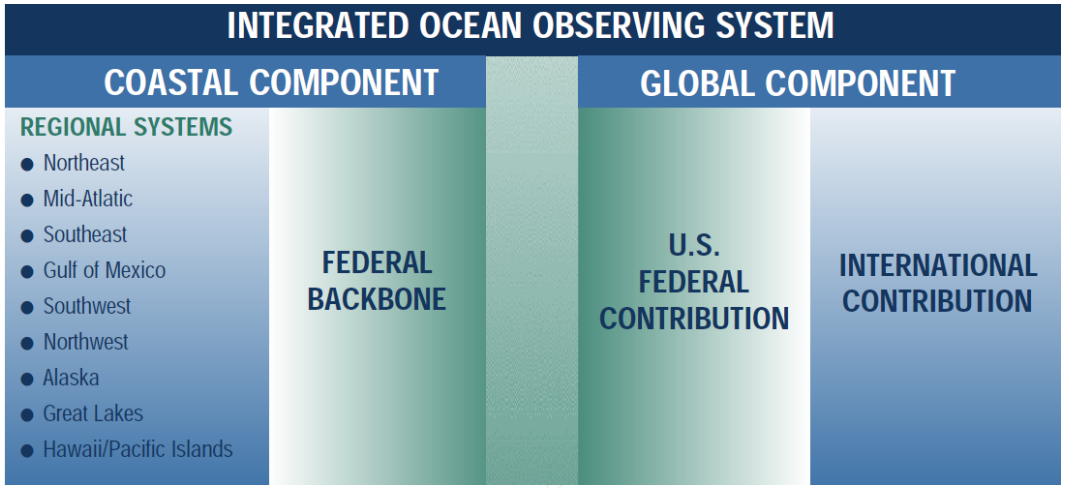
US IOOS®

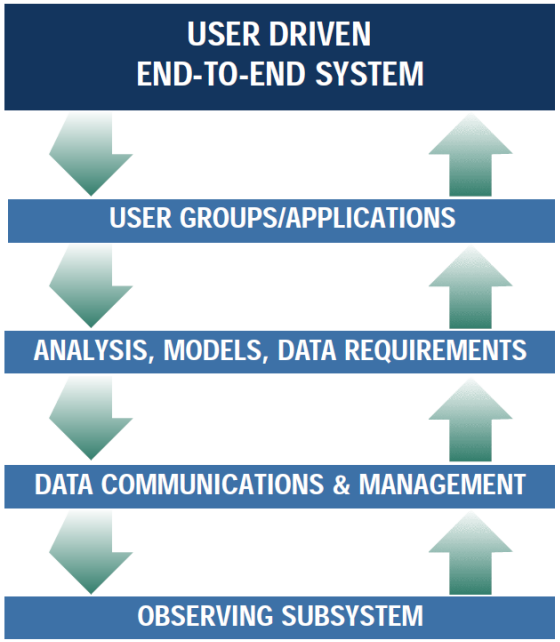
Zdenka Willis
Director, US IOOS

IOOS | EYES ON THE OCEAN™

U.S. IOOS®: Program **Overview**

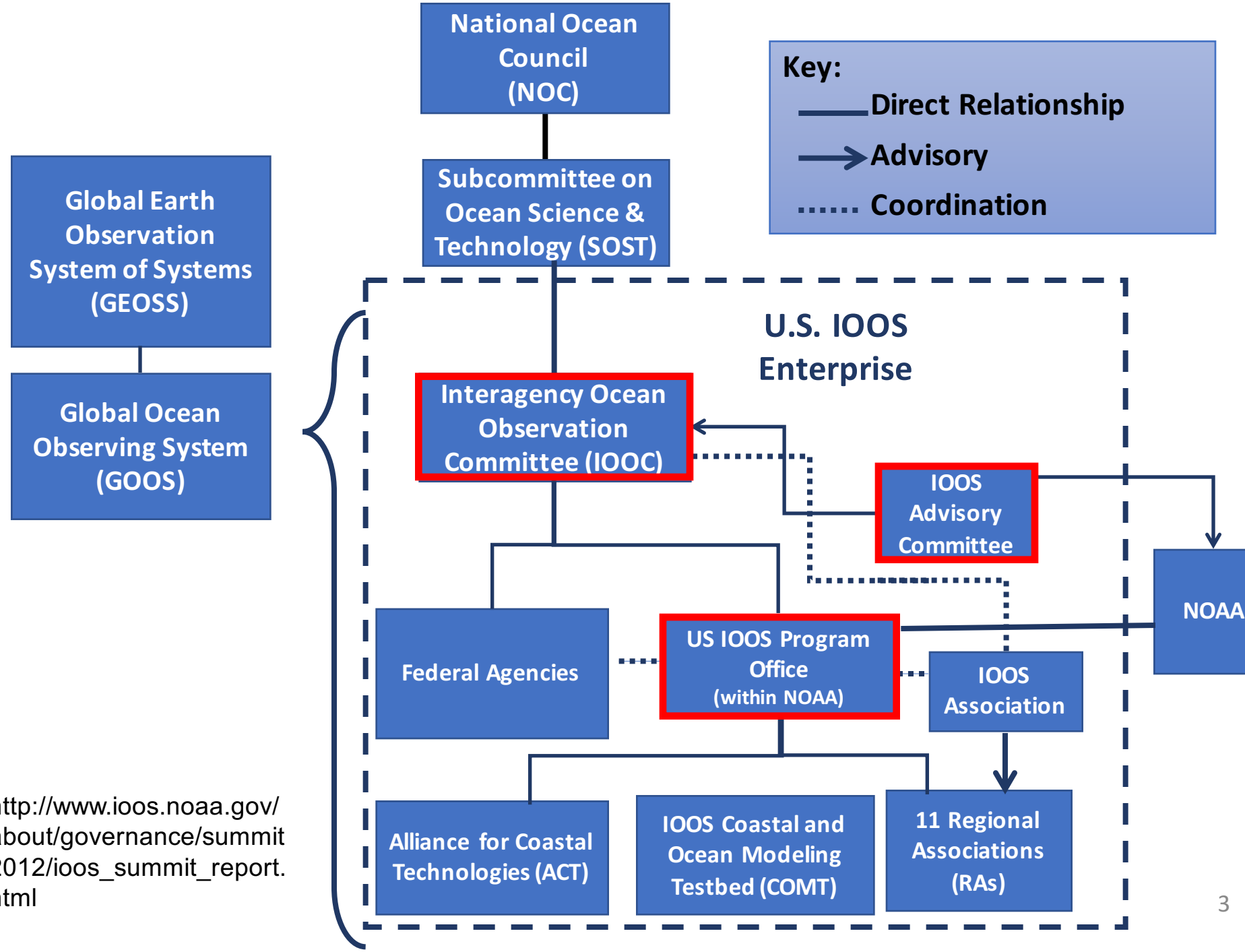
Policy Neutral, Stakeholder driven, Scientifically based





- Improve predictions of climate change and weather, and their effects on coastal communities and the nation
- Improve the safety and efficiency of maritime operations
- More effectively mitigate the effects of natural hazards
- Improve national and homeland security
- Reduce public health risks
- More effectively protect and restore healthy coastal ecosystems
- Enable the sustained use of ocean and coastal resources.

ICOOS Act - P.L. No 111-11, March 2009



http://www.ioos.noaa.gov/about/governance/summit2012/ioos_summit_report.html

IOOS: Advancing Communities

HF Radar:

Biological Variables & BIO TT:

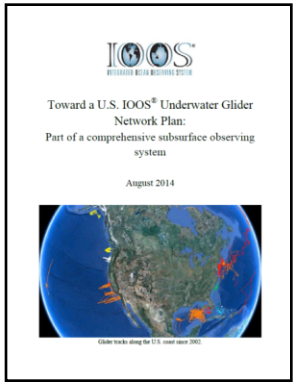
WORKSHOP REPORT

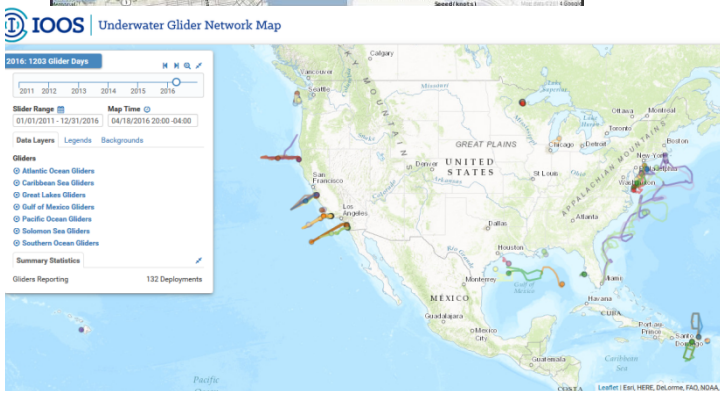
Biological and Ecosystem Observations within U.S. Waters:

A Workshop to Inform Priorities for the U.S. Integrated Ocean Observing System®

Convened by the Interagency Ocean Observation Committee (IOOC) Biological Integration and Observation (BIO) Task Team

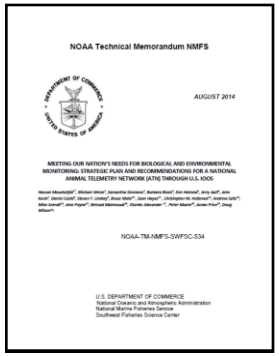
Gliders:





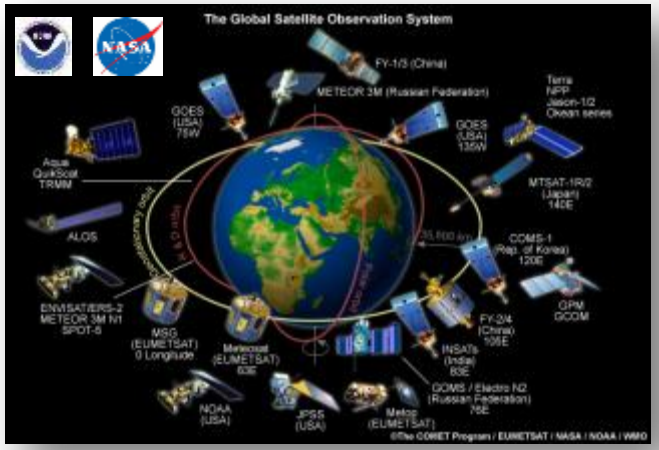
Wave Measurements:

Animal Telemetry:

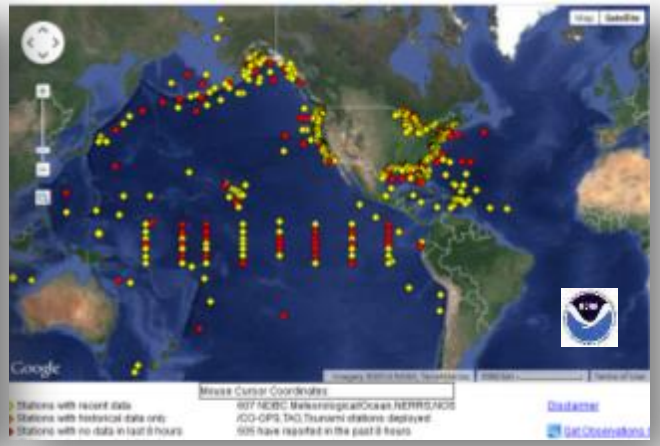


IOOS | EYES ON THE OCEAN™

IOOS - National Backbone

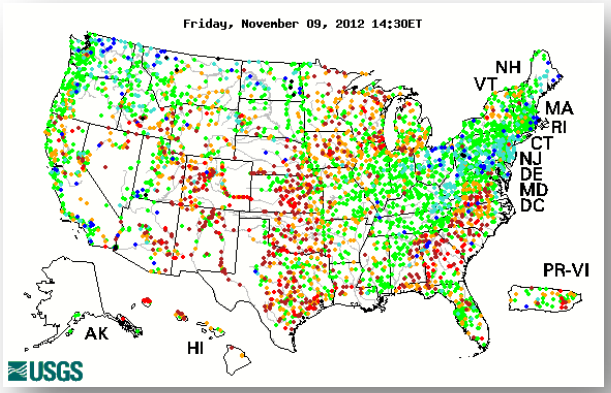


Satellites



Buoys, Water Level Gauges, Coastal and Estuary stations

PORTS®



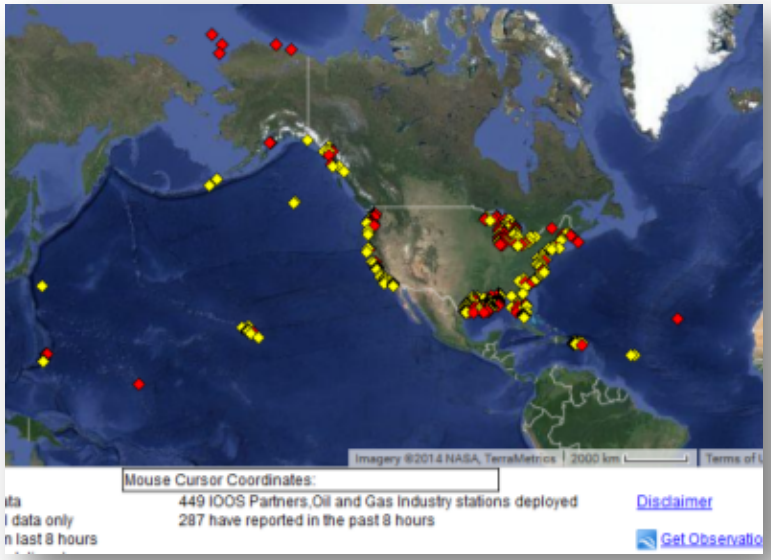
Stream Gauges

Water Quality

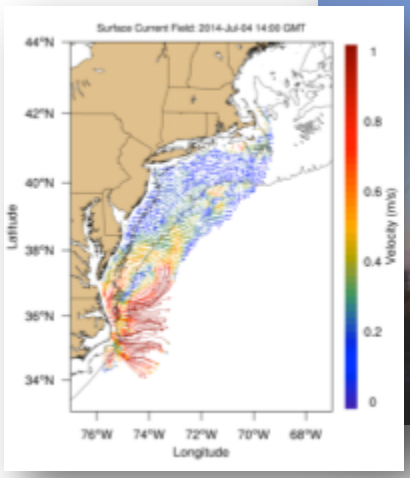
Research Infrastructure

IOOS | EYES ON THE OCEAN™

IOOS – Regional Component



High Frequency Radar



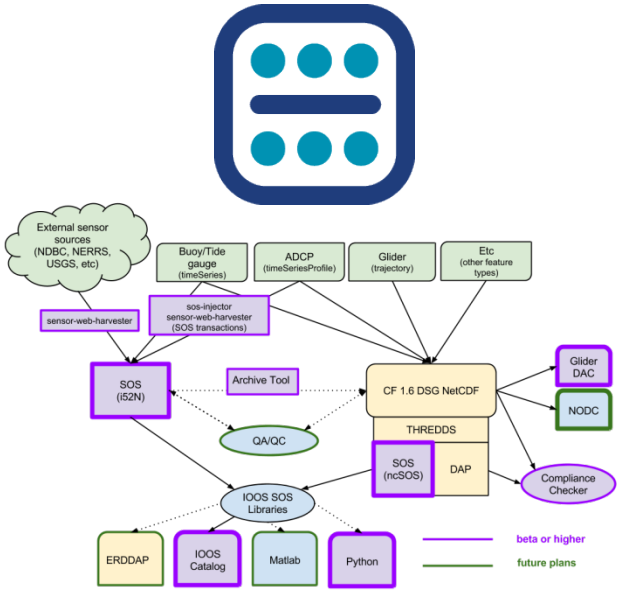
Buoys, Water Level Gauges, Coastal and Estuary stations

Waves

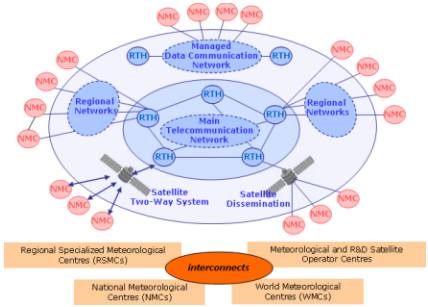
Tagging

IOOS | EYES ON THE OCEAN

Access to Data

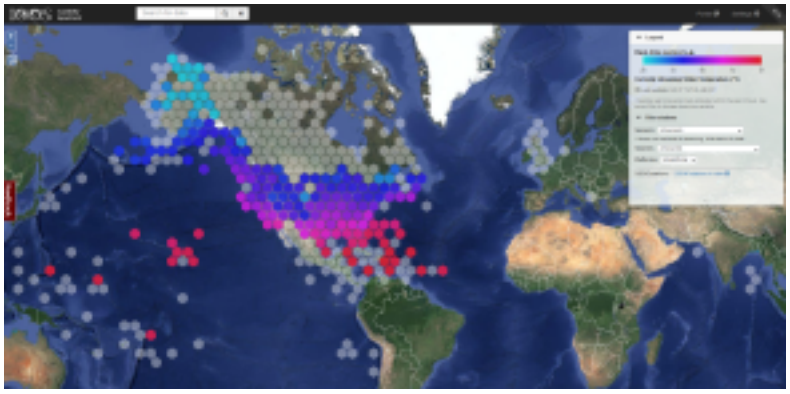


Standards



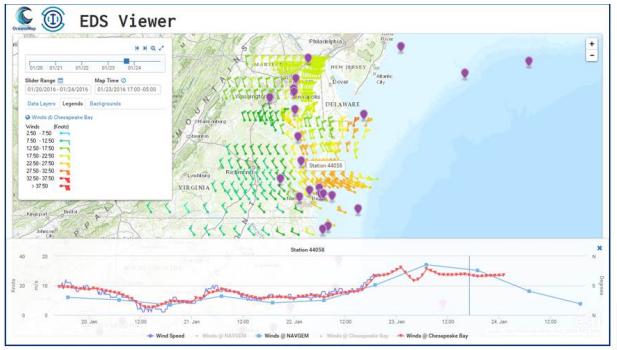
Global Telecommunications System (GTS)

Access on 1 page: loos.us



2 week cache of real-time observations

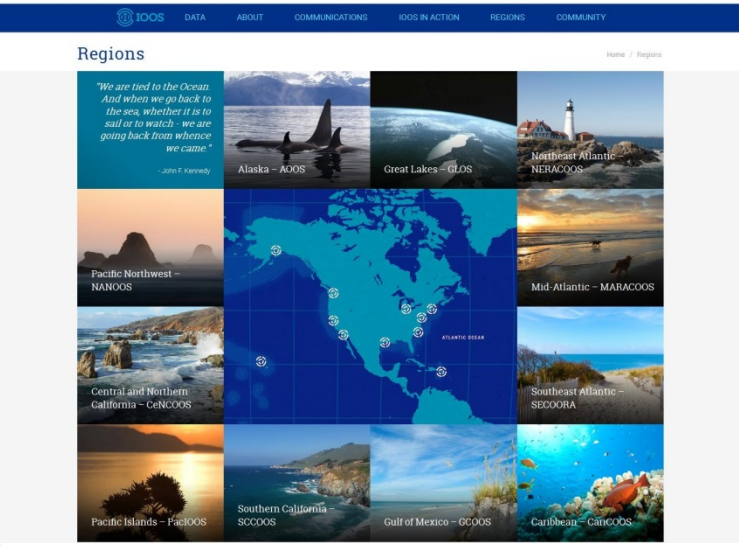
Quality Assurance



Blizzard 2016: CBOFS winds at 1/23 17:00 EST. Time-series of model output and buoy observations (1/20 - 1/23)

Access to model output

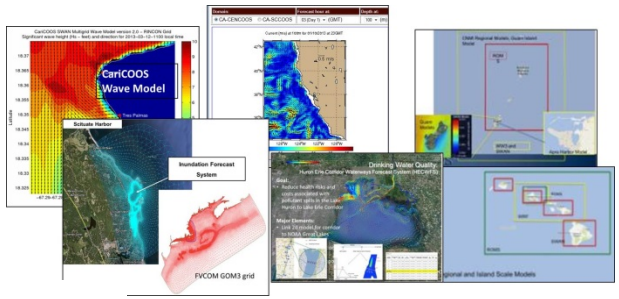
IOOS Regions



11 Regions

Observations

Data Access



Models

Who

- State, Local, Tribal Government
- Profit & non profit industries
- Academia

Education
Outreach

Produce | Integrate | Communicate

IOOS | EYES ON THE OCEAN

Certification

Integrated Coastal and Ocean Observation System Act of 2009 (ICOOS Act)

1. Formal recognition of IOOS Regional Associations
2. Extends **civil liability** coverage for data use
3. Establish minimum criteria for how a RICE operates
4. Adherence to data management best practices
5. Enhance delivery and quality of data and information

Credible – recognize NOAA's responsibility for ensuring data quality and assumption of liability risk

Reasonable – develop program guidelines in accordance with RA capabilities as supported by IOOS Program funding

PacIOOS
PACIFIC ISLANDS OCEAN OBSERVING SYSTEM

great lakes observing system

IOOS | EYES ON THE OCEAN

Functional Components

Alliance for Coastal Technologies (ACT)

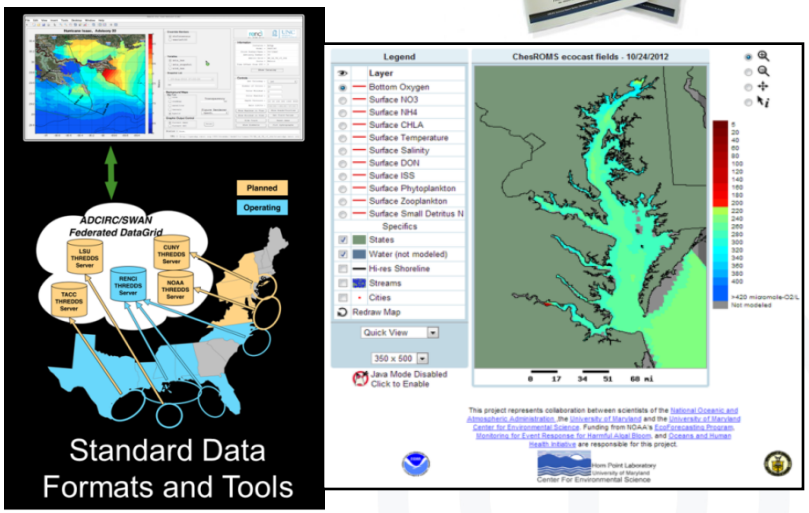
Technology Evaluations, Technical capacity building, and information clearinghouse

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

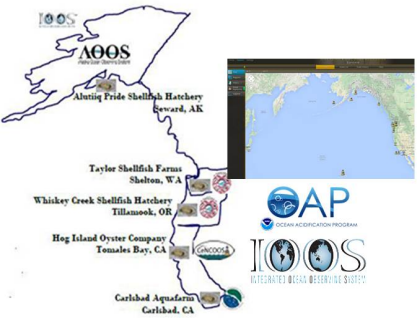


IOOS | EYES ON THE OCEAN

Ocean Technology Transition

Fostering the transition of advanced observing technologies to operations mode.

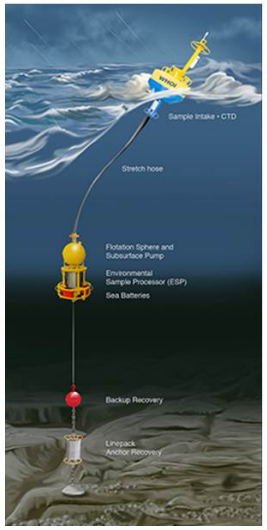
West Coast Ocean Acidification



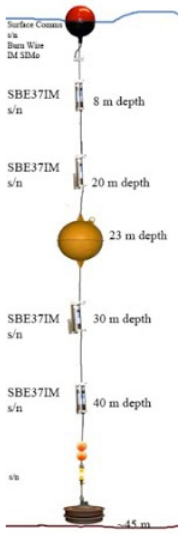
The "Burk-o-lator" – developing low cost OA sensors

Imaging Flow CytoBot in SF Bay – Industry

Harmful Algal Bloom
Gulf of Maine
North west United States



Operational Nutrient Observatory for the Northeastern United States – Industry Partner: WetLabs



Detecting Arctic Freeze Up Real-Time

IOOS | EYES ON THE OCEAN

Marine Biodiversity Observation Network (MBON)

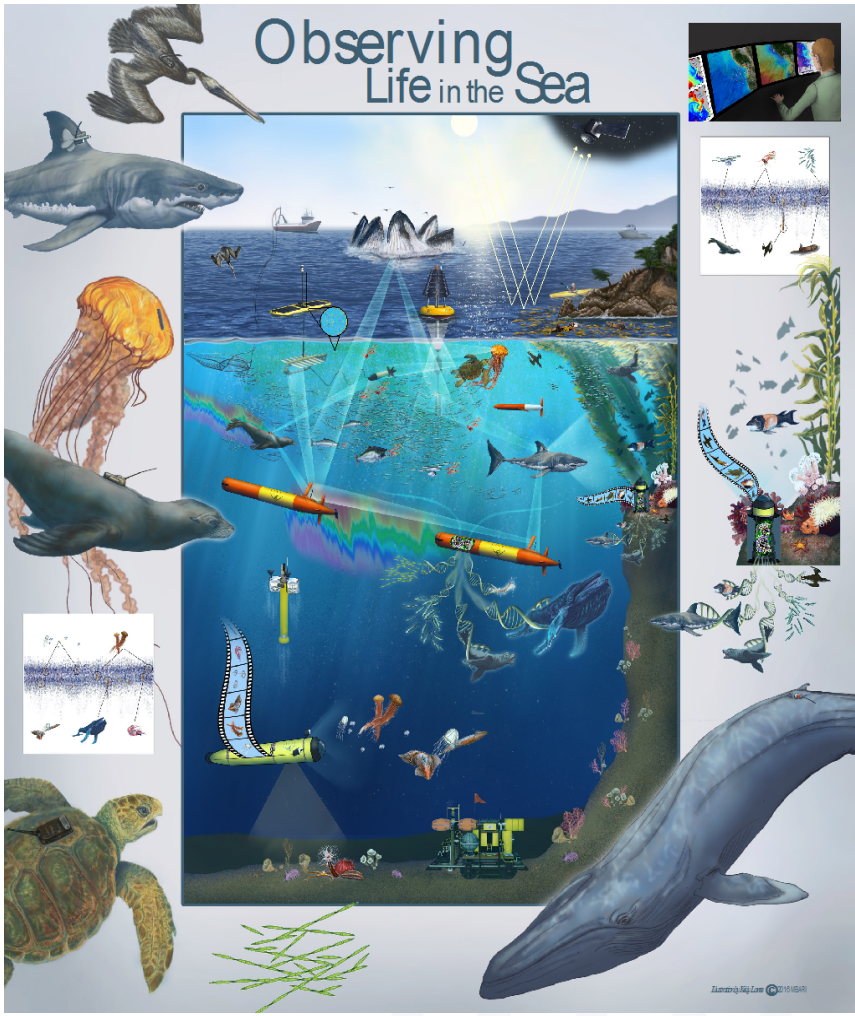
Interagency support:

$15M from NASA, NOAA (IOOS and OER), and BOEM for 5 years (FY14-18)

$2M from Shell to launch Arctic MBON

Demo projects are:

- Integrating existing monitoring
- Filling spatial, taxonomic gaps
- Monitoring "microbes to whales," "in-situ to satellites"
- Exploring technology applications
- Addressing data management
- Building MBON for the Nation
- Creating global MBON (with GEO, GOOS)
- Connecting with the Animal Telemetry Network



Credit: MBARI

MBON Technology Applications

New technologies and methods will lower the cost of observing while increasing space and time and space resolution.

MBON is:

- Refining eDNA methods - large, multi-institution partnership
- Leveraging OAR 'omics work with MBON funds and in-kind (corals, ESP)
- Evaluating technologies for MBON: genomics, acoustics, bio-optical informatics and images, animal tagging, ESP

	Microbes /Phyto	Zooplankton	Fish	Top Predators	Benthos, habitat forming
Optics/ Imaging	X	X	X Benthic		X
Acoustics		X active	X active	X Tags, passive	X active
Genomics	X	X	X	X	X
Platforms with samplers	AUVs, floats, moorings	AUVs, moorings	AUVs, moorings	AUVs, moorings, tags	AUVs, moorings
Data and visualization	X	X	X	X	X

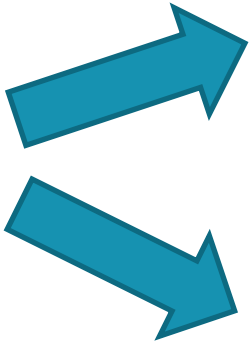
Sustaining MBON

- MBON observes marine life – how it's changing, how it affects us.
- MBON is establishing long-term species status and trends and merging that with environmental information.
- MBON informs understanding of impacts from climate, ocean acidification, and human activity to species we depend upon.
- MBON directly supports:
  - Understanding biological impacts from ocean acidification, climate change
  - Management of National Marine Sanctuaries and marine protected areas
  - Protection of shallow and deep-water corals
  - Ecosystem-based science and management, including Integrated Ecosystem Assessments

Private and federal funding is needed to sustain MBON.

Global Participation

IOOS
Integrated Ocean Observing System



The Global Ocean Observing System

GEO GROUP ON EARTH OBSERVATIONS

Questions

Enables decision making

Fosters Advances in Science and Technology

https://ioos.noaa.gov

https://www.facebook.com/usioosgov

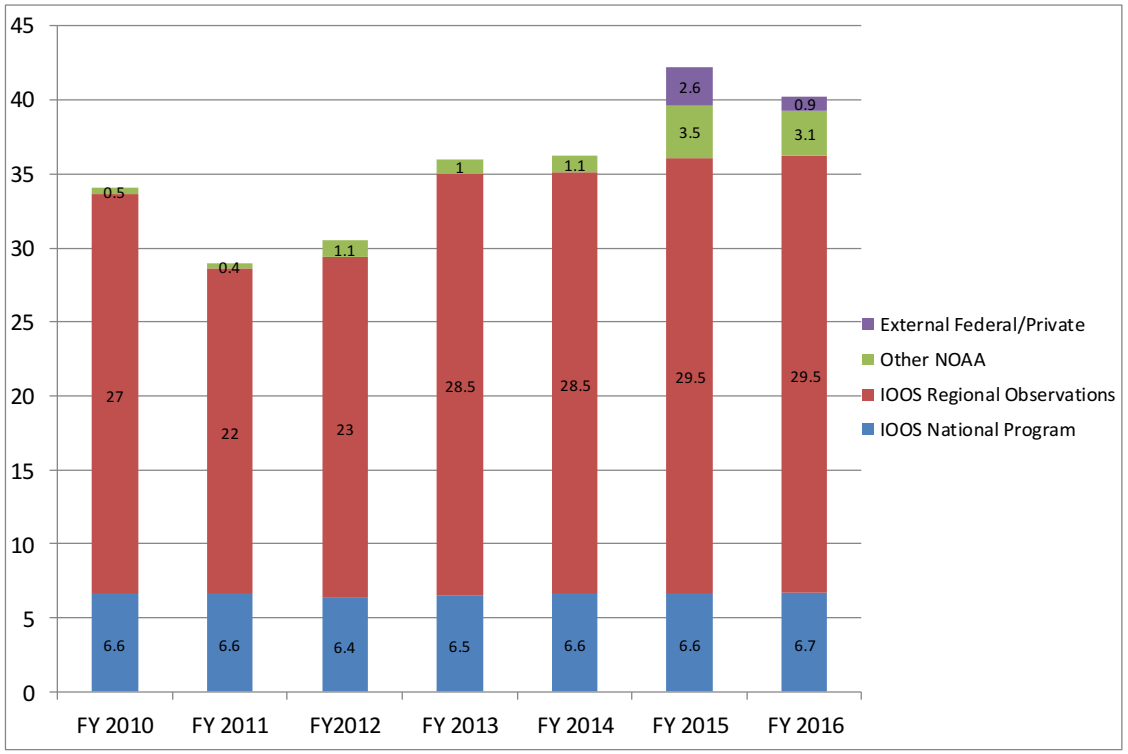
@usioosgov

IOOS | EYES ON THE OCEAN™

Programmatic - 2016

Budget History FY10-FY16

$ in M



IOOS Office Primary Roles:

Provide Programmatic Leadership

Foster Operational Capability

Forge Robust Partnerships

Champion Regional and Stakeholder Interests

U.S IOOS By The Numbers

17
Federal Partners
Providing a Federal Backbone for IOOS

11
Regional Associations
Observing Assets and Data Feeds

1
Alliance for Coastal Technologies
A partnership supporting sensor evaluation and verification

1
Coastal Ocean Modeling Testbed
COMT - a conduit for research models to transition to operations

1
Marine Biodiversity Observing Network
MBON integrates marine biodiversity and ecosystem data

697
National Platforms
Buoys, Water level guages, Coastal and Estuary stations at the National level

254
Regional Platforms
Buoys, Water level guages, Coastal and Estuary stations at the Regional level

9
Ocean Technology Transition Projects
OTT supports transition of marine sensors to operations

15
Animal Telemetry Projects
Providing data on animal responses to the ocean and environment

140
HF-Radar Installations
High-Frequency Radar measures speed & direction of ocean currents

41,820
Glider Days
1 Glider in the water collecting data for 1 day

8
QARTOD Manuals
Realtime Oceanographic Quality Assurance

>15,000
Datasets
Oceanographic Datasets available in the IOOS Catalog

42
Servers
Top-level domains hosting data access

1
IOOS
Integrated Ocean Observing System

IOOS is a Team Sport

Interagency
Oversight IOOS
Task Teams

Programmatic
Operational Capacity
Partnerships
Champion Regional

Congress
OMB
Sponsor Events
RA Coordination

Official Advice
Recommendations

U.S. Integrated Ocean Observing System (IOOS®)

Policy Neutral, Stakeholder driven, Scientifically based