CRITFC-CMOP program

May 15, 2024

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CRITFC

Founded in 1977 by the Yakama Nation, Warm Springs, Umatilla, and Nez Perce treaty tribes to:

1) Put fish back in the rivers and protect watersheds.

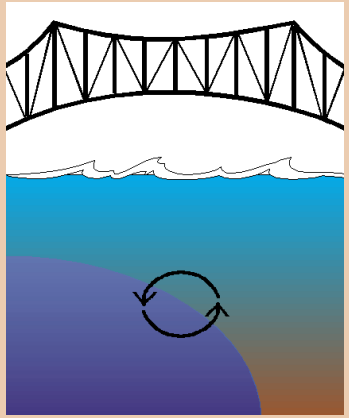
2) Protect tribal treaty fishing rights.

3) Provide fisher services.

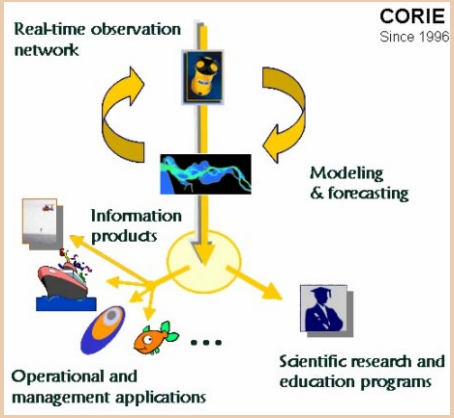
4) Share salmon culture.

History of the CMOP program:

roughly
30 years of observation and modeling



1990-2000:
Columbia River Estuary Turbidity Maxima LMER



1996-2006:
CORIE program housed at OGI → OHSU

1996: began collecting continuous physical data

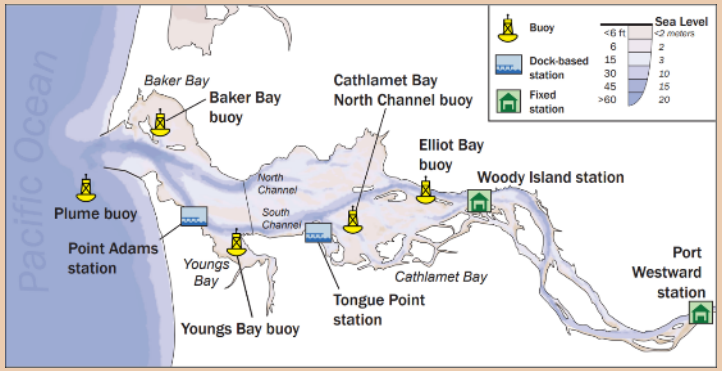
2006-2016:
CMOP program, (NSF-STC) housed at OHSU

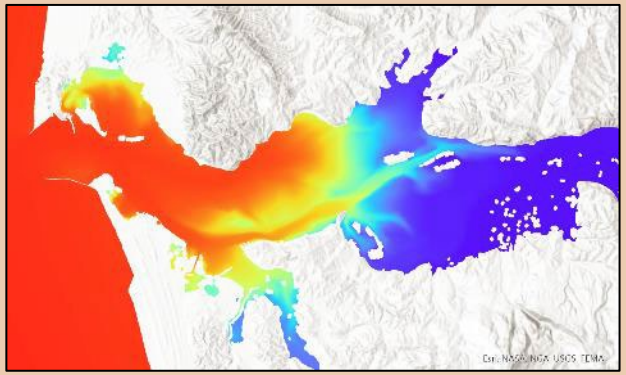
2008: began collecting continuous biogeochemical data

2020 onward:
CMOP at CRITFC

Columbia River Inter-Tribal Fish Commission

Two sides of the program





Our growing team

Charles Seaton
Program Coordinator
>20 years

Sarah Riseman
Data quality analyst
12 years

Mike Swirsky
Ocean Modeler
<2 years

Rosie Gradoville
Oceanographer
<2 years

Andrés Salazar
Instrumentation Tech
1 year

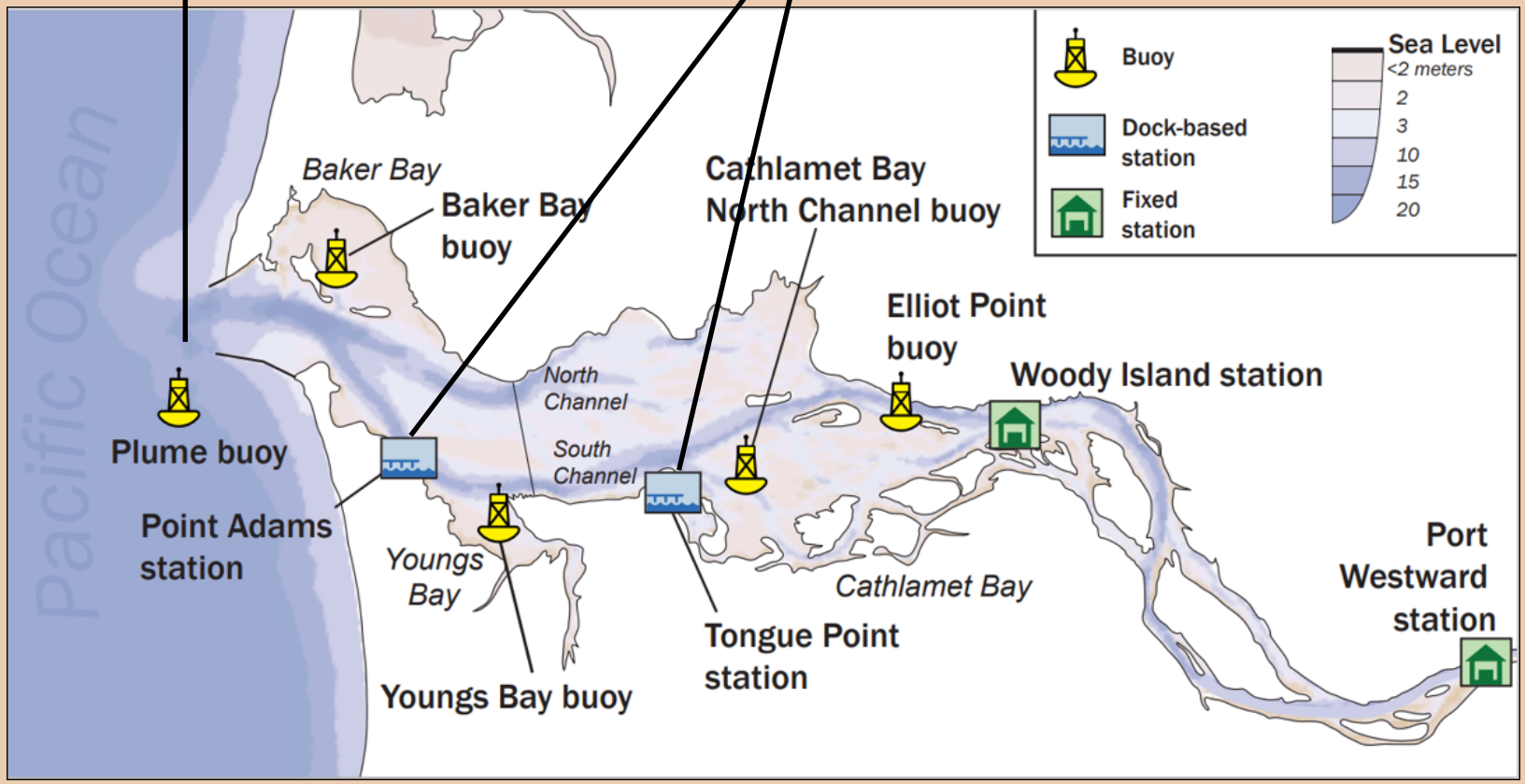
Dan Feldman
Instrumentation Tech
4 months

Columbia River Inter-Tribal Fish Commission

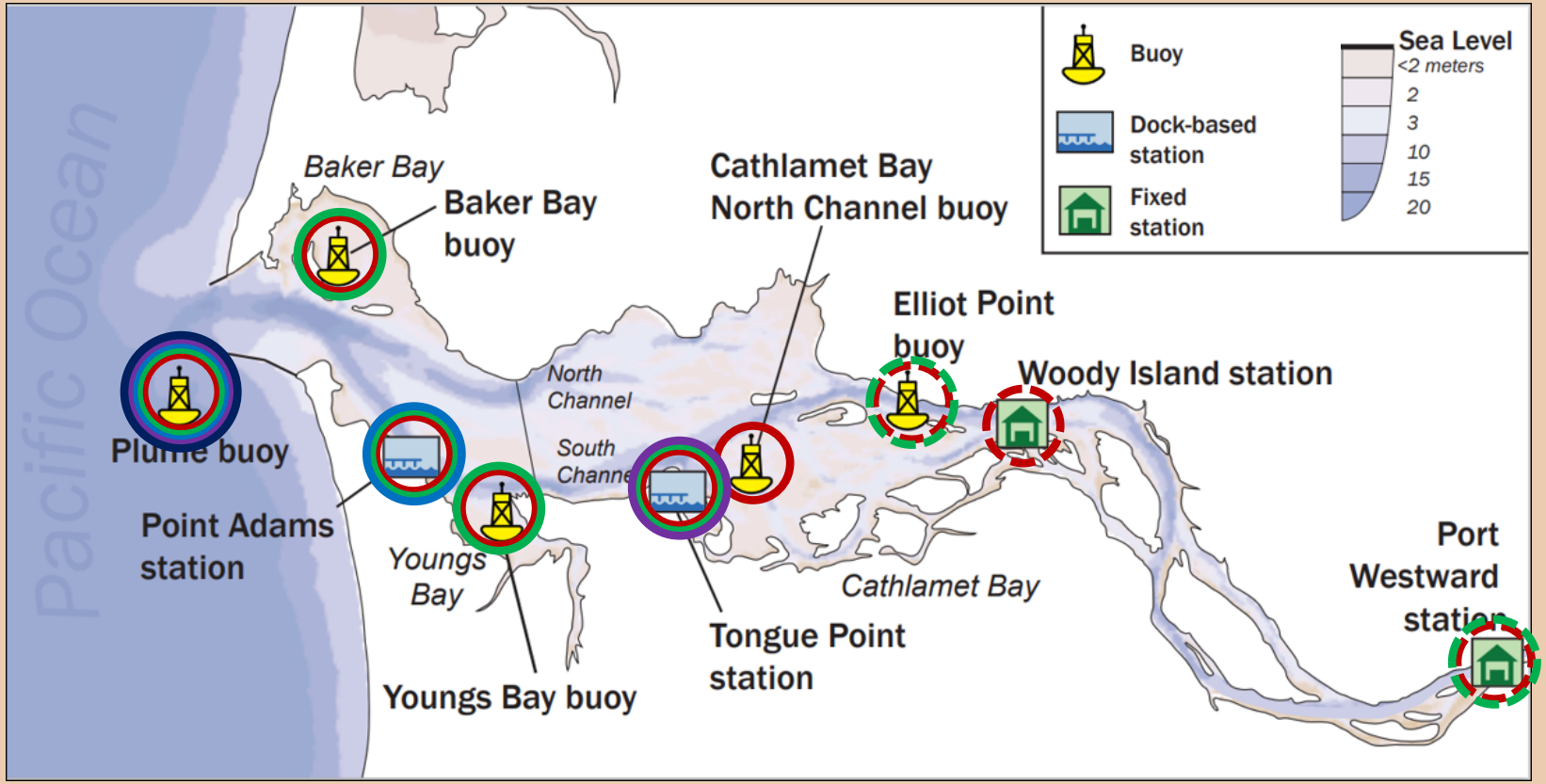
Current CMOP Observatory

Seasonal, multi-depth
+ second ocean buoy planned

Multi-depth
pier-based stations



Current CMOP Observatory measurements



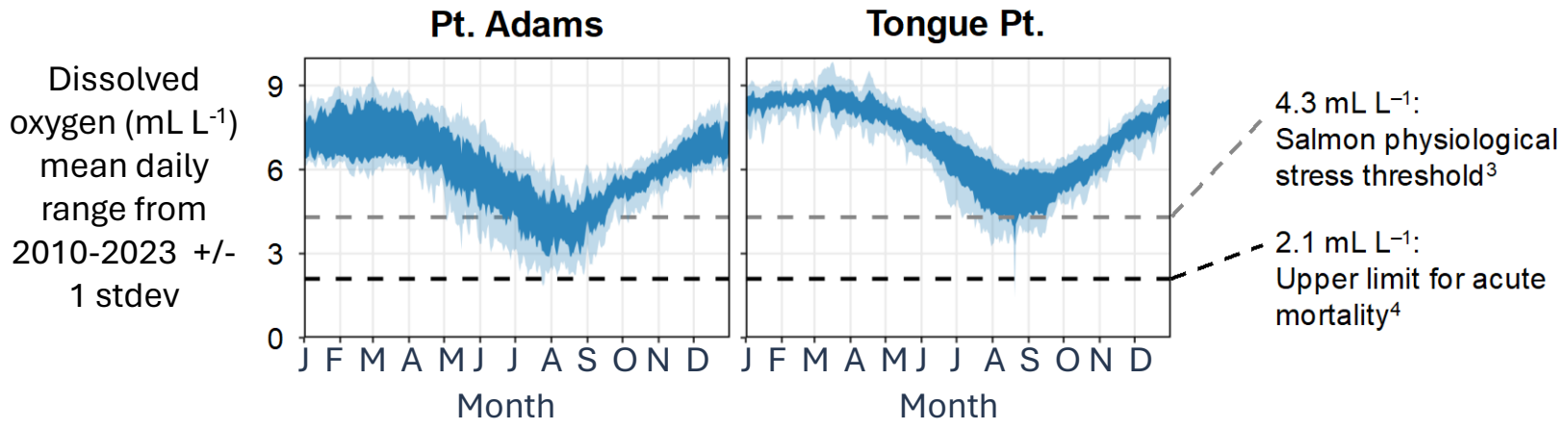
Nearly all preliminary data available in real time at cmop.critfc.org

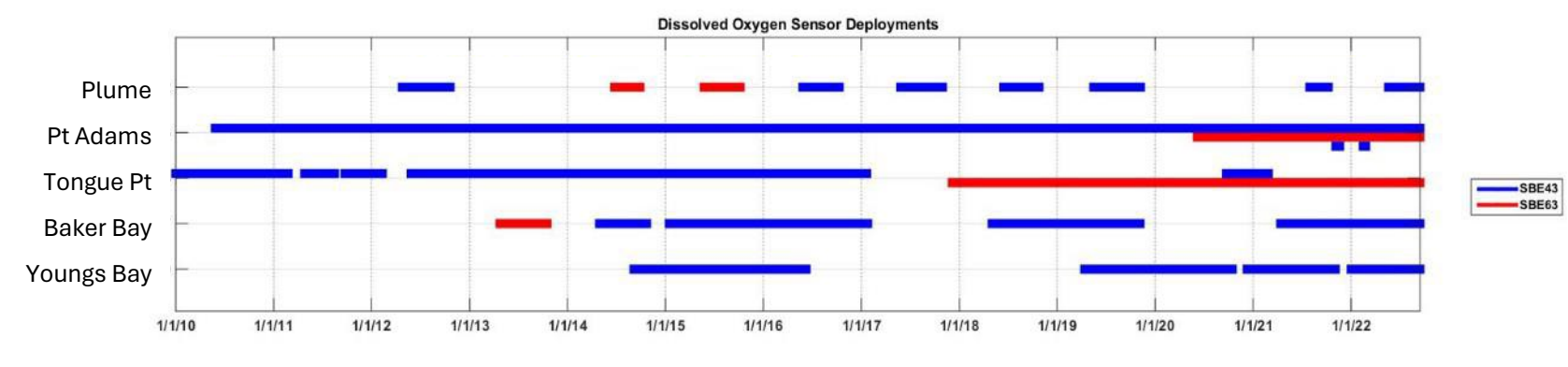
Physical:
- Temperature
- Salinity

Biogeochemical:
- Oxygen
- Turbidity
- Chlorophyll
- Phycoerythrin
- CDOM
- Nitrate
- Quantum yield
- Multi-excitation fluorescence

Meteorological/currents:
- PAR
- Wind
- Barometric pressure
- Air temperature
- Currents

CMOP's long-term datasets can help us understand variability and change in the estuary

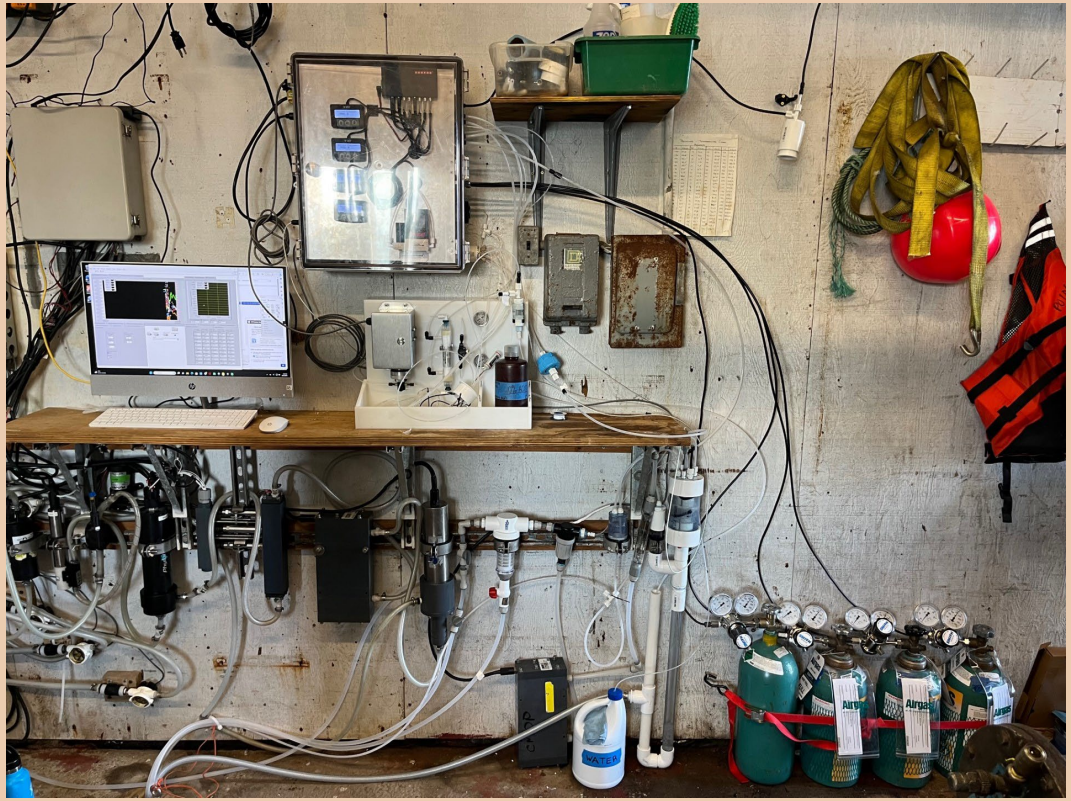




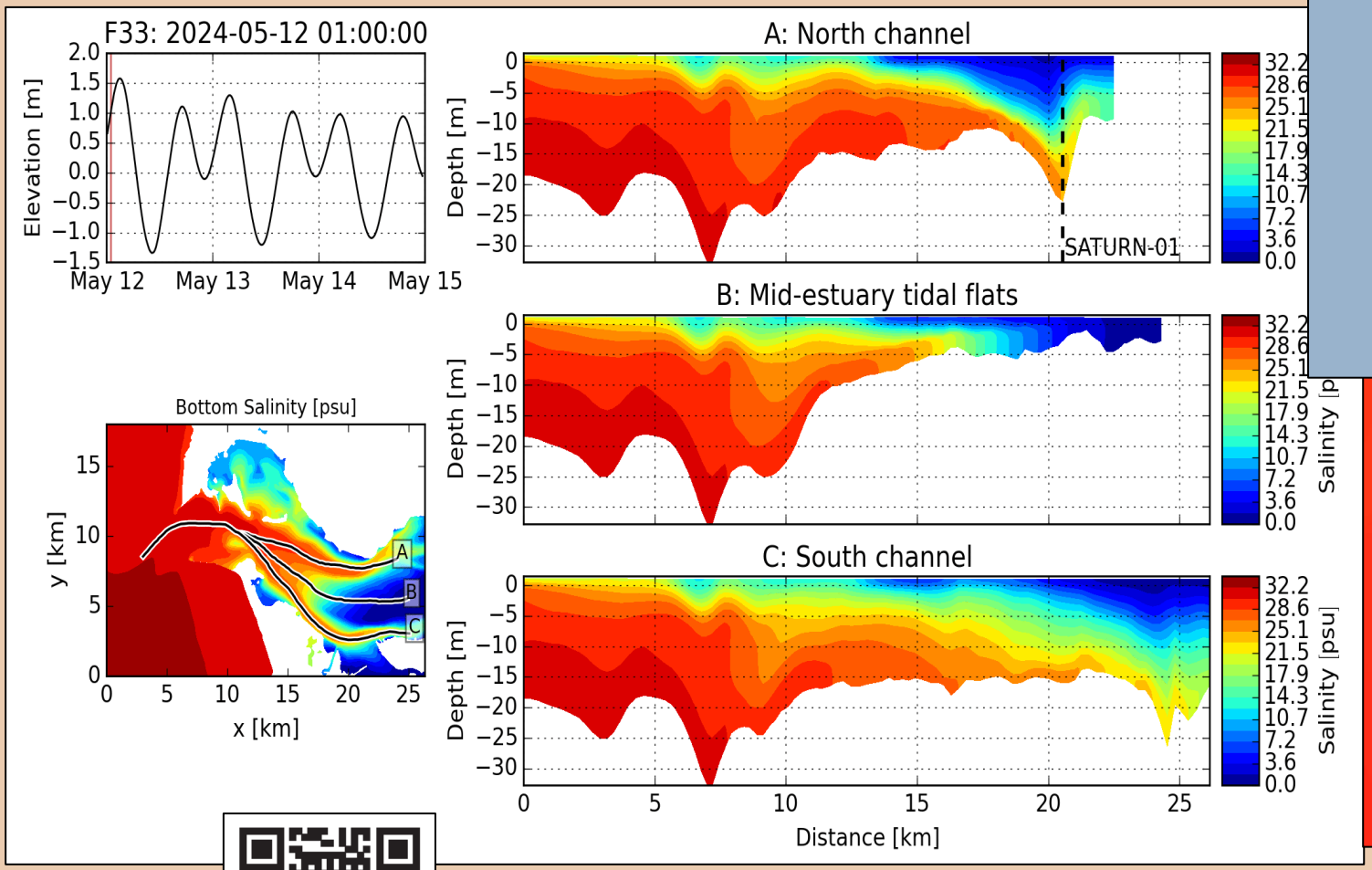
All data available online: https://cmop.critfc.org/datamart/

CO2 relevant improvements to the observatory

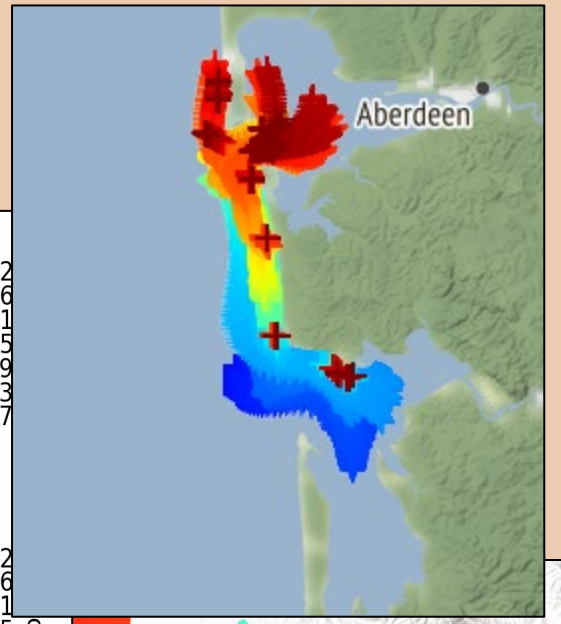
- Monitoring for ocean acidification with a continuous pCO_2/TCO_2 analyzer (Burkolator) recently installed at Point Adams station
- Plan to monitor surface pCO_2 with AFT-CO_2 sensor at Tongue Point station (co-located with Needoba/ Estuary Partnership Eddy Flux Tower)



Virtual Columbia River

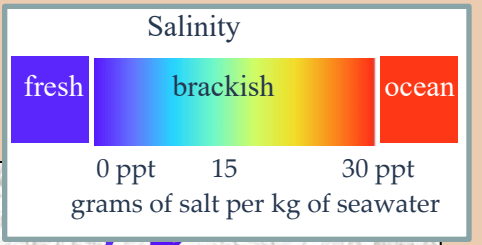


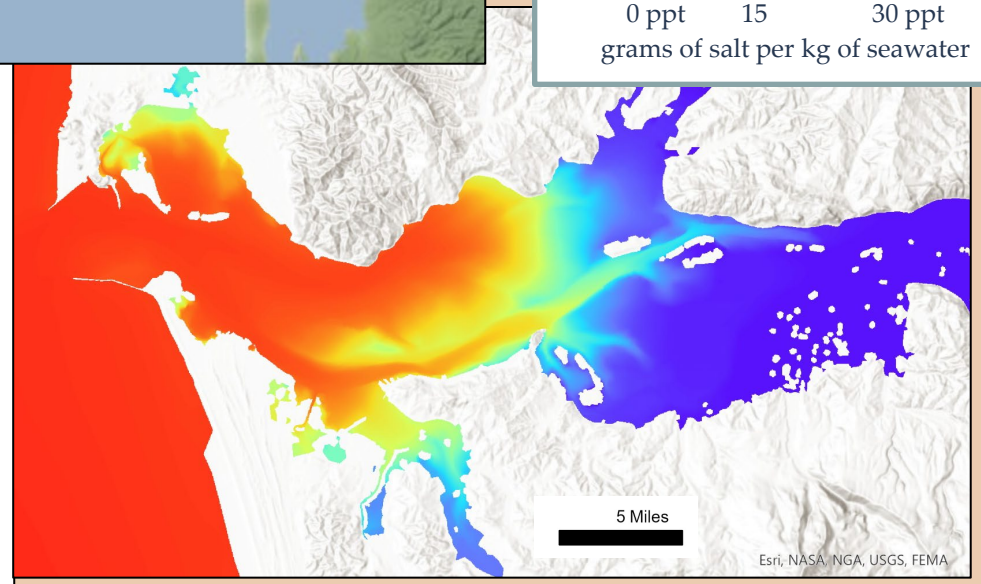
Daily forecasts



Particle Tracking

SCHISM





Climatology

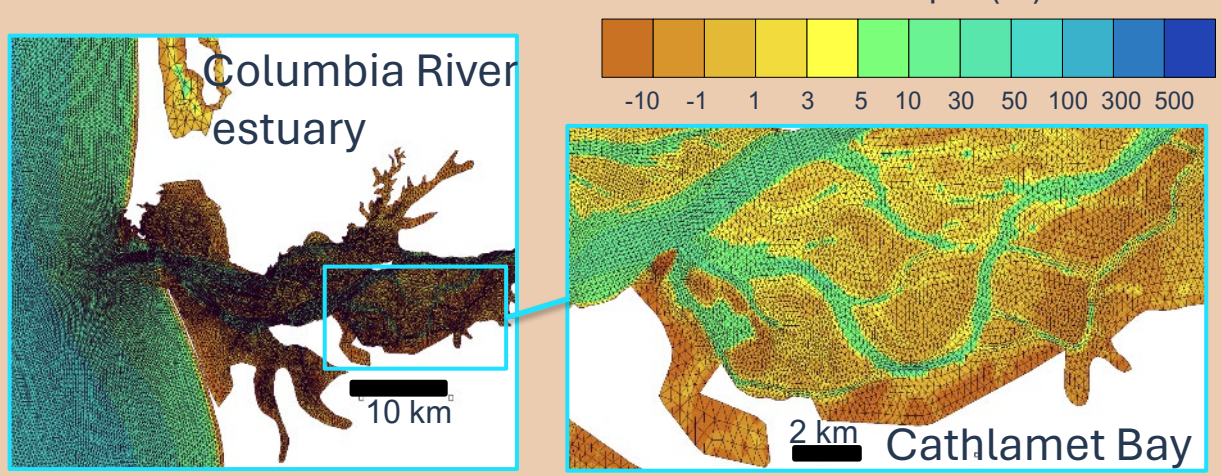
Columbia River Inter-Tribal Fish Commission

Physical Ocean models

- Hydrodynamic models solve physics equations describing the motion of water
- Physics equations are made solvable by splitting the world into discrete pieces

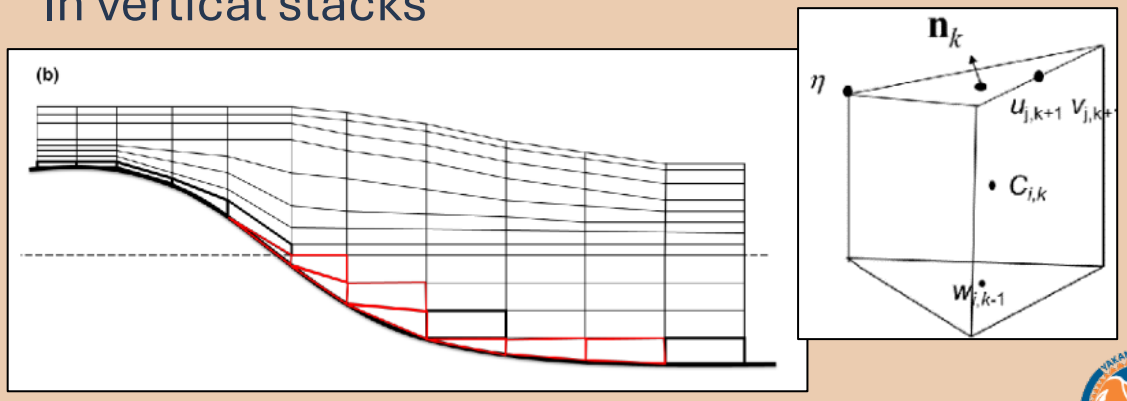
We model:

Using triangles and quadrangles



… the world as prisms

In vertical stacks

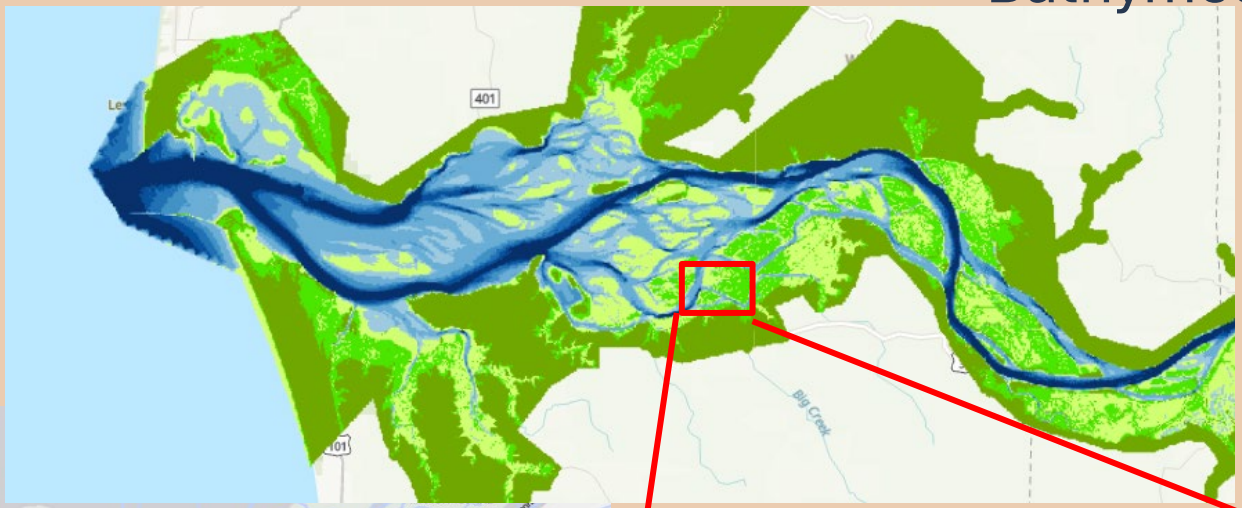


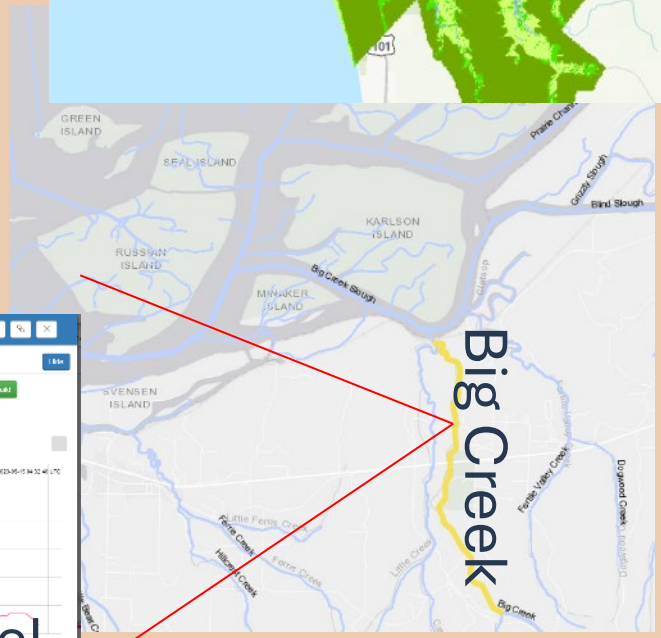
Columbia River Inter-Tribal Fish Commission

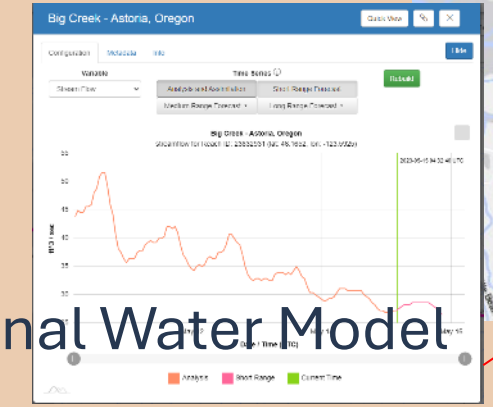
Next step for the Virtual Columbia River

- New database (1994-2023) and forecast
- High resolution (<5m) wetlands
- Integration of discharge from National Water Model
- Climate change scenarios

Bathymetry



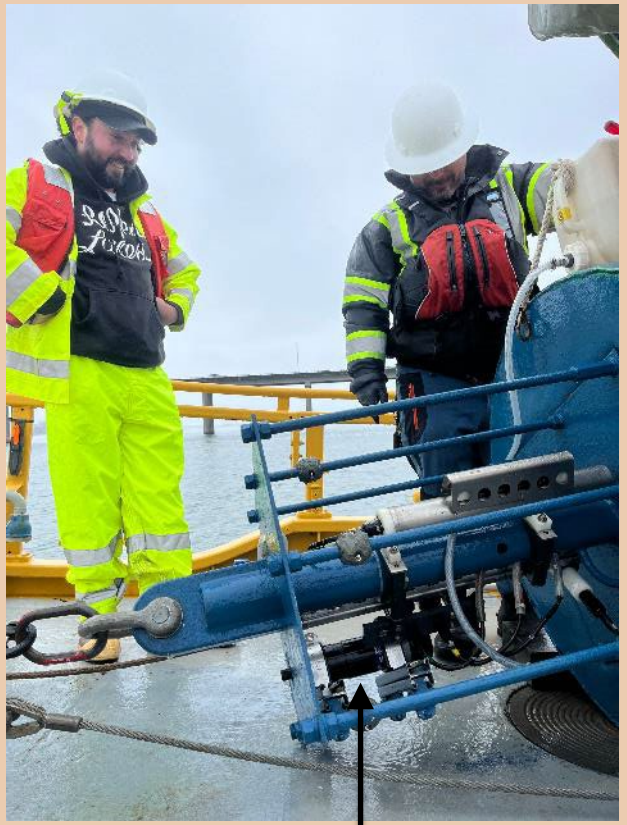




National Water Model

Using CMOP assets to support regional needs

- CMOP stations serve as platforms of opportunity for monitoring programs and experimental instruments
- CMOP modeling can explore relevant scenarios and describe the estuary more broadly than observations
- We are open to using CMOP capabilities to support carbon sequestration efforts in the estuary



Acoustic receiver for WDFW green sturgeon project