

# Introduction to the National Ocean Service



National Ocean Service

# NOS Mission

Provide science-based solutions through collaborative partnerships to address evolving economic, environmental, and social pressures on our Great Lakes, ocean, and coasts.





# NOS Organization

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**Office of National Marine Sanctuaries**  
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**Office of Response and Restoration**  
Scott Lundgren

**U.S. Integrated Ocean Observing System Program**  
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# NOS Strategic Goals

- Increase U.S. Coastal Resilience
- Make Equity Central to Our Mission
- Accelerate Growth of the Ocean Enterprise and the Blue Economy
- Conserve, Restore, and Connect Healthy Coastal and Marine Ecosystems





# NOS Program Offices



National Ocean Service

- Center for Operational Oceanographic Products and Services
- U.S. Integrated Ocean Observing System
- National Centers for Coastal Ocean Science
- National Geodetic Survey
- Office for Coastal Management
- Office of Coast Survey
- Office of National Marine Sanctuaries
- Office of Response and Restoration

# Navigation, Observations and Positioning

## Center for Operational Oceanographic Products and Services (CO-OPS)

### Services

- National Water Level Observation Network (NWLON)
- Physical Oceanographic Real-Time System (PORTS®)
- Operational Forecast Systems & Marine Channel Forecast Systems
- National Current Observation Program
- Coastal Flood Predictions

### Products

- Tide and tidal current observations and predictions
- U.S. sea level trends
- Tidal datums and Great Lakes datums – coastal mapping/charting
- Monthly and Annual High Tide Flooding Outlooks
- Coastal Inundation Dashboard

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

### Services

- Coordination and integration of national coastal, ocean, and Great Lakes data
- Data management and cyberinfrastructure
- Coastal and Ocean Modeling
- Ocean Technology development & deployment
- Biodiversity data & information
- Ocean Enterprise team

### Products

- IOOS.us toolbox
- High Frequency Radar
- QARTOD
- Ocean Enterprise Study

## National Geodetic Survey (NGS)

### Services

- National Spatial Reference System with Modernization coming in 2025
- Coastal Mapping Program (shoreline)
- Aeronautical Survey Program
- Geodetic Research

### Products

- GNSS and GPS Data (CORS data and OPUS)
- Remote sensing data (shoreline and emergency response)
- Geodetic datasheets
- Gravity data and models

## Office of Coast Survey (OCS)

### Services

- Navigation response
- Regional navigation support
- Technology research and development
- Surge and Tide Operational Forecast Systems
- GIS data and services
- Development of international standards and requirements

### Products

- Electronic navigational charts and viewer
- Nautical publications
- Hydrographic survey data
- nowCOAST
- Precision Marine Navigation

# Coastal Resilience, Coastal Zone Management, Coastal Ocean Science, and Coastal Conservation

## National Centers for Coastal Ocean Science (NCCOS)

### Services

- HAB monitoring and detection
- Detection, quantification, and chemical contaminant monitoring
- Habitat mapping and ecological assessments, aquaculture and Offshore Wind (OSW) siting
- Evaluation of nature-based solutions
- Extramural funding - Competitive Research Program and RESTORE Science Program

### Products

- Mussel Watch Program
- Ecological forecasts for HABs, Hypoxia, and Pathogens
- Spatial Planning Tools
- Wave Exposure Model

## Office for Coastal Management (OCM)

### Services

- Coastal Zone Management Program
- Coral Reef Conservation Program
- National Estuarine Research Reserve System
- Bipartisan Infrastructure Law Grants
- Climate Resilience Regional Challenge

### Products

- Digital Coast
  - Data – Elevation, economic, land cover
  - Tools - Visualization, modeling, decision support
  - Training – Natural infrastructure, risk communication, climate adaptation, blue economy

## Office of Response and Restoration (OR&R)

### Services

- Oil Spill response
- Emergency Response
- Assessment and Restoration
- Marine Debris,
- Disaster Preparedness Program

### Products

- GNOME
- ERMA
- Environmental Sensitivity Index (ESI) maps and data
- Web CAFE
- Response System Planning Tools
- DIVER (Data Integration, Visualization, Exploration, and Reporting) tool

## Office of National Marine Sanctuaries (ONMS)

### Services

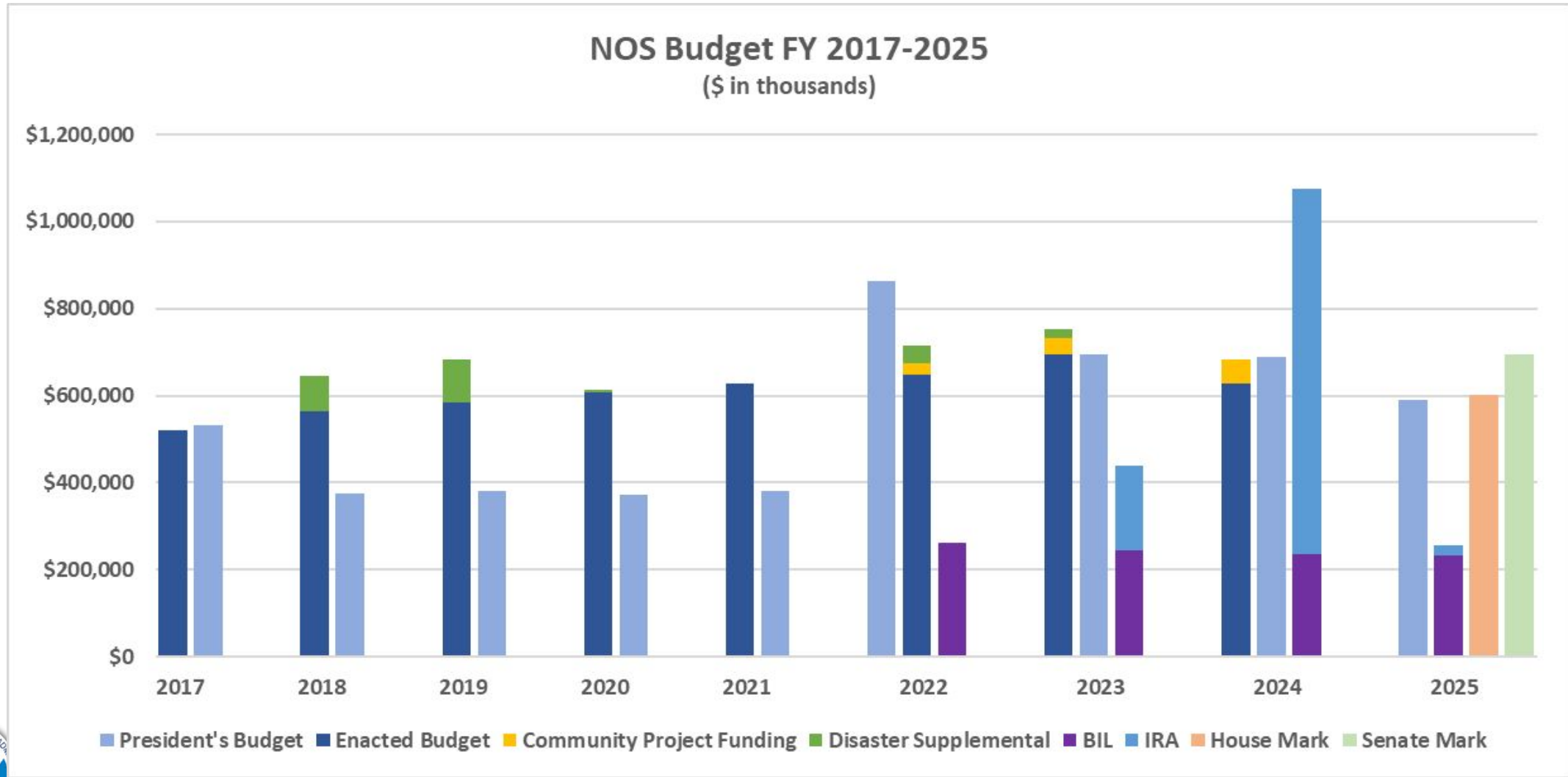
- Natural and maritime heritage resource protection and conservation
- Natural and maritime heritage science and monitoring
- Education and stewardship programs
- Volunteer programs

### Products

- Management plans
- Conservation Science Series
- Education curricula and training
- Outreach products, visitor centers, exhibits

# Budget

NOS Budget FY 2017-2025  
(\$ in thousands)





# U.S. Integrated Ocean Observing System (IOOS) 101



# What is U.S. IOOS?

U.S. IOOS is a cooperative, coordinated network of federal and non-federal observing networks since 2009.



Thousands of observing data sets gathered every day by public and private programs

Integrated, made accessible, & supported U.S. IOOS

Supporting weather forecasting, maritime safety, and ocean and public health

# U.S. IOOS: Program Overview

## Authorizing legislation

Integrated Coastal Ocean Observing System (ICOOS) Act (P.L. No 111-11, March **2009**)

Coordinated Ocean Observations and Research Act (P.L. No 116-271, December **2020**)

It is time for reauthorization of ICOOS Act (**Early 2025**)

## Mission Areas

Predicting Weather & Climate variability

Safe and Efficient Transportation and Commerce

Preparedness, Risk Reduction, and Resilience for Coastal Communities

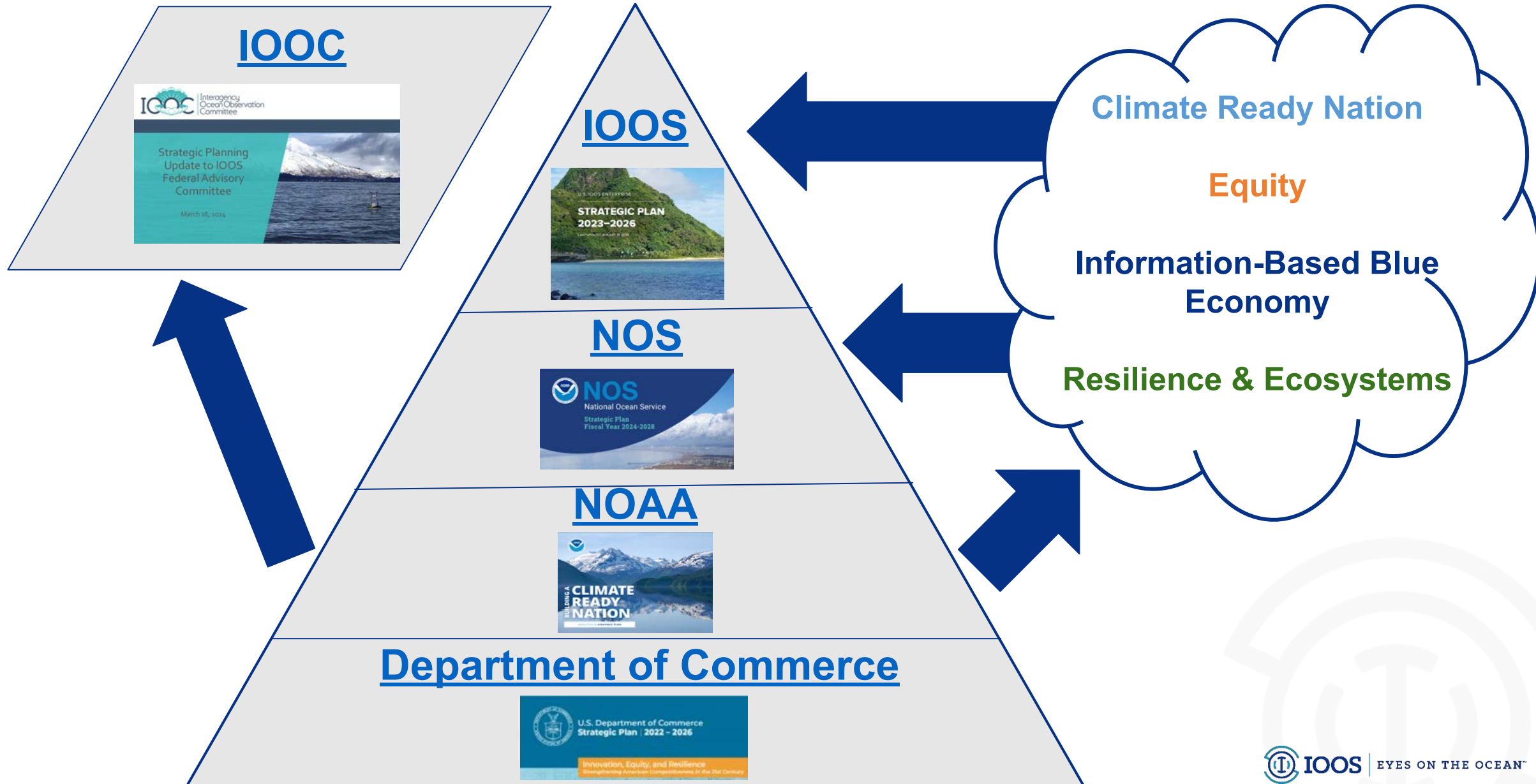
Healthy ecosystems and water quality

Supporting Decisions Every Day!





# Strategic Alignment



# FY 2025 IOOS Office Priorities

**Coastal, Ocean, & Great Lakes Observing, Predicting, and Informing**  
Continue delivering, diversifying, enhancing, and increasing accessibility of IOOS products and services for all Americans to meet customer needs

## Coastal and Ocean Data & Services



Photo credit: Dennis Wise, UW

Core observing and data management to deliver **sustained IOOS observations and services**

## Improved Coastal Resilience including coastal modeling/predictions



Photo Credit: John Cannon

Enhance ecological forecasting supported by observing, science, and **service delivery.**

## Economic Development

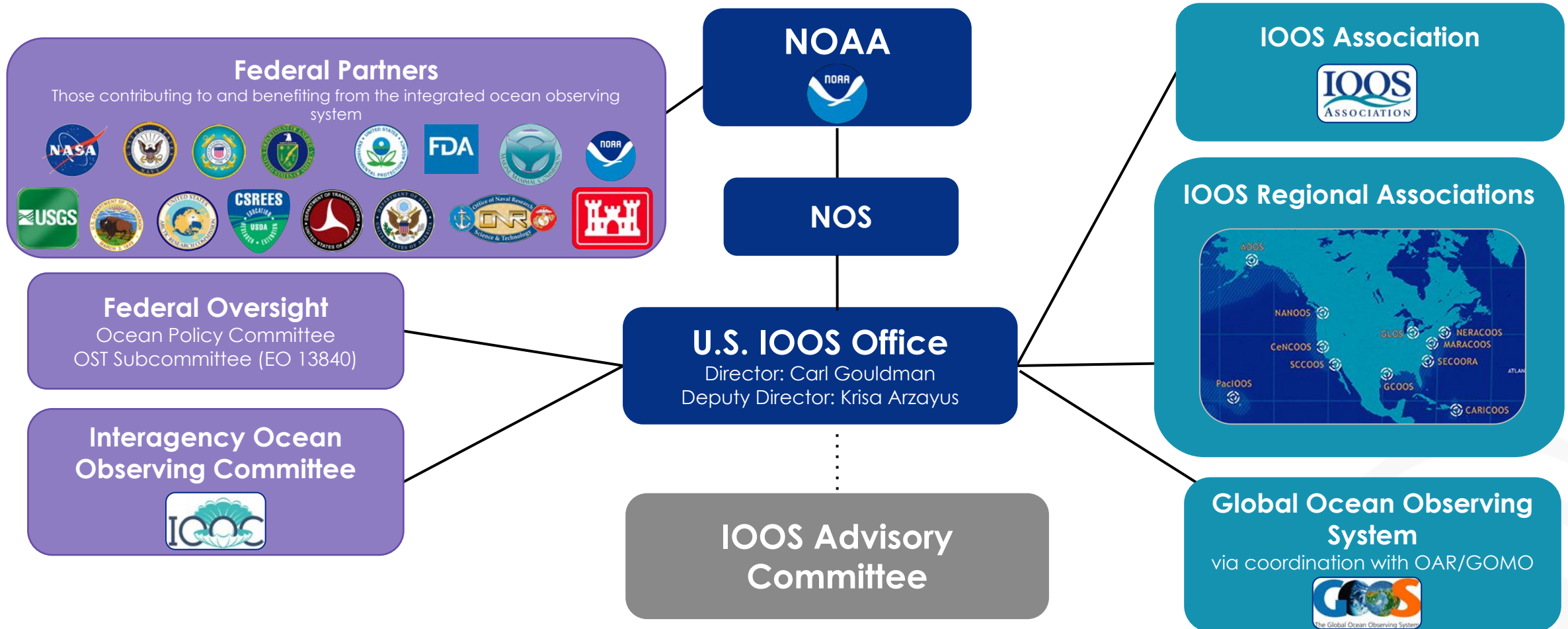


A healthy blue economy and growing **“ocean enterprise”** and services in the face of coastal hazards—including workforce development.

# The IOOS Enterprise

## WHO/WHAT IS THE IOOS ENTERPRISE?

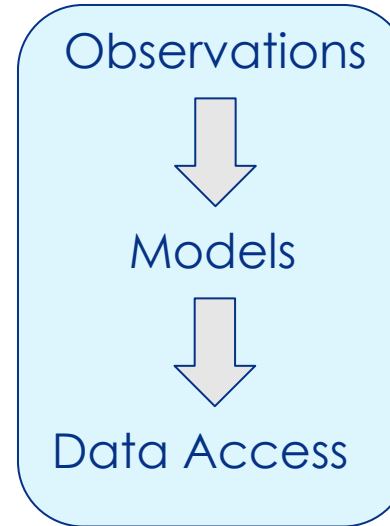
A cooperative, coordinated network of federal and non-federal observing networks since 2009



Legend: Federal (purple) and non-federal (teal)



# U.S. IOOS Regional



- State, Local, Tribal Governments; profit & non profit industries; and academia
- Connection from the national backbone to regional stakeholder needs
- Certified RAs expand available federal data resources for all users
- The national HFR network is unique to the System and has over 150 radars throughout the coastal U.S. and Caribbean

## Connections:

- Reg. Ocean Partnerships (ROPs)
- Office for Coastal Mgmt.
- Weather Act I & II

# U.S. IOOS Global

THE GLOBAL EARTH OBSERVATION SYSTEM OF SYSTEMS



Building a global observing system, providing leadership in high-frequency radar, and furthering the Blue Planet initiative.

GEO BON

Ameri  
GOOSS

GEO  
BLUE PLANET

MBON  
Marine Biodiversity  
Observation Network



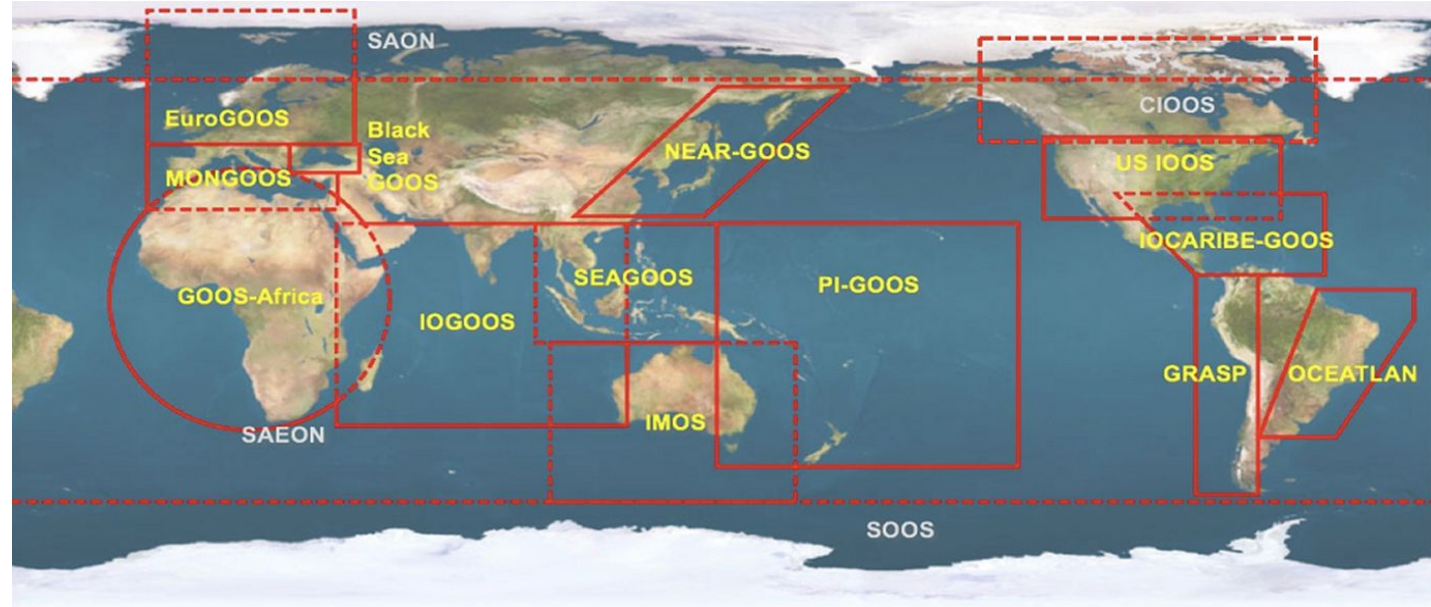
United Nations  
Educational, Scientific and  
Cultural Organization



Intergovernmental  
Oceanographic  
Commission



2021  
2030 United Nations Decade  
of Ocean Science  
for Sustainable Development



IOOS is the U.S. contribution to GOOS. 61% of the Global Climate Ocean Observing System completed



# Our primary (but not only!) observing assets...

IOOS supports a national high-frequency radar network as well as providing for operation and maintenance of observing assets in U.S. coastal & territorial waters.

Fixed Moorings & Buoys



HF Radar



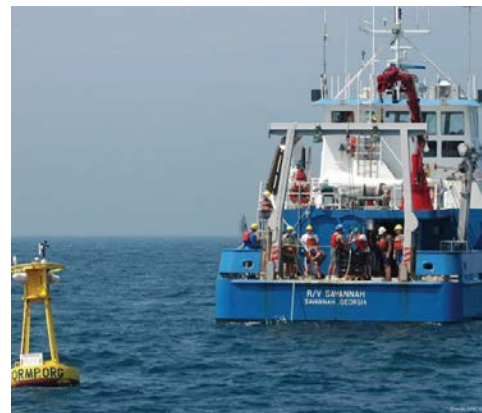
Shore Stations



Animal Borne Sensors



Sub-surface gliders



Ships



Water Levels



# ...what we do with that data (and how to access it!)



**Regional Portals:** 11 RA portals integrate data at a local level and provide tailored products for stakeholders



**Program portals & data assembly centers:** gliders, animal telemetry, high-frequency radar, and more!



[ioos.us](http://ioos.us)

a central portal of portals

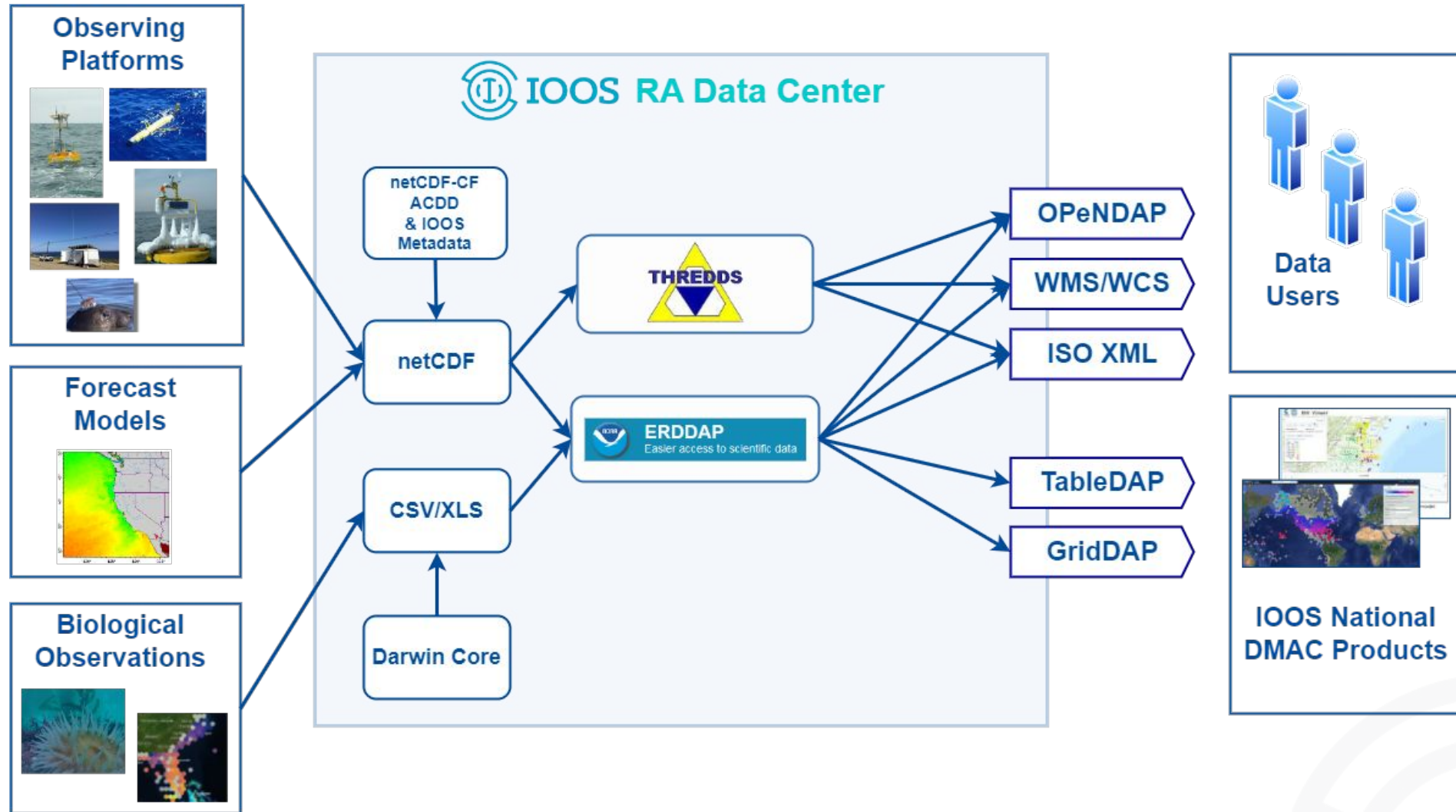


**Sensor Map:** a 2 week cache of real-time observations from 108 providers



**IOOS Model Viewer:** Visualize and access model hindcast/forecast information and compare to observations

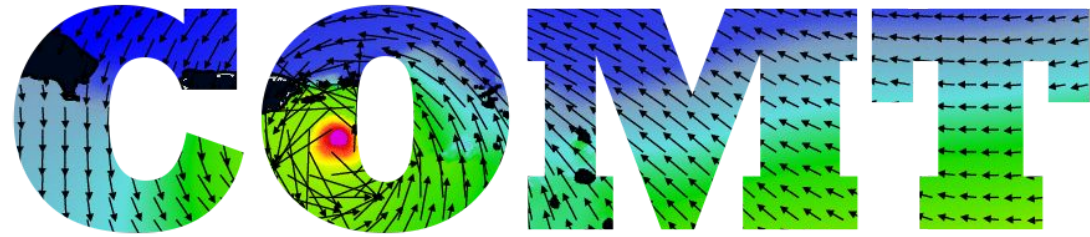
# Generic RA Data Center/DMAC Present Day Architecture



IOOS' 11 RAs operate independent DMAC systems implementing standard baseline interoperable data formats and services, feeding data to both regional and national users.



...and how we promote innovation



**MBON**

Marine Biodiversity  
Observation Network

**OCEAN TECHNOLOGY  
TRANSITION**

**Ocean Enterprise Accelerator  
Program**



**Animal Telemetry  
Network**



# National Harmful Algal Bloom Observing Network (NHABON)

| Year | Award  | # Pilot Projects | # RAs Involved |
|------|--------|------------------|----------------|
| FY20 | \$1M   | 5                | 6              |
| FY21 | \$1.5M | 7                | 8              |
| FY22 | \$2.5M | 10               | 11             |
| FY23 | \$3.0M | 9                | 11             |
| FY24 | \$3.5M | 9                | 11             |

NOAA (IOOS and NCCOS) has drafted a **NHABON Implementation Plan** for Congress

- **Goal:** *Integrate existing assets and research efforts across NOAA into a more formal national observing network*





# DEFINITIONS

NOAA recently authored a paper to provide definitions for terminology related to ocean and coastal economic activity, including:

- **Ocean Economy.** The sum of the economic activities of ocean-based industries, together with the assets, goods and services provided by marine ecosystems.
- **Blue Economy.** The sustainable, equitable and socially inclusive use of ocean and Great Lakes resources to benefit economies, livelihoods, and ecosystem health.
- **Ocean Enterprise.** All entities in the public, private, non-profit, research and academic sectors that provide infrastructure and capacity for ocean observation, measurement and forecasting, or who deliver operational ocean information products and services.



Link to: "Terminology Related to Ocean and Coastal Economic Activity"



# The Ocean Enterprise Study 2015–2020

The Ocean Enterprise Study  
2015 – 2020

A study of U.S. New Blue  
Economy business activity




**Objective:** Understand the scale and scope of U.S. New Blue Economy business activity and how this has changed since 2015.

## 2015

  
**514**  
companies

**36**  
states

  
**245,000**  
employees

  
**\$7.1B**  
annual revenue



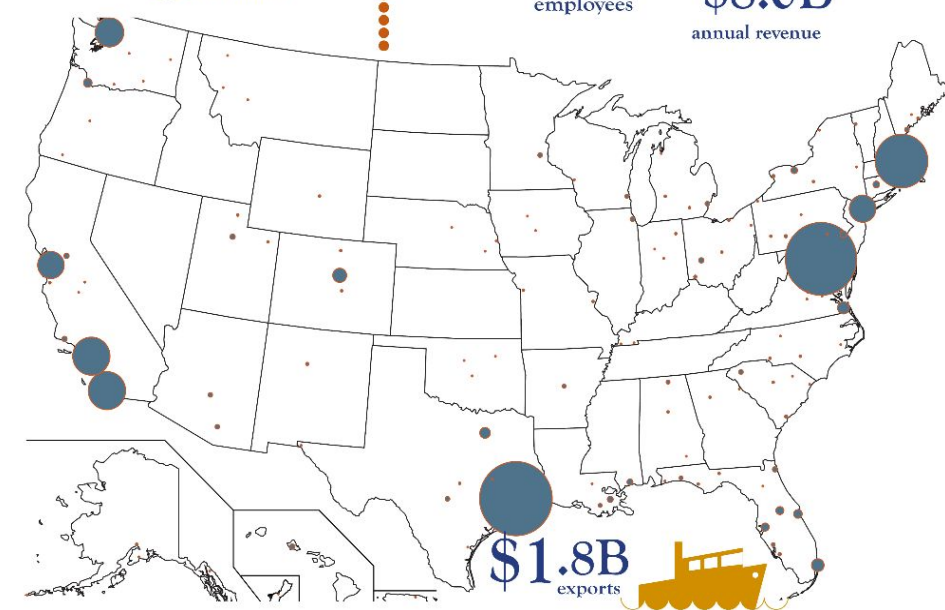
## 2020

  
**814**  
companies

**45**  
states

  
**325,000**  
employees

  
**\$8.0B**  
annual revenue







## NOAA and the Ocean Enterprise



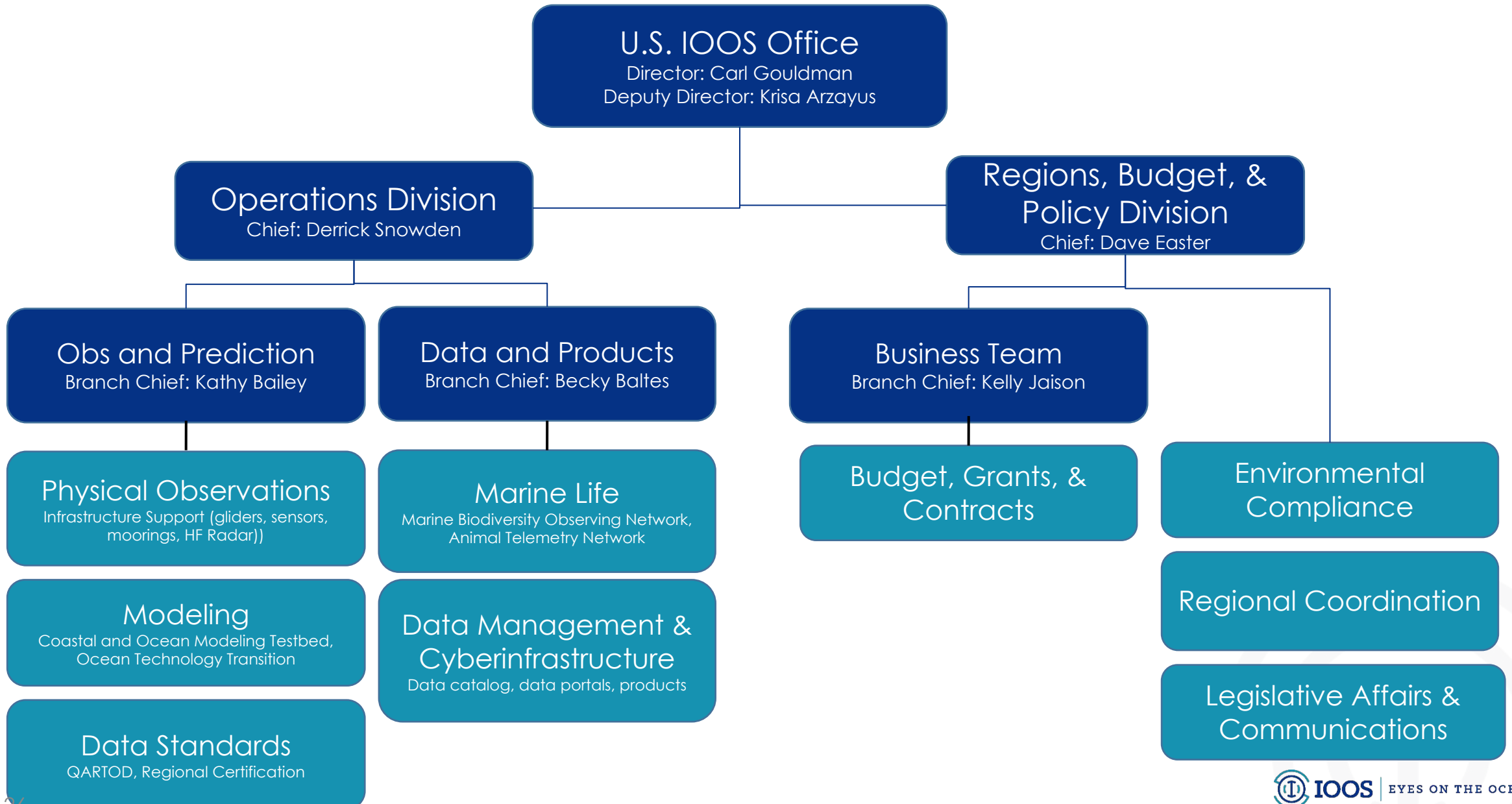
## Benefits of Ocean Observing Catalog





# Backup Slides

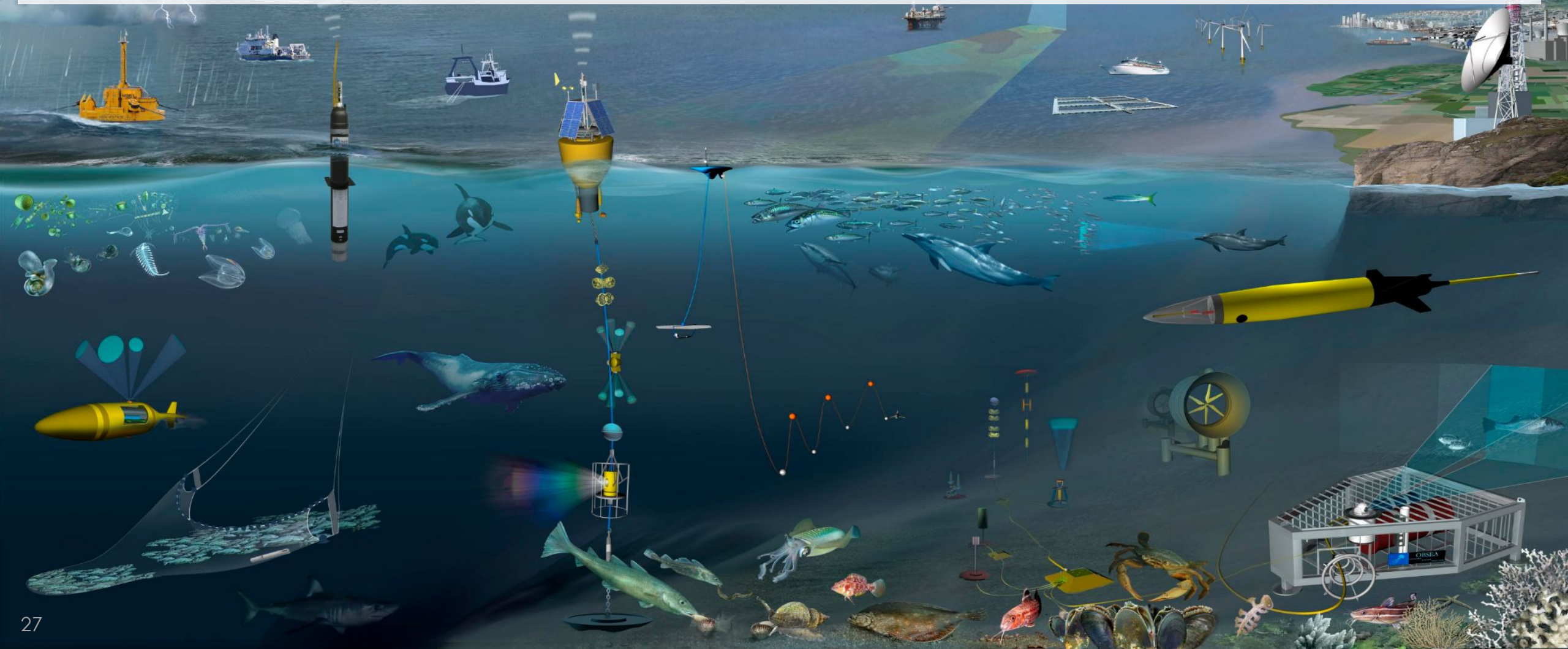
# Who we are





# NOAA's New Blue Economy Vision

A sustainable and equitable ocean and coastal economy that optimizes advances in science and technology to create value-added, data-driven economic opportunities and solutions to pressing societal needs.



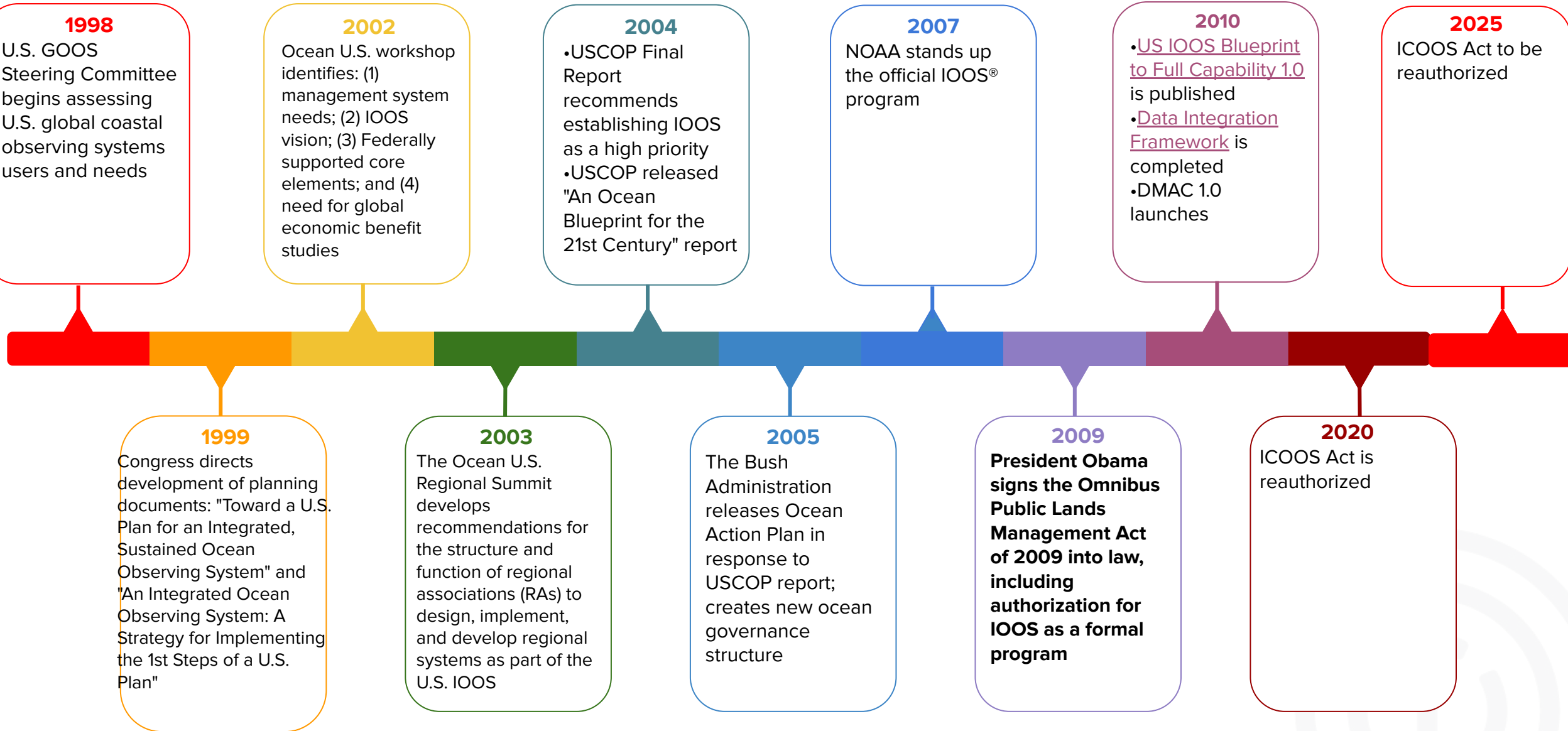


# National Ocean Service: Accelerating Growth of the Ocean Enterprise and the Blue Economy

- ❖ Ocean Enterprise Initiative
- ❖ Benefits of Ocean Observing Catalog (BOOC)
- ❖ Ocean Enterprise Study 2025
- ❖ NOAA Ocean-Based Climate Resilience Accelerators



# HOW DID WE GET HERE?







# The Global Ocean Observing System

GOOS unifies national observing systems to meet national needs, strengthen connections through learning and sharing, and make a greater set of ocean observations available to a global community.

Our Regional Alliances (GRAs) integrate these national needs into regional systems and deliver the benefits of GOOS's strategy, structure, and programmes at a regional, national and finally global level.

- GRAs are coalitions of nations and/or institutions that share GOOS principles and goals, but are mostly concerned with local priorities and organized around ocean basins or coastal environments.
- Different regions of the globe are represented by 15 GRAs, emphasizing regional priorities, differing by need, resources and culture. These interact with each other to learn and share best practice in implementing observing systems.
- Some GRAs emphasize data sharing or regional capacity development. Others are building out extensive observation systems with dedicated marine service goals such as oil spill response capabilities or typhoon forecasting.



# The Benefits of Ocean Observations Catalog

incorporate use cases



tag to relevant categories



create a searchable database



query to generate focused reports



# UN DECADE PROJECTS

## OCEAN OBSERVING CO-DESIGN

By 2030, this project will have the tools in place to allow funders to target investments for the optimal societal benefits

## OBSERVING TOGETHER

Transforming the availability and accessibility of ocean data by supporting community to national scale projects

## OCEAN PREDICT

In the coming decade, Ocean Predict will advance ocean prediction science and increase capacity in an ever-increasing international operational oceanography context

## BENEFITS OF OCEAN OBSERVING CATALOG

Illustrating the ways in which different types of ocean information delivers benefits in a region or for a type of use

