US IOOS Coastal and Ocean Modeling Testbed Roundup

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COMT Program Manager
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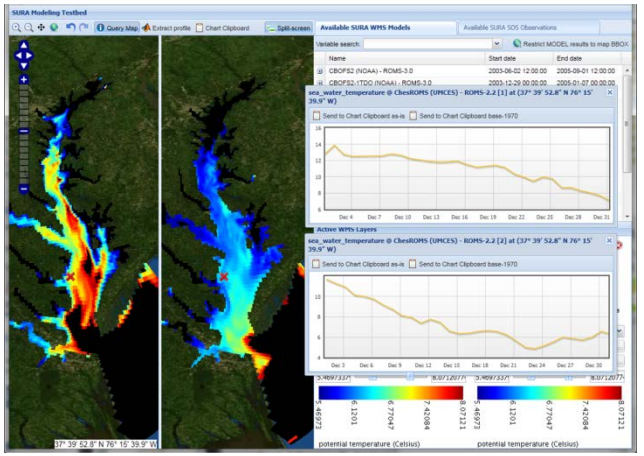
COMT History and Background

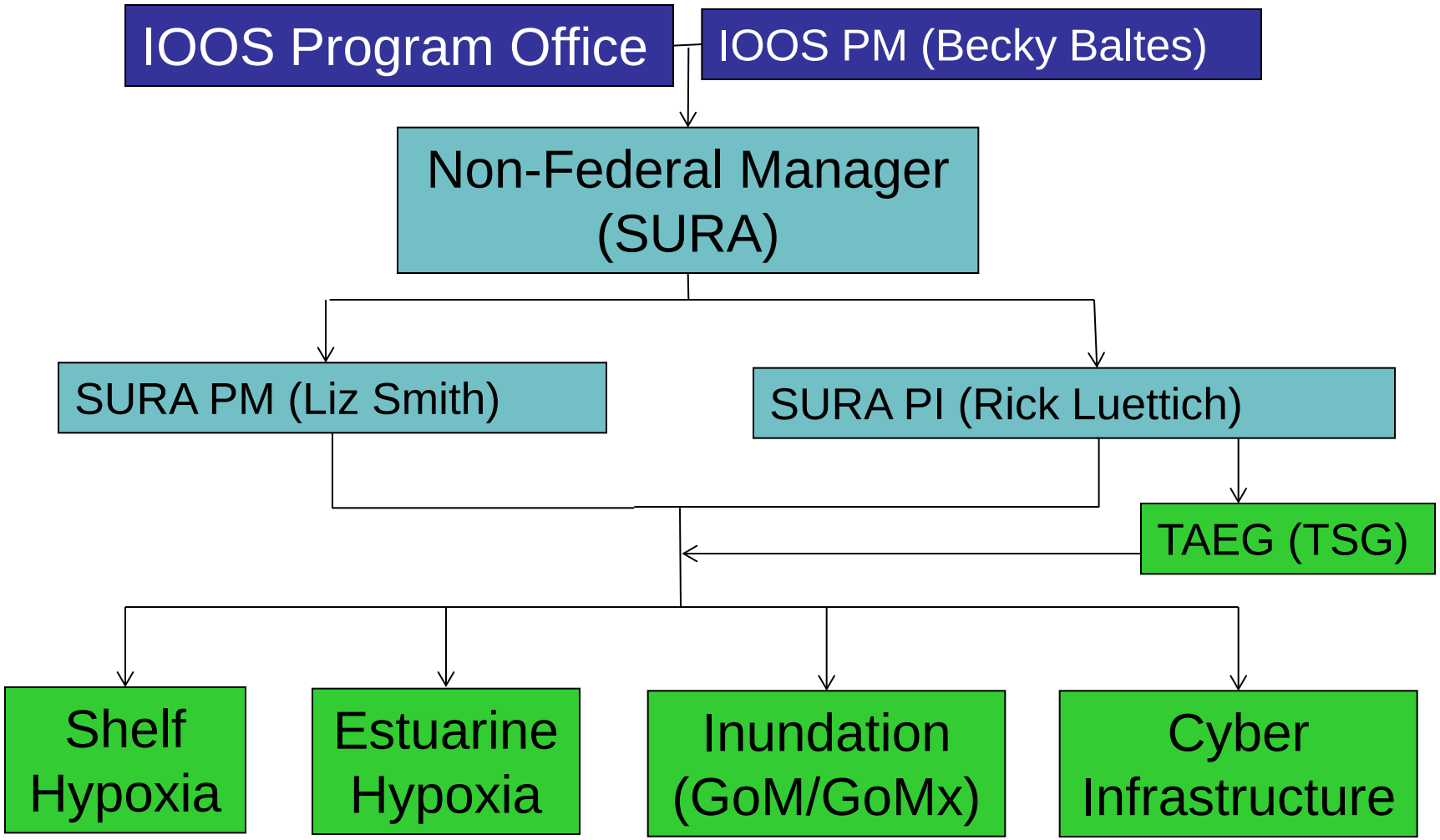
- Unique Elements:
  - Intended to be inter-agency
  - Managed by a non-federal partner



- Funding Background
  - 2010: Grant: $4M
  - 2011: Grant: $1M
  - 2012: None
  - 2013: Grant: TBD Tent. ~ $1M (Appropriations Dependent)

- Composition (SURA non-fed partner and lead for execution)
  - 5 teams, 64 scientists/analysts (Smaller for 2011 Grant)
    - 3 Science themes (Inundation, Shelf & Estuarine Hypoxia)
    - 1 Cyberinfrastructure team
    - 1 Technical Steering Group
  - Multi-sector engagement (federal, academia, industry)

Current Organizational Chart



COMT Teams

- **Technical Advisory and Evaluation Group**, *Rich Signell, USGS*
  - Provides insight, direction and focus to 4 separate teams trying to unite in the COMT
- **Coastal Inundation**, *Rick Luettich, UNC-CH*
  - Gulf of Mexico and Gulf of Maine storms
- **Shelf Hypoxia**, *John Harding, NGI and Katja Fennel, UD*
  - Hypoxia forecasting in Gulf of Mexico shelf environment
- **Estuarine Hypoxia**, *Carl Friedrichs, VIMS and Marjy Friedrichs, VIMS*
  - Hypoxia forecasting in the Chesapeake Bay
- **Cyber infrastructure**, *Eoin Howlett, ASA and Sara Graves, UAH*
  - Cyber tool development and testing, support to other teams

Original Testbed Goals

1. Build a common infrastructure for access, analysis and visualization of all ocean model data produced by the Federal Backbone and the IOOS Regions

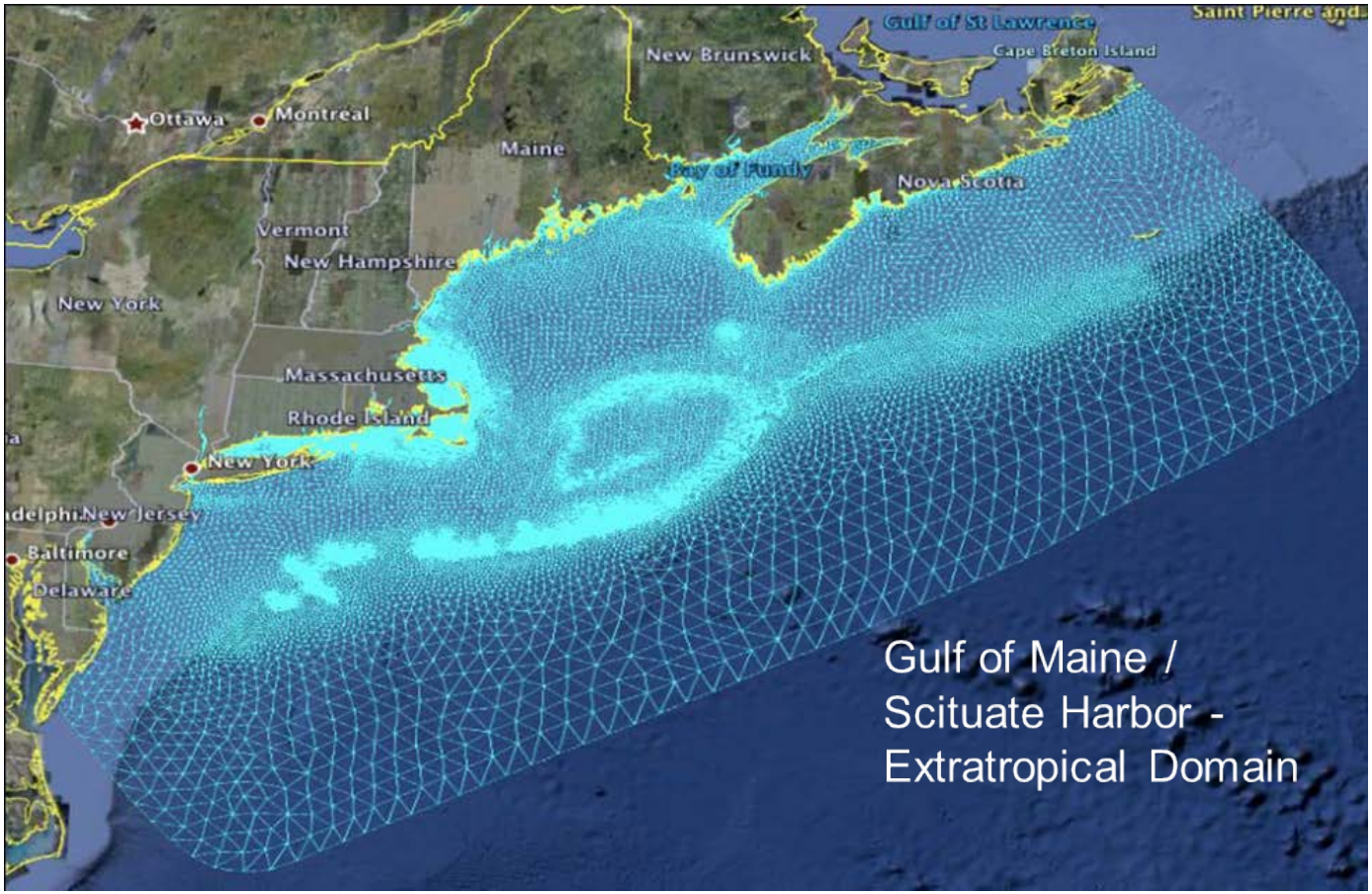
2. Improve R2O and O2R by building stronger relationships between academia and operational centers through collaboration

3. Develop skill metrics and assess models in three different regions and dynamic regimes

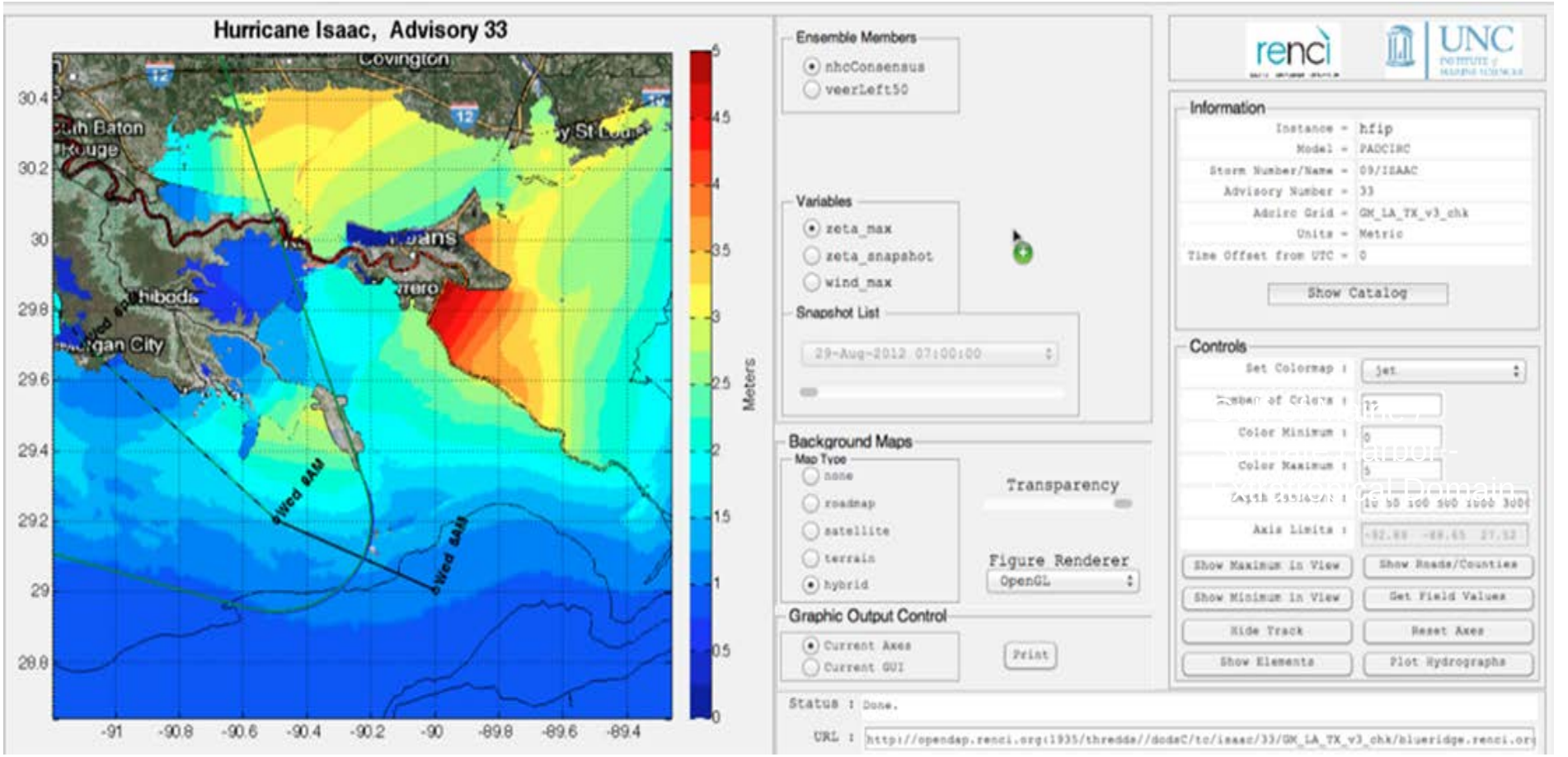
4. Transition models, tools, toolkits and other capabilities to federal operational facilities

Surge, Waves and Inundation Results

- Data Archiving
- HPC time
- Model Enhancement
- Skill & Runtime analysis



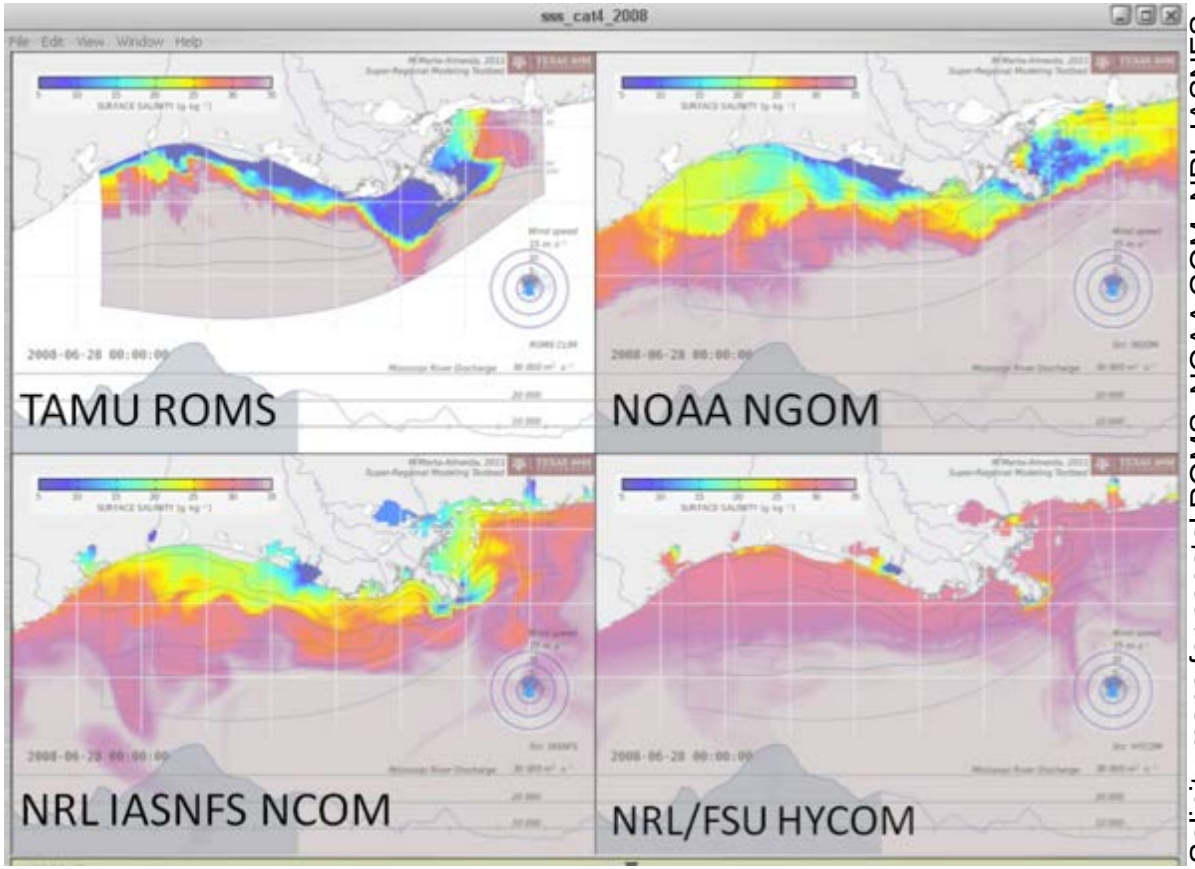
Surge, Waves and Inundation Results



- Unstructured grid viz tool developed, used to access ~200 storm surge forecasts for Hurricane Sandy (2012)

Shelf Hypoxia Team Results

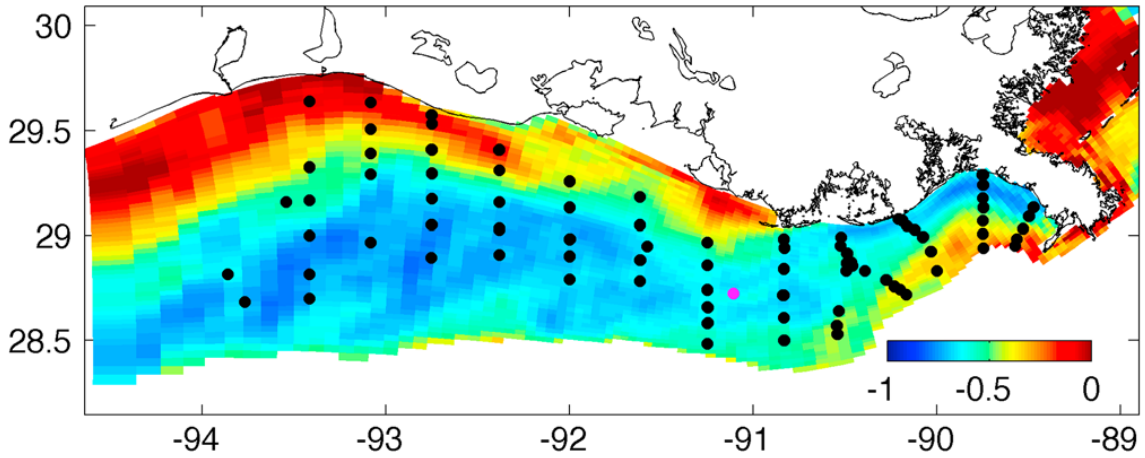
- Improving Collaboration
- Improving Data
- Model Development
- Supporting Operations



Salinity maps for coastal ROMS, NOAA GOM, NRL IASNFS and NRL/FSU HCOM Gulf, http://pong.tamu.edu/~mma/sura/anims_models.php

- Biogeochemical operating equations transitioned to FVCOM community modeling group in CSDL

Shelf Hypoxia Team Results



Spatial distribution of temporal correlations between stratification index Φ and bottom oxygen concentration over the whole simulation period for B20clim. Also shown are stations (black dots) that had hypoxic bottom waters during at least one of the July monitoring cruises between 2004 and 2007. (Fennel et al, JGR 2013)

Estuarine Hypoxia Results

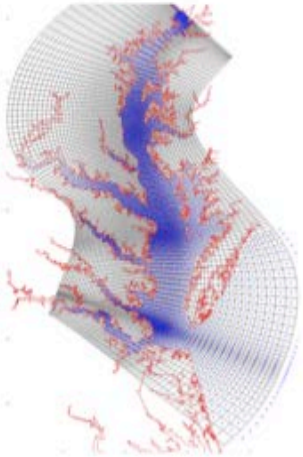
- Transitioning information to federal agencies
- Model Comparison
- Conducting sensitivity experiments
- New, single term hypoxia model

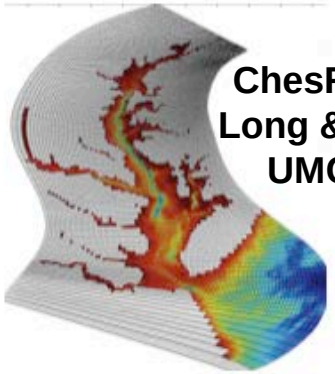
Five Hydrodynamic Models Configured for the Chesapeake Bay

CH3D
Cerco & Wang
USACE

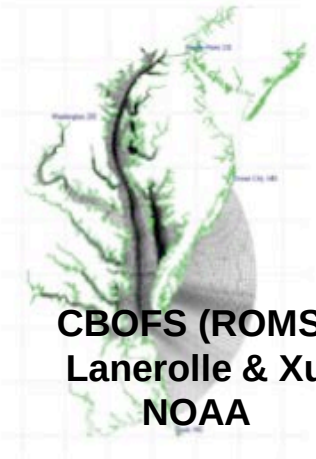
EFDC
Shen
VIMS

UMCES-ROMS
Li & Li
UMCES



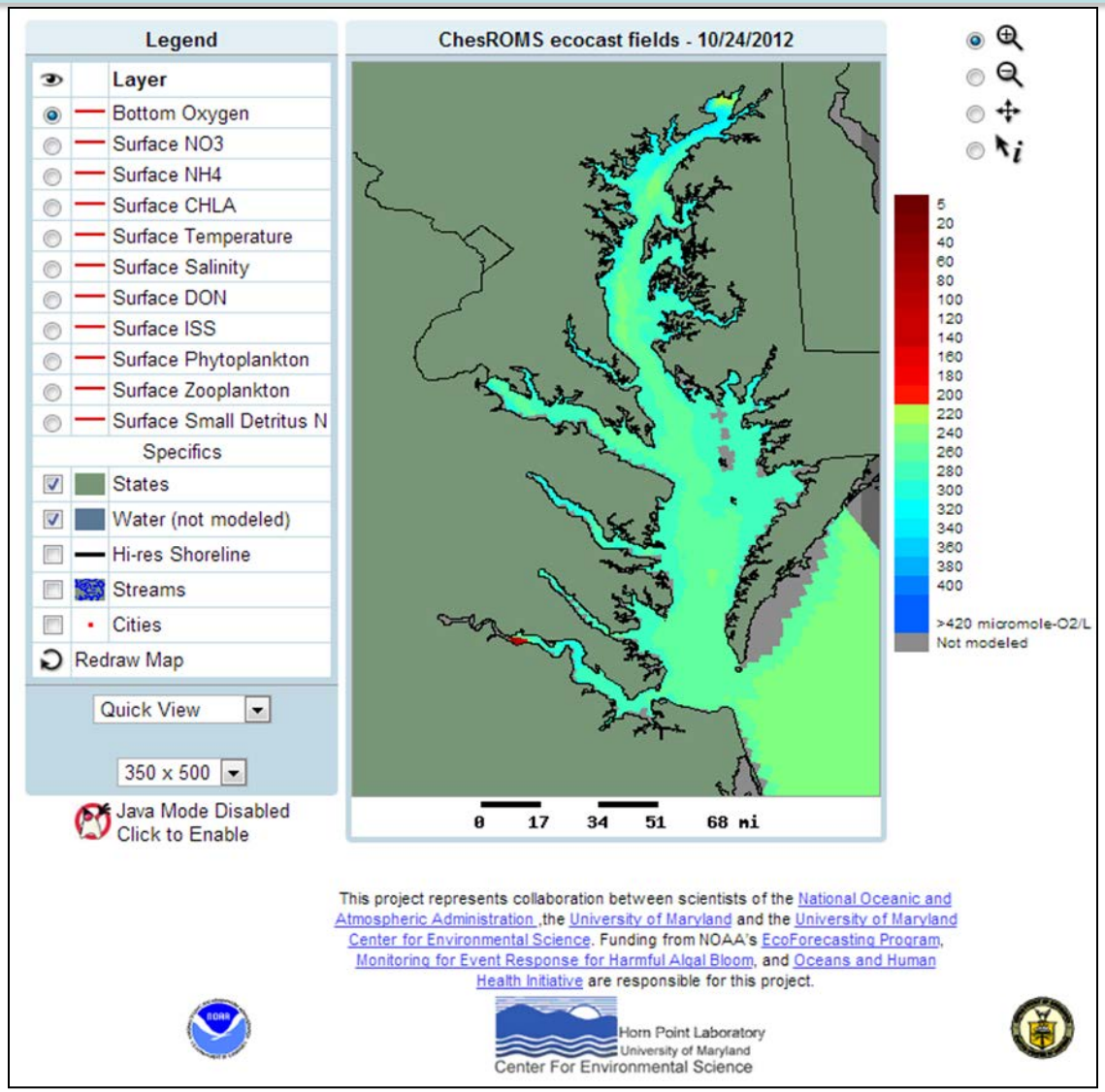


ChesROMS
Long & Hood
UMCES



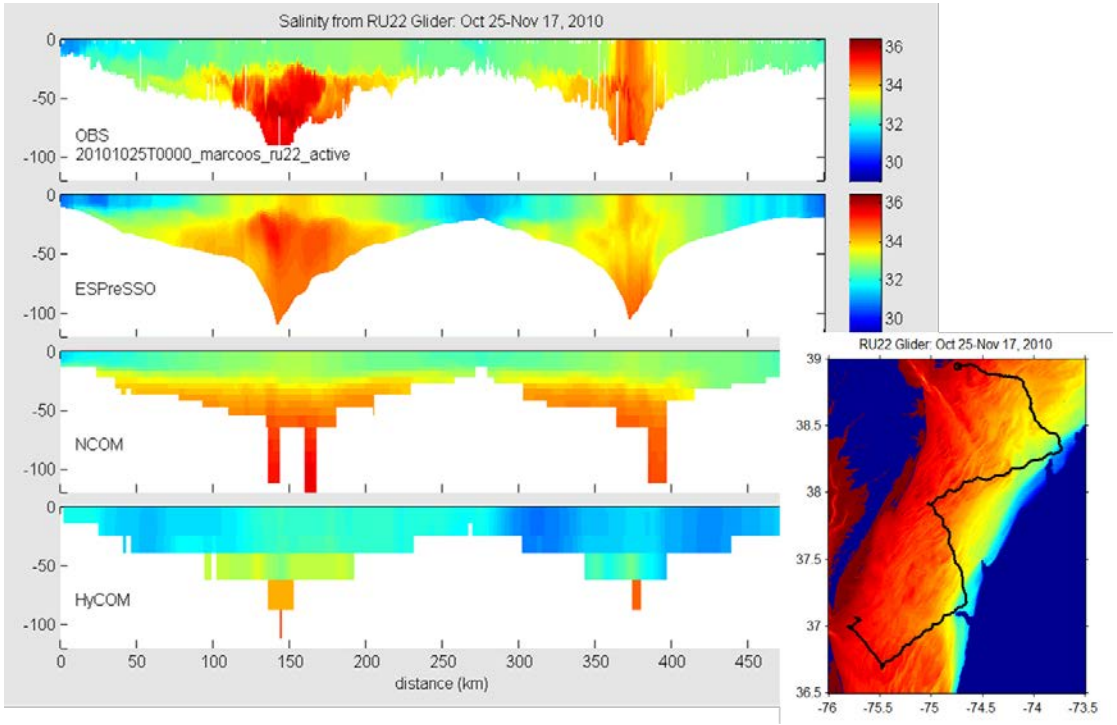
CBOFS (ROMS)
Lanerolle & Xu
NOAA

Estuarine Hypoxia Results



Cyber Infrastructure Results

- Interactive Model and Observation
- Unstructured Grid
- NCToolbox
- Matlab as a Web
- Skill Assessment Tools
- Collaborative Web Site



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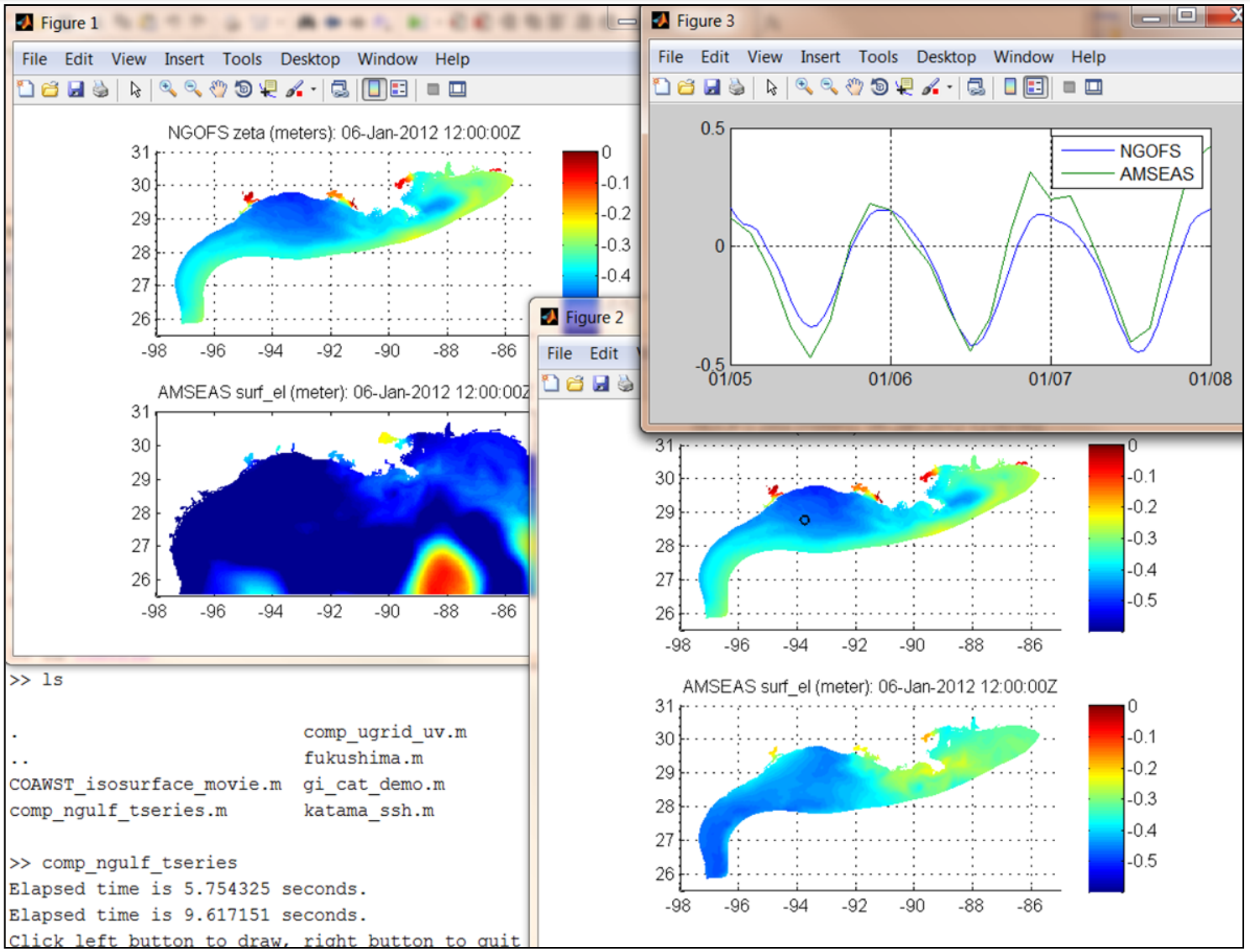

Future

- FY13 : Complete Proposal Review and initiate new 5 year Cooperative Agreement
- Transitions and projects more thoroughly aligned with federal liaisons and operational development planning
- Cyberinfrastructure development for COMT and IOOS DMAC tailored to needs
- Permanent Testbed infrastructure, data archive for models and obs

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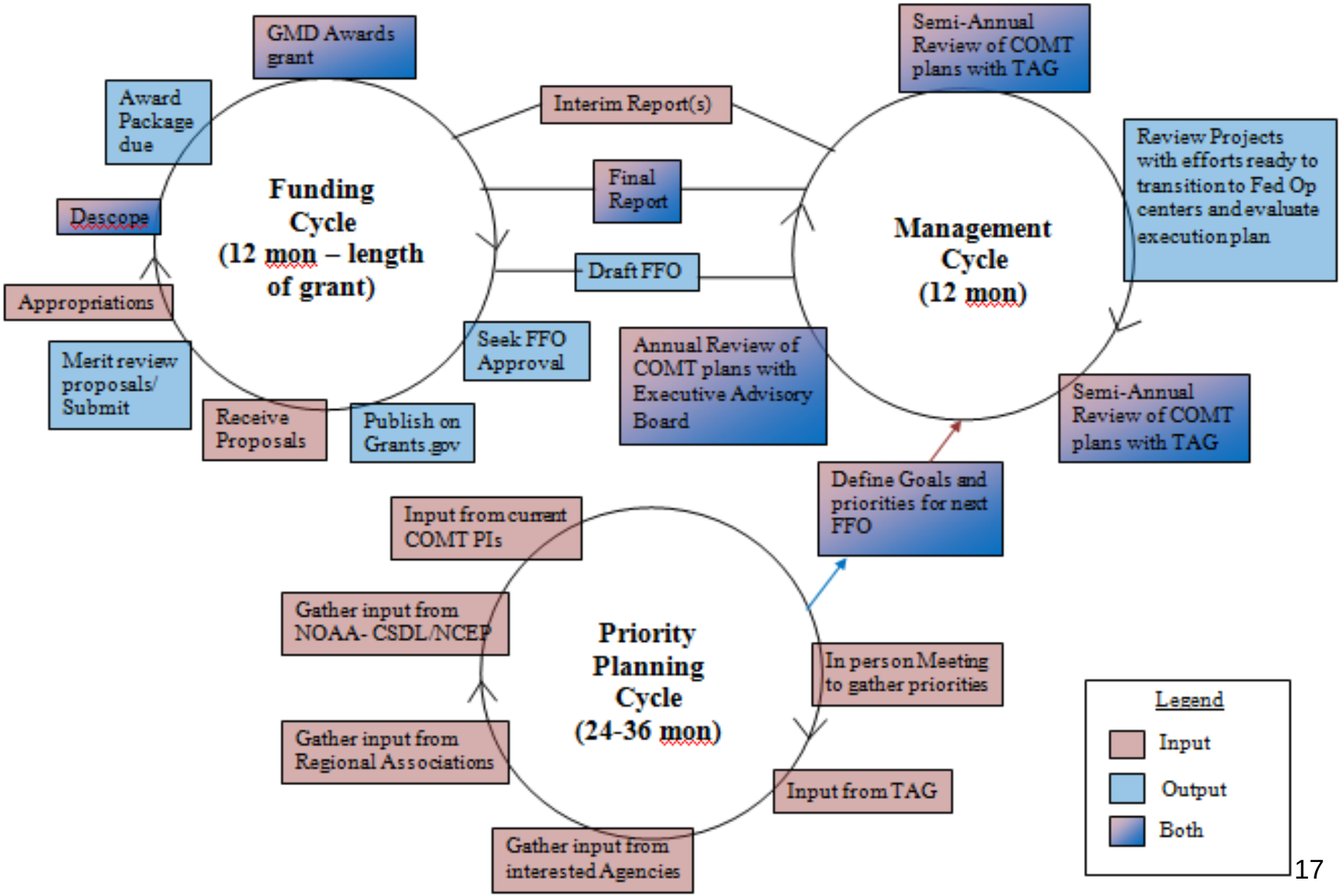
http://www.ioos.noaa.gov/modeling/testbed.html

Back Up Slides

COASTAL OCEAN MODELING TESTBED



Cyber Infrastructure Results

- **Interactive Model and Observation Explorer**: Browse model results, view model grid data, side by side comparisons, and MUCH MORE
- **Unstructured Grid Support:** Time series extraction completed for FVCOM, SELFE, ELCIRC, ADCIRC
- **NCToolbox**: standardized data transformations, new methods for comparing data (including unit conversion)
- **Matlab as a Web Service**: Matlab processes - no desktop license required
- **Skill Assessment Tools**: Measure the degree of correlation between model prediction and observations
- **Collaborative Web Site**: public/private access to portal, content organization with internal/external tools