

National Operational Coastal Modeling Program



Paul Bradley (CO-OPS) & Ed Myers (Coast Survey Development Lab)
NOAA Industry Day
October 4, 2018



NOAA Operational Coastal Modeling Program

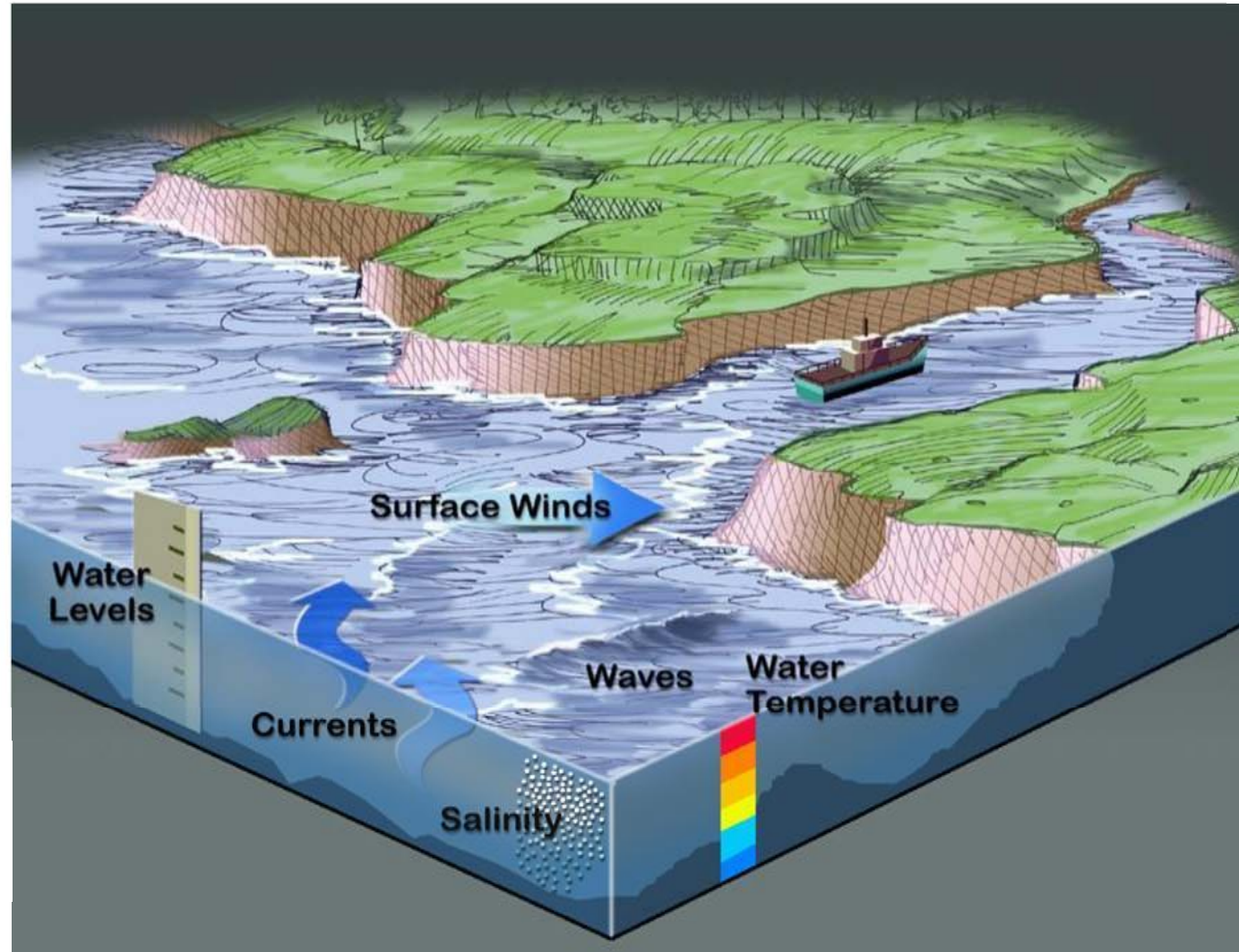
A national network of operational hydrodynamic models providing nowcasts and short-term (2 -5 day) forecasts of:

- Water levels
- Currents
- Salinity
- Temperature

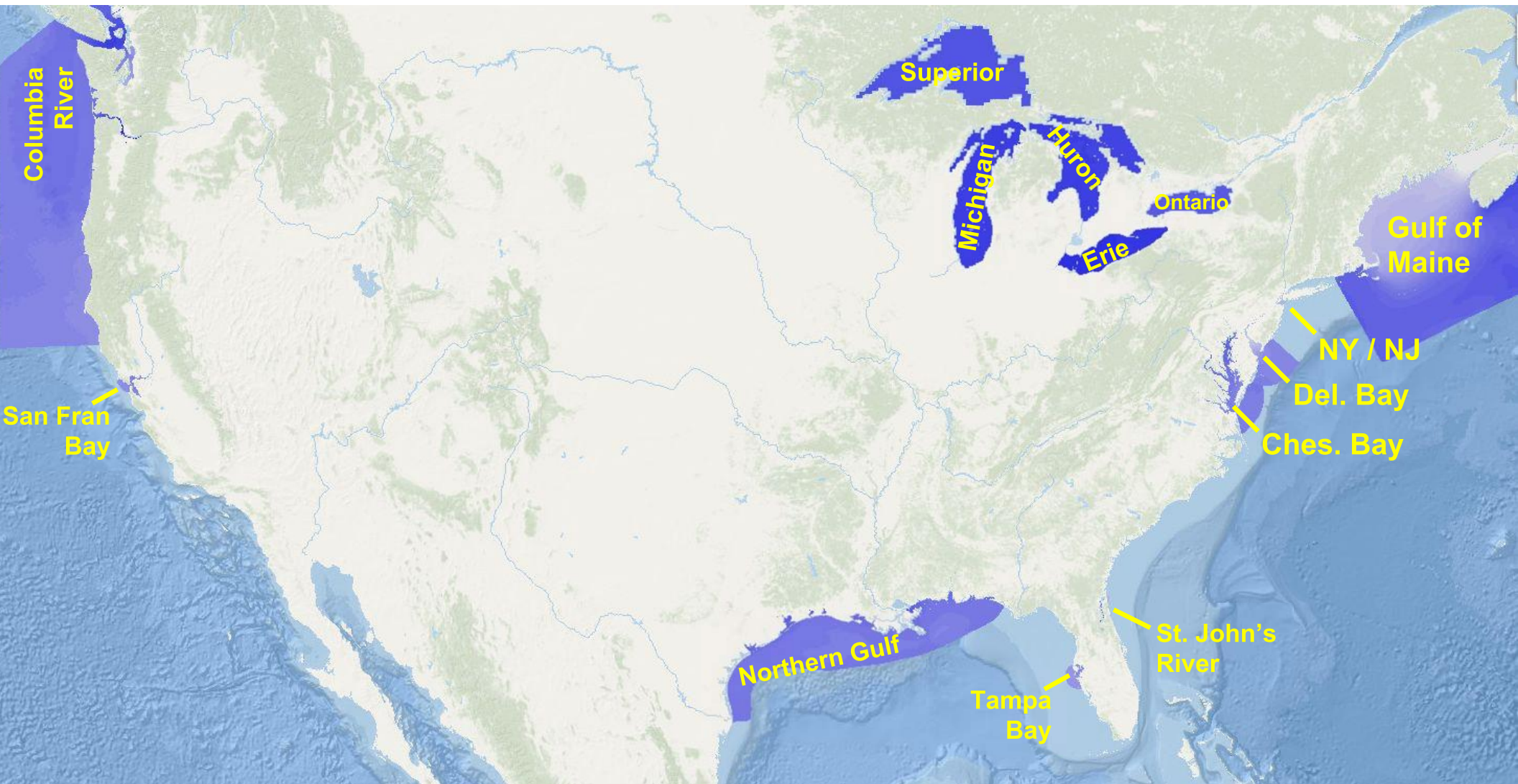
Future developments:

- Waves
- Ice coverage
- Ecology

Which parameters are most useful?



Current OFS Model Coverage



Priorities for future development?



Why is Coastal Modeling Important?

Commercial Navigation



Recreational Boating



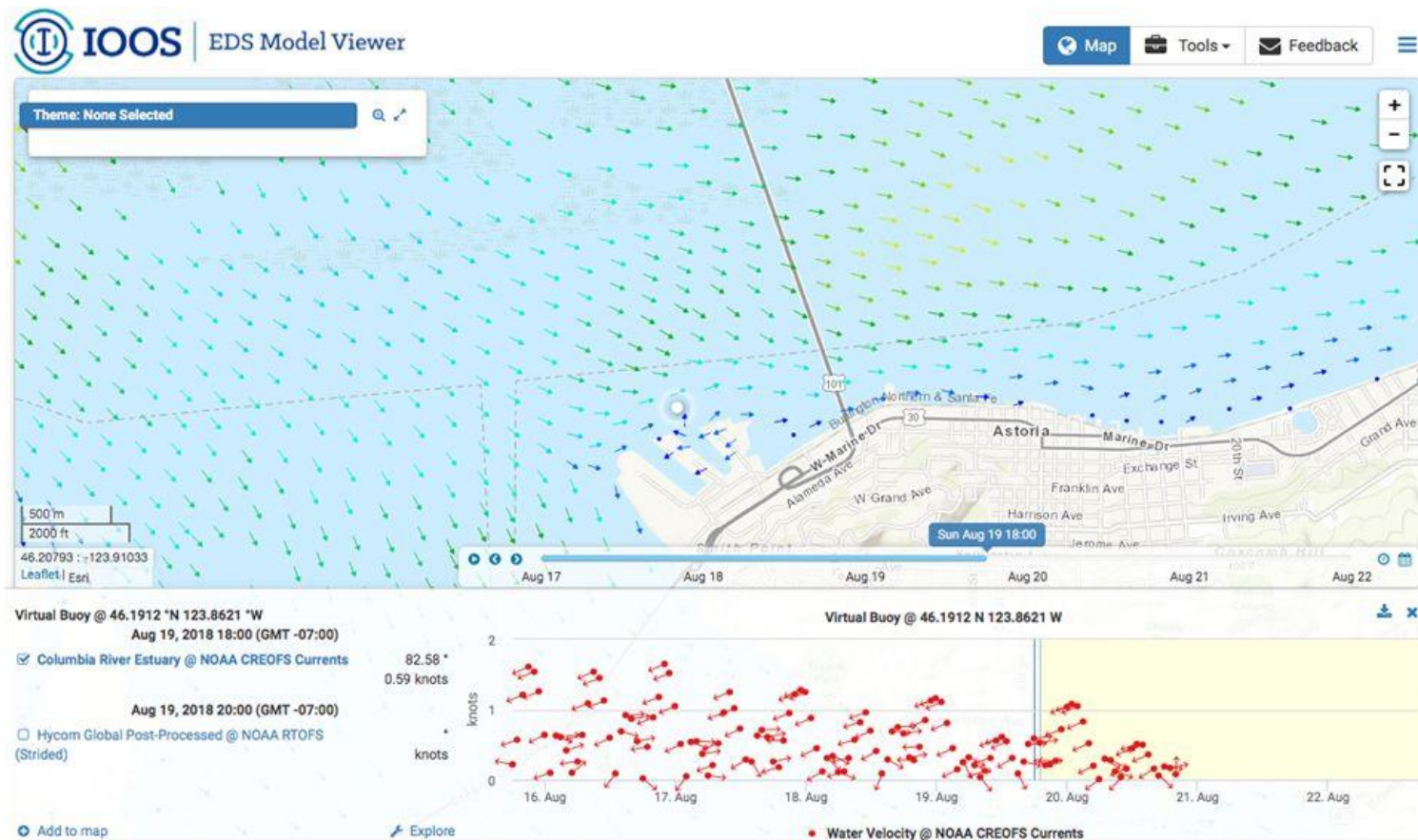
Fishing



Coastal Management



Commercial Navigation – Columbia River



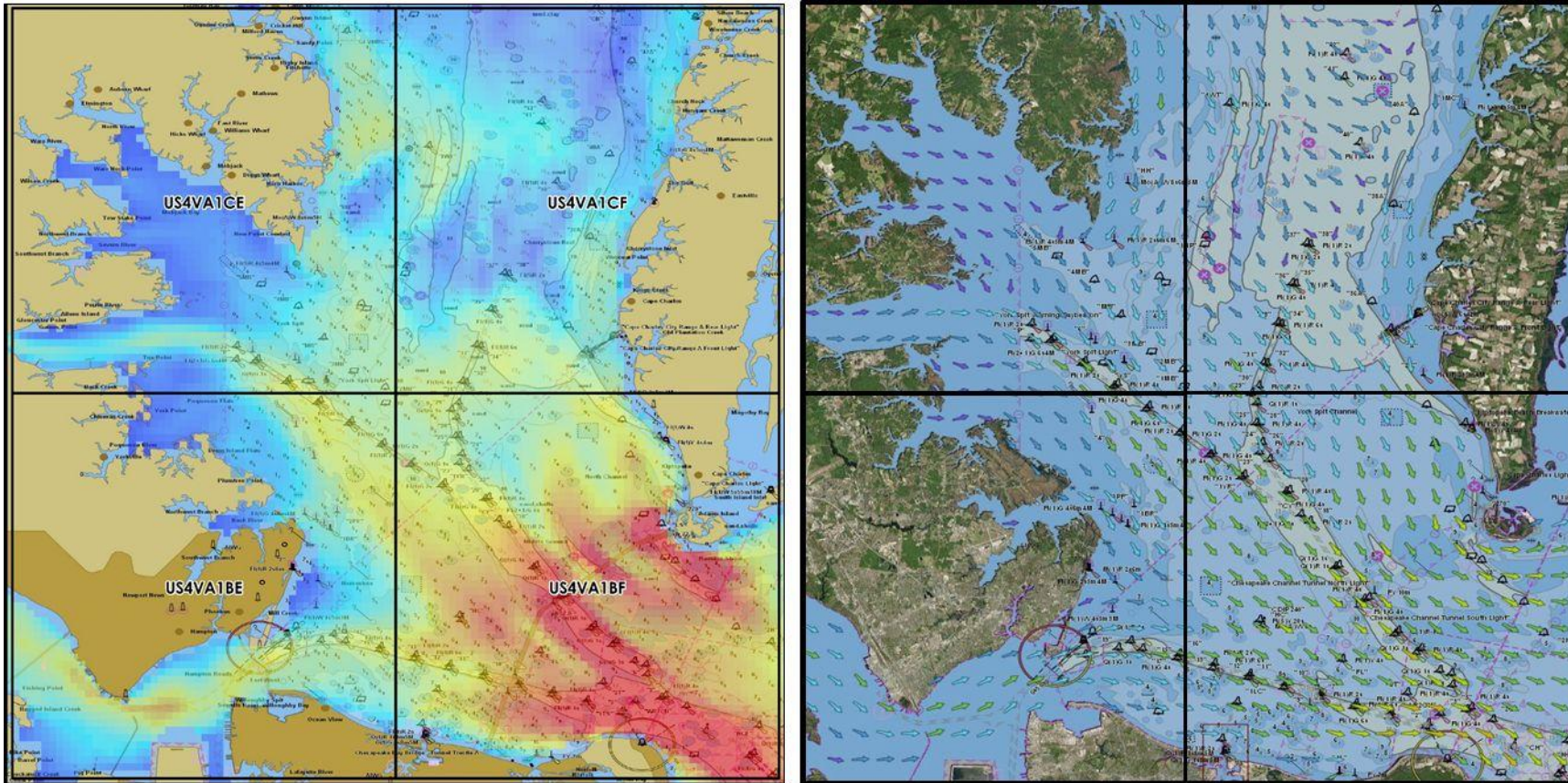
OMC International is using CREOFS, along with wave modeling and observations, to provide realtime under-keel clearance guidance

Columbia River Bar Pilots use CREOFS to navigate across the CR Bar

Coordinated use of modeling, observations, and high resolution bathymetry for “Precision Navigation” are being developed in other regions.



Commercial Navigation - OFS and Nav Systems



NOS is developing a service for disseminating OFS surface current information in the IHO's S-111 Format for use in navigation systems

S-111 data is designed for interoperability with the Electronic Navigational Charts

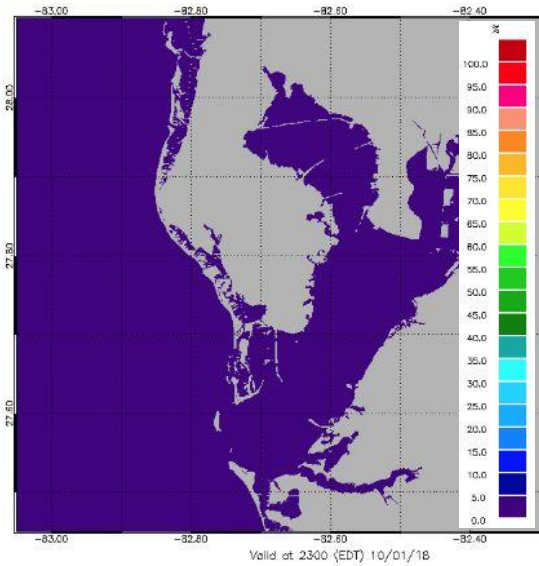
NOS will then extend this capability to other variables, such as water levels



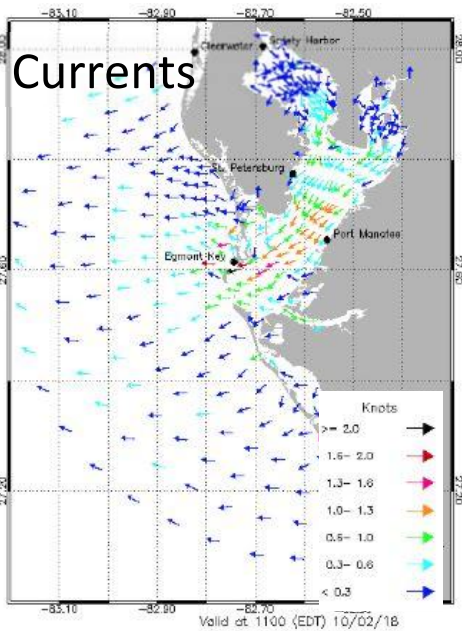
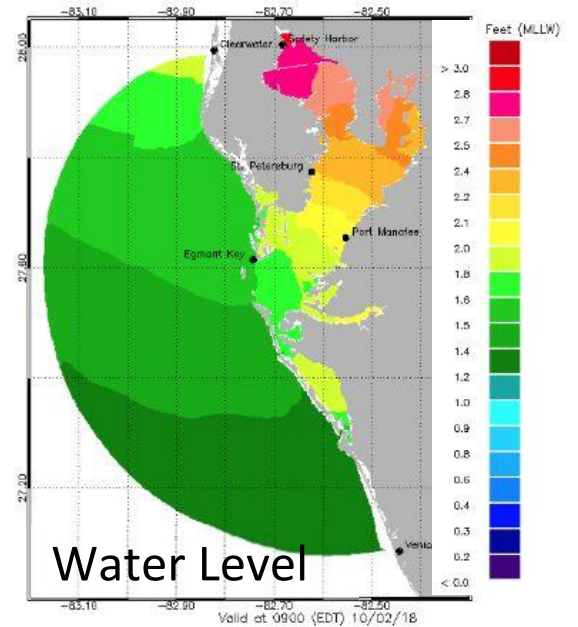
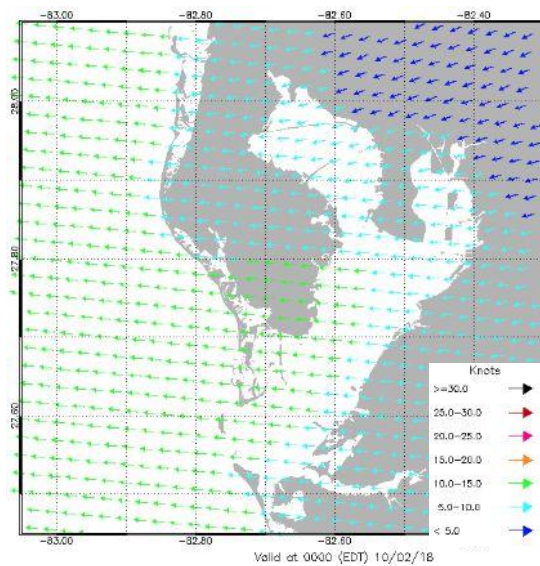
Recreational Boating – Tampa Bay

https://tidesandcurrents.noaa.gov/ofs/tbofs/tbofs_mcf.html

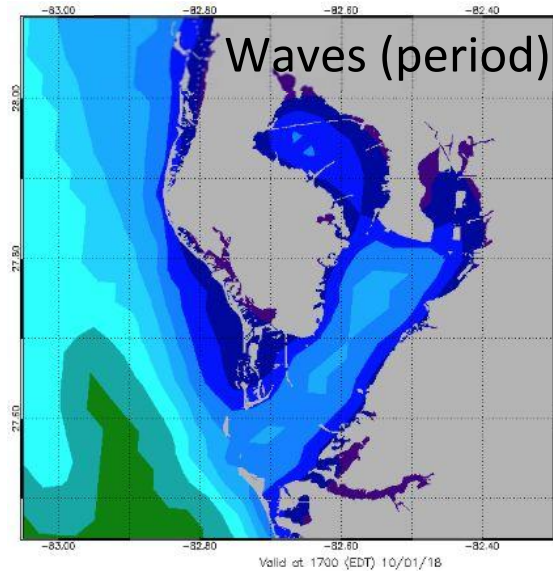
Visibility



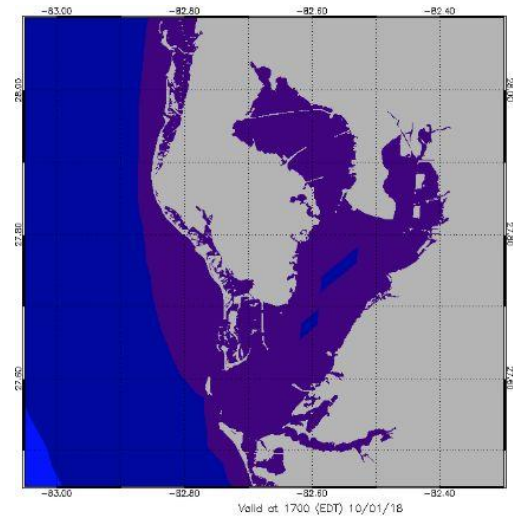
Winds



Waves (period)



Waves (height)

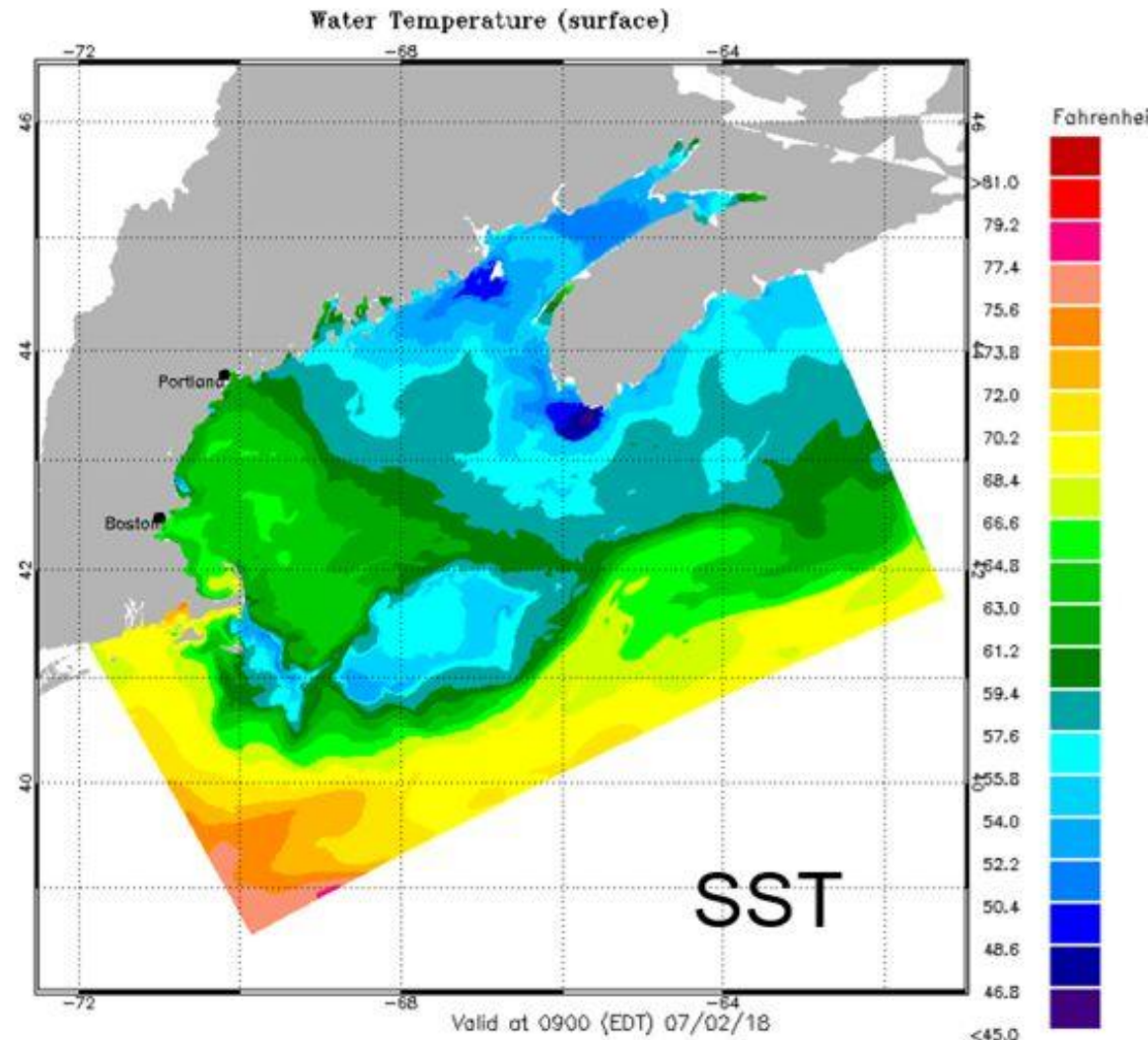


Fishing – Gulf of Maine

OFS can provide valuable information to better understand variables affecting fisheries.

- Temperatures / fronts
- Salinity

The Gulf of Maine OFS will also be used to drive a Harmful Algal Bloom model. *Alexandrium fundyense* can cause paralysis and death if contaminated shellfish is consumed.



Coastal Management – Lake Erie

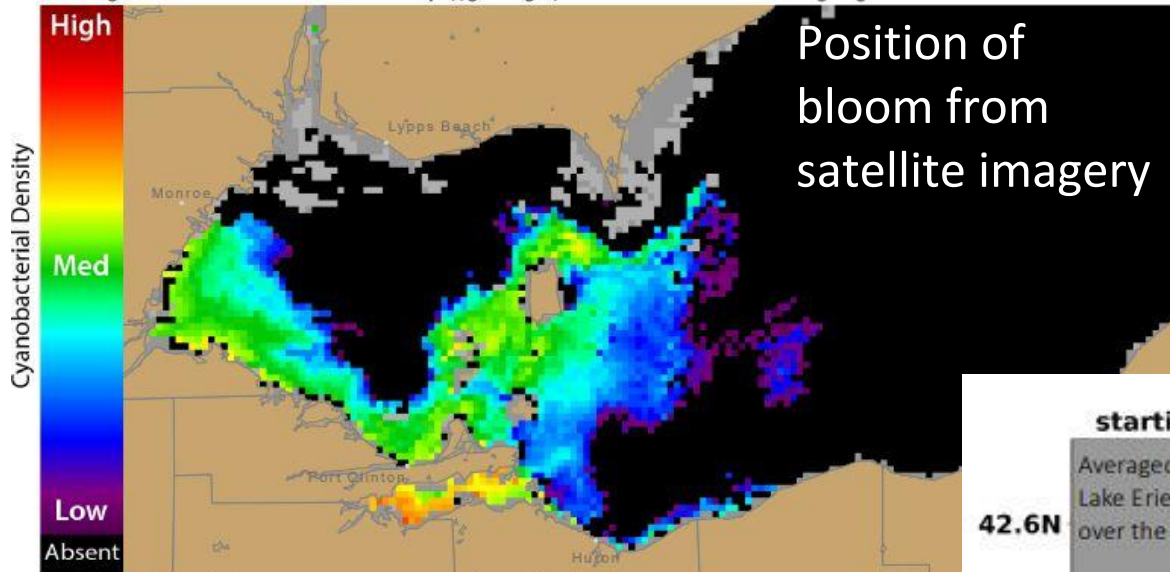


Figure 1. Cyanobacterial Index from NASA MODIS-Aqua data collected 11 August, 2018 at 14:21 EST. Grey indicates c estimated threshold for cyanobacteria detection is 20,000 cells/mL.

OFS provide the hydrodynamic “backbone” needed to support ecological forecasts, such as harmful algal bloom tracking in Lake Erie.

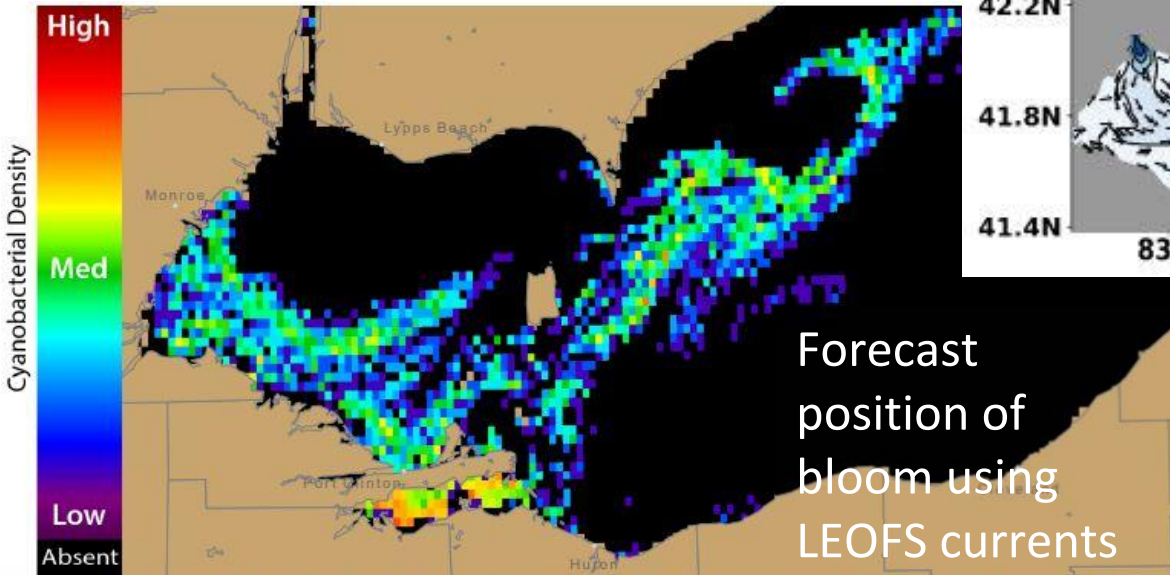
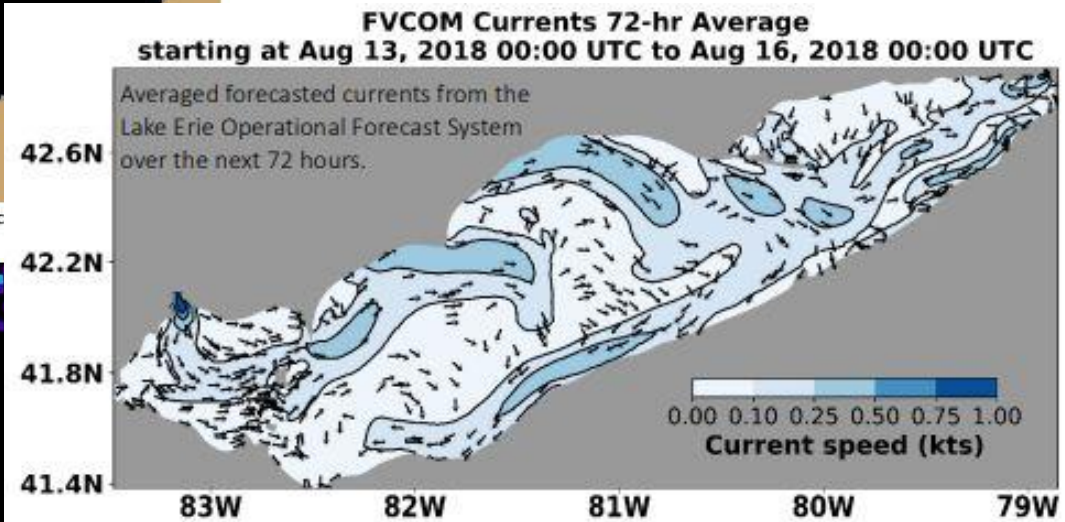


Figure 4. Forecast position of bloom for 16 August, 2018 using LEOFS modelled currents to move the bloom from the 11 August, 2018



Coastal Management – Chesapeake Bay

NOAA NCCOS led the development of a product that predicts the concentration of *Vibrio* species in Chesapeake Bay oysters. The product uses our Chesapeake Bay OFS to force a statistical model that predicts expected *Vibrio* concentrations at harvest as well as in the oyster after harvest.

The product is currently available via the [NCCOS website](#) and will soon also be displayed via nowCOAST.

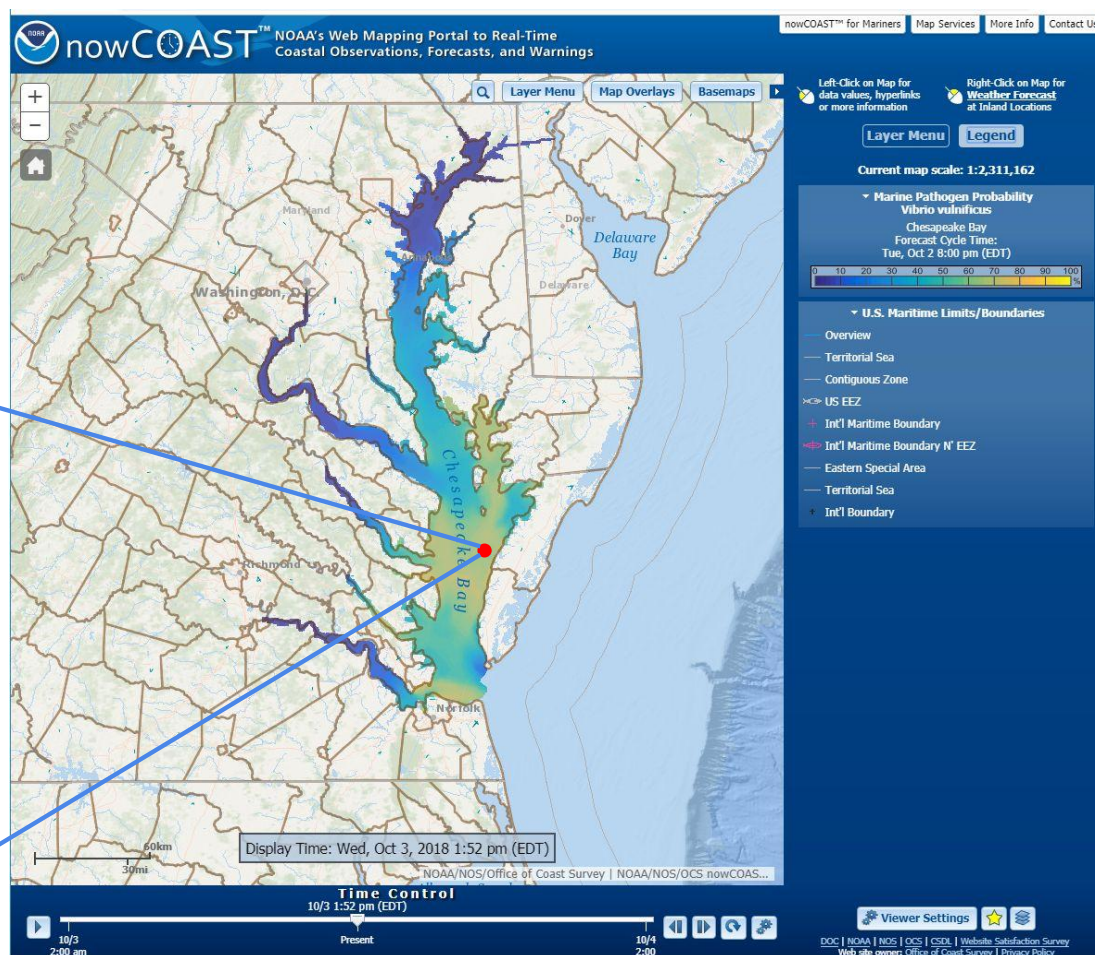
Identify Results for -75.95, 37.65 @ 10/3 1:52 pm (EDT)

Vibrio vulnificus

Total Features Returned: 1

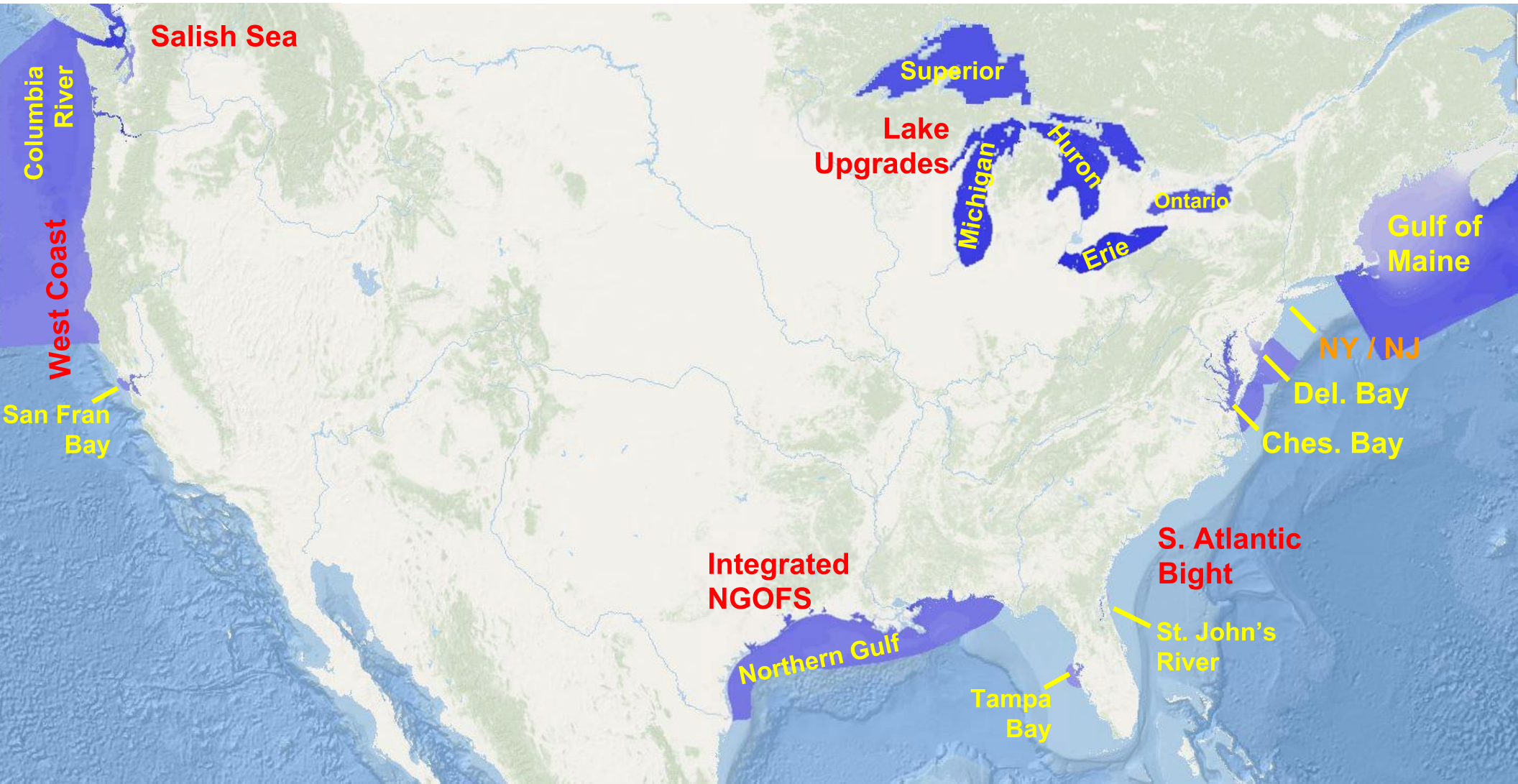
Probability of Occurrence (%)
67.02

Close



Future OFS Coverage

Cook Inlet, AK



Future Directions

Further geographic coverage of OFS for all U.S. coastal waters

Upgrades of legacy OFS

New capabilities:

- ice forecasting
- data assimilation
- cloud computing
- visualization improvements

Engagement with the academic community

Improved use of the models by end users: navigation, ecological, fisheries, search and rescue, spill response

Integration of OFS with other NOAA models (e.g., National Water Model hydrologic system)

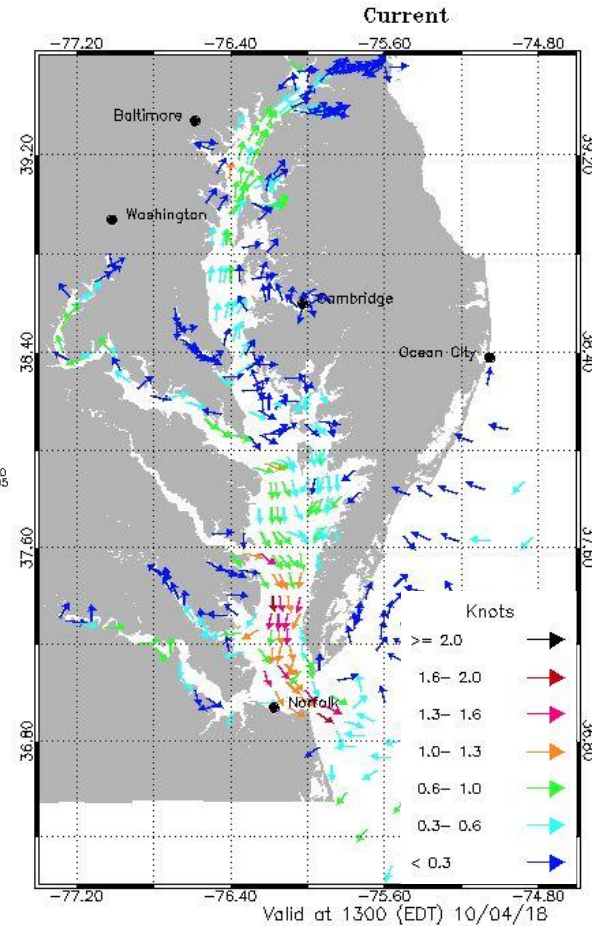
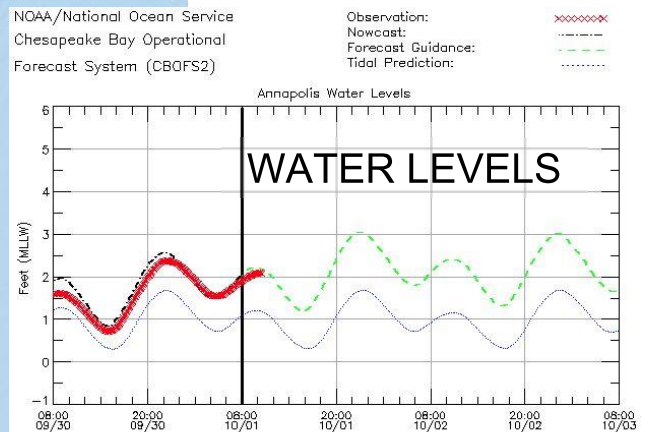
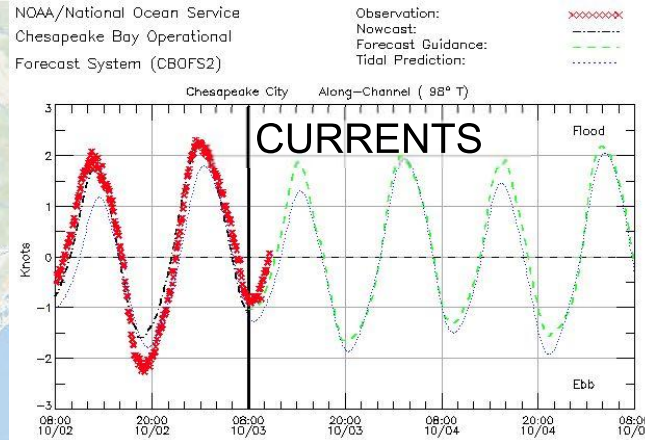
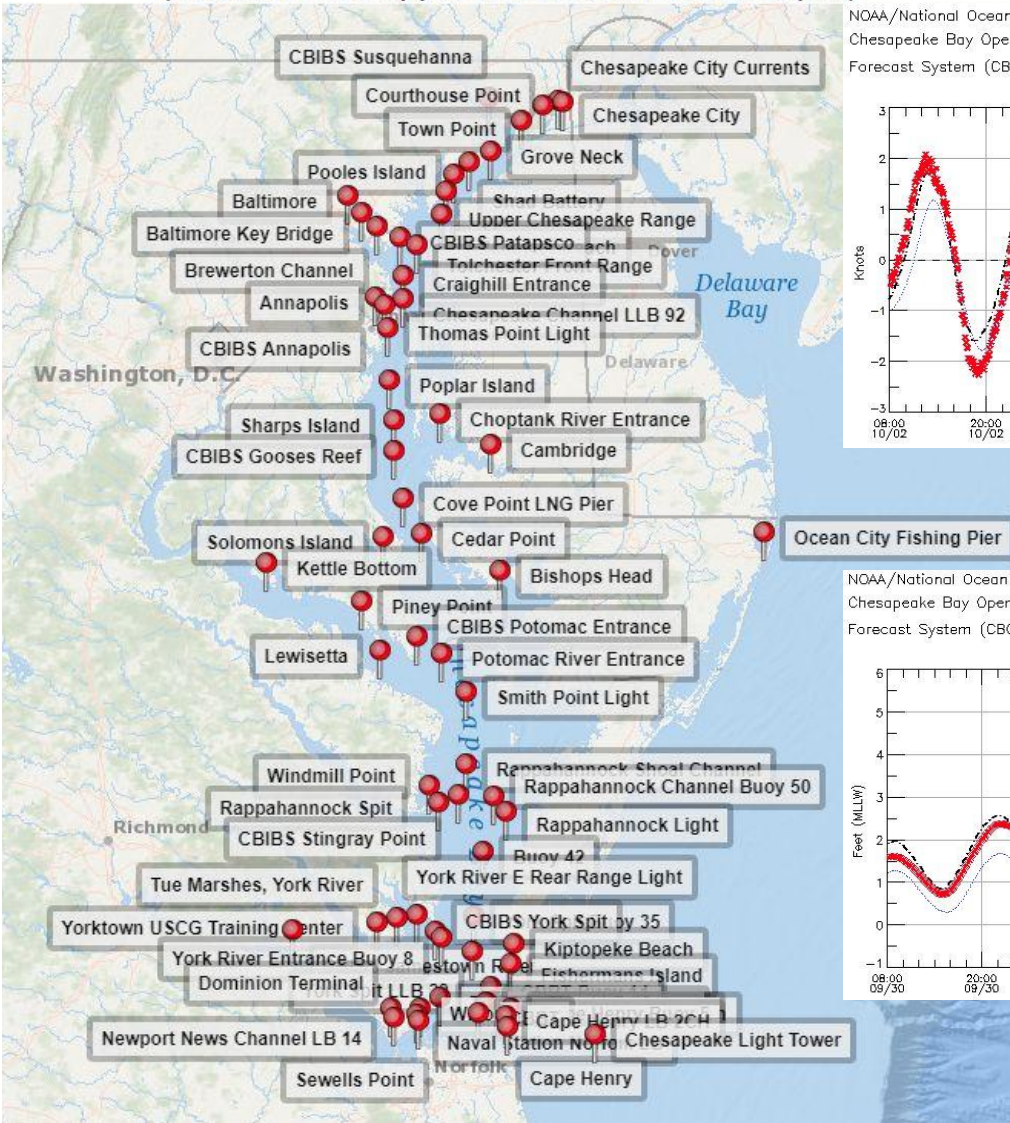


Where to Access Model Output

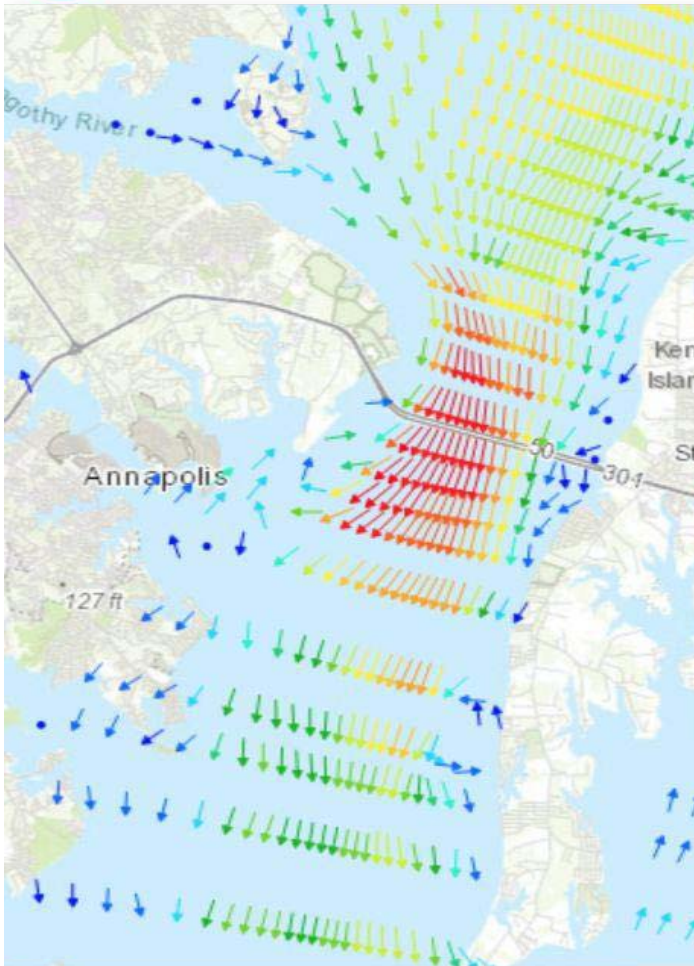
<https://tidesandcurrents.noaa.gov/models.html>

Chesapeake Bay Operational Forecast System (CBOFS)

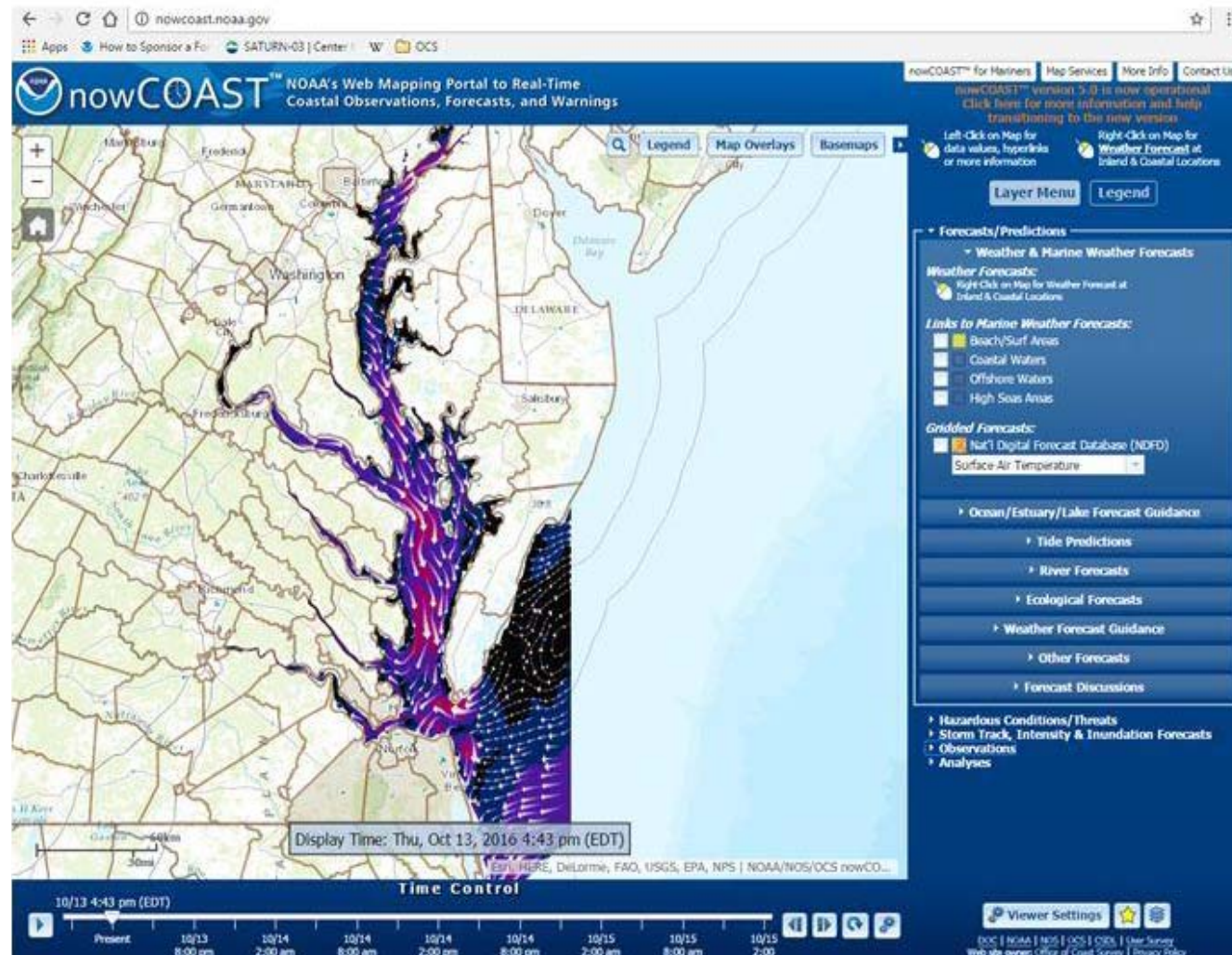
(Please click on the map pins below to access the time series plots)



Tools to Visualize Model Output



<https://eds.ioos.us/>




<https://nowcoast.noaa.gov>



OFS Data via Web Services

 **Catalog <http://opendap.co-ops.nos.noaa.gov/thredds/catalog.html>**

Dataset

-  [NOAA CBOFS NetCDF Files Catalog/](#)
-  [NOAA CBOFS_DEV NetCDF Files Catalog/](#)
-  [NOAA CIOFS NetCDF Files Catalog/](#)
-  [NOAA CREOFS NetCDF Files Catalog/](#)
-  [NOAA DBOFS NetCDF Files Catalog/](#)
-  [NOAA GOMOFS NetCDF Files Catalog/](#)
-  [NOAA LEOFS NetCDF Files Catalog/](#)
-  [NOAA LEOFS.v1 NetCDF Files Catalog/](#)
-  [NOAA LHOFS NetCDF Files Catalog/](#)
-  [NOAA LMOFS NetCDF Files Catalog/](#)
-  [NOAA LOOFS NetCDF Files Catalog/](#)
-  [NOAA LSOFS NetCDF Files Catalog/](#)
-  [NOAA NEGOFBS NetCDF Files Catalog/](#)
-  [NOAA NGOFS NetCDF Files Catalog/](#)
-  [NOAA NNGOFS NetCDF Files Catalog/](#)
-  [NOAA NYOFS NetCDF Files Catalog/](#)
-  [NOAA SFBOFS NetCDF Files Catalog/](#)
-  [NOAA SJROFS NetCDF Files Catalog/](#)
-  [NOAA TBOFS NetCDF Files Catalog/](#)
-  [NOAA WCOFS NetCDF Files Catalog/](#)
-  [Aggregated 7 day CBOFS Fields Forecast/](#)
-  [Aggregated 7 day CIOFS Fields Forecast/](#)
-  [Aggregated 7 day DBOFS Fields Forecast/](#)

How would you prefer to access the model data?



We'd Like to Hear from You!

- Where are models most needed?
- Which parameters are most useful?
- How would you prefer to get the model output?
- Are you more interested in model products (i.e., visualizations) or do you just want the raw data?
- How frequently would you want the model updated?
- What resolution is needed?
- How much uncertainty in the predictions can be accepted?

Paul.Bradley@noaa.gov;

(240) 533-0582

Edward.myers@noaa.gov;

(240) 847-8256

