



GULF OF MEXICO
COASTAL OCEAN
OBSERVING SYSTEM

The Gulf of Mexico Coastal Ocean Observing System:
10 years of protecting and preserving the Gulf

IOOS/ GCOOS

Dr. Barbara Kirkpatrick
Executive Director

SAML Meeting
May 12, 2016

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*

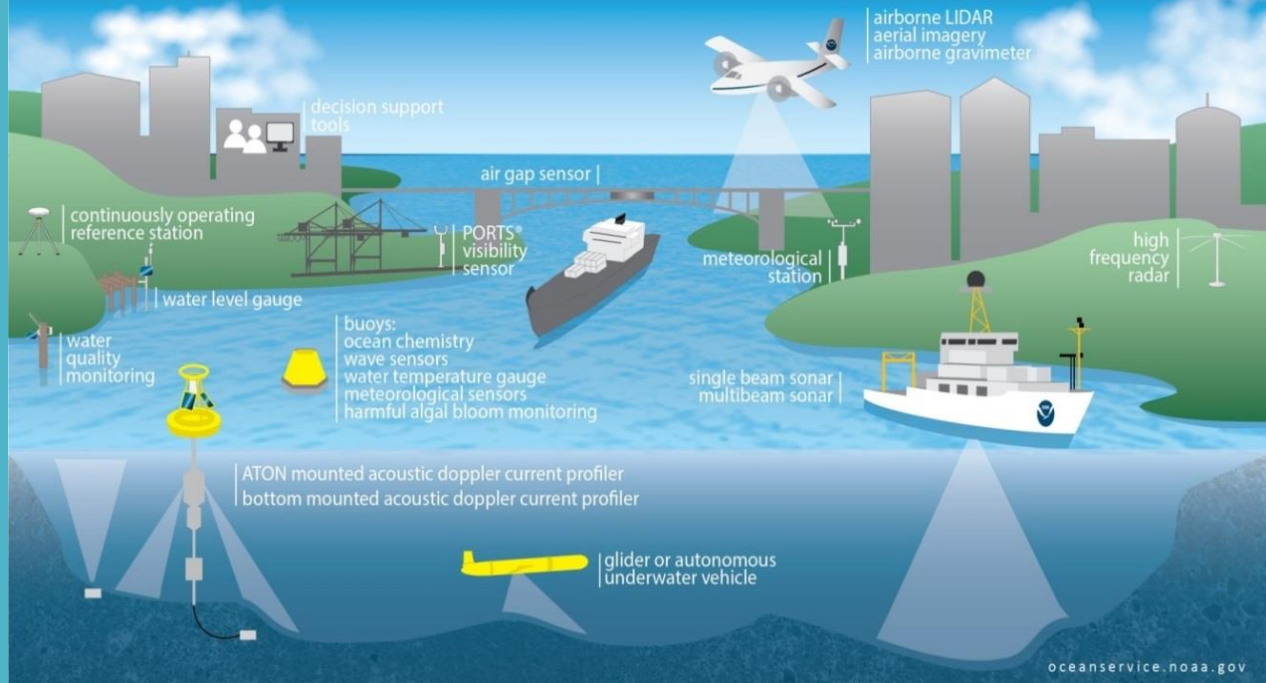


COASTAL INTELLIGENCE

satellite communication



Helping decision makers along the coast make the best choices for their communities.



Operated By:

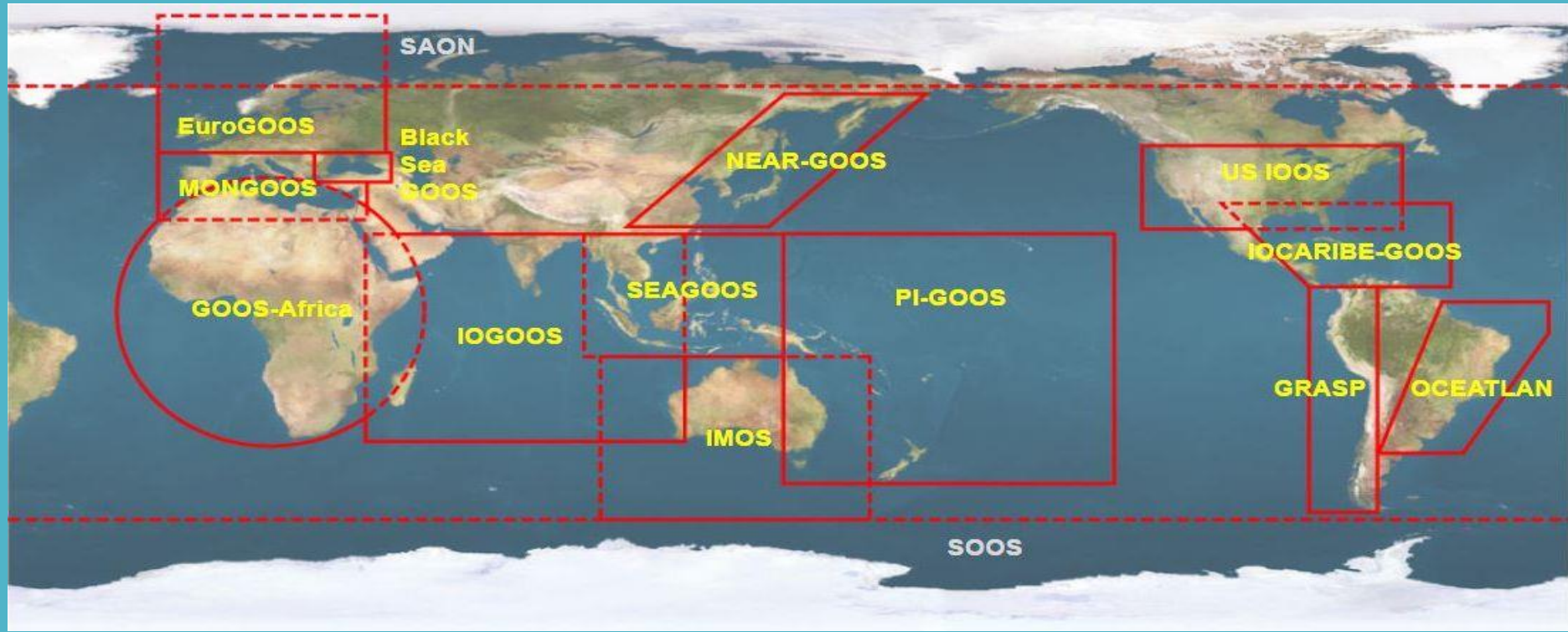
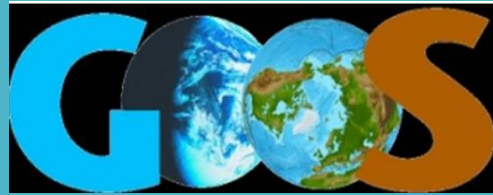
Federal Component:



Regional Component:



U.S. IOOS: Contribution to Global Observations



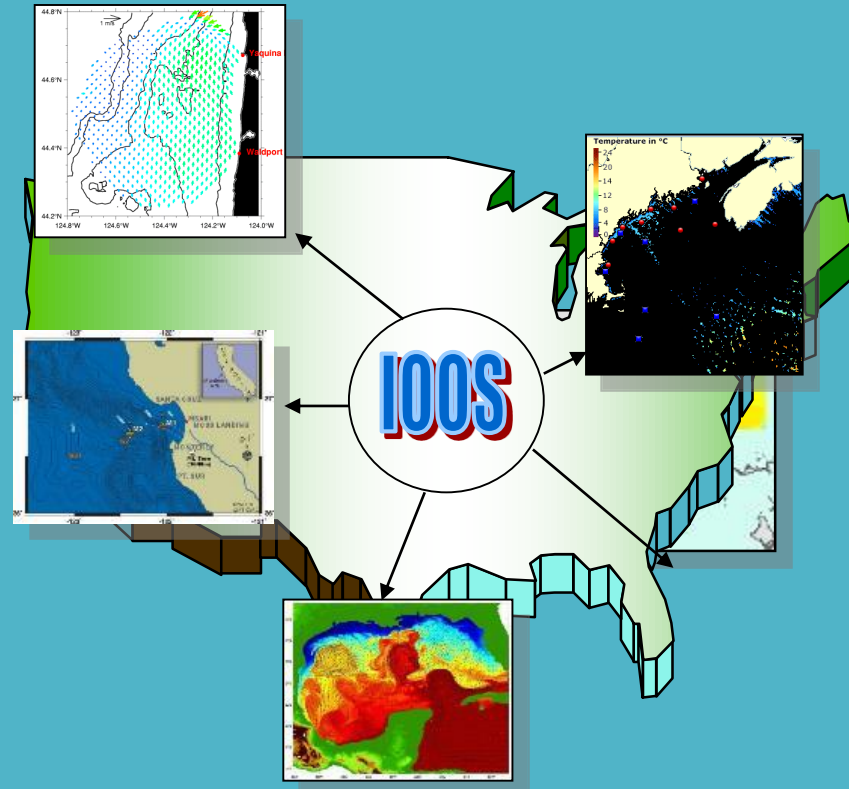
How is the national initiative organized?

International GOOS

National IOOS-
Ocean.US

Coastal Component
COOS

Regional Association
Implementation
(RA-COOS)



Supporting Research to Operations

Alliance for Coastal Technologies (ACT)

Technology Evaluations, Technical capacity building, and information clearinghouse

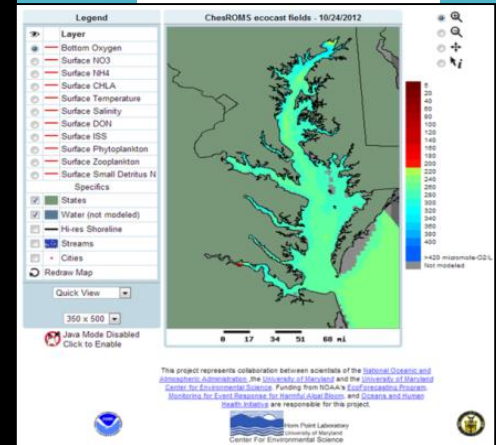
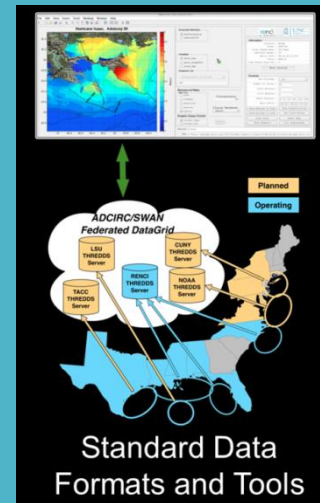


Nutrient Sensor Challenge (FY2015/2016)



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.



Gliders



Featured Maps



Download Help



6837 Datasets | 5265 Services

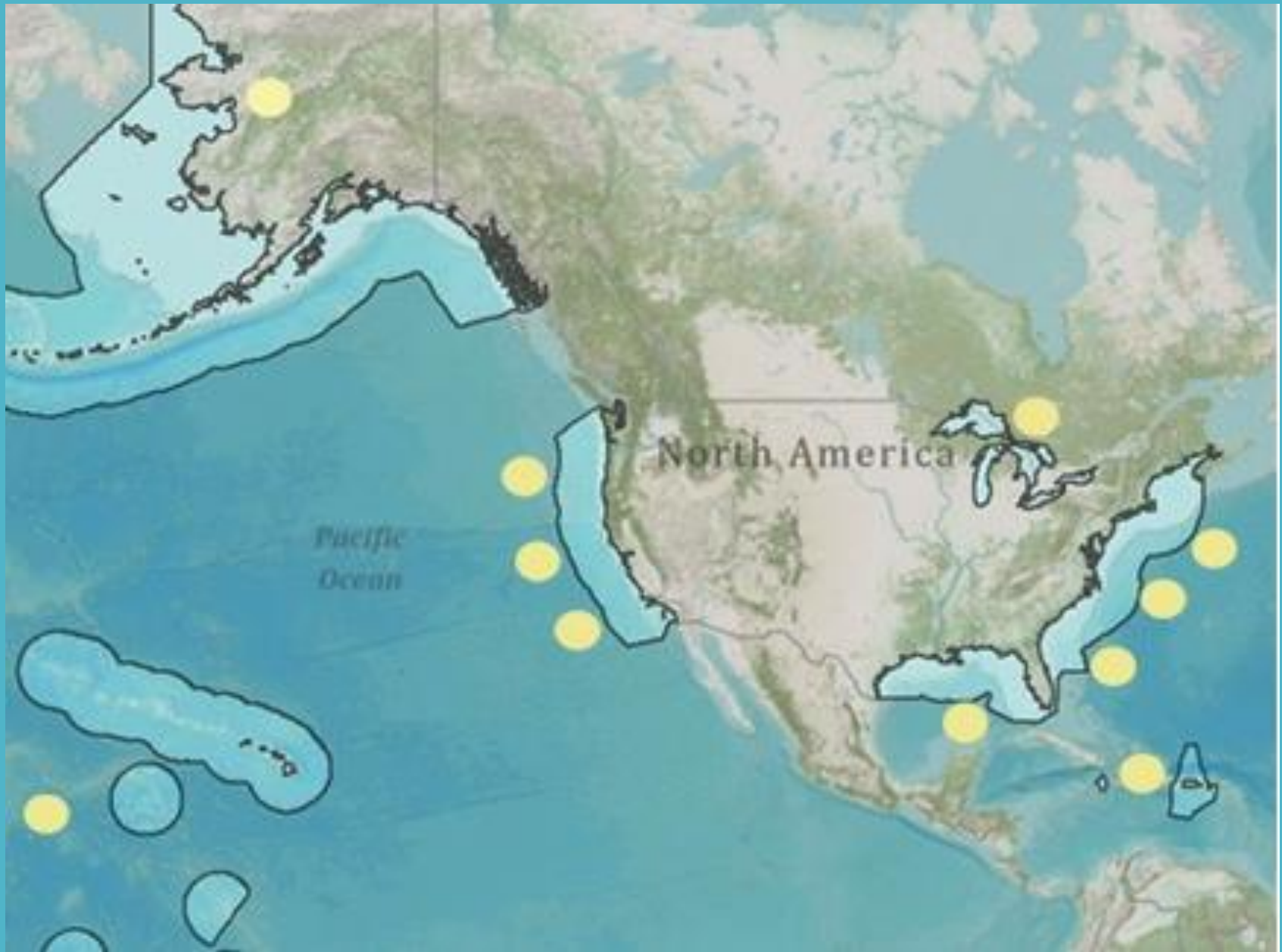
Catalog Map



By The Numbers



Catalog Inventory



What is the purpose of Regional Coastal Ocean Observation

End-user Relevance

Regional Differences

Local Applicability

Increased Flexibility



- 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			Select all	Deselect all
<input checked="" type="checkbox"/> COMPS	<input checked="" type="checkbox"/> DSL	<input checked="" type="checkbox"/> LUMCON		
<input checked="" type="checkbox"/> MOTE	<input checked="" type="checkbox"/> TABS	<input checked="" type="checkbox"/> TCOON		
<input checked="" type="checkbox"/> WAVCIS	<input checked="" type="checkbox"/> SOCF-RECON	<input checked="" type="checkbox"/> FSU/COAPS		
<input checked="" type="checkbox"/> FWRI	<input checked="" type="checkbox"/> GenGOOS	<input checked="" type="checkbox"/> Industry ADCP <small>Commodia</small>		
<input checked="" type="checkbox"/> NOS	<input checked="" type="checkbox"/> NERRS	<input checked="" type="checkbox"/> NDBC		



Data Portal and Products:

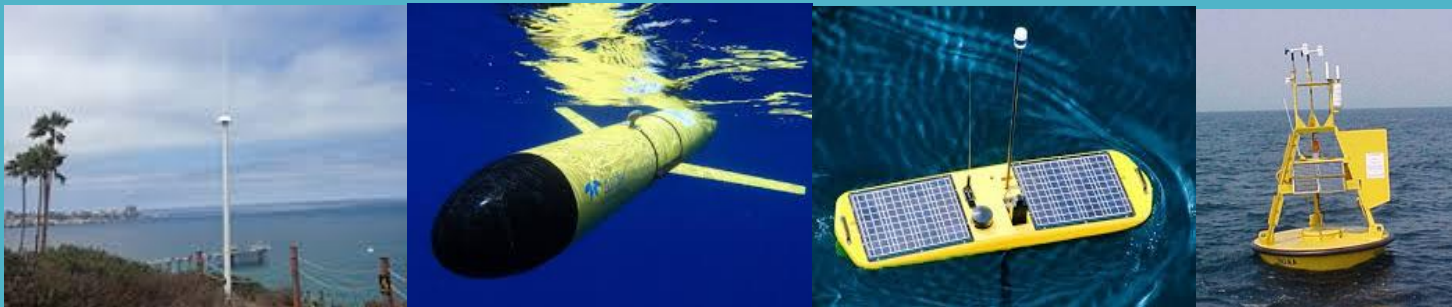
- Integrated Data for Emergency, Resource Managers and Others
- Data Products to Meet Public Stakeholder Needs
- Integrated Data for Private Sector Use in Building Business

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



GCOOS Data Portal

COASTAL OCEAN OBSERVING SYSTEM DATA PORTAL

Assets Monitoring Direct Data Access SOS LDN SOS URLs Vocabularies Downloads Contact Us

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



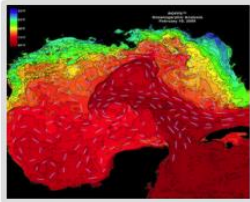
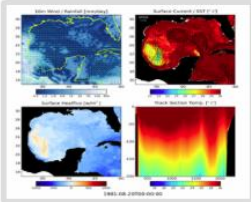

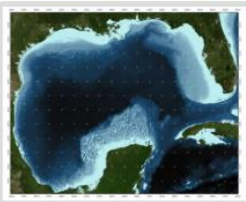






The following is an interactive map to display resources. Click on the station to view status and station details. Not all stations may be visible at the current scale. Zoom-in on an area to reveal all the stations. The HF Radar overlay uses Coastal Observing Research and Development Center (CORDC) published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

The screenshot shows a 3D map of the Gulf of Mexico coastline from Texas to Florida. Numerous monitoring stations are indicated by colored pins (green, red, orange). Major cities like Austin, San Antonio, Houston, Tallahassee, Jacksonville, Orlando, and Miami are labeled. The map includes a coordinate grid and various interface elements like a zoom control and a station filter menu.

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

New/Updated Map Products

			
<p>MSU Wave gliders</p> <p>During the 2014 Hurricane Seasons, three Unmanned Surface Vehicles know as Wave Gliders leased from Liquid Robotics have been deployed into the eastern Gulf of Mexico.</p>	<p>Gulf gliders map</p> <p>Near real-time glider tracking map in the Northern Gulf of Mexico. Updated in January 2015</p>	<p>Lionfish observations</p> <p>Observations of red lionfish from 1985-2014 have been recorded and shown in a map Updated in July 2014</p>	<p>Information for Mobile/Tablet Users</p>



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)



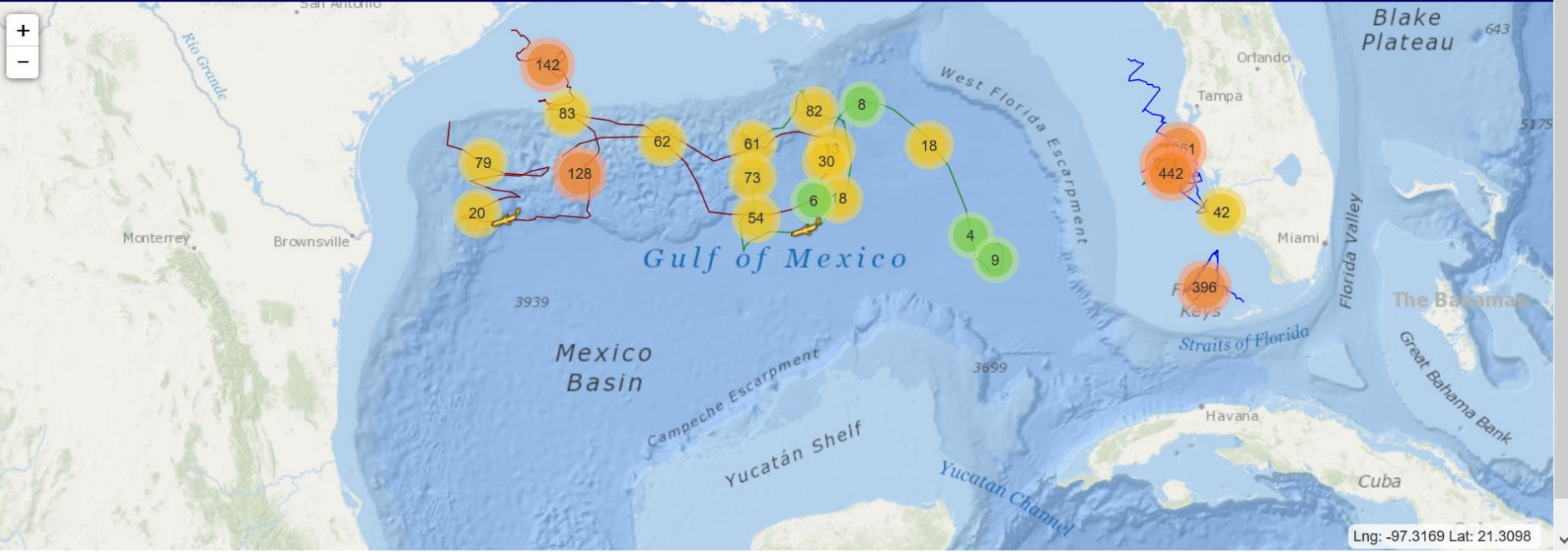
Gulf Of Mexico Coastal Ocean Observing System

Gulf AUV Network and Data Archive Long-term storage Facility (GANDALF)

[Home](#) [Summaries](#) [Deployed](#) [Help](#)

[Sign In](#)

Archived AUV Trajectories





Gulf Of Mexico Coastal Ocean Observing System

Gulf AUV Network and Data Archive Long-term storage Facility (GANDALF)

AUV Deployment Summaries

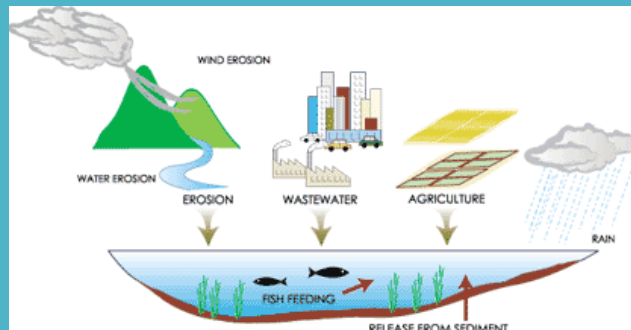
P.I.	Vehicle	Type	Operator	Project	Deployed	Recovered	Days Wet	Distance (km)	Data	KMZ	Plots
Beckler	mote-genie	Slocum G2	Mote	FWRI	2016-04-07	2016-04-24	17	254			
Beckler/Dixon	mote-genie	Slocum G2	Mote	FWRI	2015-12-01	2015-12-11	10	149			
Beckler/Dixon	mote-genie	Slocum G2	Mote	FWRI	2015-11-09	2015-11-12	3	38			
Ordonez	se_02	Slocum G2	DOF Subsea	Loop Current	2015-09-23	2015-11-01	39	1268			
Dixon	usf-bass	Slocum G1	USF	FWRI	2015-08-27	2015-09-04	9	138			
DiMarco	Sverdup	Slocum G2	TAMU	GERG	2015-08-22	2015-11-10	80	862			
Sutton/Hu	usf-murphy	Slocum G2	USF	USF	2015-08-09	2015-08-19	10	265			
DiMarco	Stommel	Slocum G2	TAMU	GERG	2015-08-05	2015-10-12	68	1177			
Dixon	usf-bass	Slocum G1	USF	FWRI	2015-07-06	2015-07-17	11	182			
DiMarco	unit_308	Slocum G2	TAMU	GERG	2015-07-01	2015-07-20	13	240			
DiMarco	unit_540	Slocum G2	TAMU	GERG	2015-07-01	2015-07-20	13	267			
Dixon	usf-bass	Slocum G1	USF	FWRI	2015-04-15	2015-04-23	8	137			
DiMarco	unit_307	Slocum G2	TAMU	GERG	2015-03-02	2015-03-25	23	267			
Dixon	mote_045	Slocum G1	Mote	FWRI	2014-08-01	2014-08-13	12	251			
Dixon	mote_045	Slocum G1	Mote	FWRI	2014-06-30	2014-07-03	3	57			

GCOOS Data Management

Recent projects

HN-DSS: Hypoxia Nutrient Decision Support System

- 71 organizations all with different data recording practices
- 9 measured variables
- 7.5M records



Statistics: Assets/Inventory

Item	Count	Remarks
Organizations	80	Organizations or departments that reported data to a repository.
Platforms	285,391	Distinct locations where data were collected.
<i>Variable: Chlorophyll</i>	55,889	Chlorophyll-a concentration (mg L-1).
<i>Variable: Dissolved Oxygen</i>	785,554	Dissolved oxygen concentration (mg L-1).
<i>Variable: Enterococcus</i>	244,727	Enterococcus bacteria (counts).
<i>Variable: Fecal coliform</i>	155,654	Fecal coliform bacteria (counts).
<i>Variable: Nitrogen</i>	44,086	Nitrogen (nitrite, nitrate, ammonia and organic nitrogen) concentration (mg L-1) as N.
<i>Variable: pH</i>	6,381,872	Measure of the acidity or basicity of a water sample.
<i>Variable: Phosphorus</i>	107,304	Dissolved Total Phosphorus concentration (mg L-1).
<i>Variable: Salinity</i>	5,937,533	Measure of salt content following UNESCO standards.
<i>Variable: Water temperature</i>	6,146,860	In situ water temperature measured in degrees Celsius.
<i>Variable: Silicate</i>	47,767	Silicate concentration (uM L-1).
Total observation records	19,907,246	

Direct Access: Assets/Inventory

To 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

Click on the map below to enlarge the map of H-N stations.

WARNING! Due to the number of stations, this can take a minute to render.





GULF OF MEXICO COASTAL OCEAN OBSERVING SYSTEM

Close

DISCLAIMER

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 to 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.

Google

Map data ©2016 Google, INEGI Terms of Use

GCOOS Fisheries Data Management

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

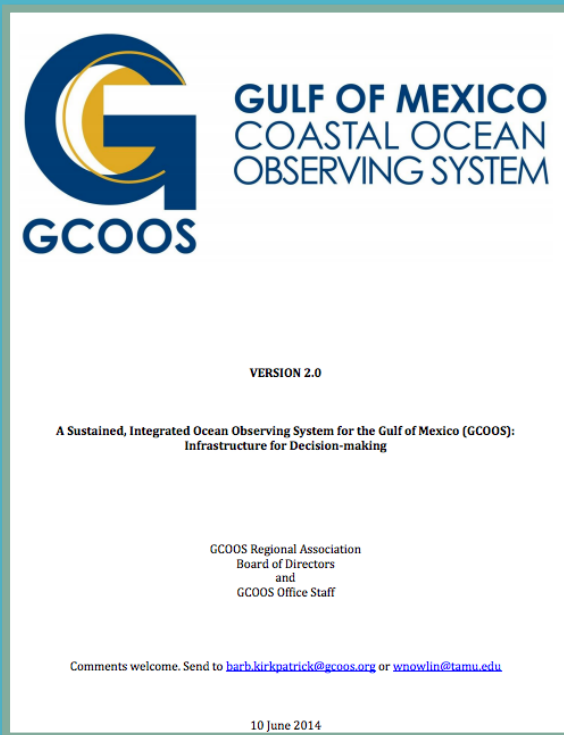


The GCOOS Build-out Plan

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

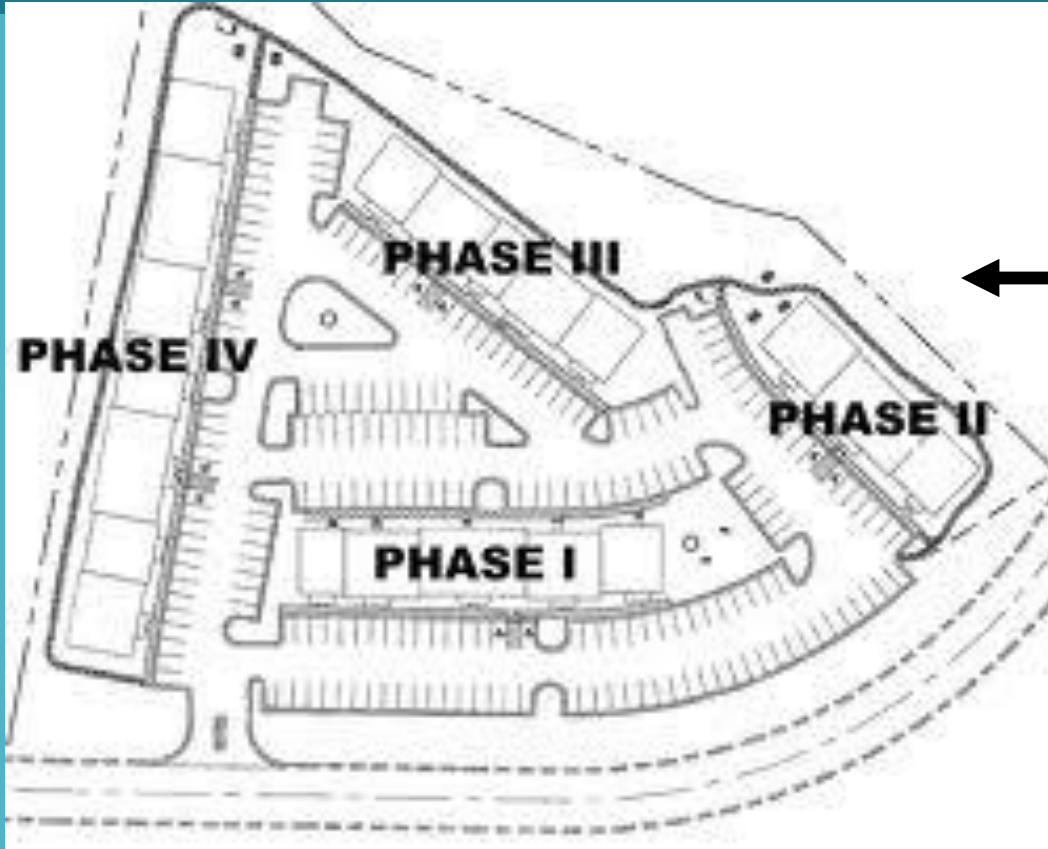
Integrated Data systems	NVODS for managers	Private sector interests	HABSOS
Next steps	Oil and Gas	Storm surge/Inundation	Educator GPS
HABs (1)	Boaters	HABs (2)	Integrated water quality
Recreational Boaters	Ecosystem modeling (1)	HABs (3)	Acoustic Tagging
	NGOs	Ecosystem modeling (2)	



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!



Reality.....



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.

Ecosystem Monitoring Section- GCOOS Build Out Plan

Table 3.4. Priority observing needs by topic

OBSERVING NEED/TOPIC	Fisheries	Marine Mammals	Sea Turtles	Plankton	Coastal Birds and Seabirds	Habitats	Monitoring for Restoration Projects
T&S profiles							
Surface T & S							
Shoreline habitat and sediment monitoring							
Habitat identification, characterization, change, and use							
Deep sea monitoring							
Coral monitoring (distribution, abundance, change)							
Passive acoustics for identification							
Individual tracking, identification of migratory habitat and corridors							
Zooplankton, phytoplankton (incl. seasonal chlorophyll) and bacteria monitoring							
HABs dynamics & distribution							
Passive acoustics for characterizing marine sound							
Surface currents and depth-averaged current profiles							
Near bottom currents							
Dissolved oxygen concentrations							
Oceanic features (e.g., convergence zones)							
Distribution, abundance, status and trends							
Environmental & habitat stressors							
Diseases, parasites, & toxins							
Nutrients							
pH							
Turbidity							
Data products: e.g., depth profiles, habitat, and fish catch							
Data Product: Bottom mapping							
Invasive species – distribution and abundance and trophic interactions							
Protected species – distribution and abundance and trophic interactions							
Marine sound characterization and monitoring – including the whole Gulf							
Centralized data access and data integration; data infrastructure and protocols							
Development of models							
Additional funding							

Page
45

Collaboration with SECOORA

Regional Associations Across the United States



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

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