Outline

• US IOOS Program
• GCOOS- RA
• Our Ocean Observing System Build Out Plan
• Closing thoughts
U.S. IOOS enables decision making and fosters advances in Science and Technology
Operated By:
Federal Component:

Regional Component:
U.S. IOOS: Contribution to Global Observations
How is the national initiative organized?

International GOOS
National IOOS-Ocean.US
Coastal Component COOS
Regional Association Implementation (RA-COOS)
Alliance for Coastal Technologies (ACT)

Technology Evaluations, Technical capacity building, and information clearinghouse

(FY2015/2016)

Nutrient Sensor Challenge

Coastal & Ocean Modeling Testbed (COMT)

Testing model skill, transition to operations, and applied science for hypoxia, inundation, and ocean forecasts
Welcome

The United States Integrated Ocean Observing System (U.S. IOOS) is a vital tool for tracking, predicting, managing, and adapting to changes in our ocean, coastal and Great Lakes environment. U.S. IOOS delivers the data and information needed, so that decision-makers can take action to improve safety, enhance the economy, and protect the environment. Explore the interactive features of the new IOOS Data Catalog.
What is the purpose of Regional Coastal Ocean Observation

End-user Relevance

Regional Differences

Local Applicability

Increased Flexibility
History of the GCOOS-RA

- Global Ocean Observing System > U.S. IOOS > GCOOS
- 2005-2015: 10 years old
- 5 themes of GCOOS
  - Public Health and Safety
  - Healthy Ecosystems and Water Quality
  - Mitigation of Effects of Coastal Hazards
  - Safe and Efficient Marine Operations
  - Long-Term Ocean Variability and Changes
- Membership and Partnership Model

Data Sources
- COMPS
- DISL
- LUMCON
- MOTE
- TABS
- TCOON
- WAVCIS
- SCCF-RECON
- FSU/COAPS
- FWRI
- CanGOOS
- Industry ADCP
- NOS
- NERRS
- NDBC

Data Portal and Products:
- Integrated Data for Emergency, Resource Managers and Others
- Data Products to Meet Public Stakeholder Needs
- Integrated Data for Private Sector Use in Building Business
GCOOS-RA Model

Data Providers/Owners/Operators – NOT the GCOOS- RA
- Federal
- State
- Academic
- NGO’s
GCOOS – RA- Data management into centralized portal for all to use
Welcome to GCOOS Data Portal

This Data Portal provides timely information about the environment of the United States portion of the Gulf of Mexico and its estuaries for use by decision-makers, including researchers, government managers, industry, the military, educators, emergency responders, and the general public. Observing stations in the region are monitored constantly.

Region’s Data Sources

The following is an interactive map to display resources. Click on the station to view status and station details. Not all stations may be visible at the current scale. Zoom-in on an area to reveal all the stations. The HF Radar overlay uses Coastal Observing Research and Development Center (CORDC) published HF RADAR API. Click here to toggle back to 2D mapping from 3D display.
GCOOS Data Management and Products Portals

Real time and Historical Data
Water Quality
Field Cruises
Model Forecasts
MBON
Sea Surface Height
Bathymetry
Satellite Data
Gliders
Fish

Observations
Giders
Model Forecasts
Model Resources
Oil and Gas
Bathymetry
HABs
Satellites
Outreach
Climate
Fish
GeoPortal

New/Updated Map Products

MSU Wave gliders
During the 2014 Hurricane Seasons, three Unmanned Surface Vehicles known as Wave Gliders leased from Liquid Robotics have been deployed into the eastern Gulf of Mexico.

Gulf gliders map
Near real-time glider tracking map in the Northern Gulf of Mexico.

Lionfish observations
Observations of red lionfish from 1985-2014 have been reconciled and shown on a map.

Information for Mobile/Tablet Users
GCOOS Data Management
Recent projects

GANDALF: Gulf AUV Network and Data Archive Long-term Storage Facility
- AUV plots, trajectories and feature collections
- Binary AUV data files, text log files, encoded ARGOS messages
- 34B sensor records for an 80 day mission
- Processed to the National Glider Data Assembly Center (DAC)
<table>
<thead>
<tr>
<th>P.I.</th>
<th>Vehicle</th>
<th>Type</th>
<th>Operator</th>
<th>Project</th>
<th>Deployed</th>
<th>Recovered</th>
<th>Days Wet</th>
<th>Distance (km)</th>
<th>Data</th>
<th>KMZ</th>
<th>Plots</th>
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<td>Slocum G2</td>
<td>Mote</td>
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<td>Slocum G1</td>
<td>Mote</td>
<td>FWRI</td>
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<td>2014-07-03</td>
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</tr>
</tbody>
</table>
HN-DSS: Hypoxia Nutrient Decision Support System

- 71 organizations all with different data recording practices
- 9 measured variables
- 7.5M records
## Statistics: Assets/Inventory

<table>
<thead>
<tr>
<th>Item</th>
<th>Count</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organizations</td>
<td>80</td>
<td>Organizations or departments that reported data to a repository.</td>
</tr>
<tr>
<td>Platforms</td>
<td>285,391</td>
<td>Distinct locations where data were collected.</td>
</tr>
<tr>
<td>Variable: Chlorophyll</td>
<td>55,889</td>
<td>Chlorophyll-a concentration (mg L⁻¹).</td>
</tr>
<tr>
<td>Variable: Dissolved Oxygen</td>
<td>785,554</td>
<td>Dissolved oxygen concentration (mg L⁻¹).</td>
</tr>
<tr>
<td>Variable: Enterococcus</td>
<td>244,727</td>
<td>Enterococcus bacteria (counts).</td>
</tr>
<tr>
<td>Variable: Fecal coliform</td>
<td>155,654</td>
<td>Fecal coliform bacteria (counts).</td>
</tr>
<tr>
<td>Variable: Nitrogen</td>
<td>44,086</td>
<td>Nitrogen (nitrite, nitrate, ammonia and organic nitrogen) concentration (mg L⁻¹) as N.</td>
</tr>
<tr>
<td>Variable: pH</td>
<td>6,381,872</td>
<td>Measure of the acidity or basicity of a water sample.</td>
</tr>
<tr>
<td>Variable: Phosphorus</td>
<td>107,304</td>
<td>Dissolved Total Phosphorus concentration (mg L⁻¹).</td>
</tr>
<tr>
<td>Variable: Salinity</td>
<td>5,937,533</td>
<td>Measure of salt content following UNESCO standards.</td>
</tr>
<tr>
<td>Variable: Water temperature</td>
<td>6,146,860</td>
<td>In situ water temperature measured in degrees Celsius.</td>
</tr>
<tr>
<td>Variable: Silicate</td>
<td>47,767</td>
<td>Silicate concentration (µM L⁻¹).</td>
</tr>
</tbody>
</table>

Total observation records: 19,907,246

## Direct Access: Assets/Inventory

The get a list of all the organizations and/or stations, their labels, description and coordinates, use the following call syntax:

```
http://nutrients.gcoos.org/get_data.php?assets={organization || stations}
```

**Example:**

- To list all organizations contributing data to the portal:  
  `http://nutrients.gcoos.org/get_data.php?assets=organization`
- To list all stations contributing data to the portal:  
  `http://nutrients.gcoos.org/get_data.php?assets=stations`
The Gulf of Mexico Coastal Ocean Observing System (GCOOS) Data Portal aggregates data from the regional data providers for the convenience of all data users. Data published on this website should not be used for navigation or certain other uses as we cannot guarantee data accuracy or availability. The data and delivery services are provided "as is" without warranty of any kind.

Click here for full statement

NOTE: click the button above the label to hide message. Labels can be dragged.
Integration of Aquatic Animals in the Gulf of Mexico (iTAG)

First step - Orphan tag database

Green/yellow/red data sharing controlled by PI
GCOOS RA

Outreach and Education (Dr. Chris Simoniello)
E- newsletter
Media releases
Outreach activities- Science fairs, web content, lesson plans, publications
The GCOOS Build Out Plan
The GCOOS Build-out Plan

- 631 workshop contributors
- From 297 organizations
- 90 plans reviewed
- 50 additional contributors
- 19 elements in the BOP
- 13 subject matter expert writing teams

http://gcoos.tamu.edu/BuildOut/BuildOutPlan-V2-1.pdf
## Stakeholder workshops

<table>
<thead>
<tr>
<th>Integrated Data systems</th>
<th>NVODS for managers</th>
<th>Private sector interests</th>
<th>HABSOS</th>
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<tbody>
<tr>
<td>Next steps</td>
<td>Oil and Gas</td>
<td>Storm surge/Inundation</td>
<td>Educator GPS</td>
</tr>
<tr>
<td>HABs (1)</td>
<td>Boaters</td>
<td>HABs (2)</td>
<td>Integrated water quality</td>
</tr>
<tr>
<td>Recreational Boaters</td>
<td>Ecosystem modeling (1)</td>
<td>HABs (3)</td>
<td>Acoustic Tagging</td>
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<tr>
<td></td>
<td>NGOs</td>
<td>Ecosystem modeling (2)</td>
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</tbody>
</table>
Plan includes 19 elements to meet stakeholder needs— with cost estimates

- Surface currents and waves network
- Fixed mooring network
- Autonomous meteorological measurement network,
- Glider and AUV network
- Satellite observations and products
- Aircraft observations
- Bathymetry and topography mapping network
- Water level network
- Enhanced PORTS® network
- Outreach and Education
- Harmful Algal Bloom Integrated Observing System
- Ecosystem monitoring
- Water quality and beach quality monitoring
- Hypoxia monitoring
- Monitoring of river discharge
- Physical modeling
- Ecosystem modeling
- Data management and communications system
- Research – input into new technology development
Building the Observing System

Ideal!
Different sources of funding
Different timelines

Doesn’t change the contributions an integrated observing system can/will provide to society
  Detecting and predicting climate variability and consequences,
  Preserving and restoring healthy marine ecosystems,
  Ensuring human health,
  Managing resources,
  Facilitating safe and efficient marine transportation,
  Enhancing national security, and
  Predicting and mitigating against coastal hazards.
### Table 3.4. Priority observing needs by topic

<table>
<thead>
<tr>
<th>OBSERVING NEED/TOPIC</th>
<th>Fisheries</th>
<th>Marine Mammals</th>
<th>Sea Turtles</th>
<th>Plankton</th>
<th>Coastal Birds and Seabirds</th>
<th>Habitats</th>
<th>Monitoring for Restoration Projects</th>
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<td>T/S profiles</td>
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<td>Surface T &amp; S</td>
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<td>Shoreline habitat and sediment monitoring</td>
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<td>Habitat identification, characterization, change, and use</td>
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<td>Deep sea monitoring</td>
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<tr>
<td>Coral monitoring (distribution, abundance, change)</td>
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<td>Passive acoustics for identification</td>
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<td>Individual tracking, identification of migratory habitat and corridors</td>
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<tr>
<td>Zooplankton, phytoplankton (incl. seasonal chlorophyll) and bacteria monitoring</td>
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<td>HABs dynamics &amp; distribution</td>
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<td>Passive acoustics for characterizing marine sound</td>
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<td>Surface currents and depth-averaged current profiles</td>
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Collaboration with SECOORA
SECOORA and GCOOS

SECOORA- supports assets in Florida waters
GCOOS - supports data management and transfer
Frequent discussions to assure not duplication of efforts
Co-sponsor workshops, media releases, white papers
Closing Thoughts

Collaborative Project on Water Quality?
- Hypoxia/Nutrient Data Portal - continue to populate
- Comprehensive Beach Portal - Current Conditions and Forecasting
  - Pathogens
  - Rip Currents
  - Harmful Algal Blooms
  - Animal migration (bull sharks)
  - On shore/near shore impacts - jellyfish, swimmer’s itch
Questions/Comments

barb.kirkpatrick@gcoos.org