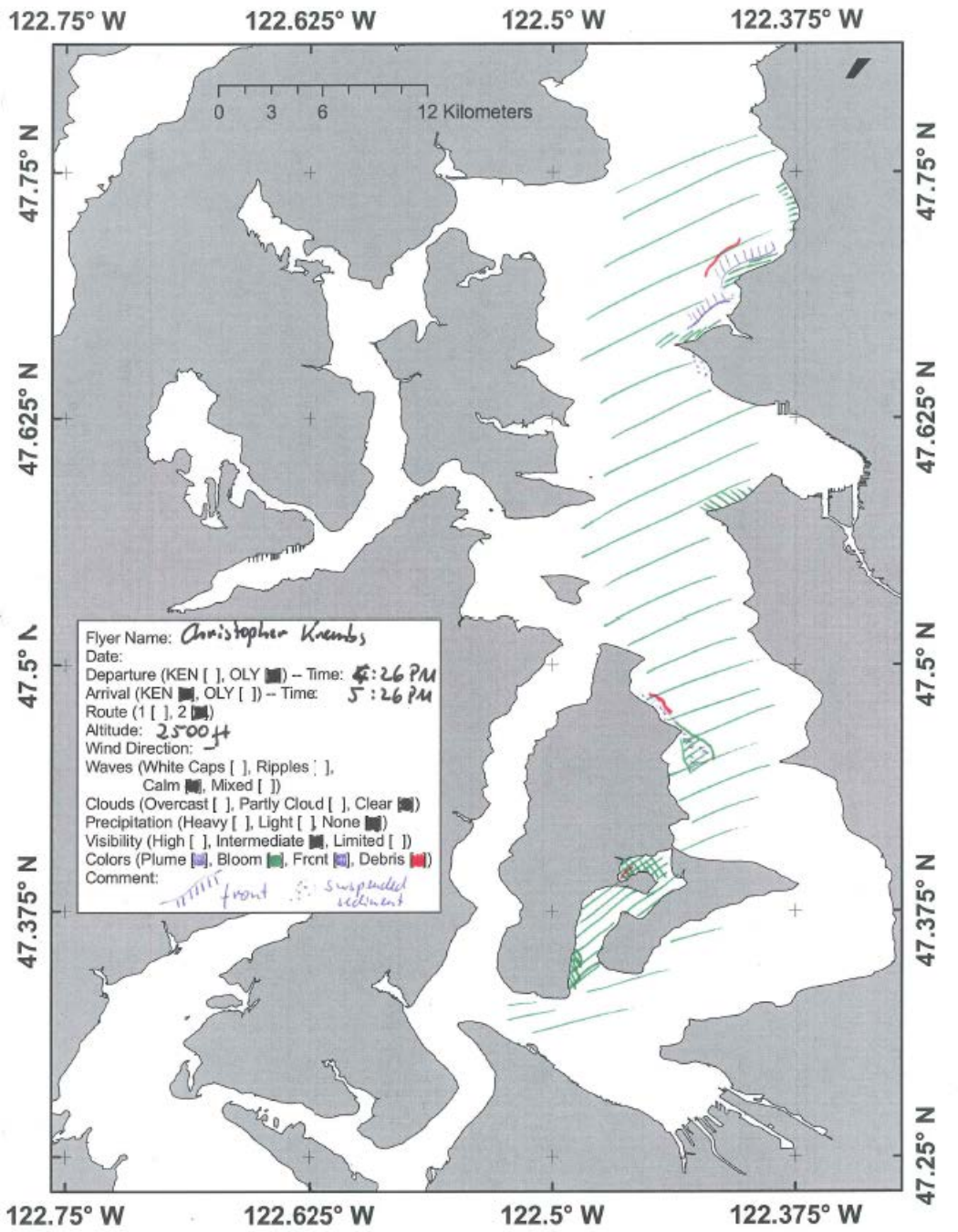
Quartermaster Harbor, bloom or suspended sediment on south western side, 4:50 PM.

Quartermaster Harbor (Burton), algae bloom, 4:50 PM.

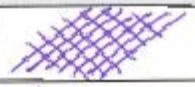
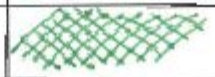
Evening, South Sound PM



Evening Central Sound PM



Legend to map annotations

Plumes	
• Freshwater with sediment **solid**	
• Freshwater with sediment **dispersed**	
• Coastal erosion with sediment	
Blooms	
• Dispersed	
• Solid	
Debris	
• Dispersed	
• Solid	
Front	
• Distinct water mass boundaries	
• Several scattered	

Mooring observation in Whidbey Basin and South Sound

DEPARTMENT OF ECOLOGY State of Washington

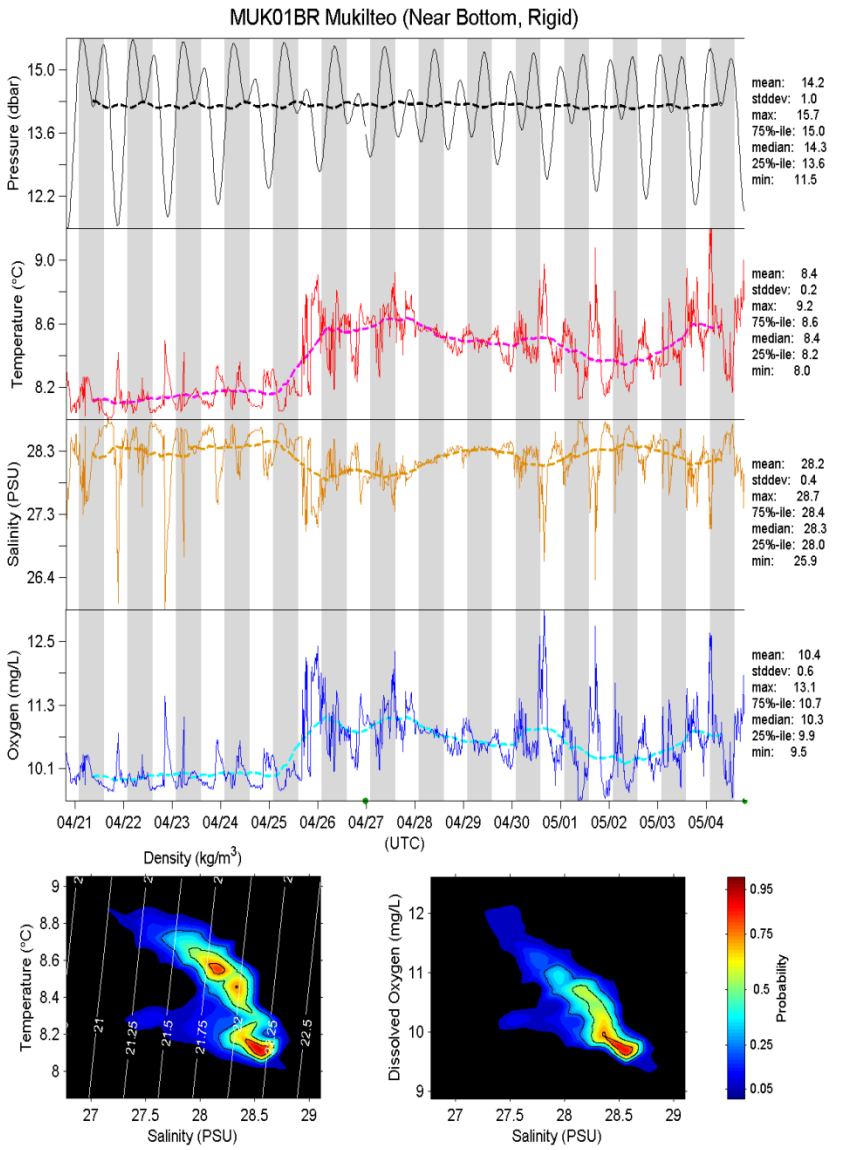
http://www.ecy.wa.gov/programs/eap/mar_wat/moorings.html

Date: April 4 to May 5, 2011

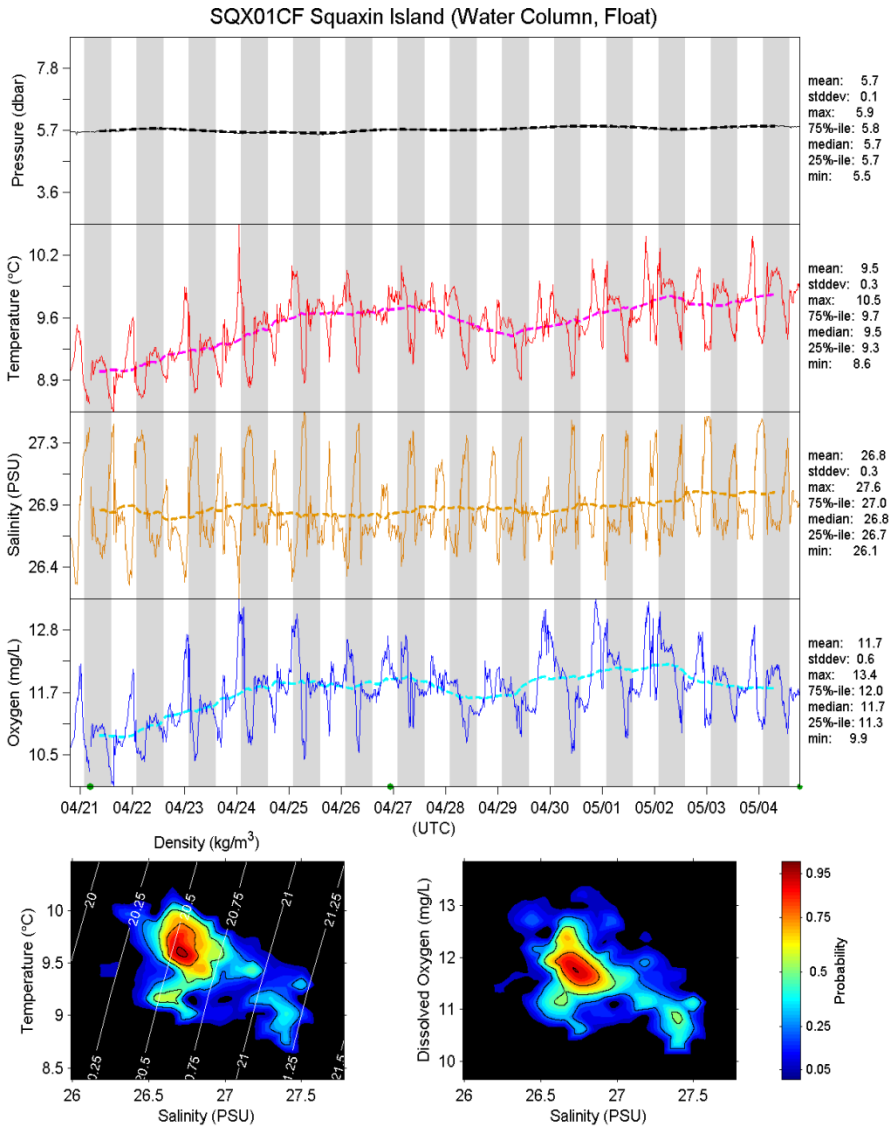
Squaxin Island (South Sound):
Dissolved oxygen and temperature rose between April 4 and May 4, 2011. Average DO conc. increased from an average of 9.2 to 11.7 mg/L. Average temperature increased from 8.5- 9.8 C. Much of the increase in dissolved oxygen concentration and temperature occurred after April 21. Average salinity increased from 26.3 to 27.0 (PSU).

Mukelteo (Whidbey Basin):
Dissolved oxygen (DO) levels and temperature continued to rise and jumped to from an average of 9.86 to 10.7 mg/L DO and from an average of 8.2 to 8.5 C. on April 26.

Mooring data near Squaxin Island (South Sound) and Mukelteo (Whidbey Basin) confirm high DO concentrations in the water



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



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