



# MARACOOS: Linking Local and Regional Networks

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Chesapeake Bay Program  
Innovative Water Quality Monitoring Workshop  
December 8, 2014



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# Focus of Today's Workshop

- Innovative Applications of New or Existing Technology
- Monitoring Network Design

## Presentation Points

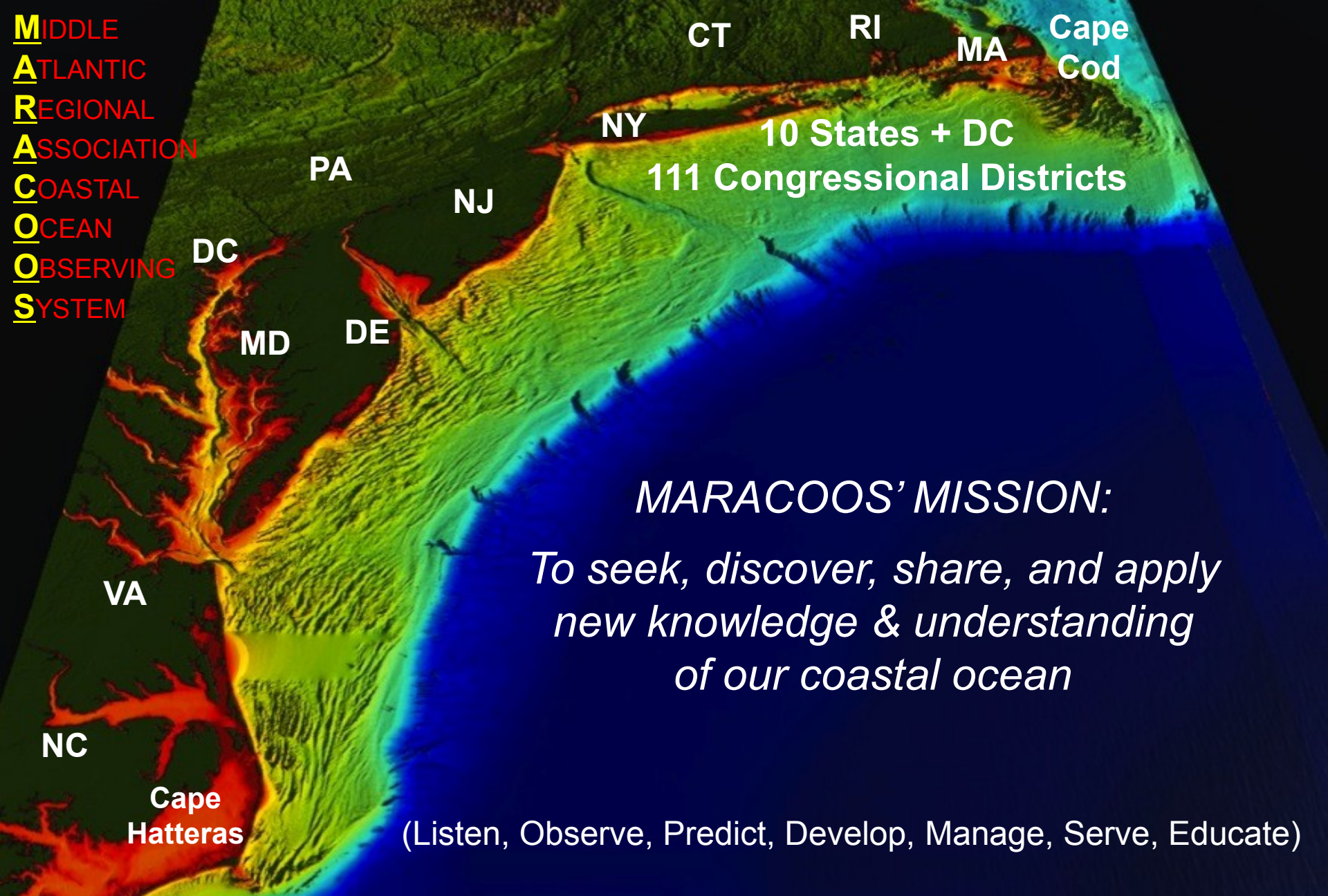
1. What is MARACOOS
2. Capabilities and Possibilities in the Chesapeake Bay region



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**M**IDDLE  
**A**TLANTIC  
**R**EGIONAL  
**A**SSOCIATION  
**C**OASTAL  
**O**CEAN  
**O**BSERVING  
**S**YSTEM



**MARACOOS' MISSION:**

*To seek, discover, share, and apply  
new knowledge & understanding  
of our coastal ocean*

(Listen, Observe, Predict, Develop, Manage, Serve, Educate)

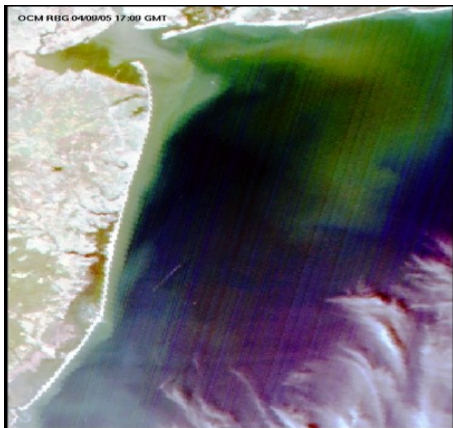


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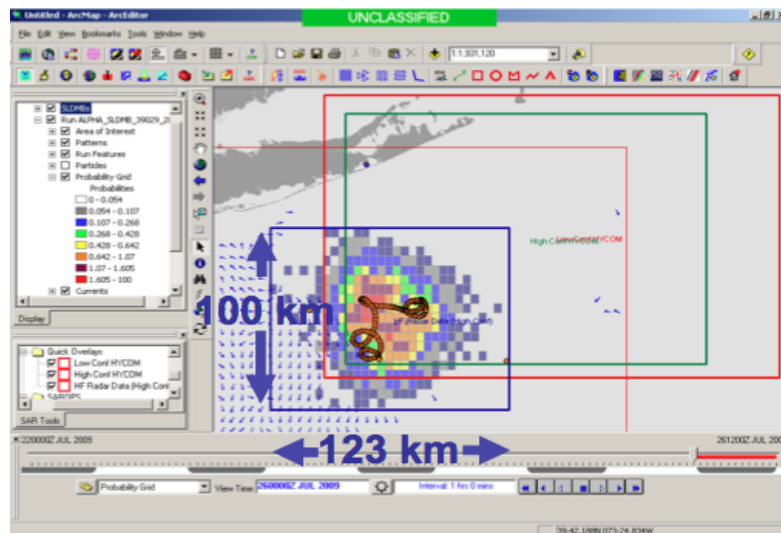
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# MARACOOS THEMES IN THE CHESAPEAKE

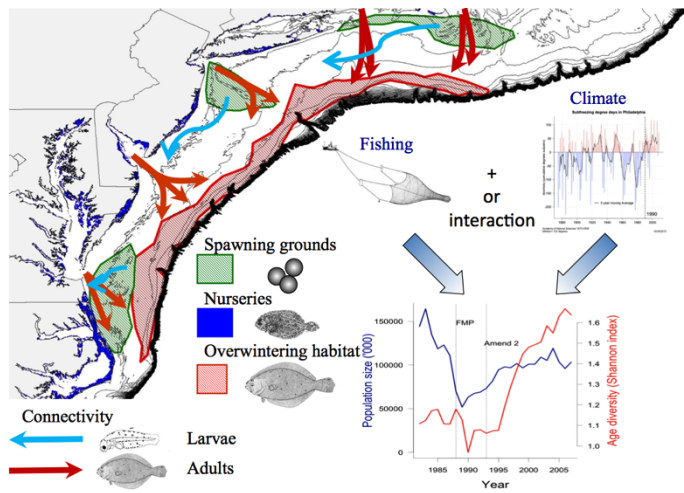
## Water Quality



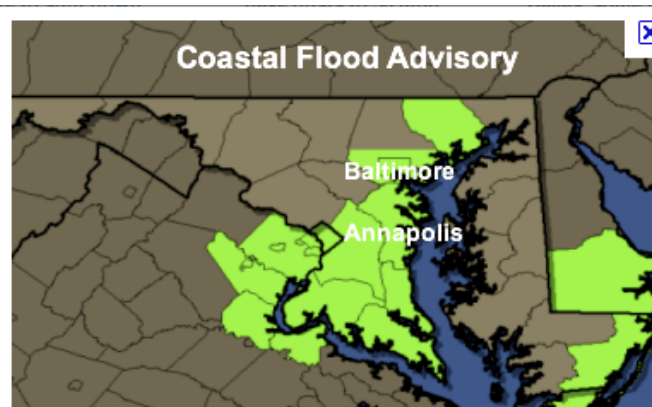
## Maritime Safety and Resiliency



## Ecological Decision Support



## Coastal Inundation



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# MARACOOS Partners

- Academic (Cape Cod to Cape Hatteras)
- Local, State, Regional, Federal Government
- Private Sector / Industry
- Non-profit Sector
  
- ~70 members <http://maracoos.org/members>
- <http://maracoos.org/board>



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# CBIBS: NOAA and MARACOOS partner to enhance CBIBS utility



- Integrate CBIBS data into MARACOOS data management system, including IOOS DMAC standards and services and QARTOD QA/QC procedures.
- Integrate CBIBS data feeds into NOAA PORTS system.
- Support CBIBS planning, operations, and maintenance activities.
- Expand CBIBS system
- Support Research and Development applications



 Chesapeake Bay  
**INTERPRETIVE BUOY SYSTEM**



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# MARACOOS Chesapeake Bay Management Team

Gerhard Kuska  
Executive Director



Peter Moore  
Stakeholder Liaison



Doug Wilson  
Board Member and  
Chesapeake Bay Rep.



Bill Boicourt  
Board Member



Larry Atkinson  
Board Member



Ray Toll  
Board Member



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# INTEGRATED COASTAL AND OCEAN OBSERVATION SYSTEM ACT OF 2009 ICOOS ACT

Subtitle C of HR 146 Omnibus Public Lands Management Act of 2009

SEC. 12302. PURPOSES. The purposes of this subtitle are to—

- (1) establish a national integrated System of ... coastal ... observing systems...coordinated...at the regional level by a network of regional information coordination entities...(that means organizations like MARACOOS)
- (2) improve the Nation's capability to measure, track, explain, and predict events...
- (3) authorize activities to promote basic and applied research to develop, test, and deploy innovations and improvements in coastal and ocean observation technologies, modeling systems, and other scientific and technological capabilities...

→ Federal and Non-Federal components



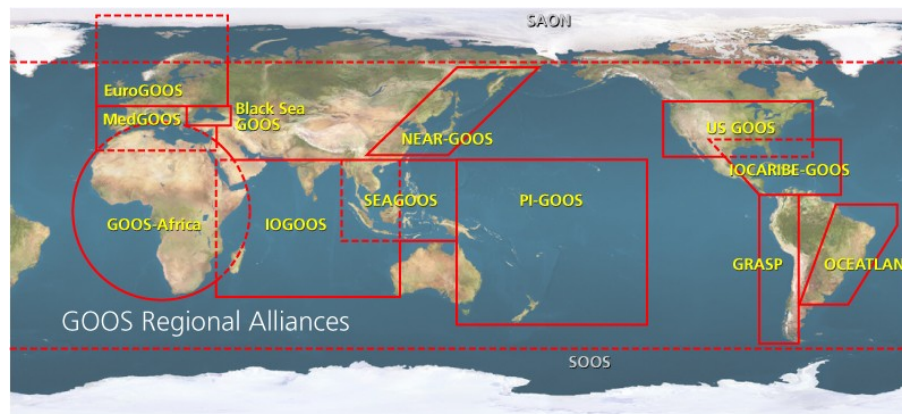
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# U.S. Integrated Ocean Observing System



International Component

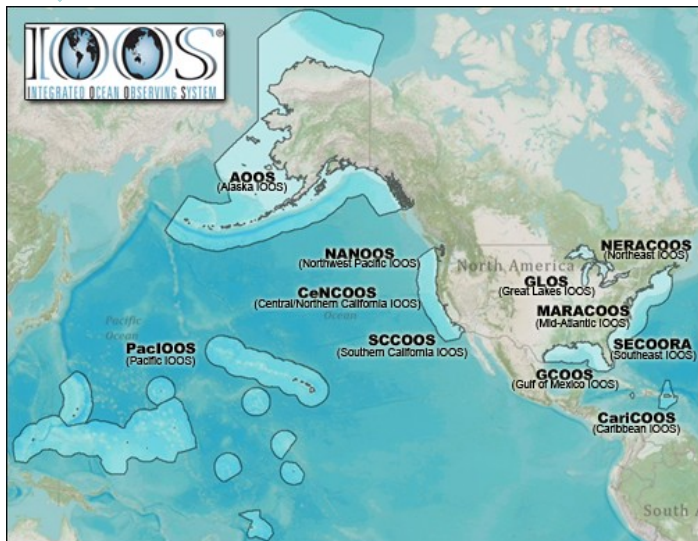
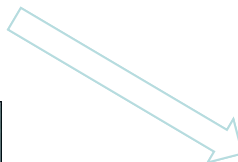


Global Ocean Observing System

Regional Component



National Component



11 Regional Associations



17 U.S. Federal Agencies

# Measured Start / Expanding Future

- Initially → Region-Wide Issues
- 10-year Strategic / Build Out Plan
- Increasing focus on Estuaries → Chesapeake



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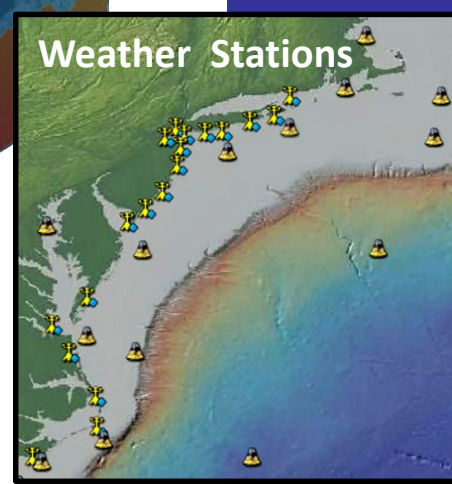
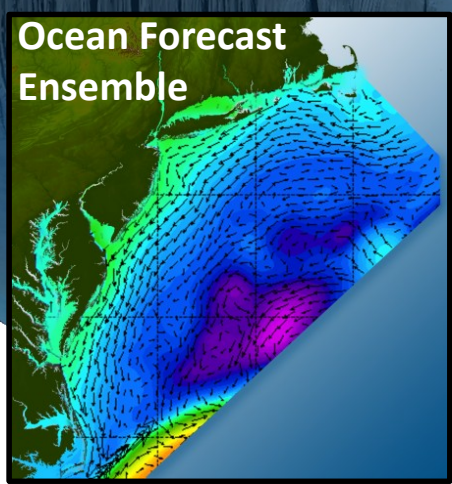
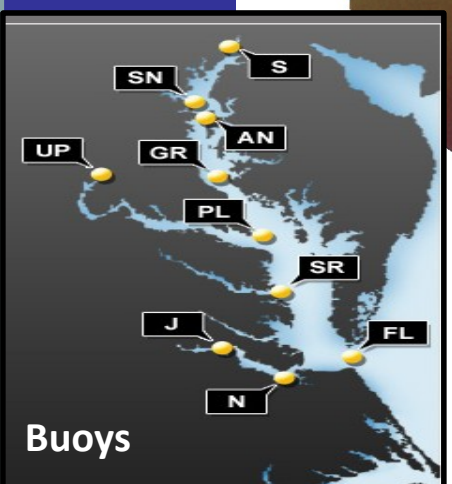
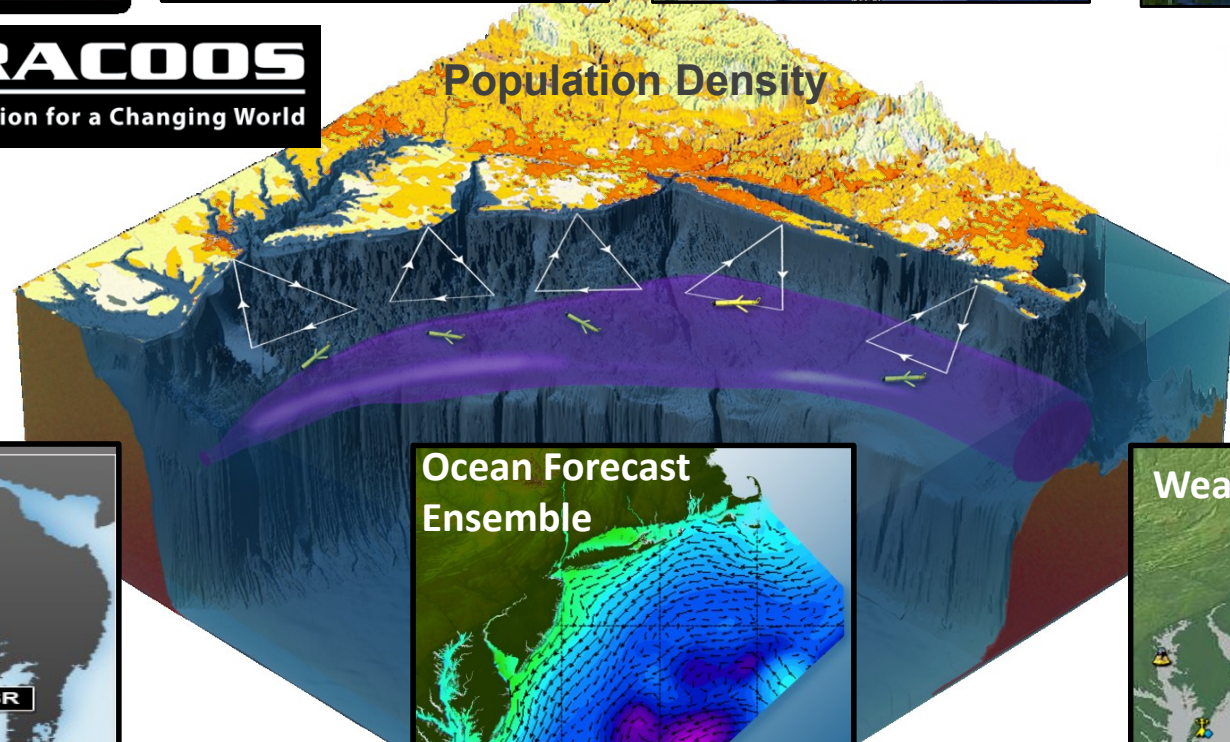
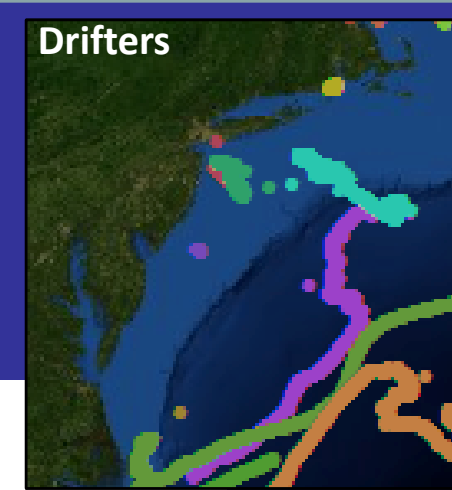
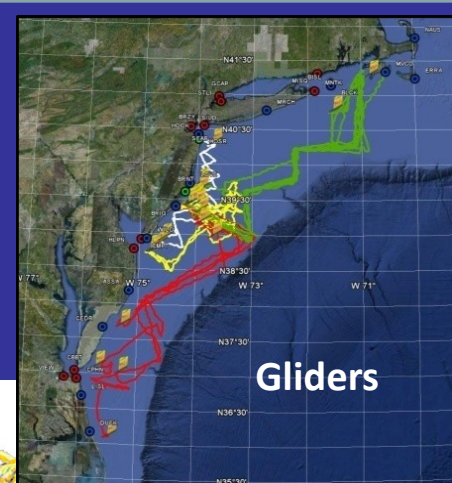
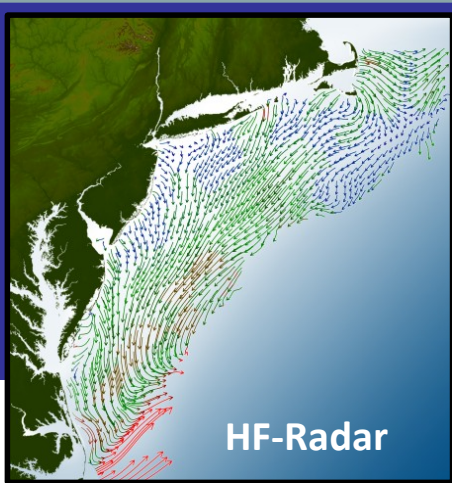
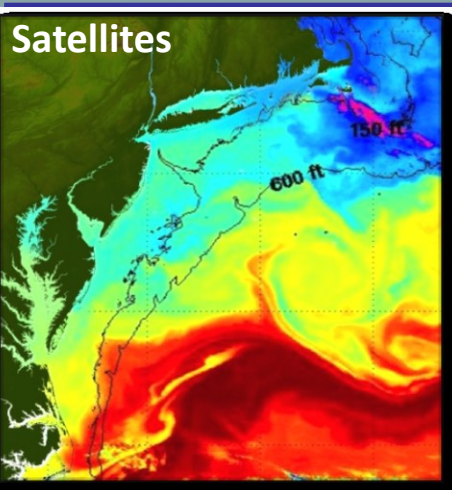
# Capabilities

- Innovative Applications
- Monitoring Network Design
- Linking Local and Regional Networks

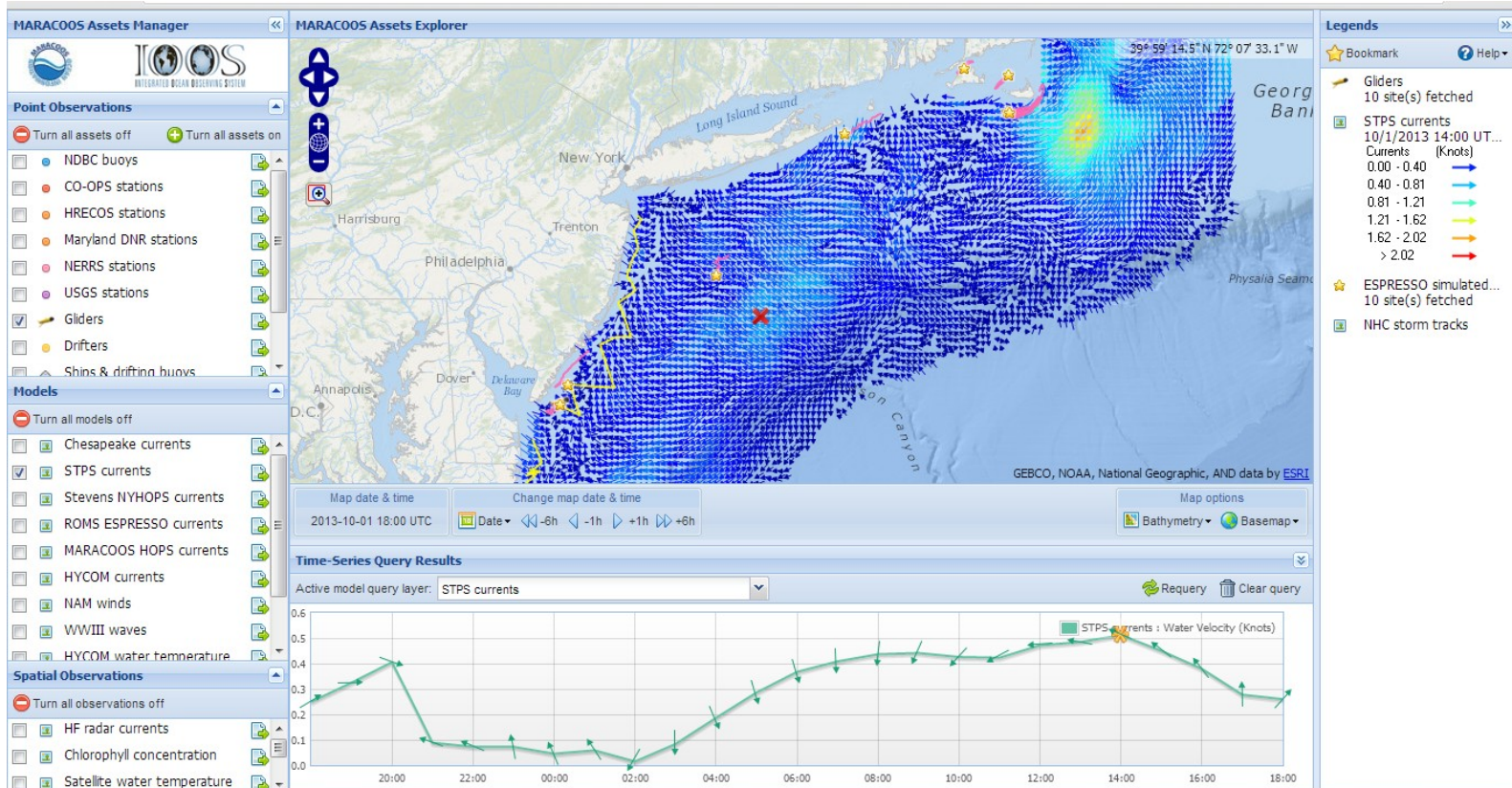


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# MARACOOS Asset Map



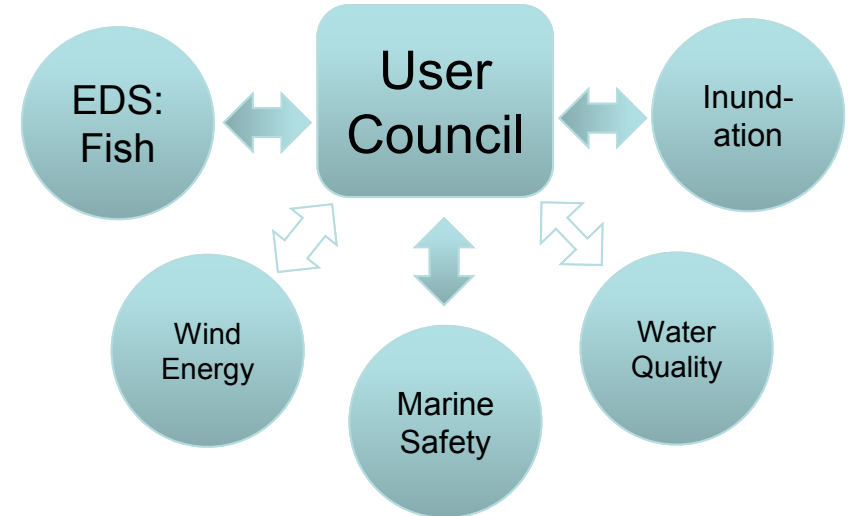
- Regional Data
- Federal Data
- In-Situ
- Gliders
- Satellite
- Radar
- Models
- IOOS Standards



# User Need Focused Product Development



- User/Stakeholder Infrastructure
  - User Council
  - Product Groups
- Stakeholder Liaison Approach
- Enhanced Cross-Regional focus



# Improving Data Integration and Mgt.

## → Ability to deliver products

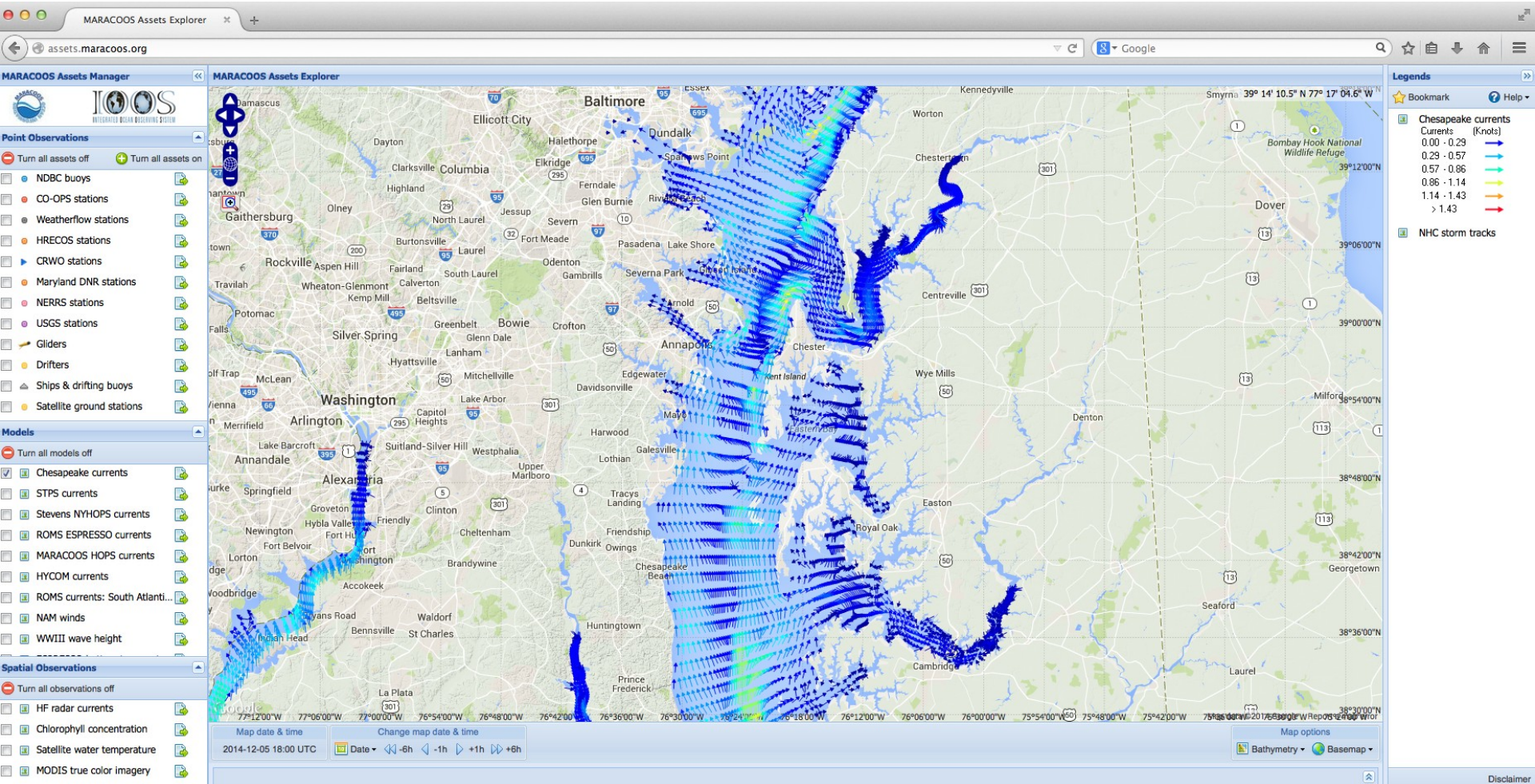
- Increase capability and opportunities for future projects
- Outreach tool to CB managers and interests
- Pilot for other MARACOOS estuaries / local coastal geographies



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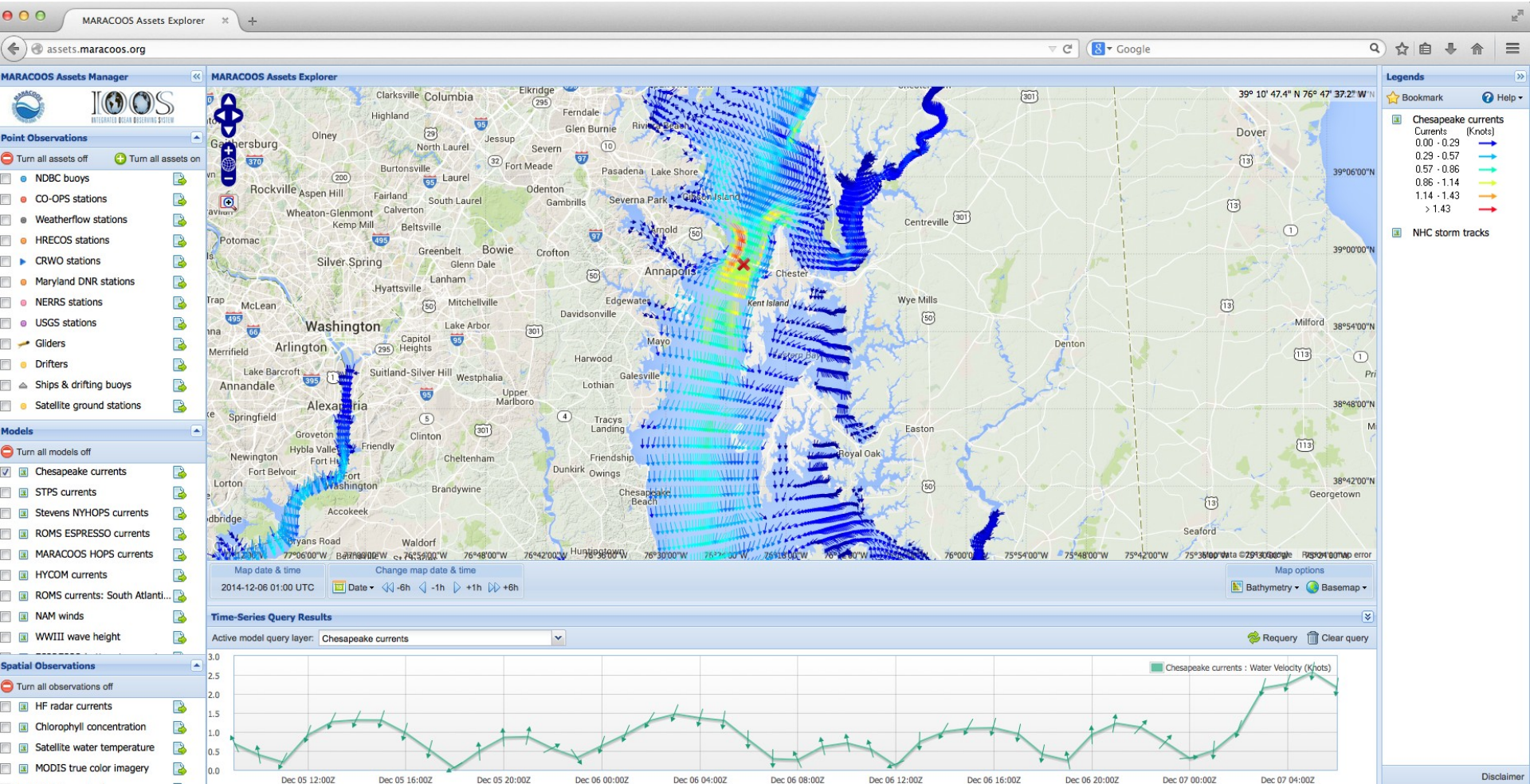
# Annapolis currents



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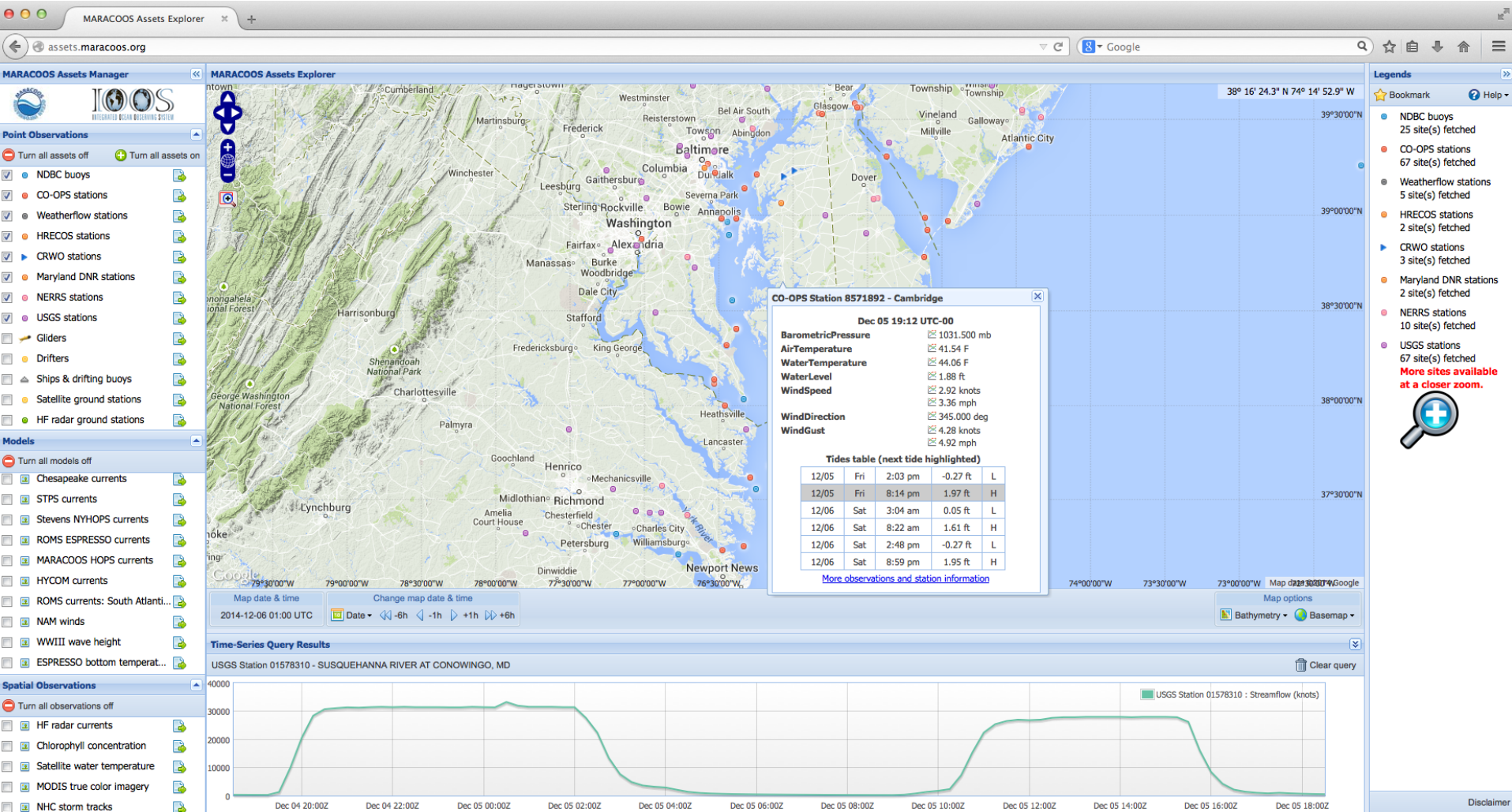
# Annapolis currents (w/graph)



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# COOPS Station; USGS Susquehanna Flow



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# Chester River WO

The screenshot displays the MARACOOS Assets Explorer interface. The main map shows the Chester River region, including Chester town and Kingstown. A pop-up window for 'Foremans Branch' indicates 'No recent observations'. The left sidebar contains several sections:

- Point Observations:** Includes checkboxes for NDBC buoys, CO-OPS stations, Weatherflow stations, HRECOS stations, CRWO stations, Maryland DNR stations, NERRS stations, USGS stations, Gliders, Drifters, Ships & drifting buoys, and Satellite ground stations.
- Models:** Includes checkboxes for Chesapeake currents, STPS currents, Stevens NYHOPS currents, ROMS ESPRESSO currents, MARACOOS HOPS currents, HYCOM currents, ROMS currents: South Atlanti..., NAM winds, WWII wave height, and ESPRESSO bottom temperat...
- Spatial Observations:** Includes checkboxes for HF radar currents, Chlorophyll concentration, Satellite water temperature, MODIS true color imagery, and NHC storm tracks.

The bottom of the interface features a 'Map date & time' section with a date of 2014-12-06 01:00 UTC and a 'Change map date & time' section with a date range from -6h to +6h. The bottom right corner includes 'Map options' for Bathymetry and Basemap, and a 'Disclaimer' link.



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# COOPS Annapolis

MARACOOS Assets Explorer

assets.maracoos.org

MARACOOS Assets Manager

MARACOOS Assets Explorer

Point Observations

- Turn all assets off
- Turn all assets on
- NDBC buoys
- CO-OPS stations
- Weatherflow stations
- HRECOs stations
- CRWO stations
- Maryland DNR stations
- NERRS stations
- USGS stations
- Gliders
- Drifters
- Ships & drifting buoys
- Satellite ground stations
- HF radar ground stations

Models

- Turn all models off
- Chesapeake currents
- STPS currents
- Stevens NYHOPS currents
- ROMS ESPRESSO currents
- MARACOOS HOPS currents
- HYCOM currents
- ROMS currents: South Atlanti...
- NAM winds
- WWIII wave height
- ESPRESSO bottom temperat...

Spatial Observations

- Turn all observations off
- HF radar currents
- Chlorophyll concentration
- Satellite water temperature
- MODIS true color imagery

CO-OPS Station 8575512 - Annapolis

Dec 05 19:06 UTC-00

Barometric Pressure 1031.300 mb

Air Temperature 41.18 F

WaterLevel 1.05 ft

Tides table (next tide highlighted)

Date	Day	Time	Height	Type
12/05	Fri	2:44 pm	-0.30 ft	L
12/05	Fri	9:37 pm	1.30 ft	H
12/06	Sat	3:52 am	0.12 ft	L
12/06	Sat	9:16 am	0.77 ft	H
12/06	Sat	3:29 pm	-0.31 ft	L
12/06	Sat	10:23 pm	1.30 ft	H

[More observations and station information](#)

Map date & time: 2014-12-06 01:00 UTC

Time-Series Query Results

CO-OPS Station 8575512 - Annapolis

Request Query Clear query

CO-OPS Station 8575512 : WaterLevel (ft)

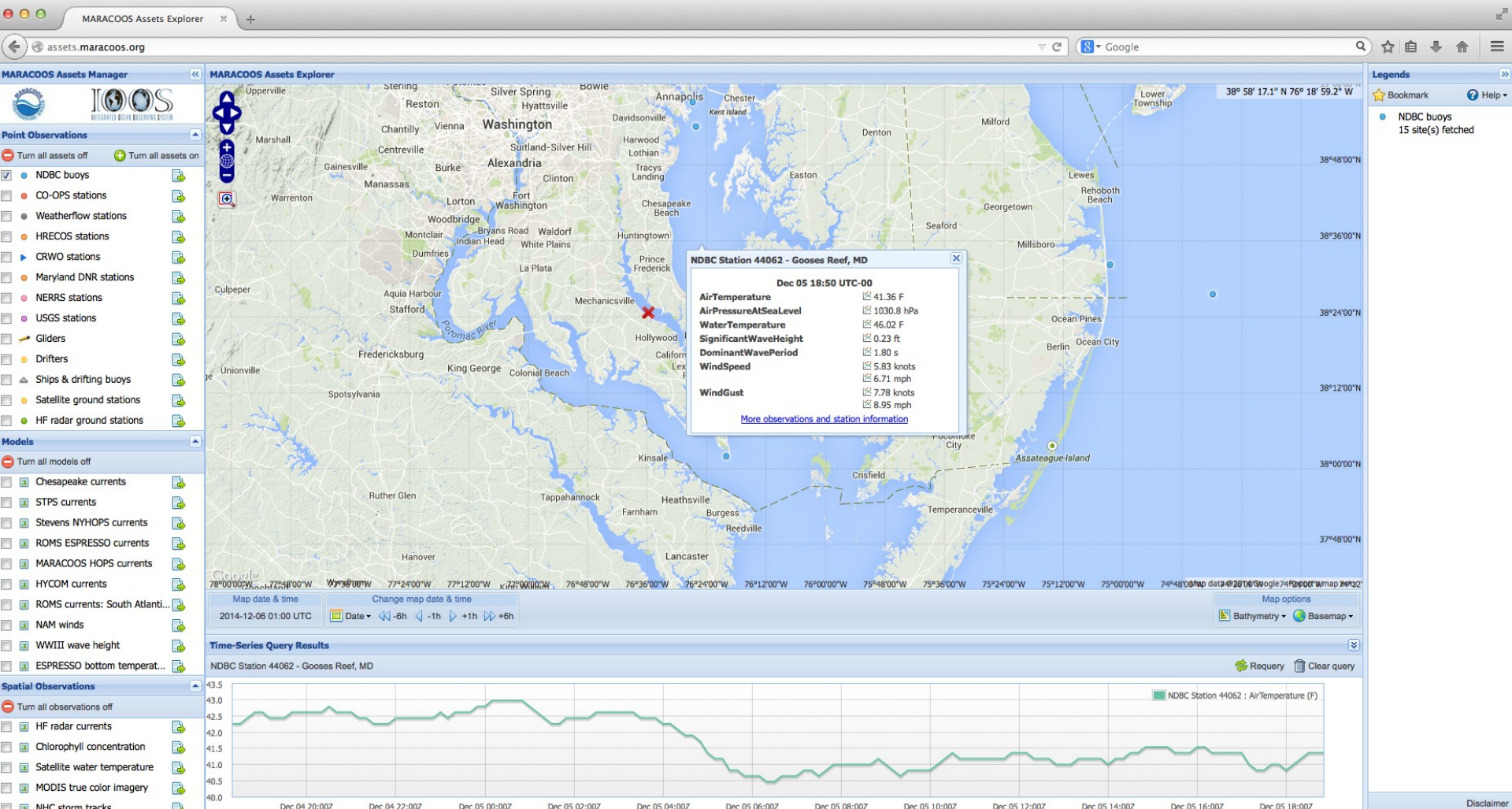
javascript:showObsTimeSeries(["graph.php?http://opendap.co-ops.nos.noaa.gov/loos-dif-sos/SOS?request=GetObservation&service=SOS&version=1.0.0&offering=...&schema=loos/0.6.1&name=WaterLevel&eventTime=2014-12-04T18:19:00Z/2014-12-05T19:19:00Z&tz=0&uom=english&lon=-76.4816&lat=38.9833&cat=elevation"])



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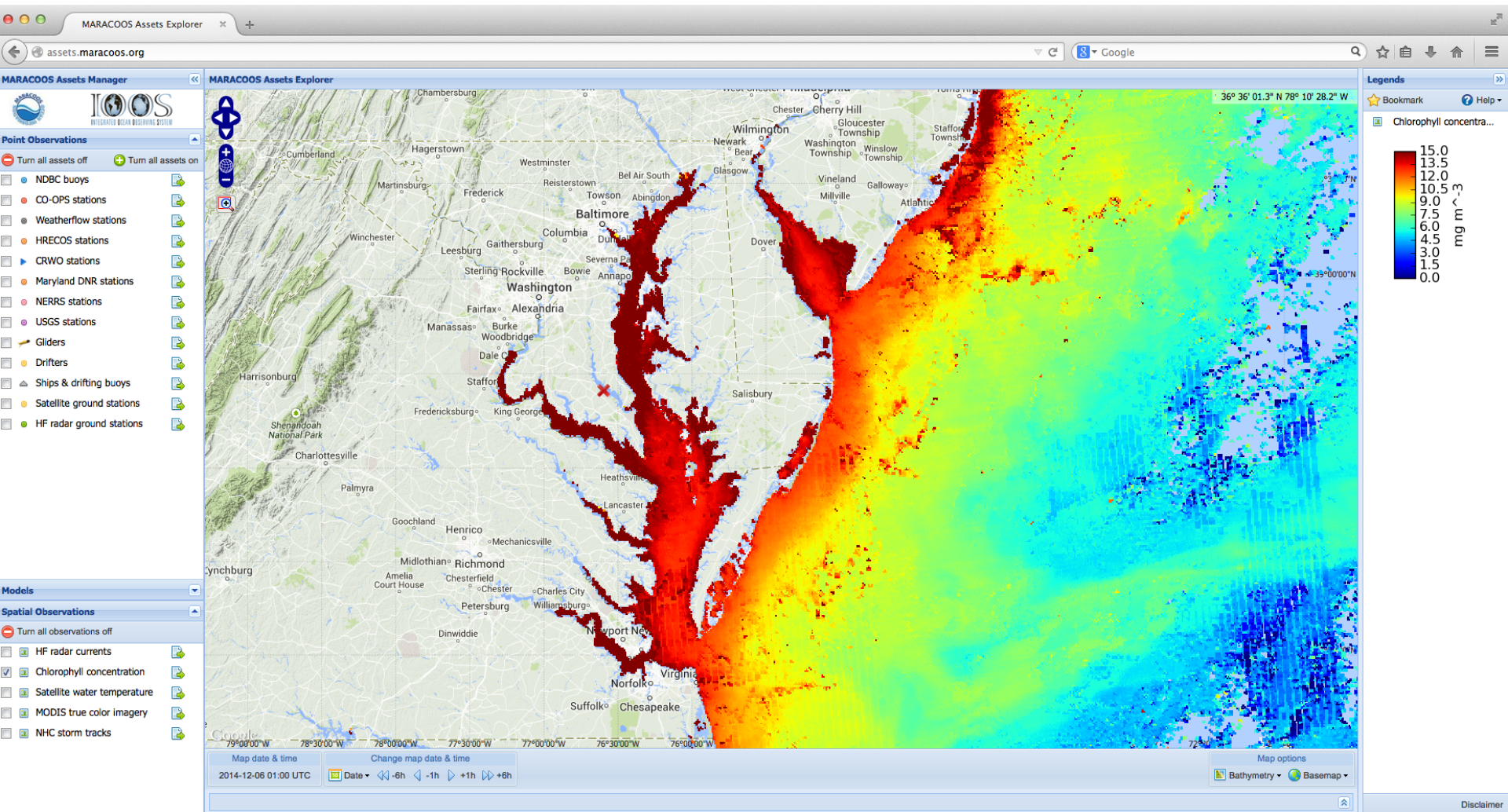
# CBIBS Gooses Reef Buoy



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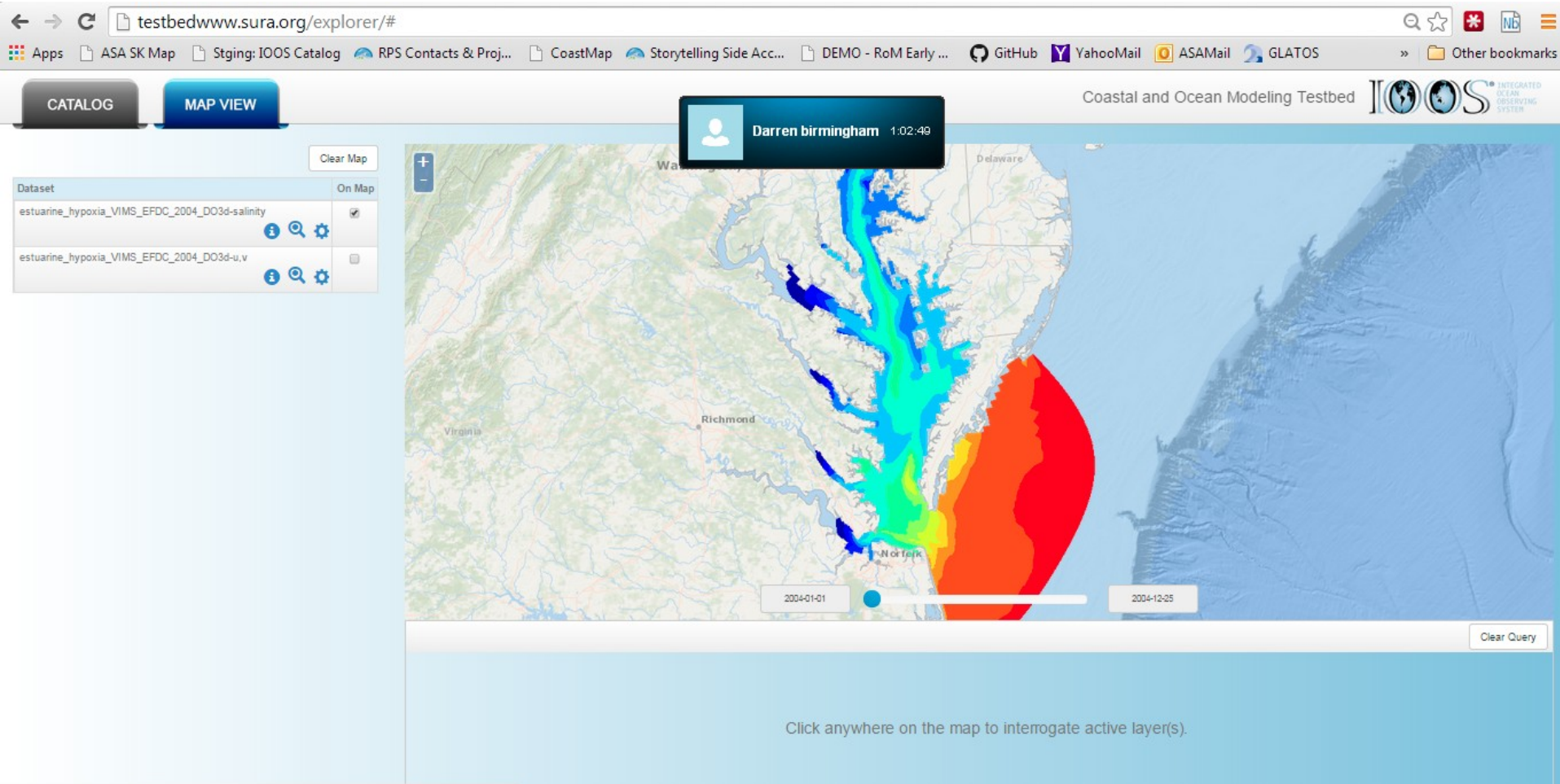
# Satellite Chlorophyll



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# VIMS Hypoxia Model



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# To summarize

- Ability to access real time data – fed (NOAA, USGS,...) state (MD DNR), local (Chester River Watershed Observatory)
- “ - satellite fields
- Access to model fields
- Publish R&D fields (COMT) – Ecological, Hypoxia
- Use to facilitate data integration from multiple sources
- Use to integrate, validate, assimilate observations and models



# Also...

- Proposed activities in WQ monitoring (vibrio, Ocean Acidification)
- Access to industry (Sonardyne, Caris, SeaBird, ASA, others) and academic institutions via partners / Board
- Integration of projects affiliated with IOOS, ACT, other RAs- like MATOS/ATN , COMT, Hampton Roads Pilot Project (sea level obs and models)
- Existing partnership with CBIBS: 1) data QAQC, 2) data integration (PORTS), 3) R&D (new technology and products), 4) expansion



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# We are LOOKING for:

- Partners – new data providers (citizen scientists, local groups, researchers)
- New requirements relevant to capabilities and mission – we have expertise and ability
- Talking to NOAA about Choptank Habitat Focus Area, Sentinel Sites
- Would like to look into bottom & water column oxygen monitoring, nutrient monitoring (have access to new technologies)
- What does CBP need - discussion?



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THANK YOU



[kuska@maracoos.org](mailto:kuska@maracoos.org)



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