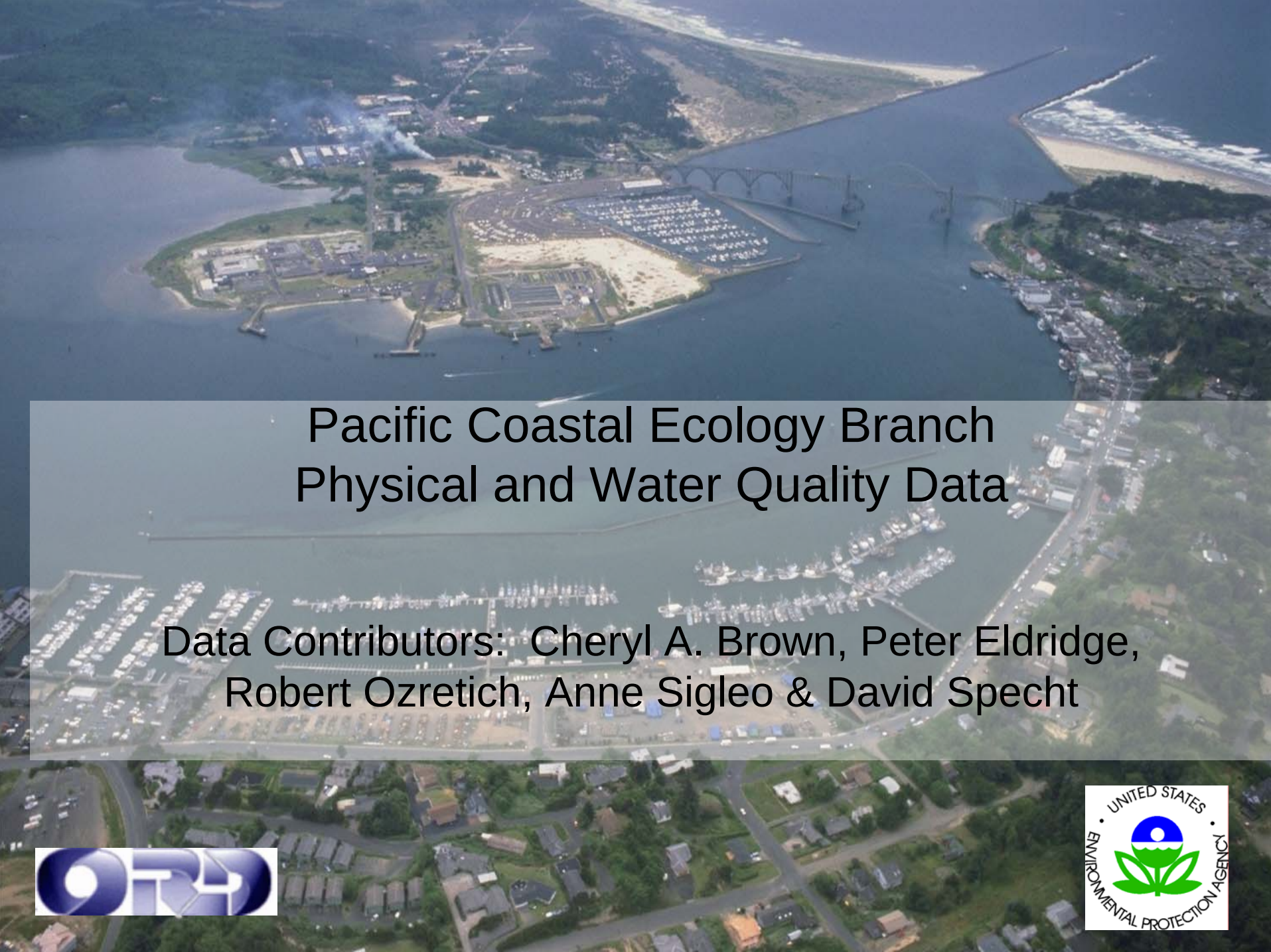


Pacific Coastal Ecology Branch
Physical and Water Quality Data

Data Contributors: Cheryl A. Brown, Peter Eldridge, Robert Ozretich, Anne Sigleo & David Specht

CRUISES

CTD profiles using (SBE 19 SEACAT) equipped with Li-Cor PAR sensor, Seapoint Turbidity Sensor, and WETStar Chlorophyll Fluorometer.

Parameters Measured Include:
Temperature
Conductivity
Photosynthetically Active Radiation (PAR)
In situ fluorescence
Turbidity

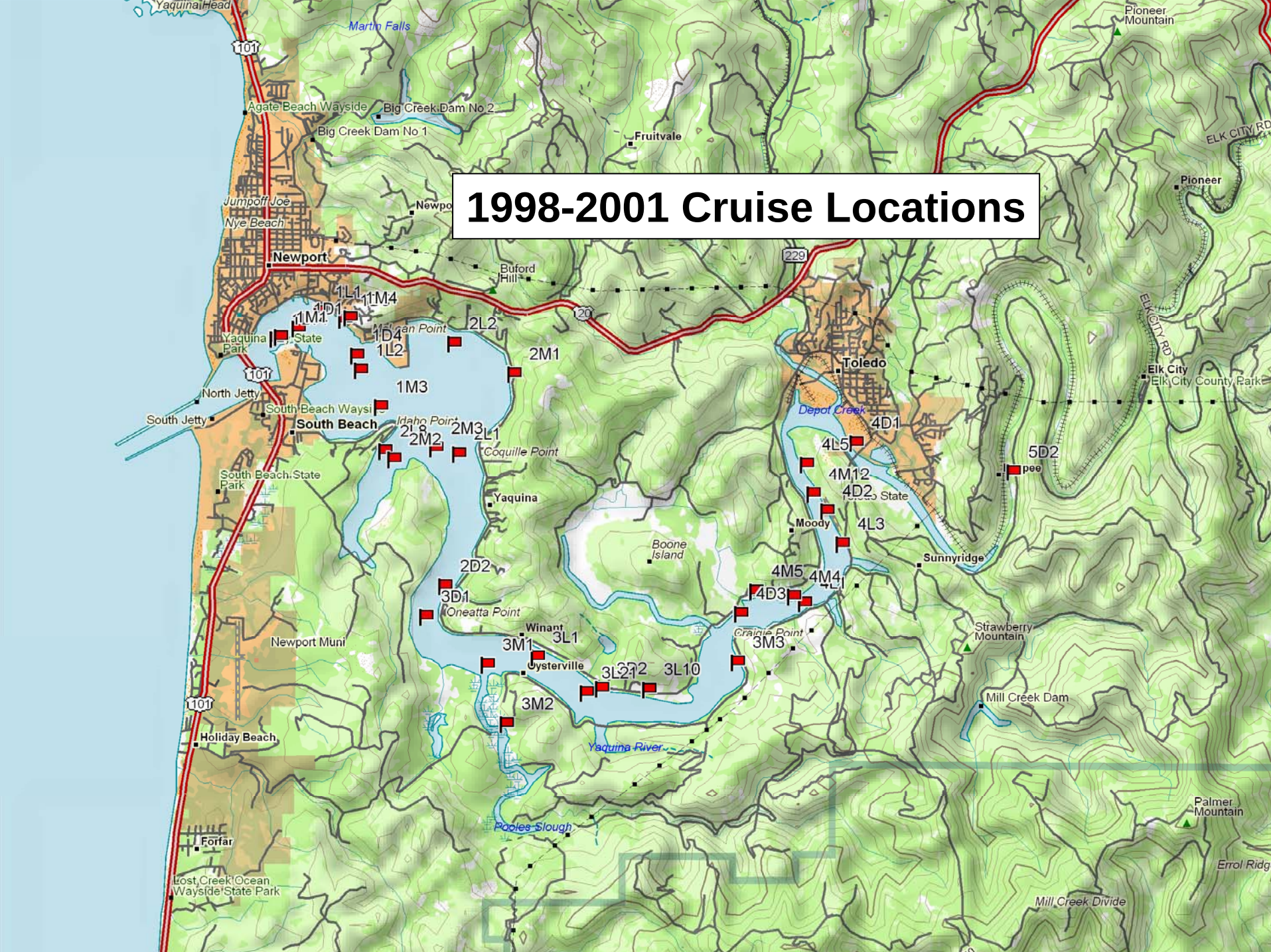
Profile measurements taken at 0.5-sec intervals from the water surface to 0.5 m above the bottom.

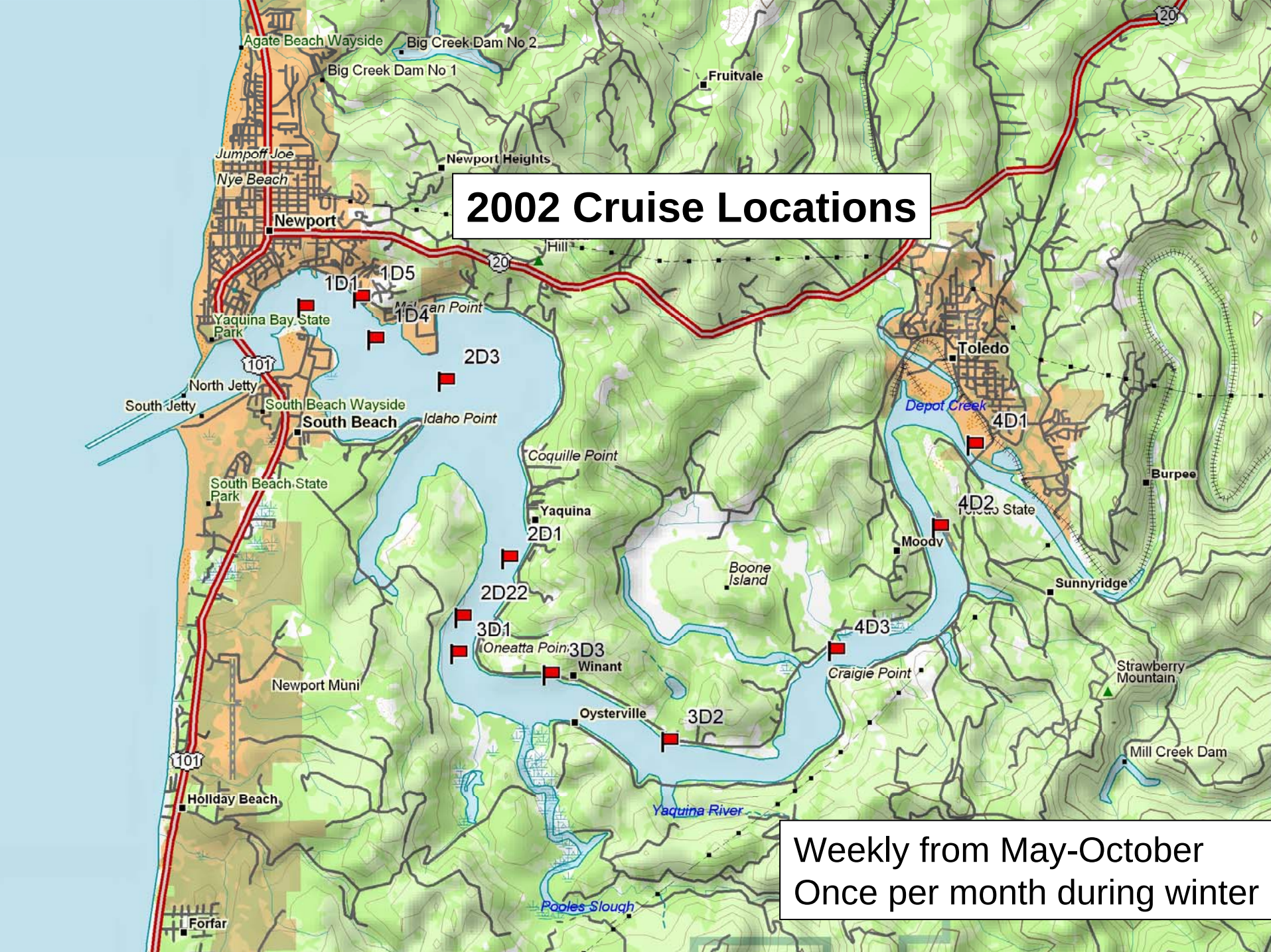
Most cruises track the flood tide, except during 2004 and 2005.

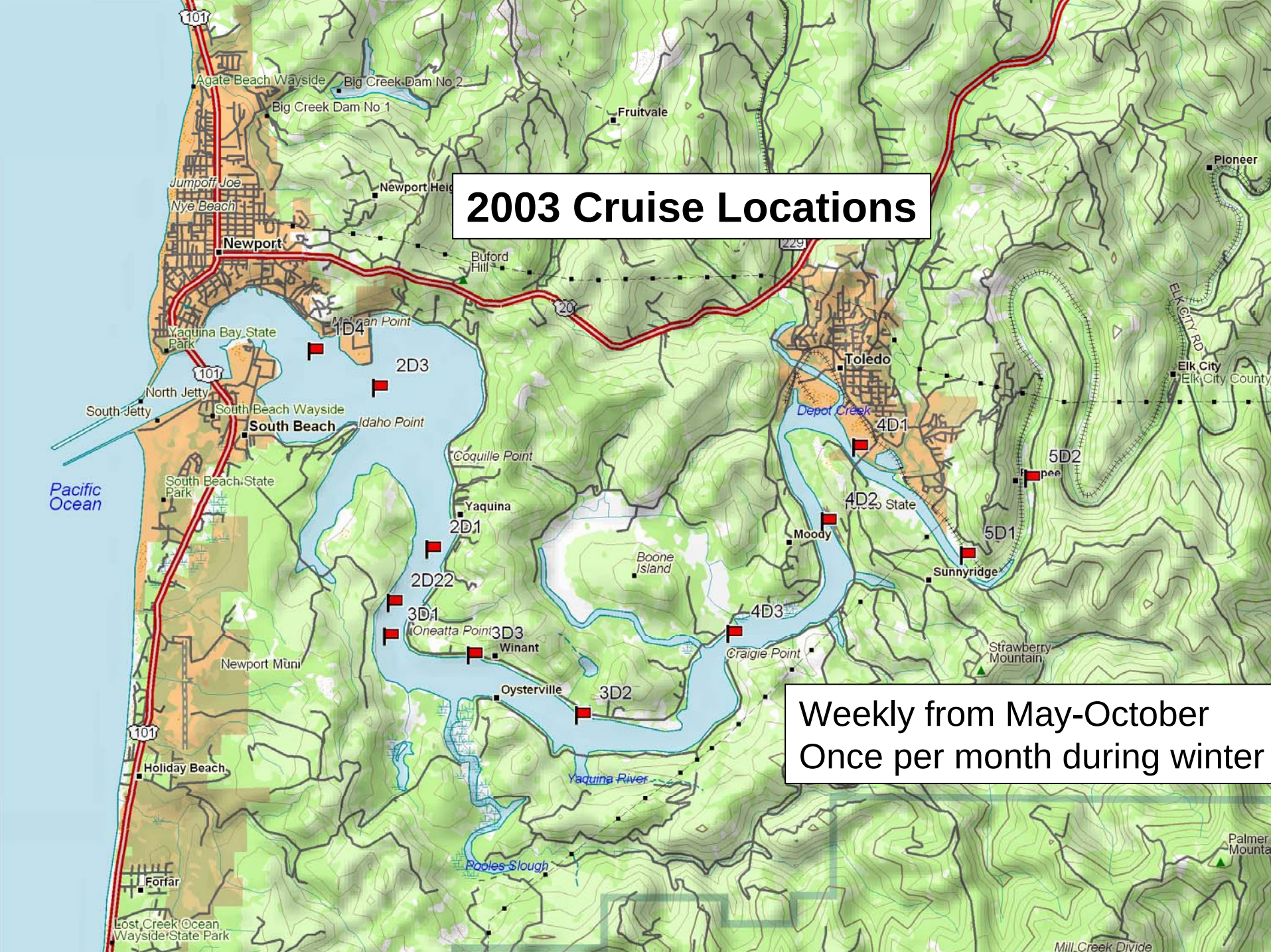
Grab samples for NO_2+NO_3, NH_4, PO_4, SiO_4

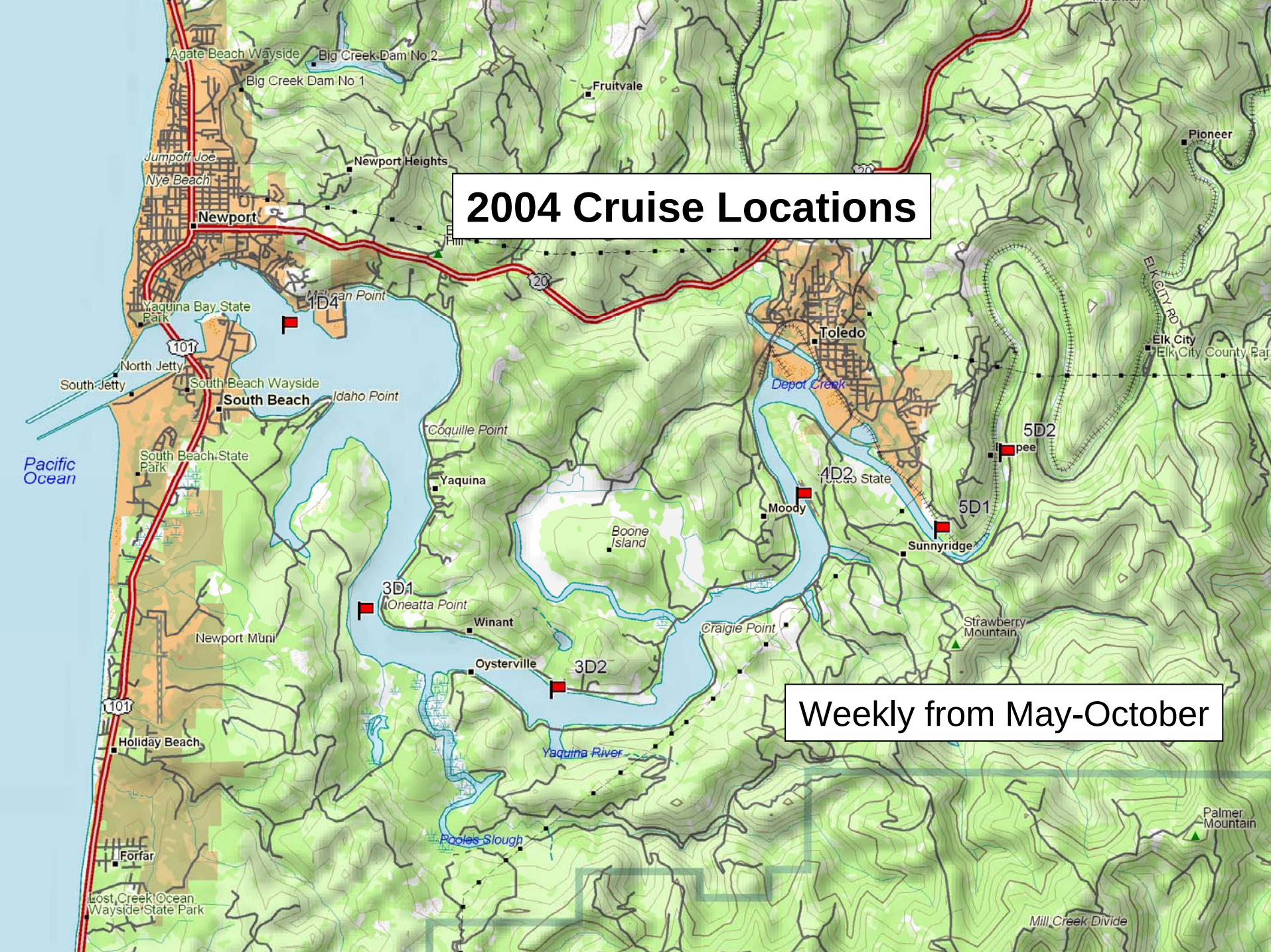
Quarterly grab samples for total suspended solids and chlorophyll *a* (2002-2004)

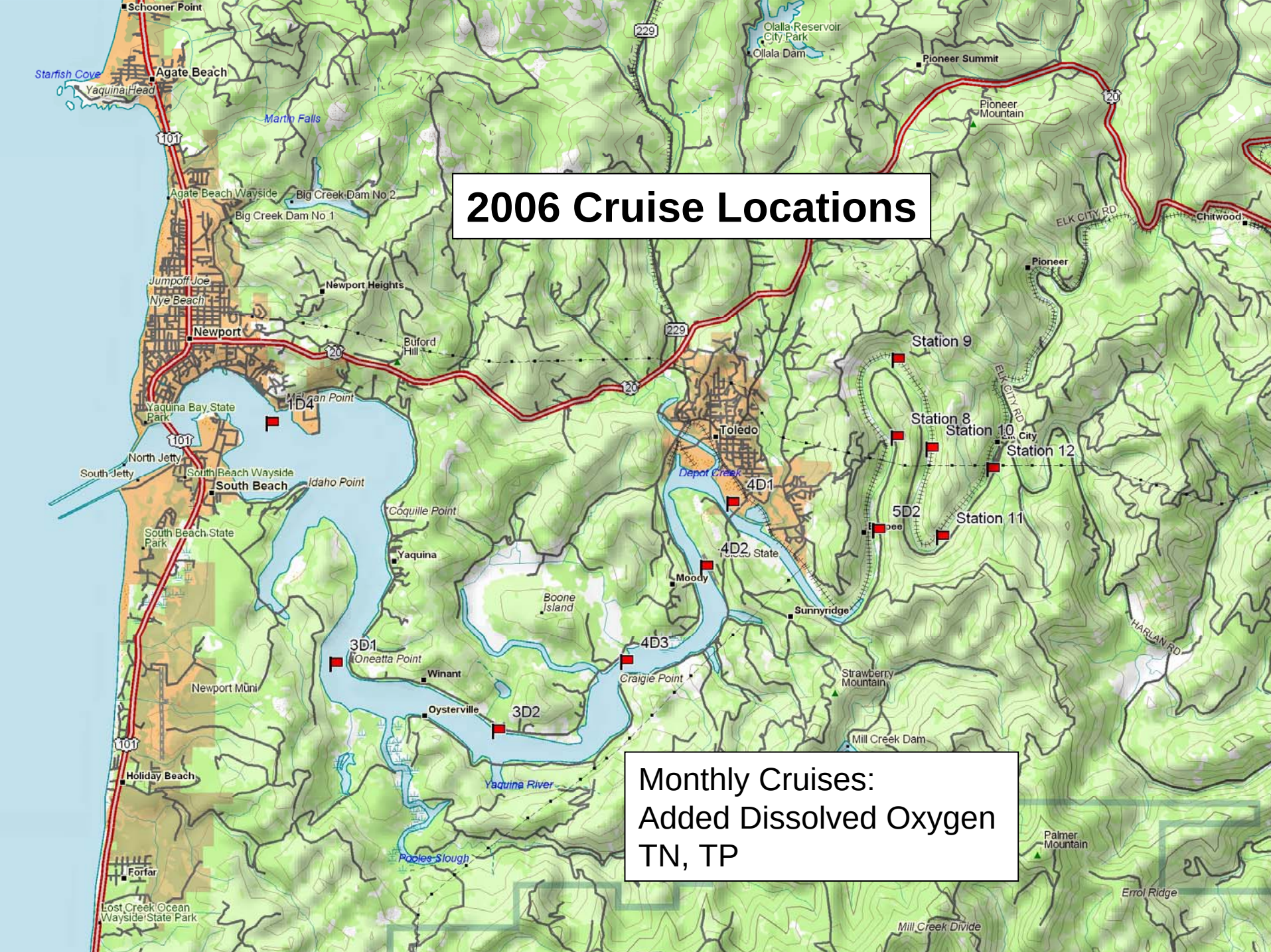
Number of Stations and sampling frequency varies by year


1998-2001 Cruise Locations
Yaquina Head
Martin Falls
Pioneer Mountain
Agate Beach Wayside
Big Creek Dam No 2
Big Creek Dam No 1
Fruitvale
ELK CITY RD
Pioneer
Jumpoff Joe
Nye Beach
Newport
Buford Hill
229
20
1L1
1M4
1D1
1M1
1D4
1L2
2L2
2M1
1M3
Yaquina Park
State
101
North Jetty
South Jetty
South Beach Waysi
South Beach
Idaho Point
2L3
2M2
2M3
2L1
Coquille Point
South Beach State Park
Yaquina
Toledo
Elk City
Elk City County Park
Depot Creek
4D1
4L5
5D2
4M12
4D2
4L3
Moody
Sunnyridge
Boone Island
2D2
3D1
4M5
4M4
4L1
4D3
Oneatta Point
Crane Point
3M3
Winant
3M1
3L1
Oysterville
3L21
3L2
3L10
3M2
Strawberry Mountain
Newport Muni
Mill Creek Dam
Holiday Beach
Yaquina River
Palmer Mountain
Forfar
Pooles Slough
Lost Creek Ocean Wayside State Park
Errol Ridg
Mill Creek Divide


2002 Cruise Locations
Agate Beach Wayside
Big Creek Dam No 2
Big Creek Dam No 1
Fruitvale
Jumpoff Joe
Nye Beach
Newport Heights
Newport
Hill
1D1
1D5
1D4
Yaquina Bay State Park
2D3
101
North Jetty
South Jetty
South Beach Wayside
South Beach
Idaho Point
South Beach State Park
Coquille Point
Yaquina
2D1
2D22
3D1
Oneatta Point
3D3
Winant
Newport Muni
Oysterville
3D2
Holliday Beach
Forfar
Yaquina River
Pooles Slough
Toledo
Depot Creek
4D1
4D2
Burpee
Moody
Boone Island
Sunnyridge
4D3
Craigie Point
Strawberry Mountain
Mill Creek Dam
20
Weekly from May-October
Once per month during winter


2003 Cruise Locations
Weekly from May-October
Once per month during winter
1D4
2D3
2D1
2D22
3D1
3D3
3D2
4D1
4D2
4D3
5D1
5D2
Newport
South Beach
Toledo
Yaquina
Moody
Sunnyridge
Oysterville
Winant
Pacific Ocean
Yaquina Bay State Park
South Beach State Park
Newport Muni
Holiday Beach
Forfar
Lost Creek Ocean Wayside State Park
Agate Beach Wayside
Big Creek Dam No 2
Big Creek Dam No 1
Fruitvale
Pioneer
Jumpoff Joe
Nye Beach
Buford Hill
North Jetty
South Jetty
South Beach Wayside
Idaho Point
Coquille Point
Depot Creek
Boone Island
Oneatta Point
Craigie Point
Strawberry Mountain
Yaquina River
Pooles Slough
Elk City
Elk City County
ELK CITY RD
Palmer Mountain
Mill Creek Divide
101
20
229


2004 Cruise Locations
Weekly from May-October
1D4
3D1
3D2
4D2
5D1
5D2
Agate Beach Wayside
Big Creek Dam No 2
Big Creek Dam No 1
Fruitvale
Pioneer
Jumpoff Joe
Nye Beach
Newport Heights
Newport
Yaquina Bay State Park
North Jetty
South Jetty
South Beach Wayside
South Beach
Idaho Point
Coquille Point
Pacific Ocean
South Beach State Park
Yaquina
Toledo
Depot Creek
Elk City
Elk City County Park
ELK CITY RD
Moody
Sunnyridge
Boone Island
Oneatta Point
Winant
Newport Muni
Oysterville
Craigie Point
Strawberry Mountain
Holiday Beach
Yaquina River
Palmer Mountain
Pooles Slough
Forfar
Lost Creek Ocean Wayside State Park
Mill Creek Divide
101
20


2006 Cruise Locations
Monthly Cruises:
Added Dissolved Oxygen
TN, TP
1D4
3D1
3D2
4D1
4D2
4D3
5D2
Station 8
Station 9
Station 10
Station 11
Station 12
Schooner Point
Agate Beach
Yaquina Head
Starfish Cove
Martin Falls
Agate Beach Wayside
Big Creek Dam No 2
Big Creek Dam No 1
Jumpoff Joe
Nye Beach
Newport
Newport Heights
Buford Hill
Yaquina Bay State Park
North Jetty
South Jetty
South Beach Wayside
South Beach
Idaho Point
Coquille Point
South Beach State Park
Yaquina
Boone Island
Oneatta Point
Winant
Newport Muni
Oysterville
Holiday Beach
Yaquina River
Poodes Slough
Forfar
Lost Creek Ocean Wayside State Park
Olalla Reservoir City Park
Olalla Dam
Pioneer Summit
Pioneer Mountain
Chitwood
ELK CITY RD
Pioneer
Toledo
Depot Creek
Moody
Sunnyridge
Strawberry Mountain
HARLAN RD
Mill Creek Dam
Palmer Mountain
Errol Ridge
Mill Creek Divide
101
20
229

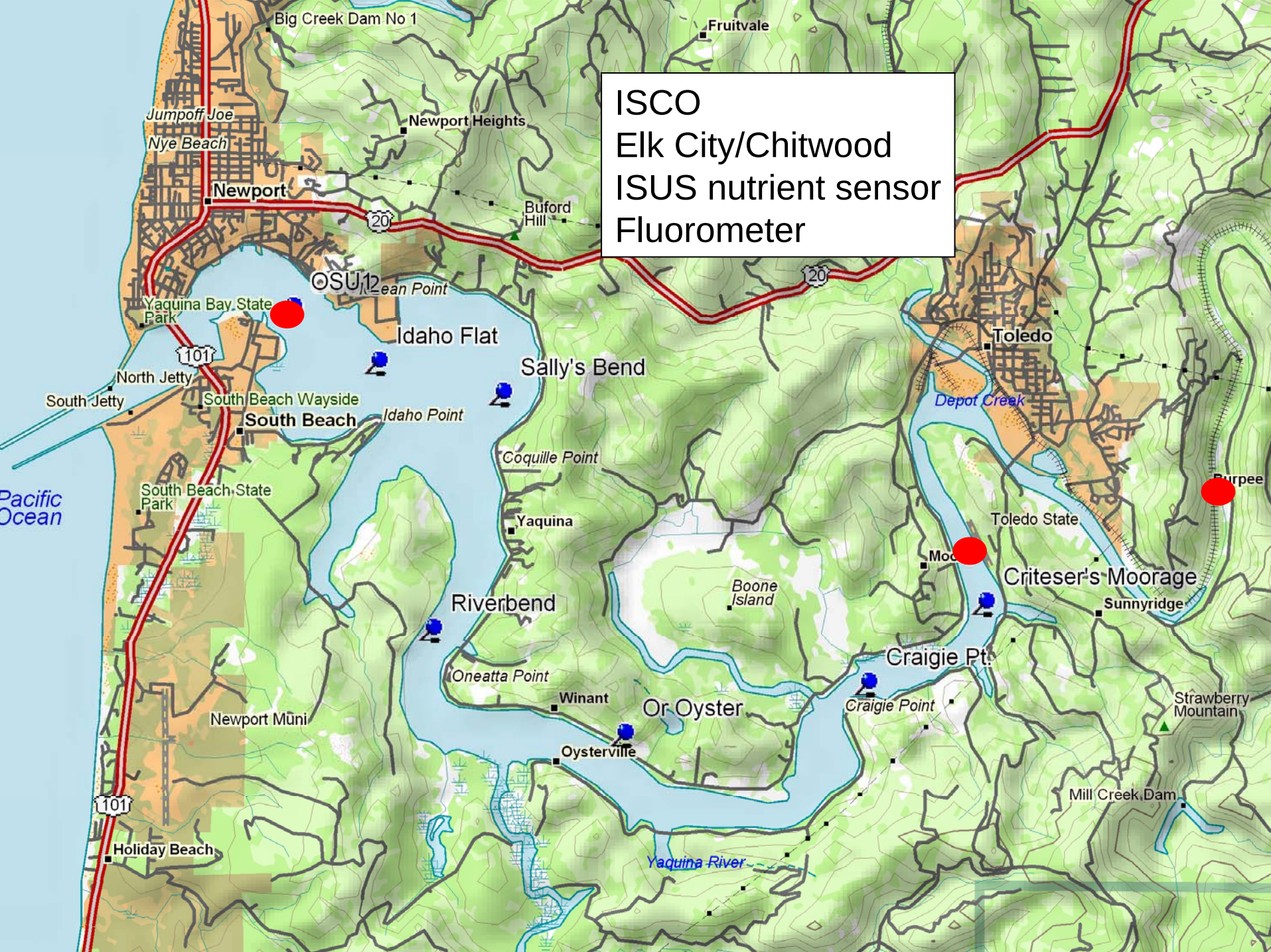
Time-Series Data

- YSI datasondes (not real-time)
- Parameters Measured

  Temperature, Conductivity/Salinity, Depth, pH, Dissolved oxygen, Turbidity, Chlorophyll *a*

Deployment locations

- 1996-1998 OSU dock
- 1999-present OSU (surface & bottom), Criteser's, Oregon Oyster, Cragie, Riverbend
- 2003-2004 Idaho Flat
- 2004-present Sally's Bend


ISCO
Elk City/Chitwood
ISUS nutrient sensor
Fluorometer
Big Creek Dam No 1
Fruitvale
Jumpoff Joe
Nye Beach
Newport Heights
Newport
Buford Hill
20
OSU 12
Yaquina Bay State Park
Idaho Flat
Sally's Bend
101
North Jetty
South Jetty
South Beach Wayside
South Beach
Idaho Point
Coquille Point
South Beach State Park
Pacific Ocean
Yaquina
Riverbend
Boone Island
Oneatta Point
Winant
Or Oyster
Oysterville
Newport Muni
Holiday Beach
Yaquina River
Toledo
Depot Creek
Toledo State
Criteser's Moorage
Sunnyridge
Craigie Pt.
Craigie Point
Strawberry Mountain
Mill Creek Dam

Yaquina Bay Nutrient Criteria Case Study

Objective: To develop and test new methods for setting nutrient criteria protective of estuarine resources.

Components Include:

- Identificatiton and quantification of sources of nutrient loading.
- Trend Analysis of nutrients, chlorophyll a, dissolved oxygen & water quality
- Reference Condition Approach vs. Stress-Response Approach
- Factors controlling the distributiton of seagrass, macroalgae, chlorophyll a.

Parameters being assembled:

- Temperature
- Salinity
- Dissolved oxygen
- Chlorophyll *a*
- Nutrients
- Turbidity
- Light Attenuation / Secchi Depth
- Total Suspended Solids

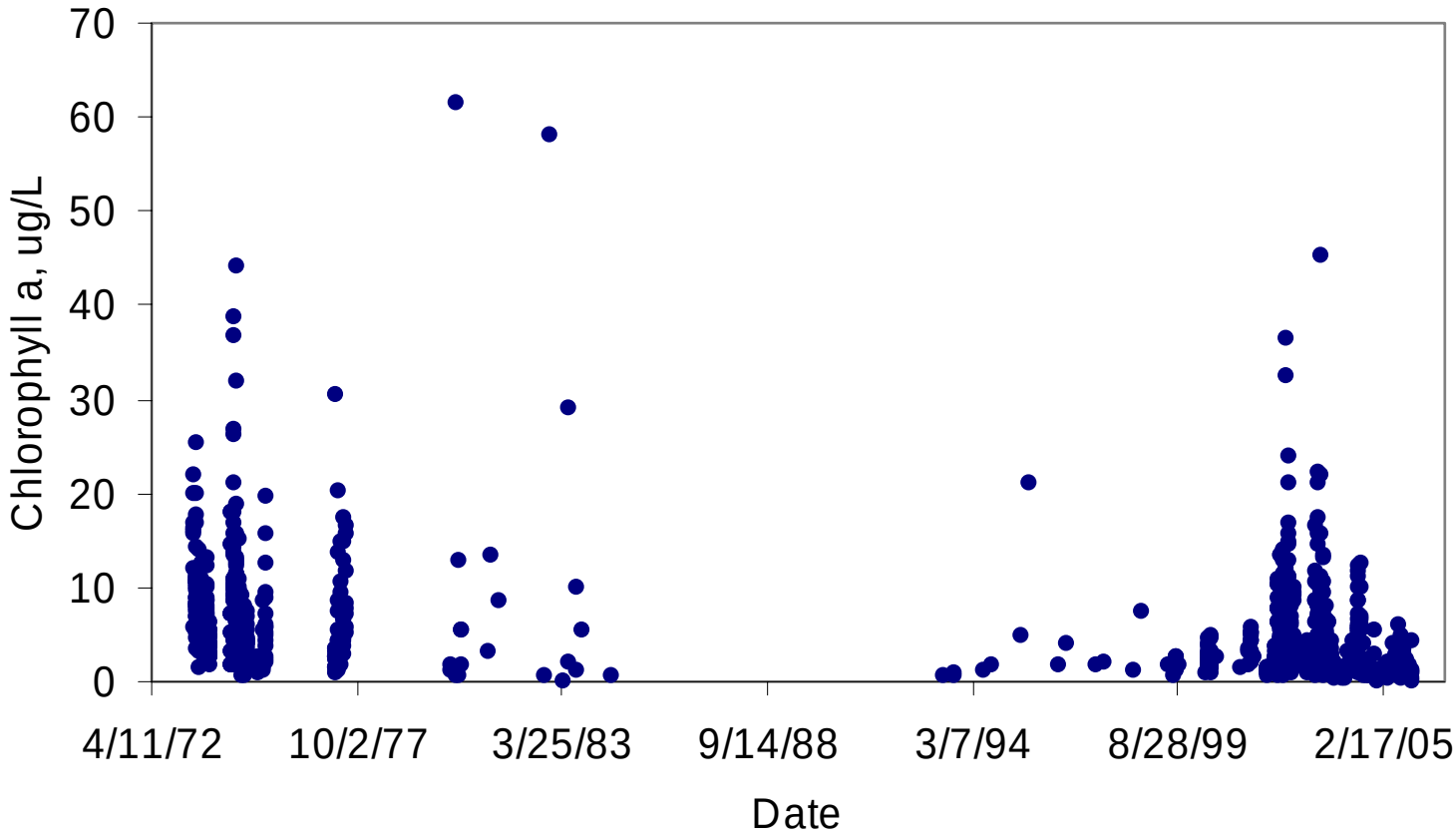
Data Includes

- Pacific Coastal Ecology Branch Cruises
- EMAP
- Classification (10 stations, low tide and high tide cruise, 2004)
- Kaldy & Eldridge – Trophic Cruises in 2000

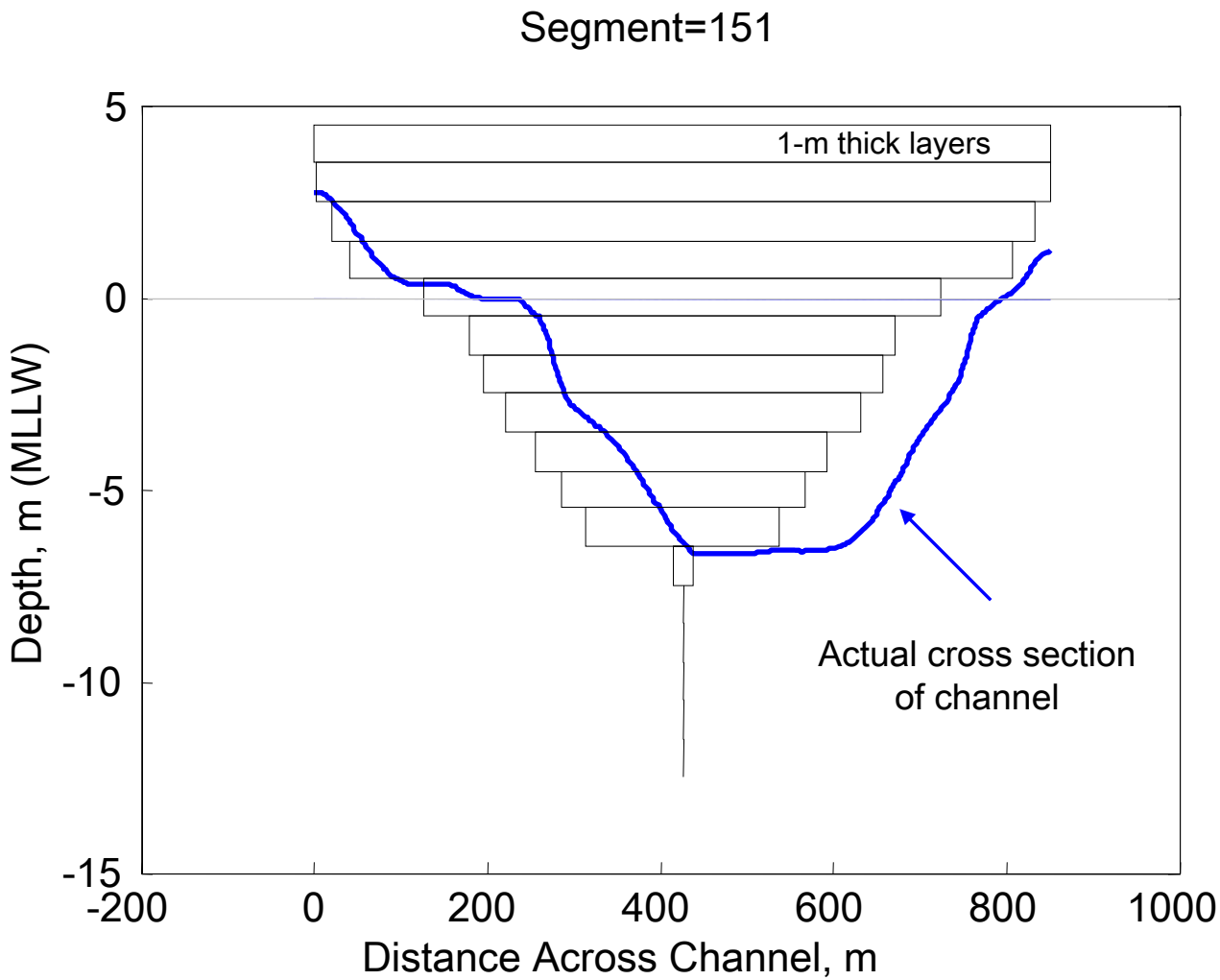
Historic Data:

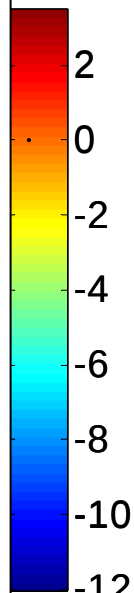
- Oregon DEQ data
- Amspoker, M.C. (1977). The distribution of intertidal diatoms associated with the sediments of Yaquina Estuary, Oregon, M.S. Thesis, OSU (Table 8, page 57)
- Arnold, G.A., R. Caldwell, C. Lannan, And J. Winton. (1992). Microbiological quality of the Yaquina Estuary. WRRI-110. (Table 8 in appendix, TSS, water temp and salinity)
- Frey, B.E. (1977). Ecological survey of phytoplankton in Yaquina Bay, Oregon, February through June 1977.
- Gibson, G. and Snow, C. D. (1967). Hydrographic data for Yaquina, Coos and Tillamook Bays, Oyster Mortality Study. (Tables 1-3)
- Johnson, J.K. (1980). Population dynamics and cohort persistence of *Acartia Californiensis* (Copepoda: Calanoida) in Yaquina Bay, Oregon. PhD Dissertation, OSU.
- Karentz, D. (1975). The distribution of planktonic diatoms in Yaquina Estuary, Oregon. M.S. Thesis, OSU.
- Karentz, D. and McIntire, C. D. 1977. Distribution of diatoms in the plankton of Yaquina estuary, Oregon. J. Phycol. 13, 379-388.
- Matson, A.L. (1964). Dissolved silicate in waters offshore Oregon and in four adjacent rivers. M.S. Thesis, OSU. (Table in Appendix, pages 89-96)
- Specht, D. (1976-1977), 17 stations, 9 sampling dates.

Example time-series of all chlorophyll *a* data in Yaquina Bay/River

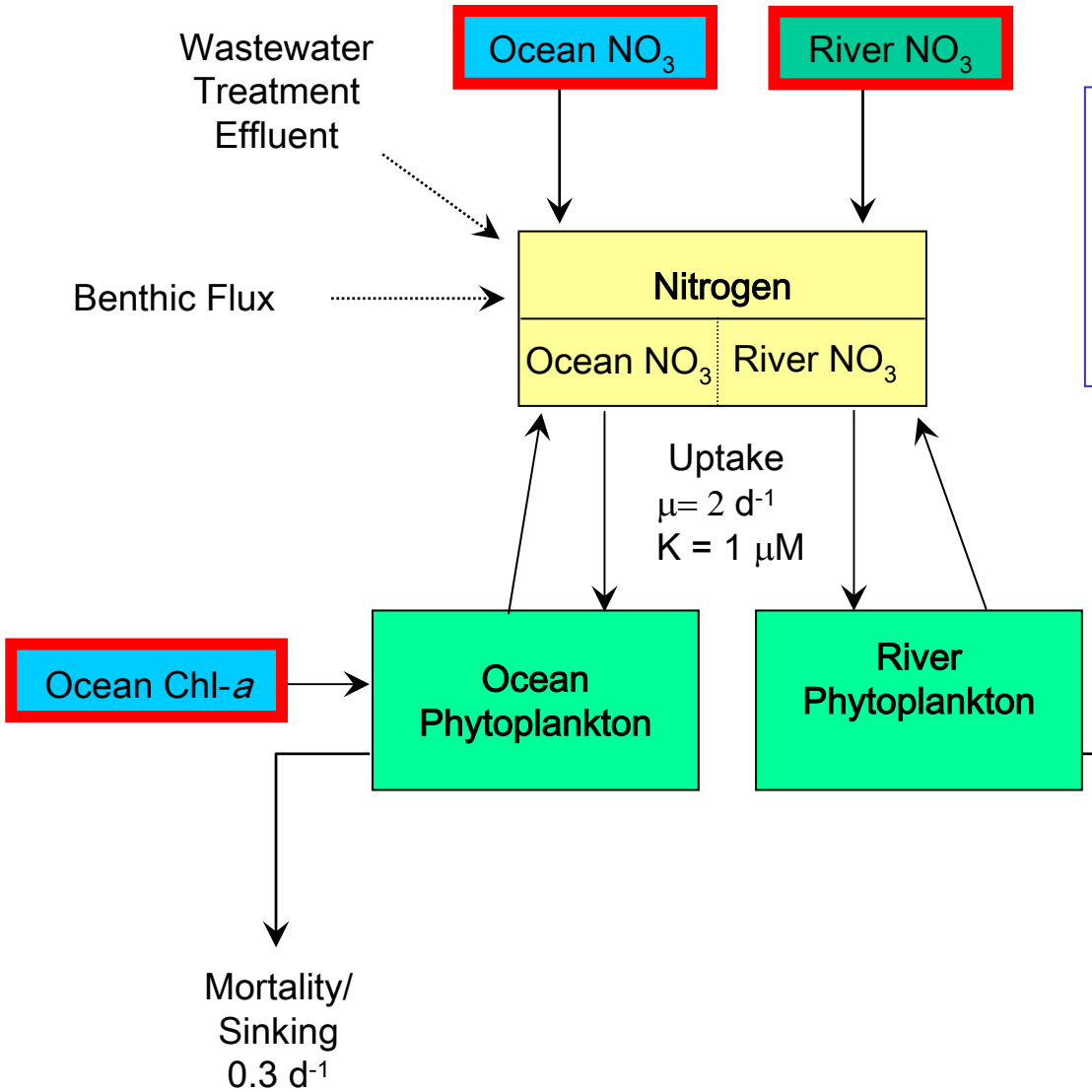


Model Representation of Cross-Section





Simplified Schematic of Model



Model nitrate

Joint Nutrient & Light Limitation

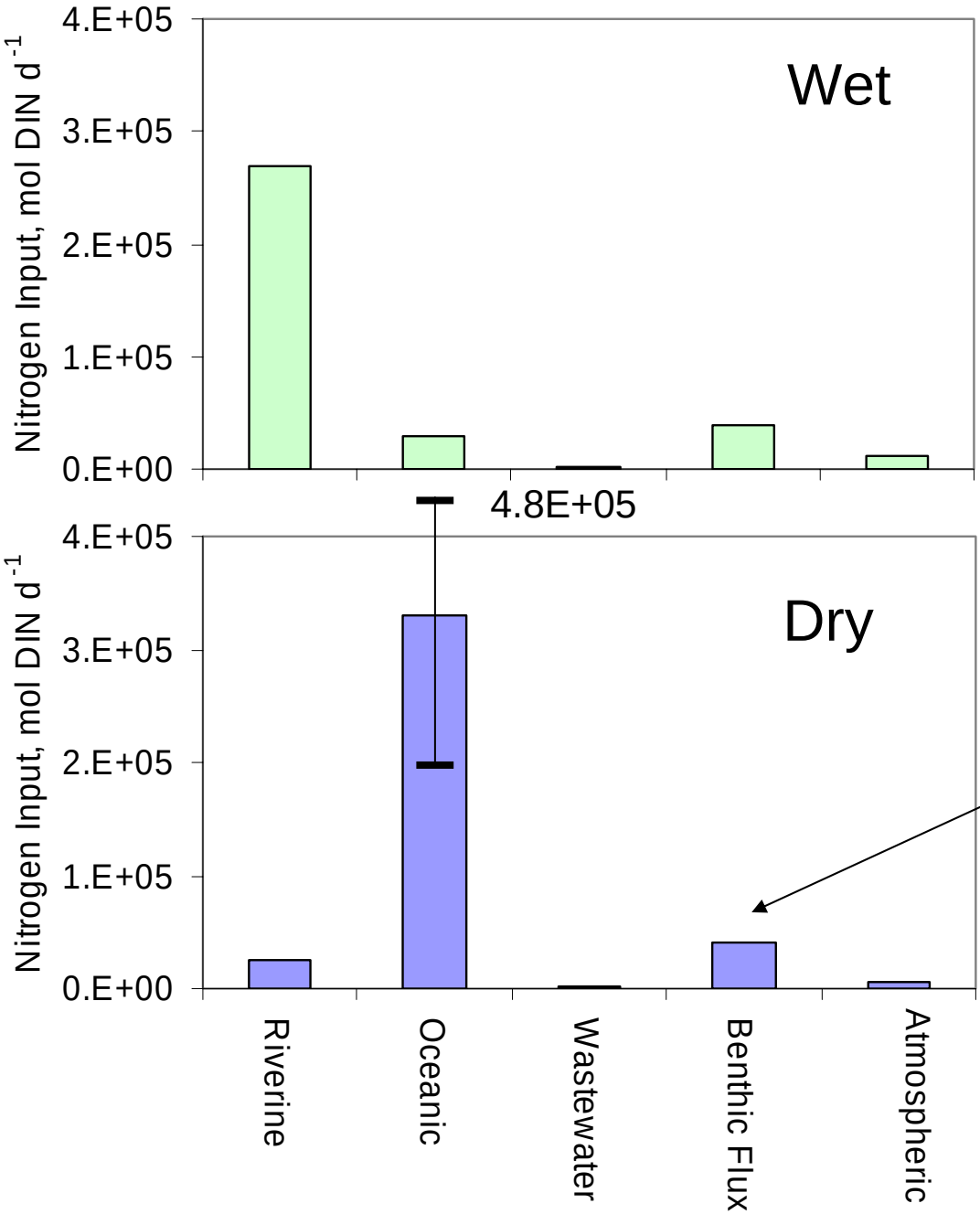
Model each source separately

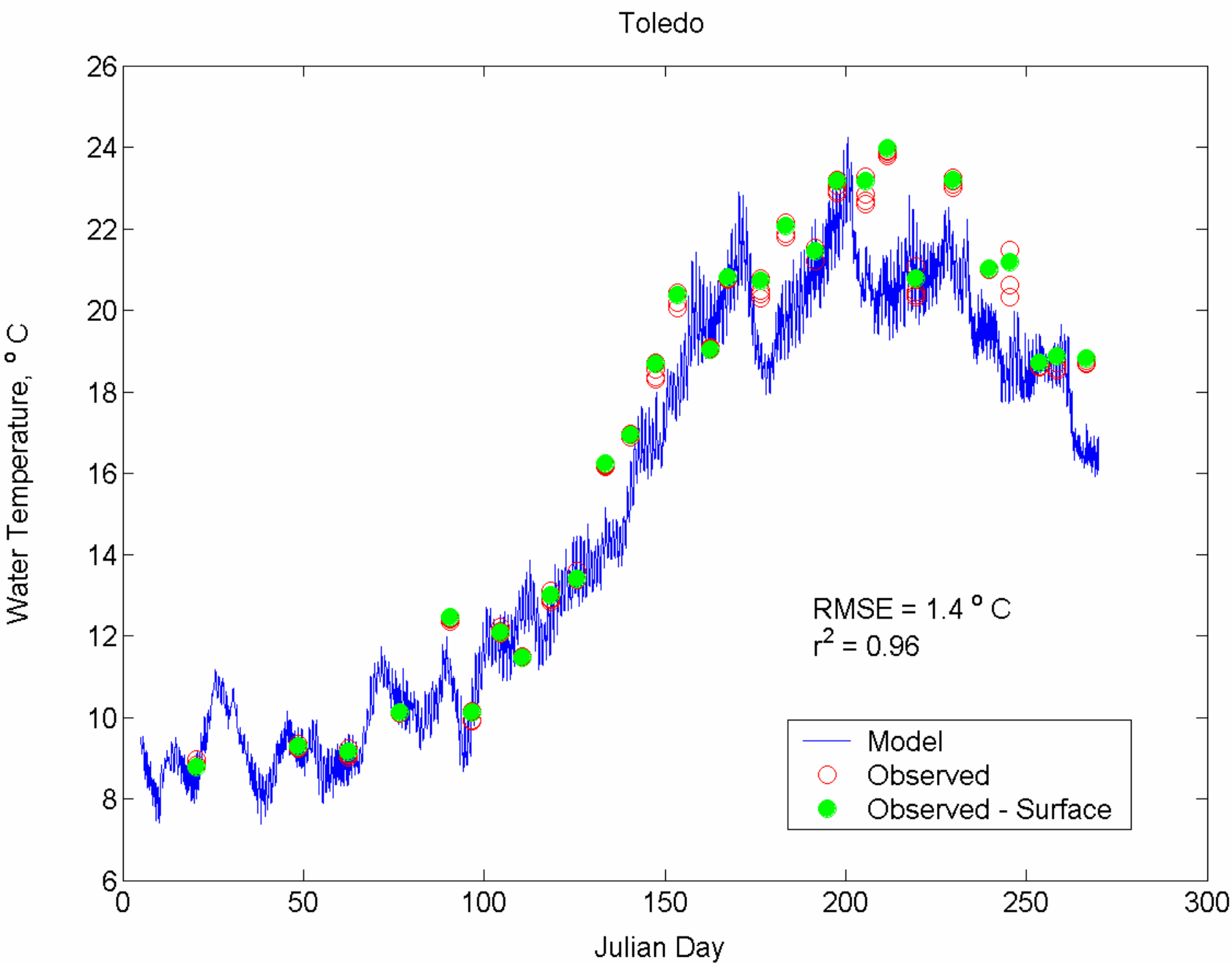
Self-shading included

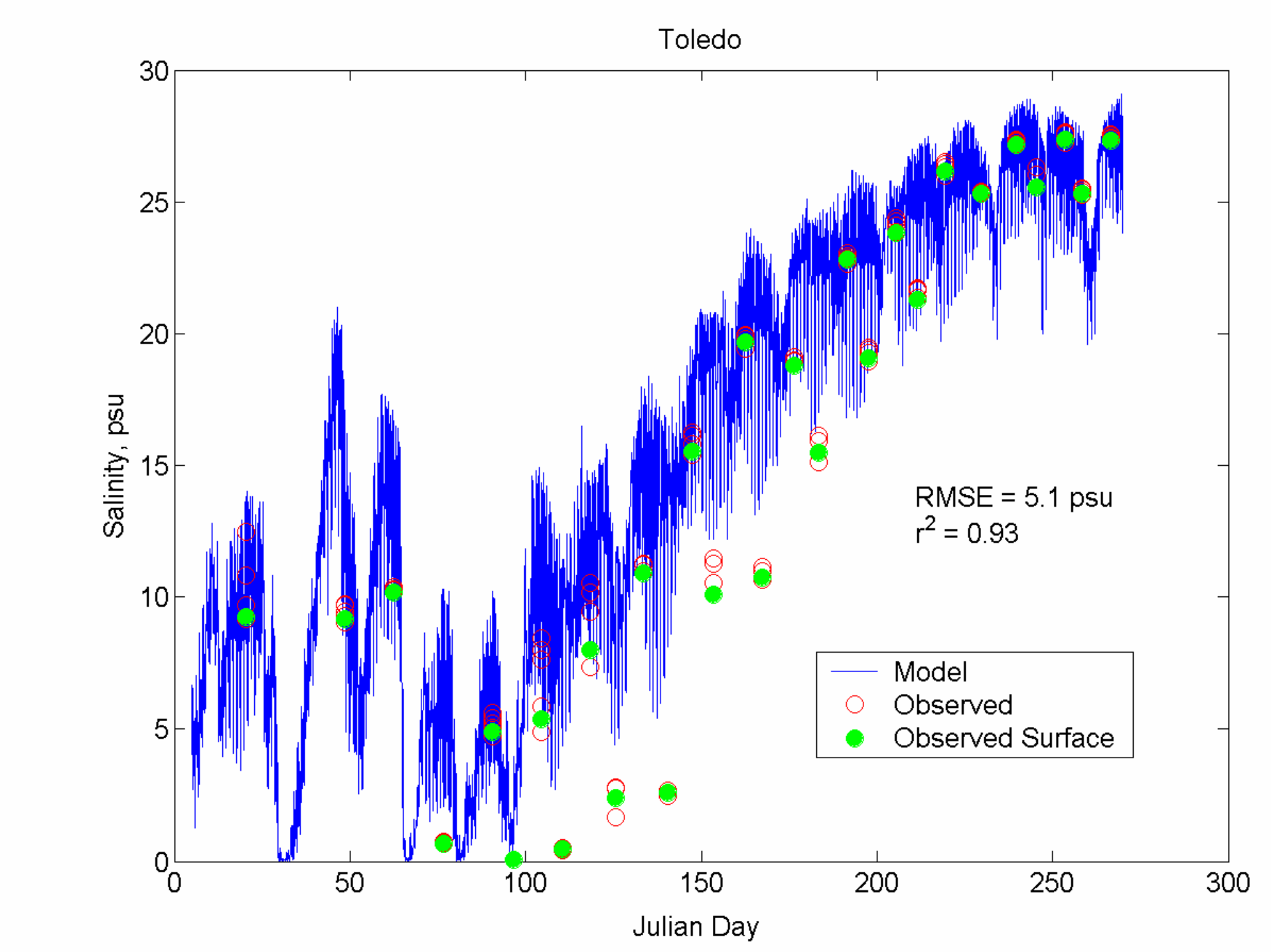
Transport of all components is modeled

Other Inputs/Forcing:

River Inflow
Point Source
Wind Forcing
Temperature
Tidal Forcing
Salinity
Air Temperature
Dew Point
Solar Irradiance
Precipitation
TSS


Wet
Dry
Nitrogen Input, mol DIN d-1
4.E+05
3.E+05
2.E+05
1.E+05
0.E+00
4.8E+05
Riverine
Oceanic
Wastewater
Benthic Flux
Atmospheric
DeWitt et al. (2004)


Toledo
Water Temperature, ° C
Julian Day
RMSE = 1.4 ° C
r2 = 0.96
Model
Observed
Observed - Surface
26
24
22
20
18
16
14
12
10
8
6
0
50
100
150
200
250
300


Toledo
Salinity, psu
Julian Day
RMSE = 5.1 psu
r2 = 0.93
Model
Observed
Observed Surface
0
5
10
15
20
25
30
0
50
100
150
200
250
300

horous)

in macroalgal biomass aatershed loading and ocean input.
urces

ass and water column properties
which indicate oceanic versus
V.

(turbidity, light attenuation, salinity, and chlorophyll a)
watershed nutrients).

omorphic clustering of estuaries.
as additional classifying variable.

esponse Approaches