

IOOS FAC: *Fill the Gaps*

Josie Quintrell
IOOS Association

08/5/2020

AOOS
Alaska • aoos.org

NANOOS
Northwest • nanoos.org

CeNCOOS
Central/Northern California • cencoos.org

SCCOOS
Southern California • sccoos.org

PacIOOS
Pacific Islands
pacioos.org

GLOS
Great Lakes • glos.us

IOOS Headquarters ★
(NOAA)

GCOOS
Gulf Coast
gcoos.org

NERACOOS
Northeast • neracoos.org

MARACOOS
Mid-Atlantic • maracoos.org

SECOORA
Southeast • secoora.org

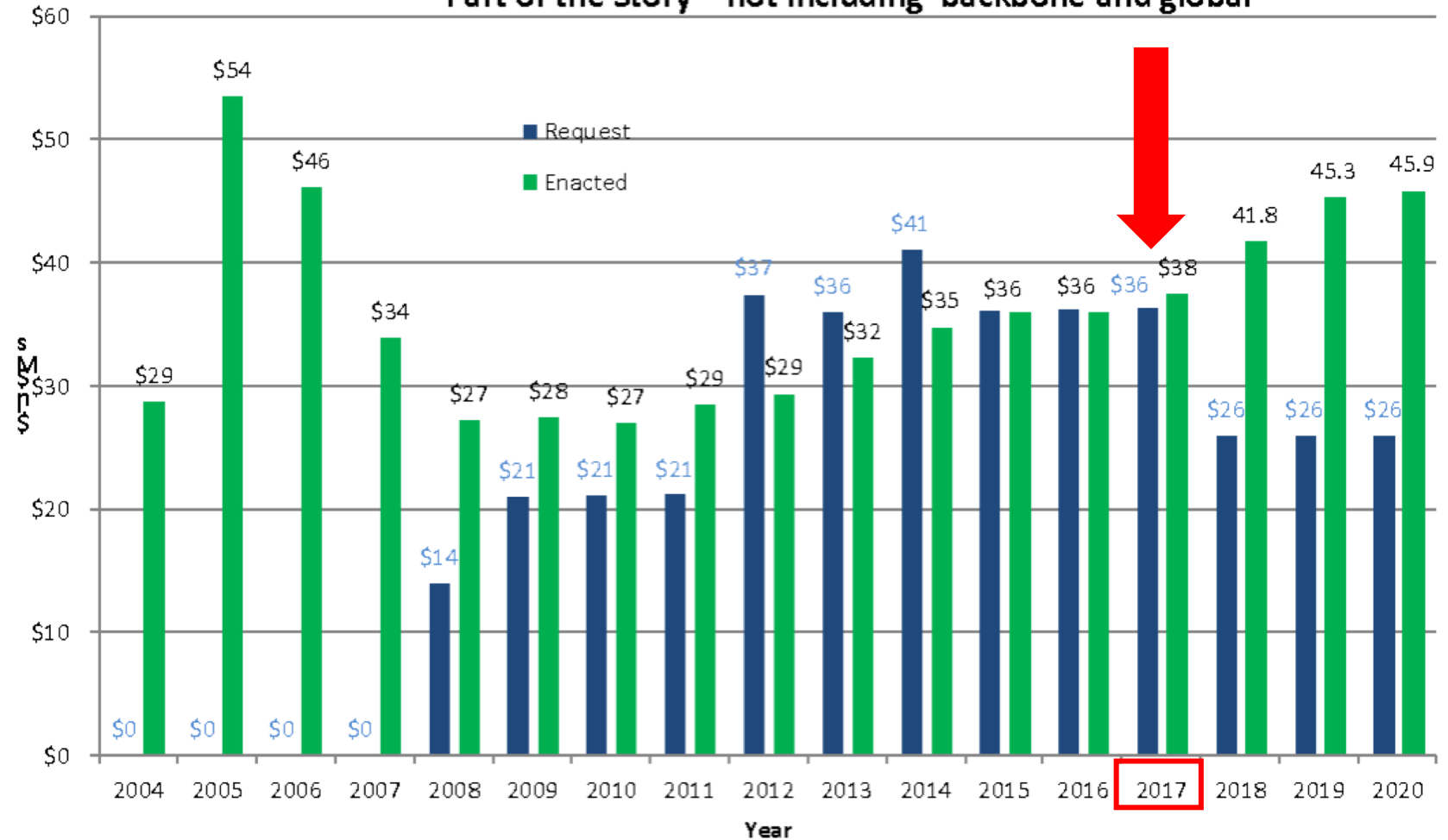
CARICOOS
Caribbean
caricoos.org

IOOS
ASSOCIATION

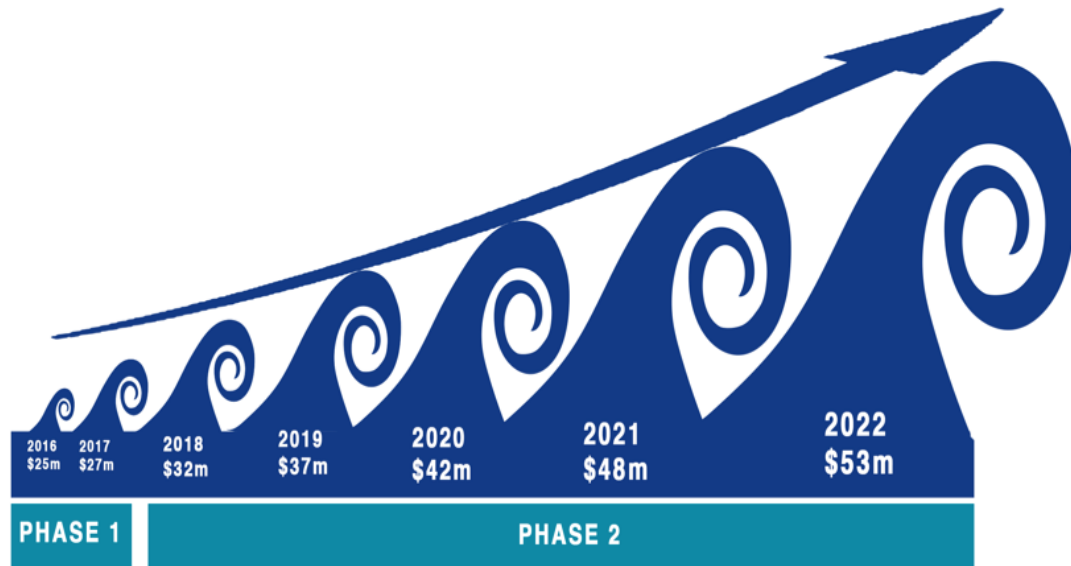
U.S. IOOS Enacted and President's Budgets FY04-20

- NOAA National Ocean Service - Navigation, Observations, and Positioning: 'National IOOS' component FY20 Omnibus \$6.9M & 'Regional IOOS Observations' \$39M
- Gaps Campaign started in FY17

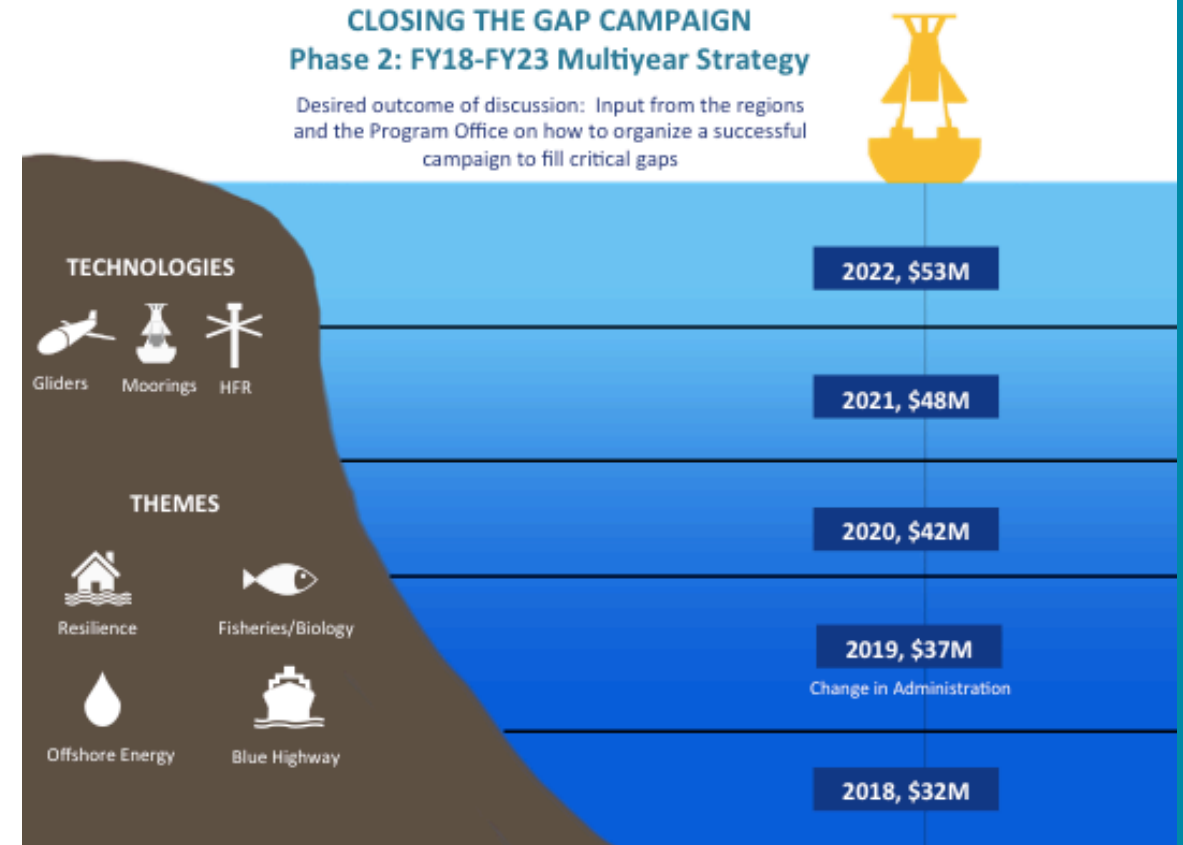
NOS IOOS Request & Appropriation History
Part of the Story – not including 'backbone and global'



IOOS Association: Fill the Gaps Congressional Campaign



- Scalable campaign
- Tangible outcomes
- Align with Administration Priorities
- Filling targeted gaps in:
 - HR Radars
 - Gliders
 - Streamlining observations



US IOOS FY 17 High Frequency Radar Request

\$3.1 million to install 12 high frequency radar systems



Safeguarding the Arctic Marine Highway

2 remote radars needed



Protecting Lives and Public Health in the Pacific Northwest

3 radars needed



Cleaning up the Great Lakes

3 radars needed



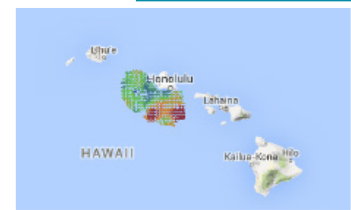
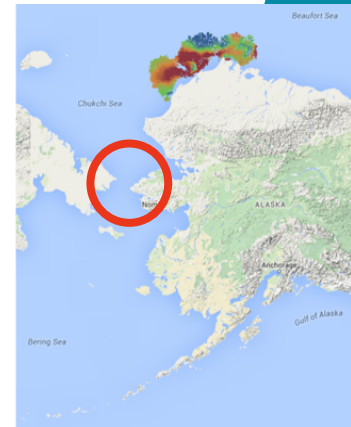
Saving Lives off Florida's Coast

2 radars needed



Saving Millions in the Gulf of Mexico

3 radars needed



FY 17-21 Request:

Scalable requests
each year for HFR,
Gliders based on
regional needs

From 2017-20:
Increase ~\$8.5M



MAPPING SURFACE CURRENTS
Saving Lives, Protecting Health & Commerce

Search and rescue, oil spill response, harmful algal bloom tracking and forecasting, water quality monitoring, and port and harbor navigation all depend on real-time surface current mapping. IOOS operates our nation's only network of high-frequency radars (HF radars) providing this information. Despite the far-ranging use of this data, there are critical gaps in coverage.

WHAT ARE HIGH-FREQUENCY RADARS?

Land-based HF radar uses radio-wave backscatter to map the speed and direction of surface currents in real time. Because of the large coverage area, HF radar data are also valuable input for ocean models and for assisting with search and rescue operations and oil spill response.



Map of IOOS high-frequency radars that provide real-time surface currents.



For more information, contact
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IOOS
Integrated Ocean
Observing System
An interagency Federal-regional partnership in
NOAA's National Ocean Service



Seeing Underwater with Coastal Gliders
Saving Lives, Protecting Health & Promoting Commerce

IOOS gliders provide data to support a range of operations including improving hurricane warnings, detecting harmful algal blooms, ensuring safe navigation, supporting offshore energy operations, fishermen and fisheries management and enhancing public health and safety.

Gliders are underwater robots that relay information about subsurface conditions. The U.S. Navy estimates gliders are 1/100th of the cost of ship-collected data. Gliders are revolutionizing ocean observing by being cost effective, safe and flexible.

IOOS FY 18 GLIDER REQUEST: \$3.3m

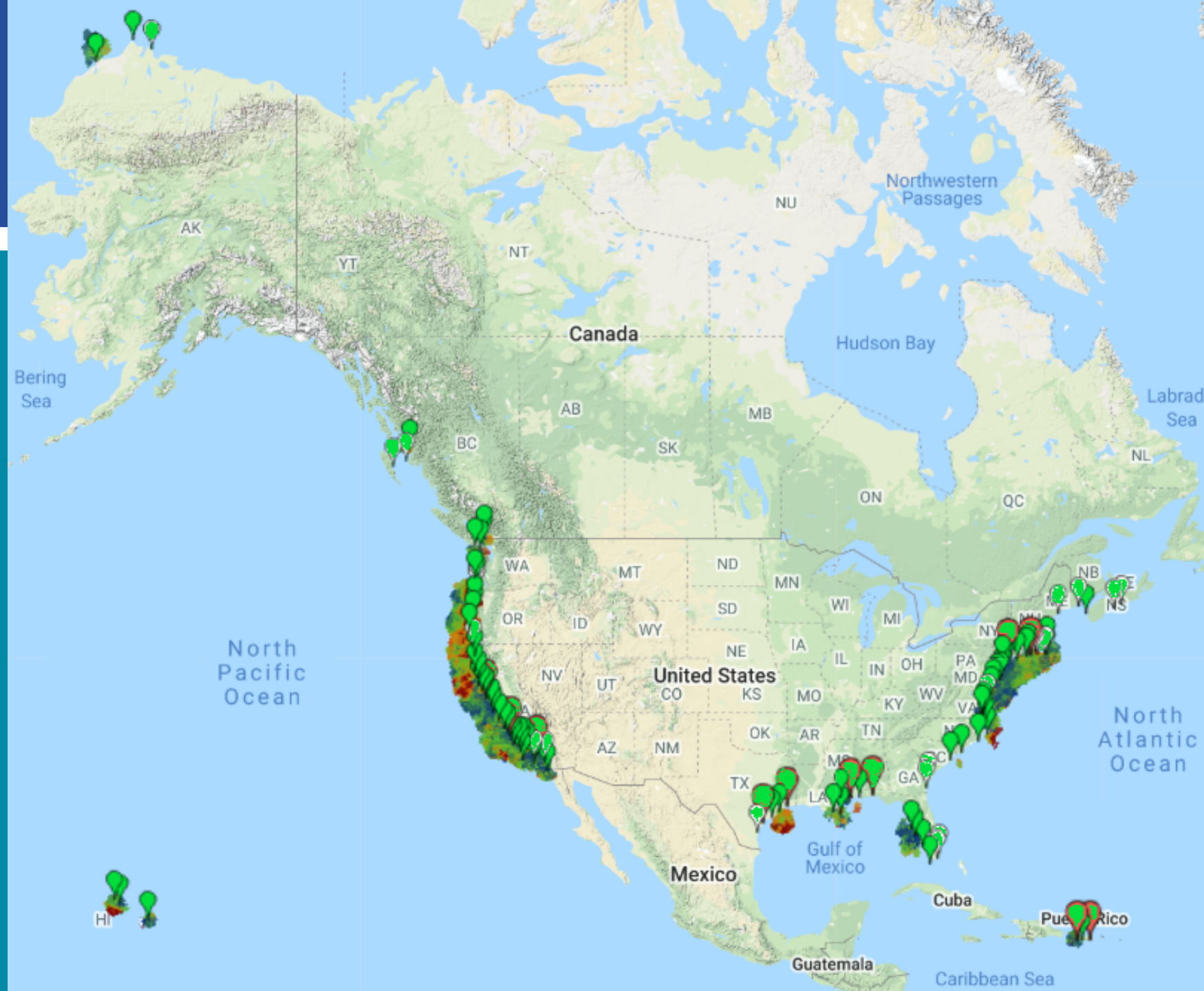
Where our nation needs gliders to support safe navigation, public health and safety, and the economy:

-  **Great Lakes: Protecting Drinking Water**
Over 35 million people depend on the Great Lakes for their drinking water. Gliders provide the flexibility to focus on issues impacting local areas and to better predict the risk of harmful algal blooms (HABs).
-  **Northeast: Enhancing Maritime Industry By Reducing Endangered Right Whale Collisions**
Ship strikes and fishing gear entanglements threaten the endangered right whales. Gliders equipped with acoustic sensors can detect the whales and alert mariners and fishermen in real time about the location of the whales, thus minimizing impacts.
-  **Mid-Atlantic: Protecting Lives and Property From Hurricanes**
Gliders are a safe method for seeing below the surface of the coastal ocean, where strong winds stir cold water upwards, affecting the intensity of the storm. Such information improves warnings that can protect lives and property.
-  **Southeast: Saving Lives, Supporting Fisheries and Detecting HABs**
Information gathered from gliders along the Southeast coast is critical for predicting riptides, optimizing fisheries management models, improving hurricane intensity forecasts and detecting marine mammals and HABs.

IOOS
Integrated Ocean
Observing System
An interagency Federal-regional partnership in
NOAA's National Ocean Service

HFR Network

- 160 HFRs operating at any given time
- Data cover thousands of square kilometers
- Data extend 150+ km offshore
- 0.2–6 km spatial resolution (bandwidth dependent)
- HFR-derived ocean surface current maps update hourly



HFR Uses



Now Operational

- Search & Rescue
- Oil Spill Response
- Oil Spill Risk Analysis
- Marine Navigation
- Advanced Weather Interactive Processing System
- Coastal Monitoring

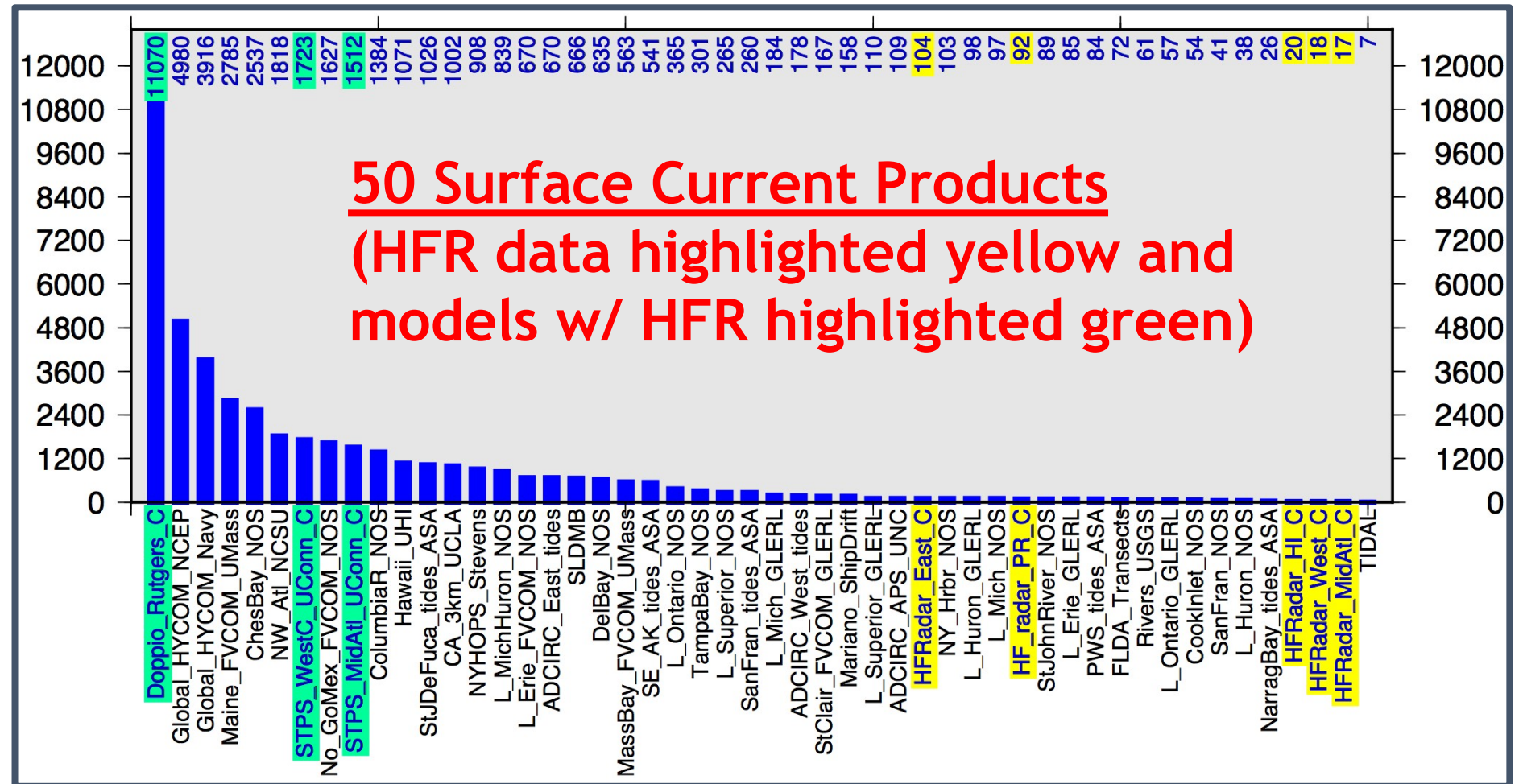
Under Development

- Tsunami Detection
- Significant Wave Height
- Hydrodynamic Modeling

US Coast Guard Search and Rescue - Surface Current

USCG Environmental Data Server (EDS)

Surface Current
Product Usage: July
2019-June 2020



IOOS Glider

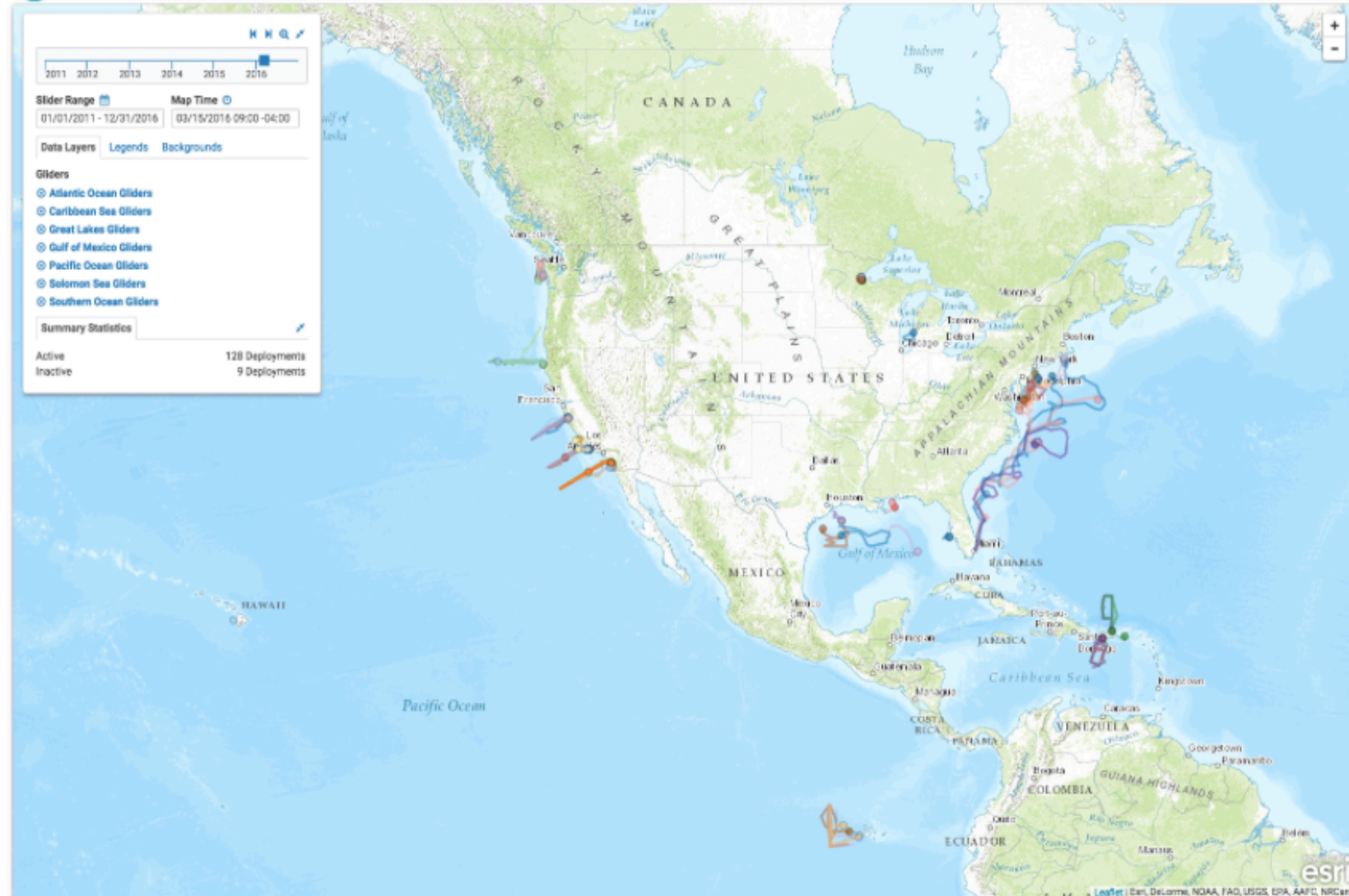
2019:

- 98 real-time deployments by non-Federal partners enabled through IOOS

2009-2019:

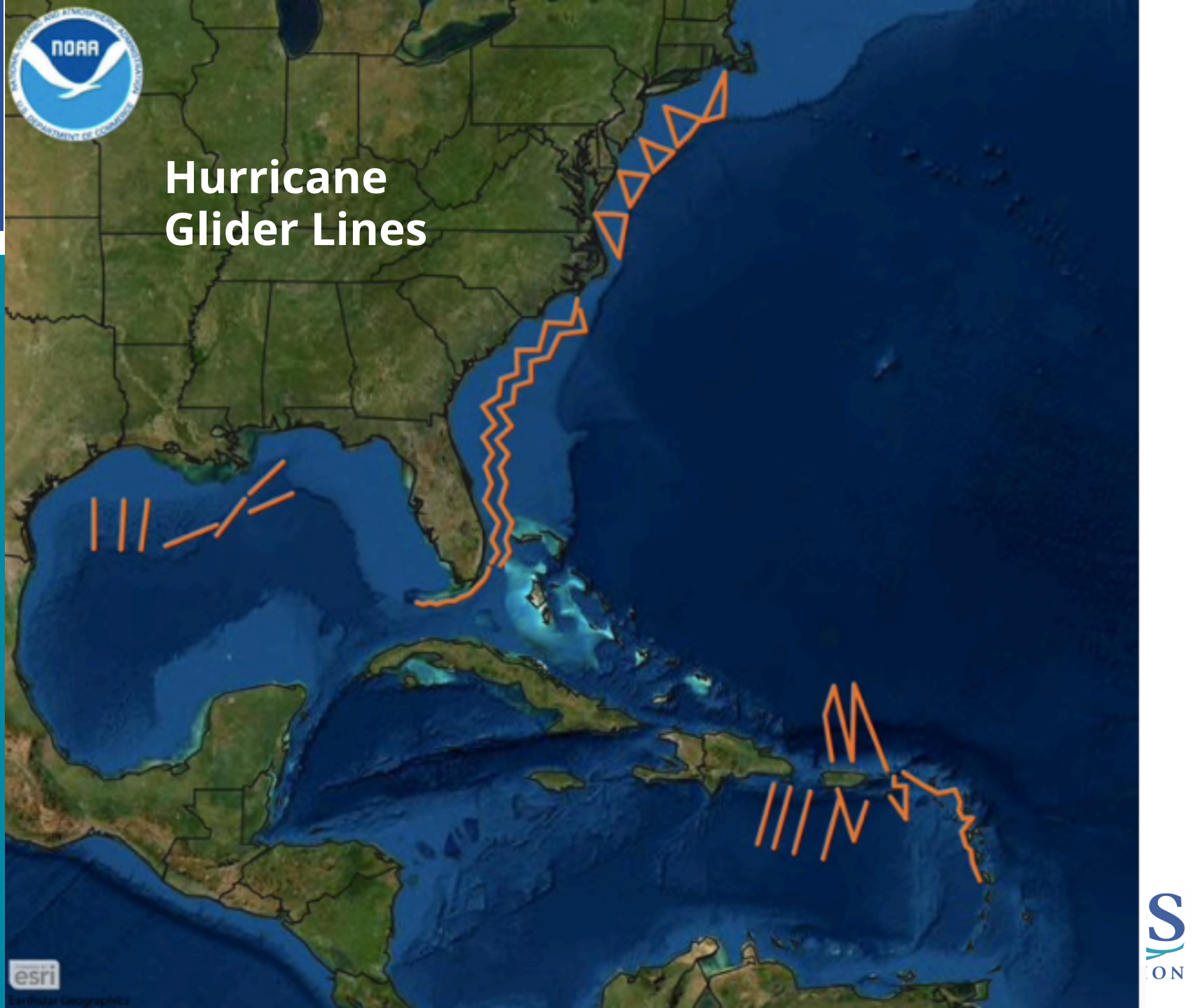
- 588 real-time deployments

IOOS Underwater Glider Network Map



Glider Uses

- Hurricane intensity
- HABs and hypoxia testing
- Marine mammal monitoring
 - Right Whale
- Fisheries
- Drinking water monitoring
- Maritime safety



Streamline Observations

**Allows RA to
address pressing
needs**

Some examples:

- Prototype data portal for Tier B and Tier C water level data as a demonstration for providing non-NWLON data for regional and national distribution.
- Automated end-to-end data flow that will enable drinking water managers to receive text-based alerts on HAB conditions
- Publication of California Harmful Algal Bloom Bulletin for managers
- Transition of Chesapeake Bay Portal to operational capacity by adding additional variables and data sources.

GAPS MAPS - DRAFT

East Coast:

- MARACOOS
- SECOORA
- GCOOS
- GLOS
- CARICOOS

Remaining Gaps

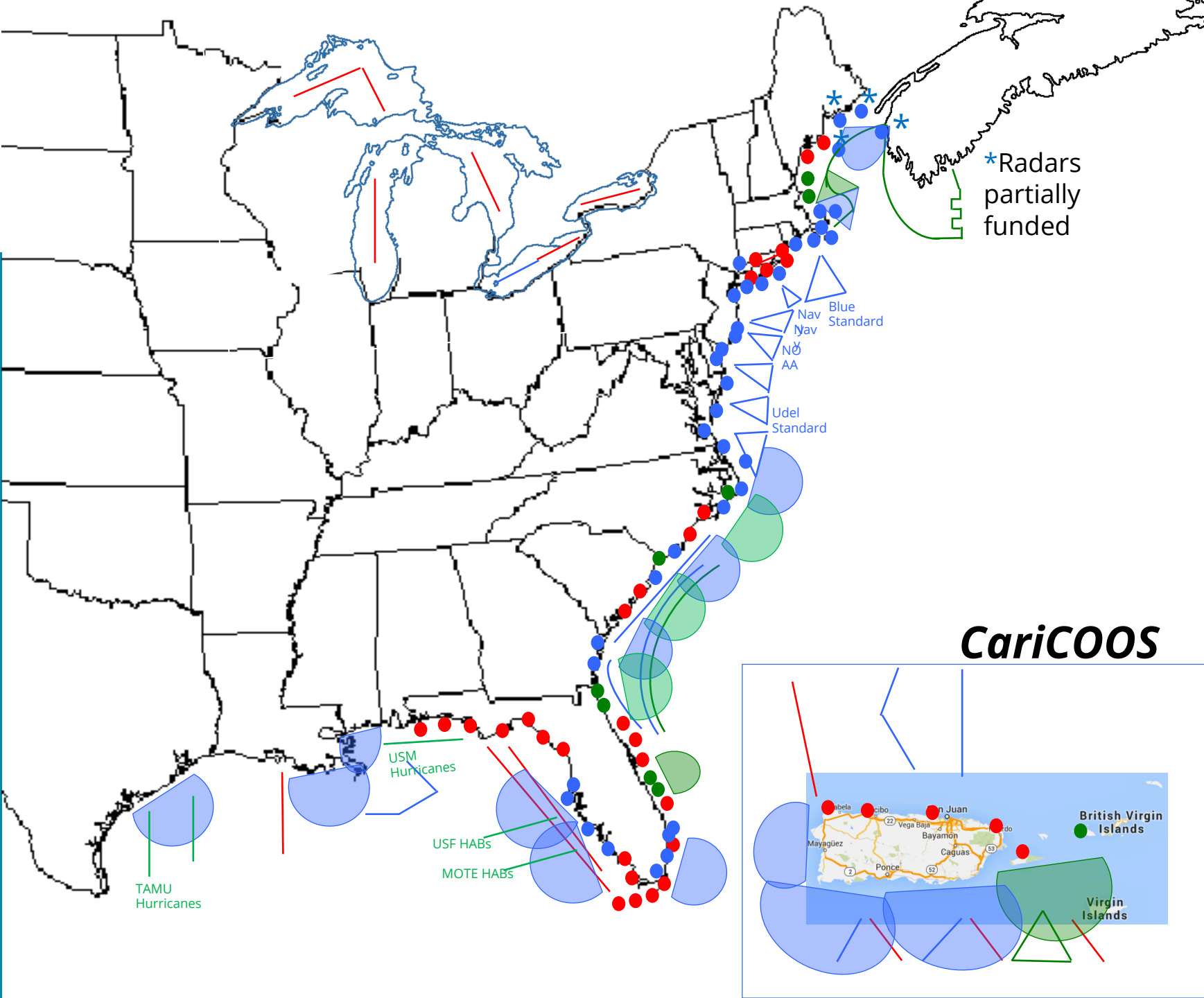
Operational

Current Gaps Funding

Surface currents/HF radar

Glider transect run

Coverage



GAPS MAPS

West Coast:

- *NANOOS*
- *CeNCOOS*
- *SCCOOS*

Remaining Gaps

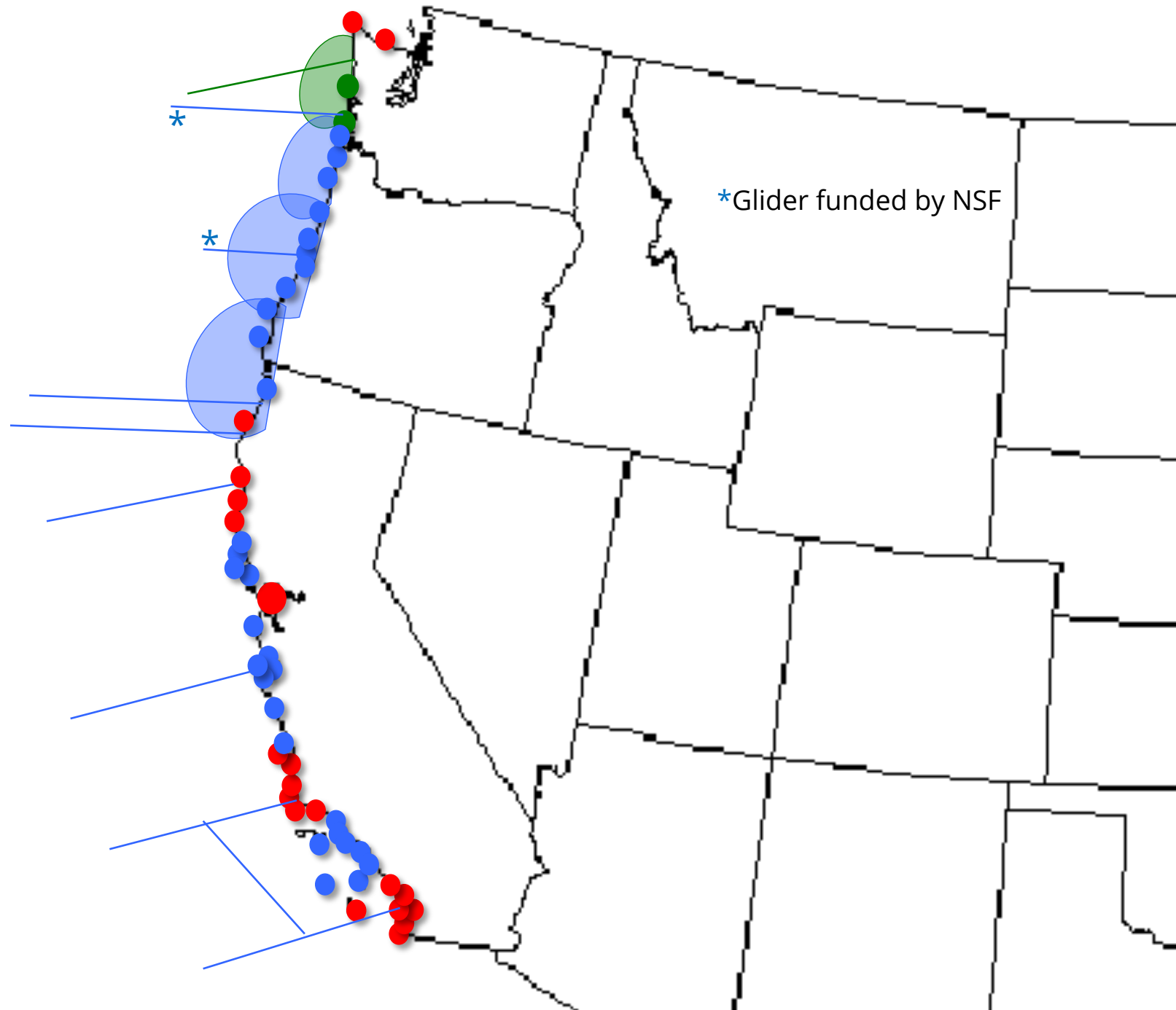
Operational

Current Gaps Funding

Surface currents/HF radar

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Coverage



GAPS MAPS

Alaska

Remaining Gaps

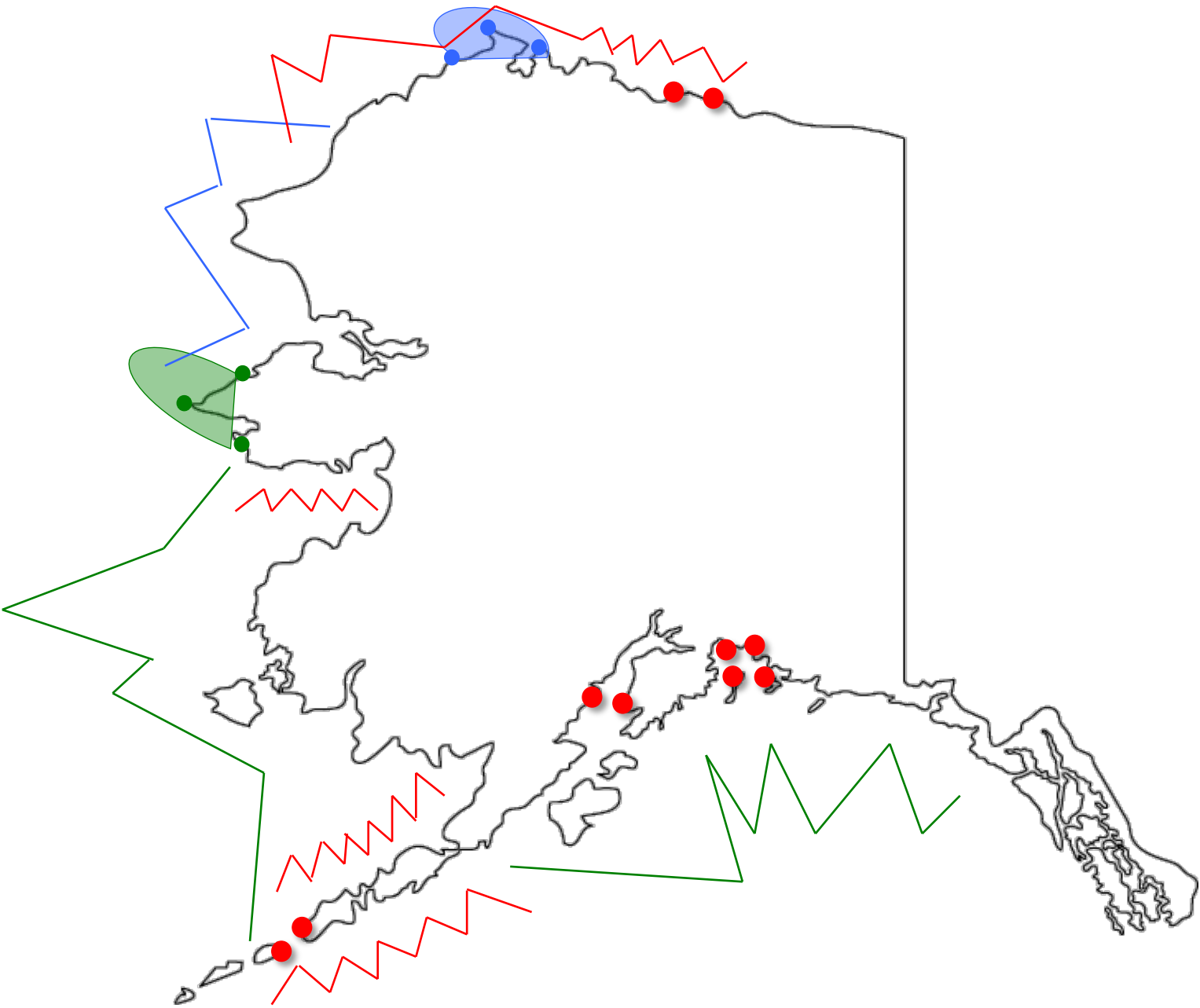
Operational

Current Gaps Funding

Surface currents/HF radar

Glider transect run

Coverage



GAPS MAPS

PacIOOS

Remaining Gaps

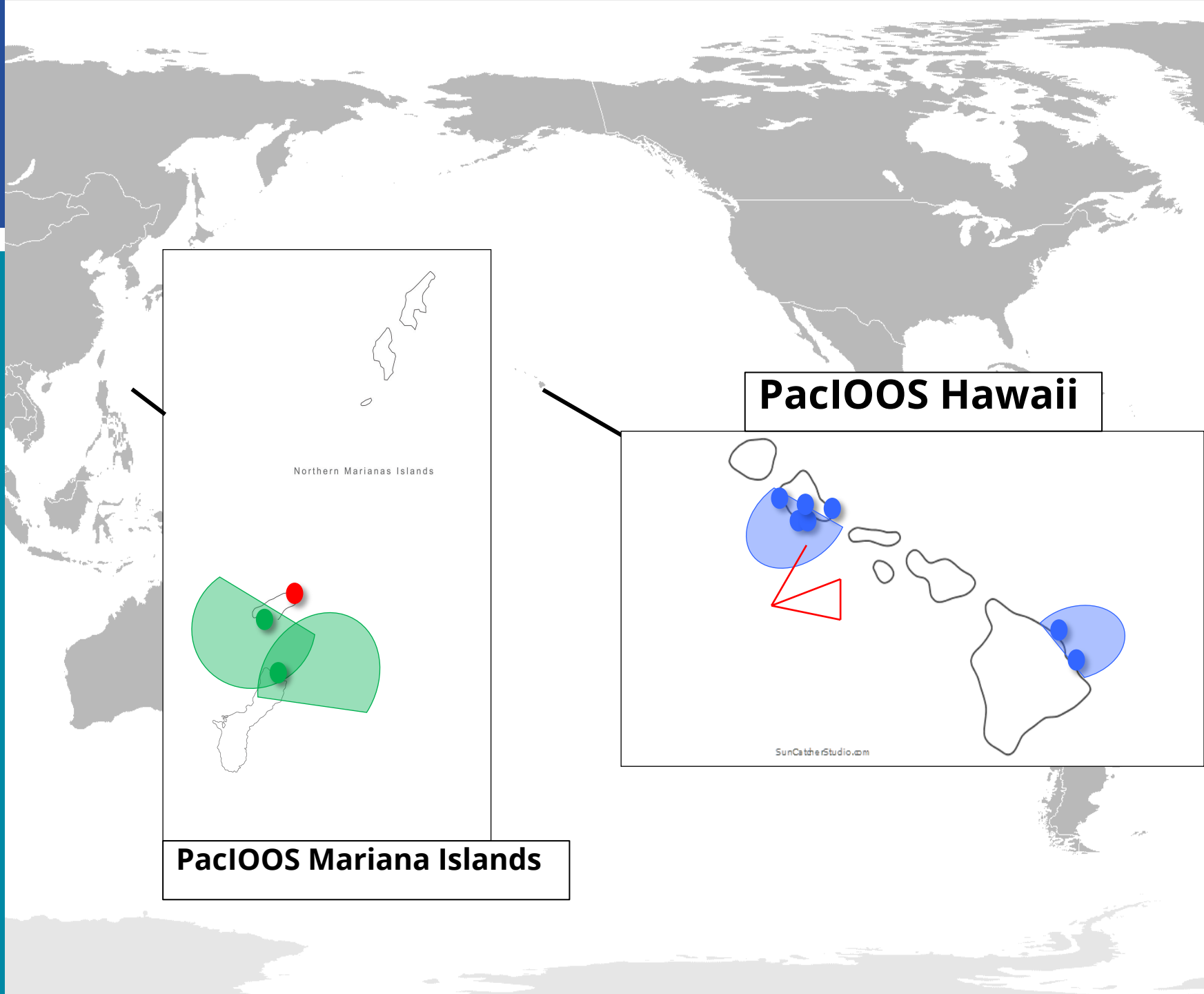
Operational

Current Gaps Funding

Surface currents/HF radar

Glider transect run

Coverage

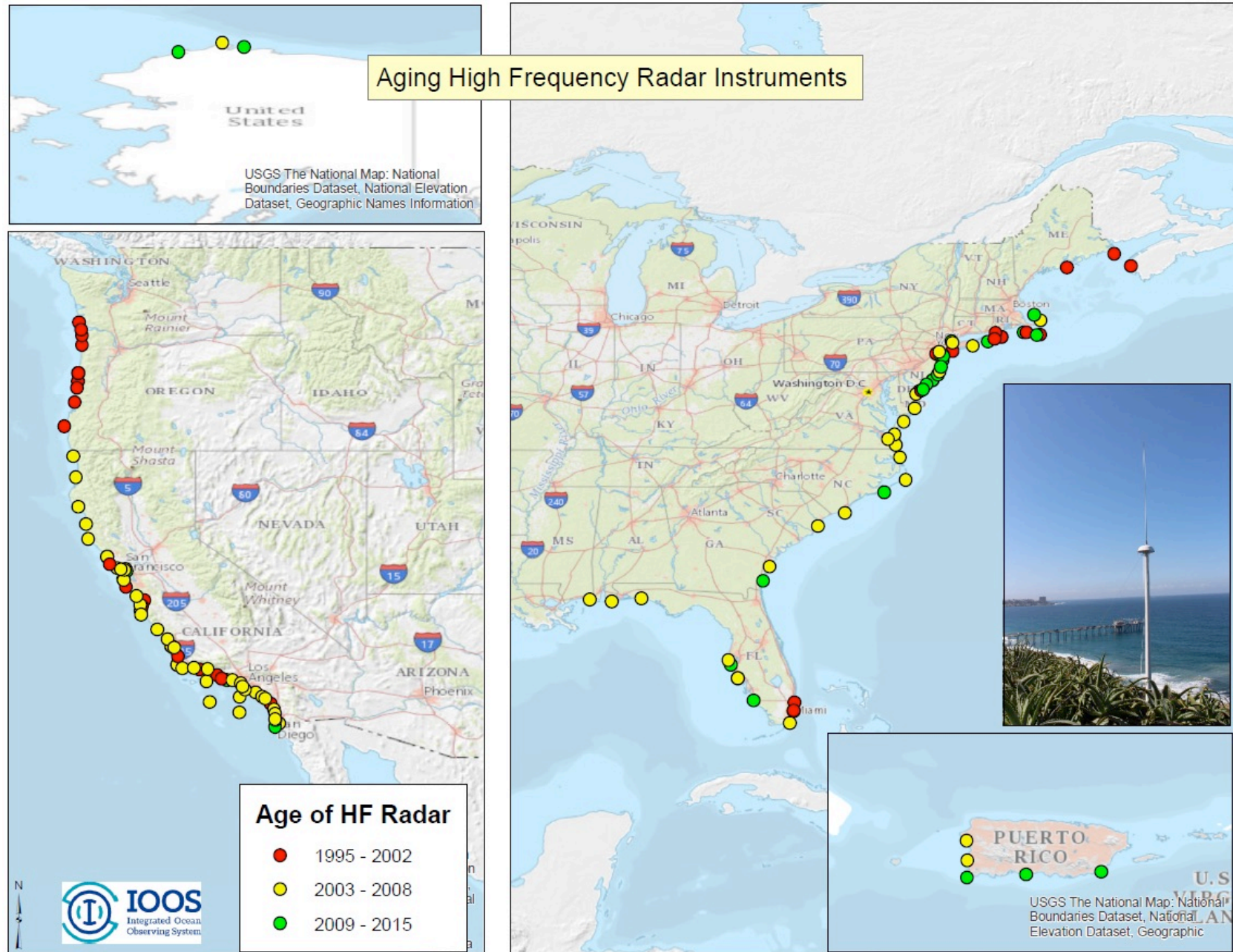


Aging Infrastructure

HFR Example

Gliders – some gliders are no longer being serviced

Moorings – many over 15 years old



Next Steps

Balance needs with Congressional interest

Specific benefits to constituents

- Next phase:
 - Continue to fill gaps in HFR and Gliders
 - Moorings?
 - Aging infrastructure – “Preventing Gaps”
- Biology
 - HAB Observing Network
 - Ecological Forecasting
 - Nutrients, OA, etc
 - Ecosystem moorings
 - MBON, ATN
- Product Development
- Next 5-year proposals will provide guidance on needs

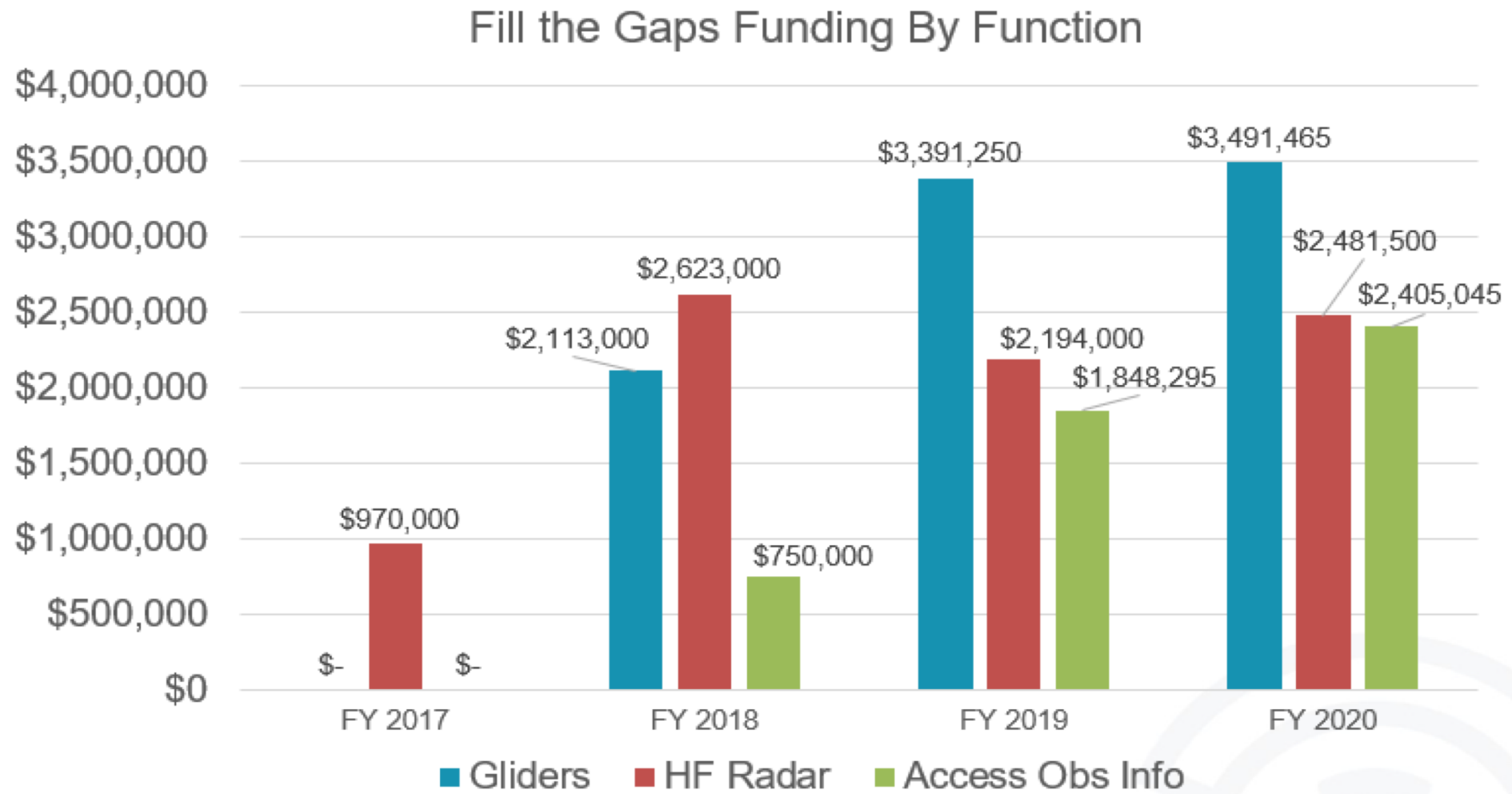
Discussion

Questions for the FAC

- How to balance societal benefits with technology plans? And Congressional interest?
- How to address the issue of aging infrastructure?
- Emerging needs:
 - Biology - HABs, Ecological forecasting
 - Technology - Imaging Flow Cytobots, Environmental Sample Processors, eDNA, AI, etc.,
 - Changing ocean/lake conditions

Additional Slides

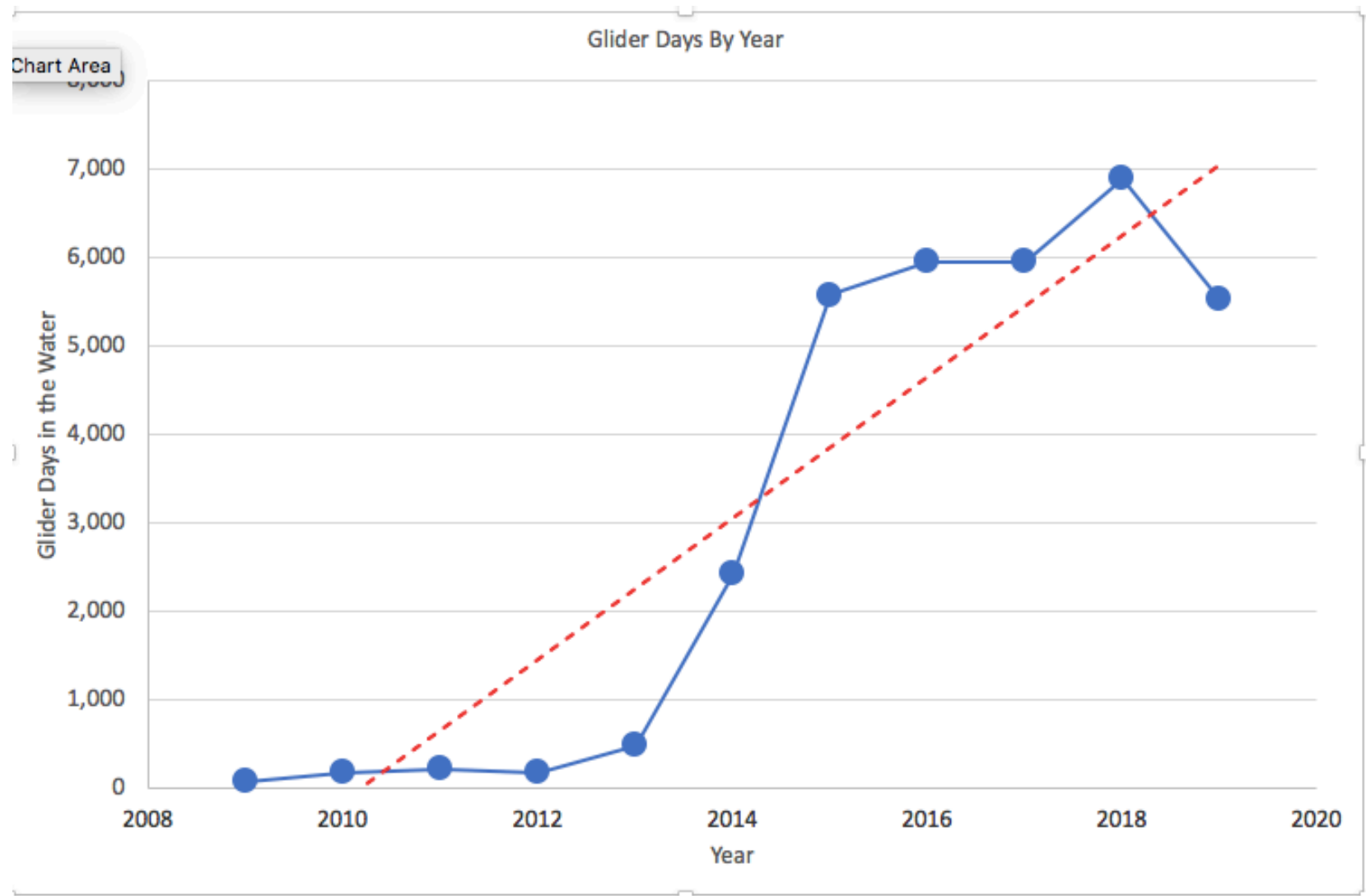
IOOS Fill The Gaps Funding 2017- 2020



Totals over the fiscal years: 2017= \$970,000 2018= \$5,486,000 2019= \$7,443,545 2020 = ~\$8.5M

Glider Days by Year

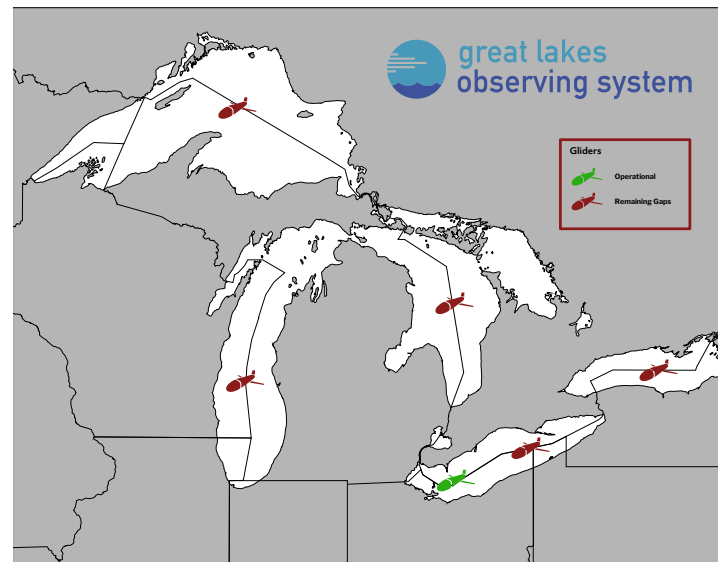
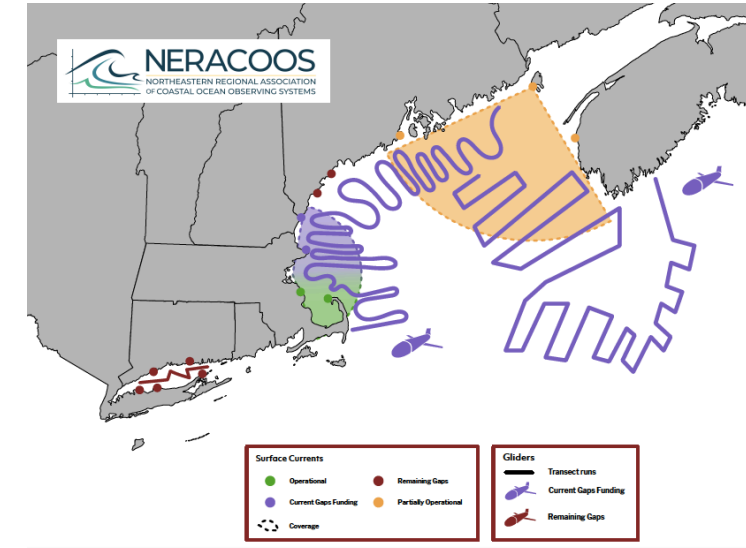
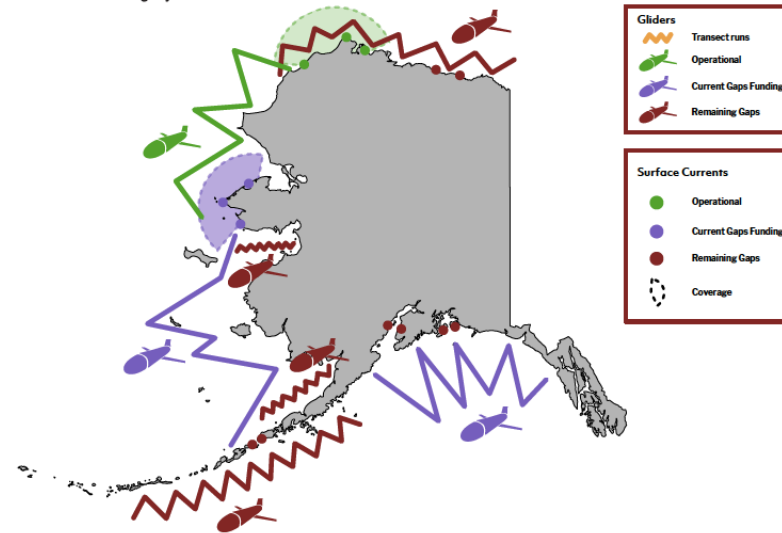
- 98 Real-time deployments in 2019
- 598 2009-19
- 5,532 glider days in 2019
- 35,000 2009-19



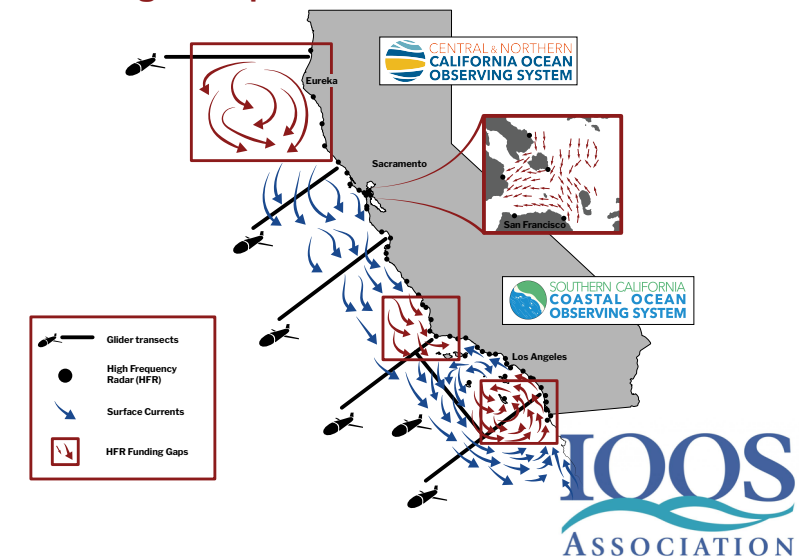
Fill the Gaps

- Alaska - Marine mammals, fisheries
- Northeast – Right whale, HABs
- Great Lakes - HAB and hypoxia in Erie, SagBay and Green Bay
- California - Marine heat waves and navigation, oil spill response, HABs and fisheries.

AOOS
Alaska Ocean Observing System



Preventing the Gaps



IOOS
ASSOCIATION

IOOS Gliders, cont

PacIOOS - Maritime safety
(used by Coast Guard,
Hawaiian Emergency
Services) Storm glider for
extreme weather

NANOOS - HAB, hypoxia,
marine heat waves

