

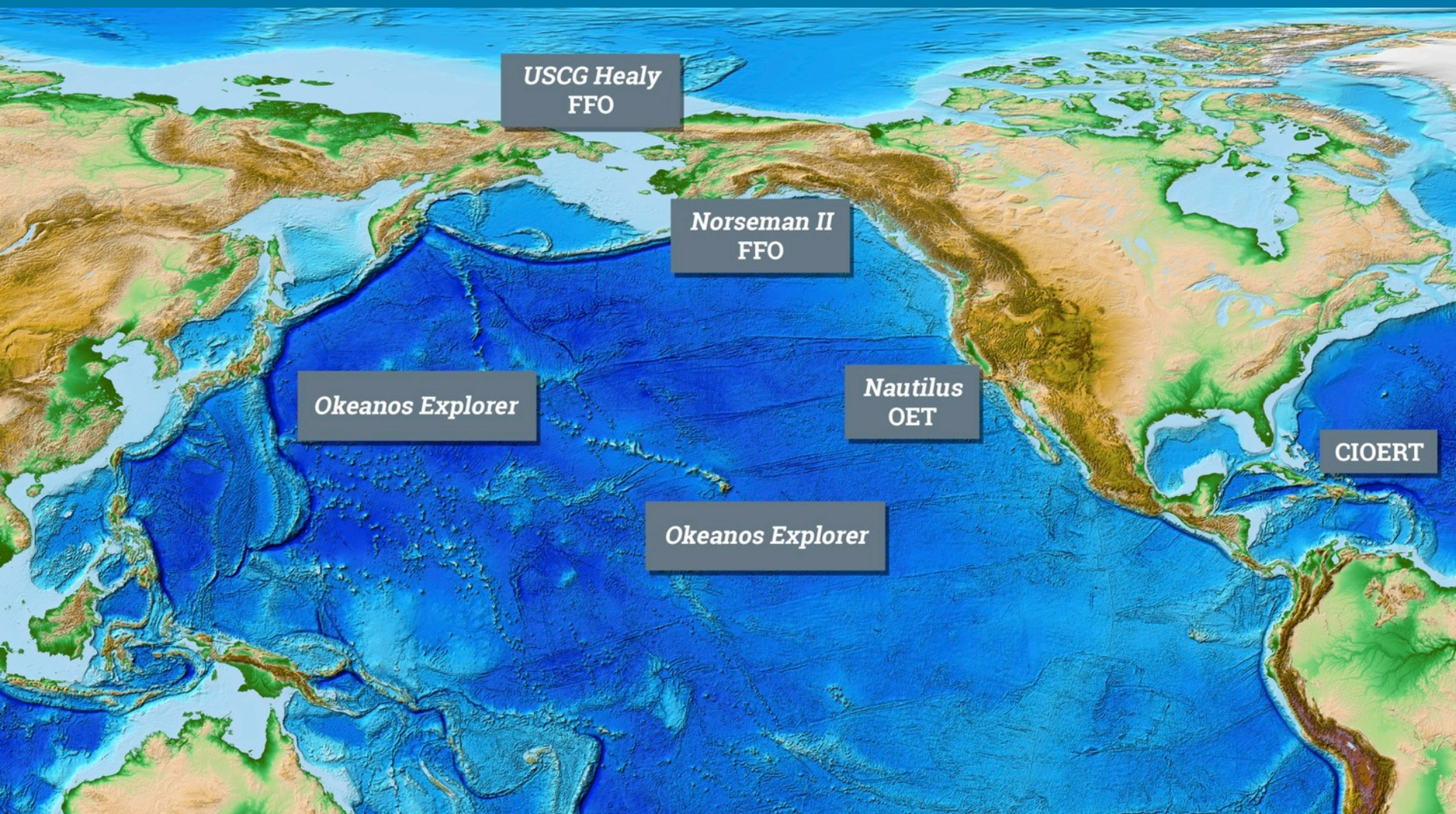
# Ocean Exploration and Research Update

Alan Leonardi, Director  
Sixth Meeting of the Ocean Exploration  
Advisory Board  
Crystal City, Virginia  
September 13-14, 2016

# Overview

- General highlights: the Marianas to California; the Arctic to Cuba
- FY16 budget and spend plan review
- IUCN and Ocean Exploration
- 2017 Season Overview

# 2016 OER Supported Expeditions





Marianas Trench  
Marine National Monument

Papahānaumokuākea  
Marine National Monument

Wake Island  
(PRIMNM\*)

Johnston Atoll  
(PRIMNM\*)

\* Pacific Remote Islands Marine National Monument

0 125 250 500 Nautical Miles



79,333 square  
kilometers of  
seafloor mapped



37 remotely operated  
vehicle dives



~575,000 live  
video views



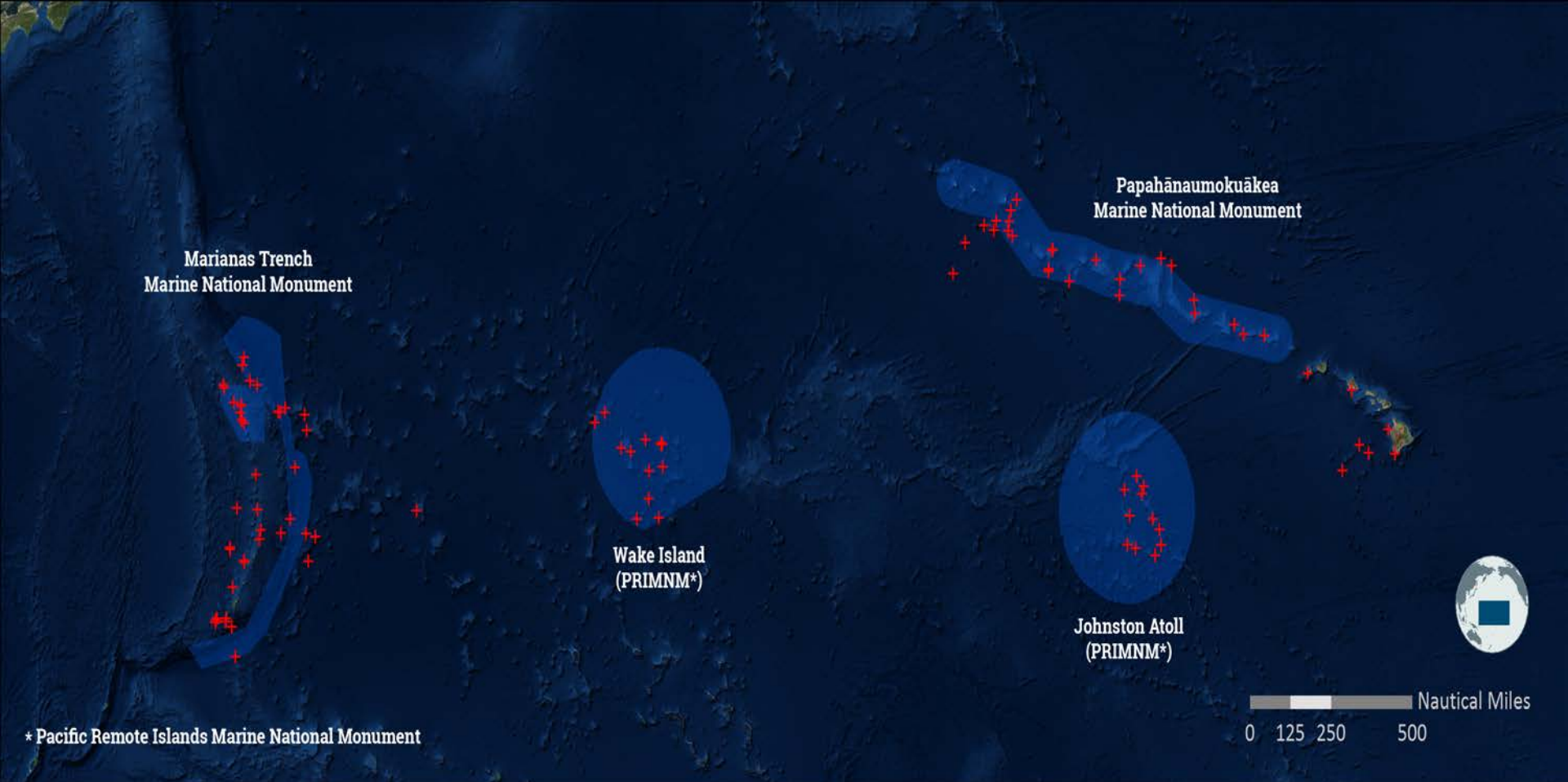
70 biological & 71  
geological samples  
collected



74 undescribed  
species observed



45 participating  
scientists, students, &  
managers



~297,244 square  
kilometers of  
seafloor mapped



102 remotely operated  
vehicle dives



~4,154,000 live  
video views



182 biological & 178  
geological samples  
collected



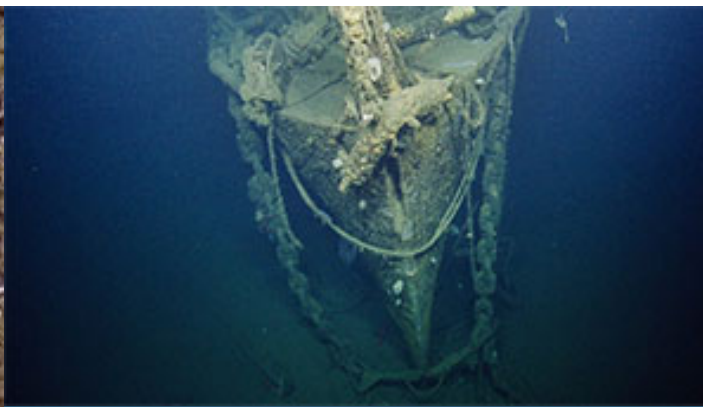
~174 undescribed  
species observed



200+ participating  
scientists, students, &  
managers

# E/V Nautilus Field Season

- Seeps and Ecosystems of the Cascadia Margin
- Central California Canyons
- Channel Islands NMS
- Southern California Margin
- U.S.S. Independence/Farallones NMS

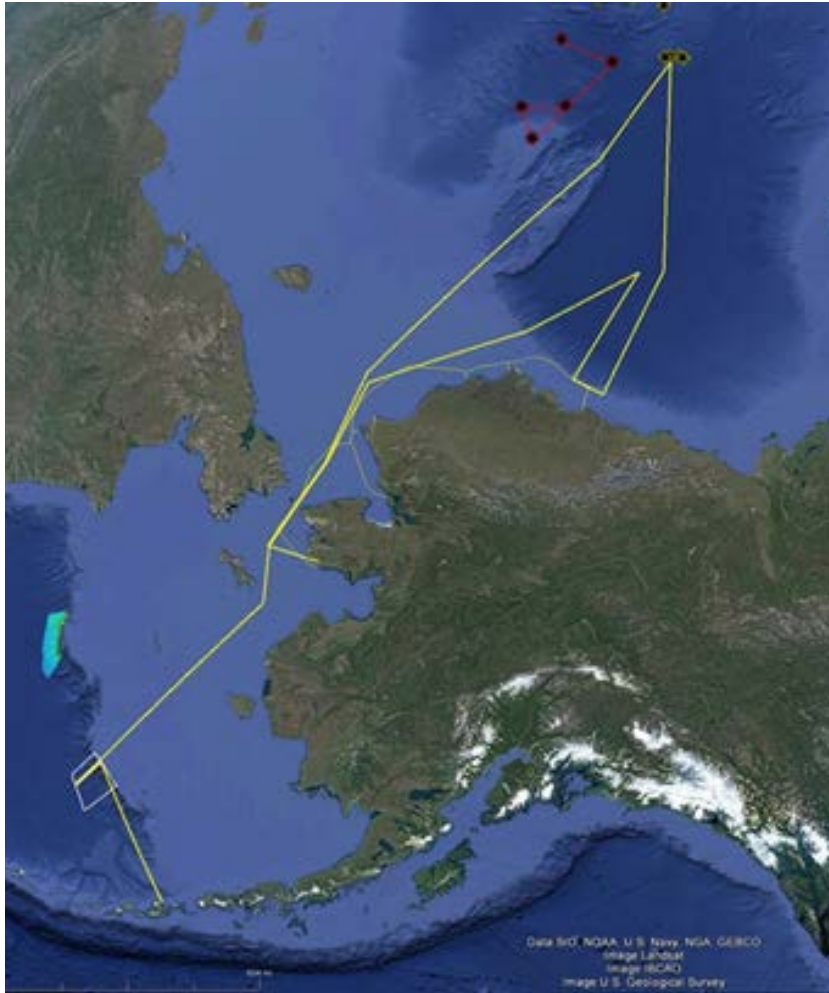


# CIOERT: 2016 Expeditions

- Final “Connectivity of the Pulley Ridge-South Florida Coral Reef Ecosystem” expedition; data from four years of cruises being compiled for publication (with NOS and NMFS)
- Explored new shelf-edge MPAs from FL to NC using multibeam and ROV aboard the NOAA Ship *Nancy Foster*
- Cuba-U.S. expedition to explore mesophotic reefs in Cuba for comparison with other reefs in Cuba, Flower Gardens, Florida Keys NMS
- Workshops to train early career scientists in how to participate in telepresence-enabled expeditions



# ECS

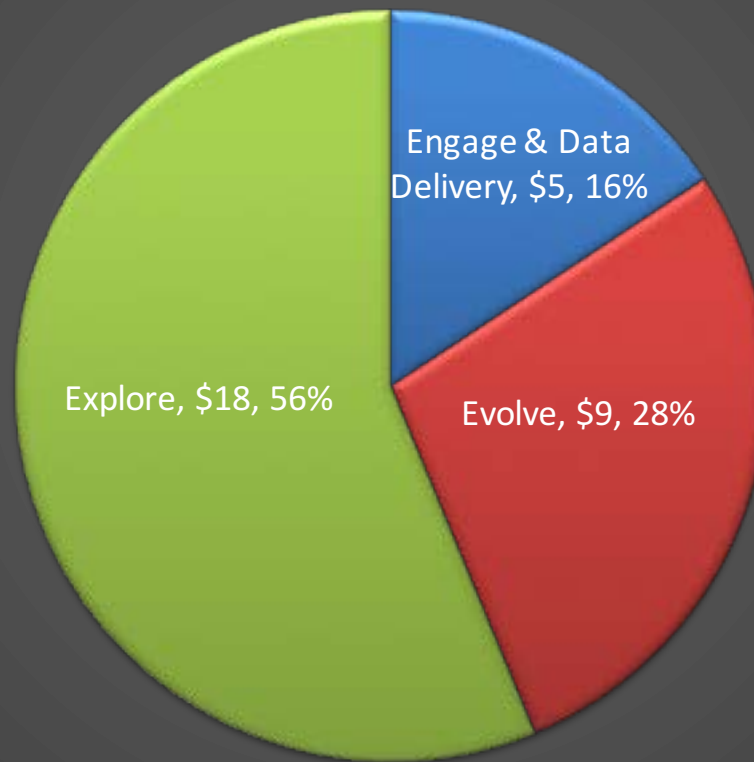


- U.S. and Canada are involved in a White House-supported reciprocal field data sharing arrangement as the *Healy* and Canada's *Louis St. Laurent* get underway this fall
- M/V *Fugro Supporter* will survey along the Mariana Arc, West Mariana Ridge, and unsurveyed Trench this month (30 days)
- This Marianas ECS work leverages *Okeanos Explorer* and *Falkor* mapping in the region
- FY17 focus expected to be on Necker Ridge area to support possible future ECS delineation



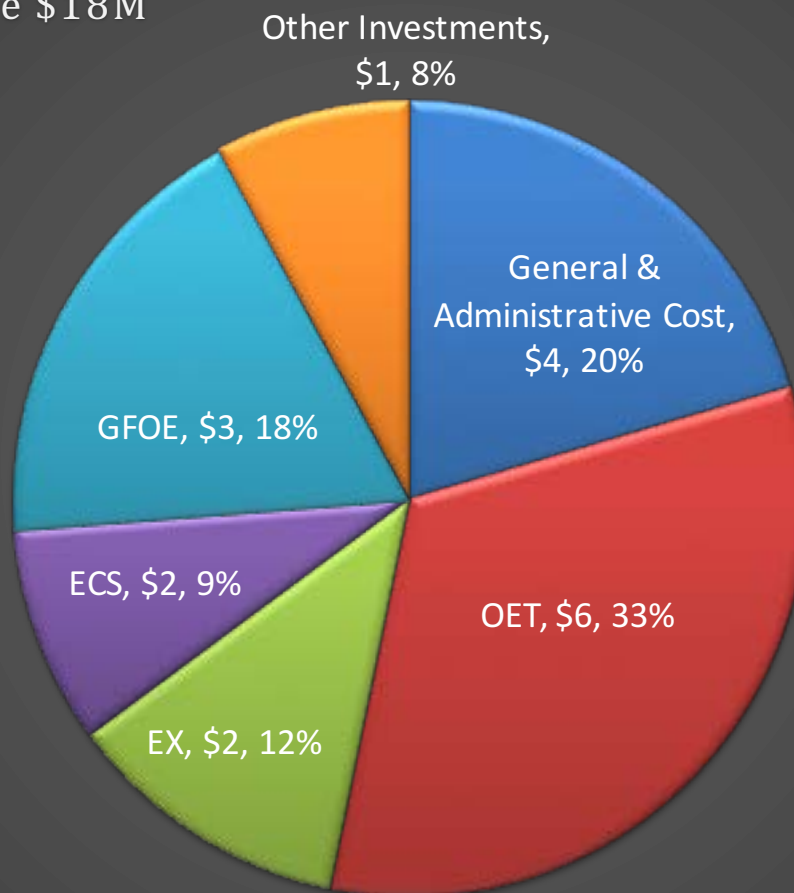
# FY16 by Strategic Categories

FY 2016 OER Enacted Amount \$32M  
by Strategic Categories



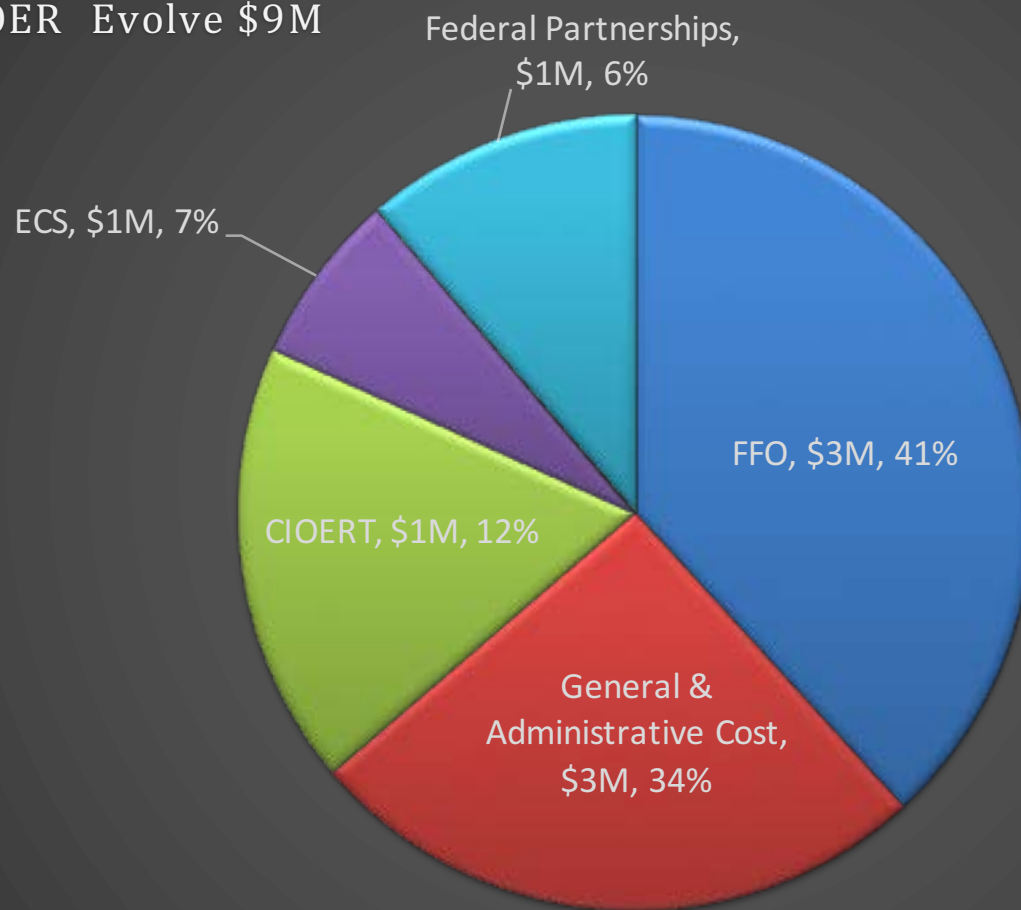
# FY16 - Explore

FY 2016 OER Explore \$18M



# FY16 - Evolve

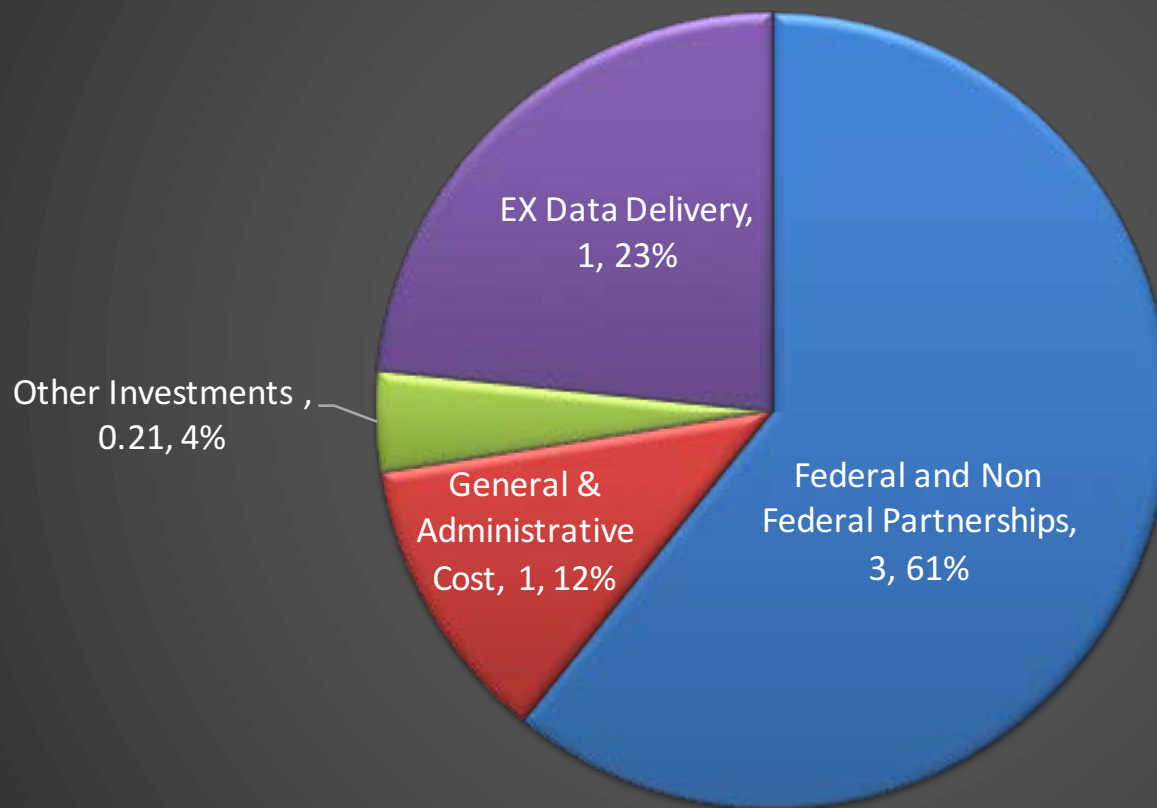
FY 2016 OER Evolve \$9M



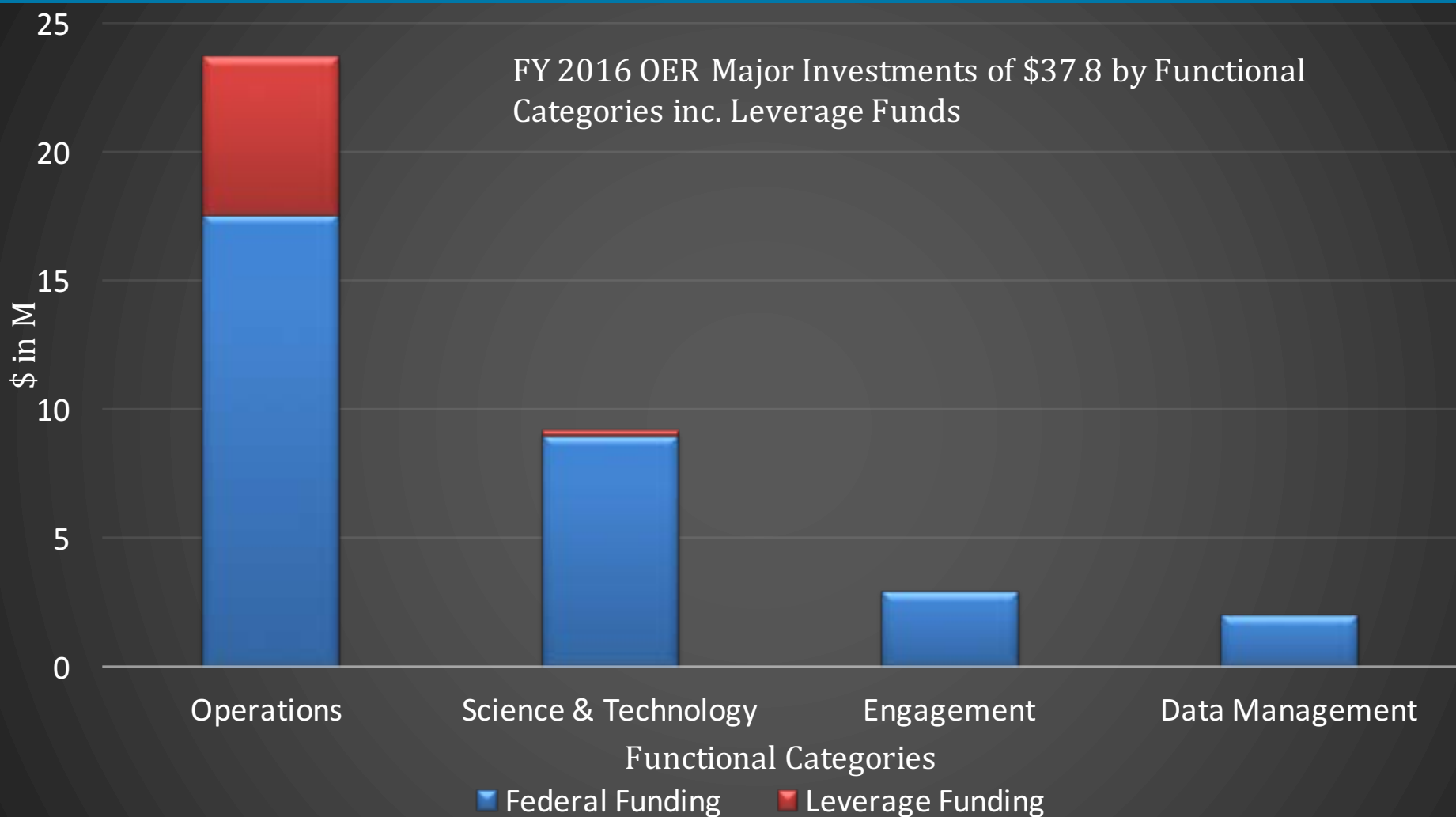


# FY16 – Engagement and Data Delivery

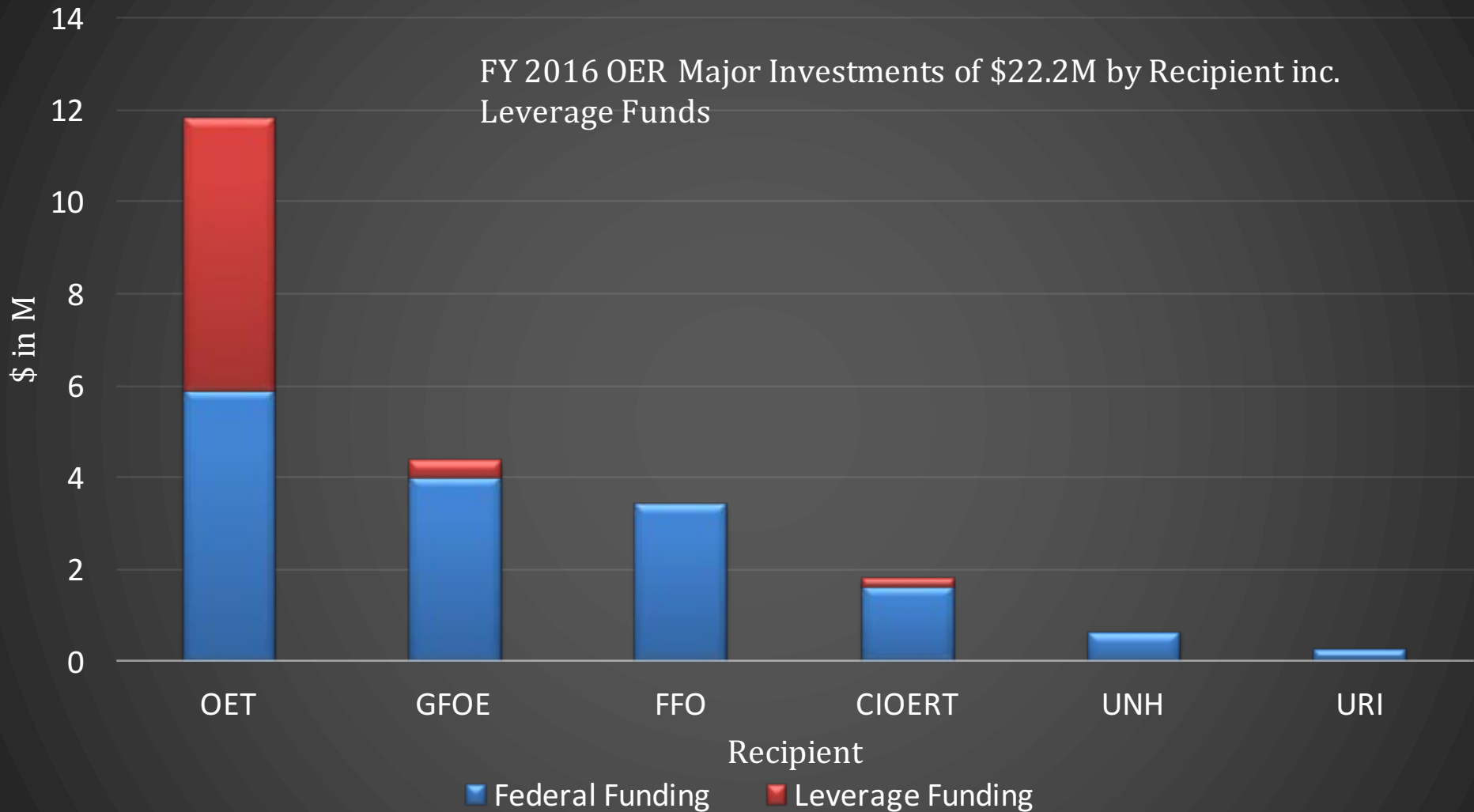
FY 2016 OER Engage & Data Delivery \$5M



# FY16 – Functional Categories



# FY16 – External Partners





# IUCN-WCC

“Thankfully, in addition to serving as the lead agency on the designation of MPAs, NOAA is also the federal anchor for ocean exploration . . . [CAPSTONE] represents a major foundational science effort to fill in the data gaps of deep and remote marine protected areas in the Central and Western Pacific . . . [t]hese insights are critical to supporting the scientific and management needs of the protected areas; whether we’re mapping vulnerable marine habitats to ensure species health or investigating seamounts in the areas to better inform decisions about deep-sea mining”

—Dr. Kathryn Sullivan

# IUCN-WCC

- U.S. Pavilion venue for Dr. Sullivan to announce the 2017 *Okeanos Explorer* field season—205 DAS focused on MPA baseline characterization
- Collaboration with up to five Pacific Island entities (Western Samoa, American Samoa, Kiribati, Cook Islands, Tokelau (NZ))
- Complementary work aboard R/V *Falkor*, with science party funded by OER
- Expect OET field season also to complement *Okeanos* and *Falkor* expeditions

# 2017 *Okeanos* Field Season

- Shakedown (Hawaiian Islands)
- Southern Units of the Pacific Remote Islands Marine National Monument; Phoenix Islands, Protected Area; Tokelau; and Cook Islands
- Samoa and American Samoa
- Johnston Atoll Unit of the Pacific Remote Islands Marine National Monument
- Musician Seamounts



# Questions?

[alan.leonardi@noaa.gov](mailto:alan.leonardi@noaa.gov)

[OceanExplorerer.NOAA.gov](http://OceanExplorerer.NOAA.gov)



**Ocean Exploration  
and Research**

# Backup Slides



# CAPSTONE NOAA & DOC Relevance

Foundational Environmental  
Intelligence

Highlight Ocean Resiliency Efforts

Maximize Observational  
Infrastructure

Demonstrating Organizational  
Excellence

FY17? – Tech Demos to Support  
NWS

4 of 5 DOC Strategic Goals and  
Objectives

## CAPSTONE Synopsis:

A major cross-NOAA foundational science effort focused on U.S. marine protected areas in the central and western Pacific. The investment provides timely actionable information to support decision-making based on reliable and authoritative science.

# FY16 Major Expeditions: Pacific

## Central Pacific ECS Mapping - *Ron Brown*

- Pacific Remote Islands MNM (Kingman/Palmyra)

## Central/Western Pacific – *Okeanos Explorer*

- Papahānaumokuākea MNM
- Pacific Remote Islands MNM (Wake Island)
- Mariana Trench MNM

## Western Pacific – *Falkor*

- Marianas Back-Arc

## Eastern Pacific – *Nautilus*

- *Pacific Northwest*
- *West Coast Sanctuaries*



# 2016 Hohonu Moana: Exploring Deep Waters off Hawai'i

NOAA Ship *Okeanos Explorer*, February 25 – March 18, 2016



Exploration Area: Papahānaumokuākea Marine National Monument



~38,000 square kilometers mapped



8 remotely operated vehicle dives  
63+ hours dive time



125,000+ live video views online



34 samples collected

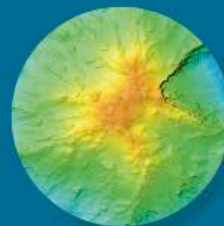


249 types of animals observed



26 shore-side science participants

## Highlights



Seafloor mapping data collected for five never-mapped seamounts



High-density coral and sponge communities documented at six sites, includes discovery of five new communities and range expansion at one site



600+ media articles about this unknown octopus including NBC, ABC, CNN, National Geographic, Associated Press, Reuters, Forbes, and Scientific American

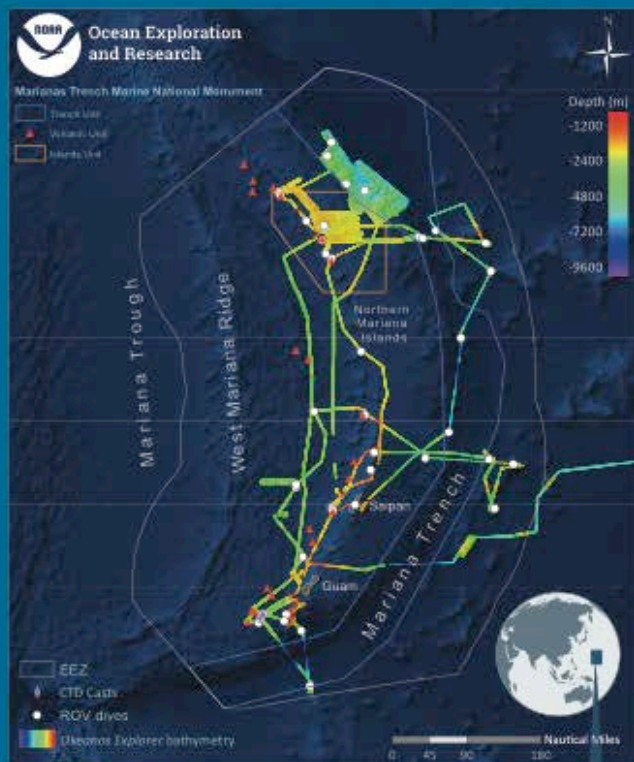


New live video mobile app installed more than 1,200 times on both Apple and Android devices

<http://oceanexplorer.noaa.gov/okeanos/explorations/ex1603/>

# 2016 Deepwater Exploration of the Marianas

NOAA Ship *Okeanos Explorer*, April 20 – July 10, 2016 <http://oceanexplorer.noaa.gov/okeanos/explorations/ex1605/welcome.html>



Expedition Operating Area: Marianas Trench Marine National Monument and Commonwealth of the Northern Mariana Islands

This expedition is part of the three-year **Campaign to Address the Pacific monument Science, Technology, and Ocean NEEDS (CAPSTONE)**, an initiative to collect deepwater baseline information to support science and management decisions in and around U.S. marine protected areas in the central and western Pacific. Highlights include:



Discovered and documented three new hydrothermal vent sites at Eifuku and Chamorro Seamounts, and a new active high-temperature "black smoker" vent field composed of multiple chimneys (one over 30 meters tall!) on the Mariana Back-Arc spreading center.



Conducted the first effort to discover and document deep-sea coral and sponge communities in the deep waters of the Marianas. Documented 10 "high-density" communities and a rare "high-density" community of basket stars and crinoids.



Shared live video feeds of the expedition with the public worldwide via the Internet, with the live video receiving a record-breaking 3.1 million views!



73,800 square kilometers of seafloor mapped



news & media coverage by 110+ outlets



41 remotely operated vehicle dives at a depth range of 240 - 6,000 meters



160 biological & 73 geological samples collected



80 - 100 undescribed species observed or collected

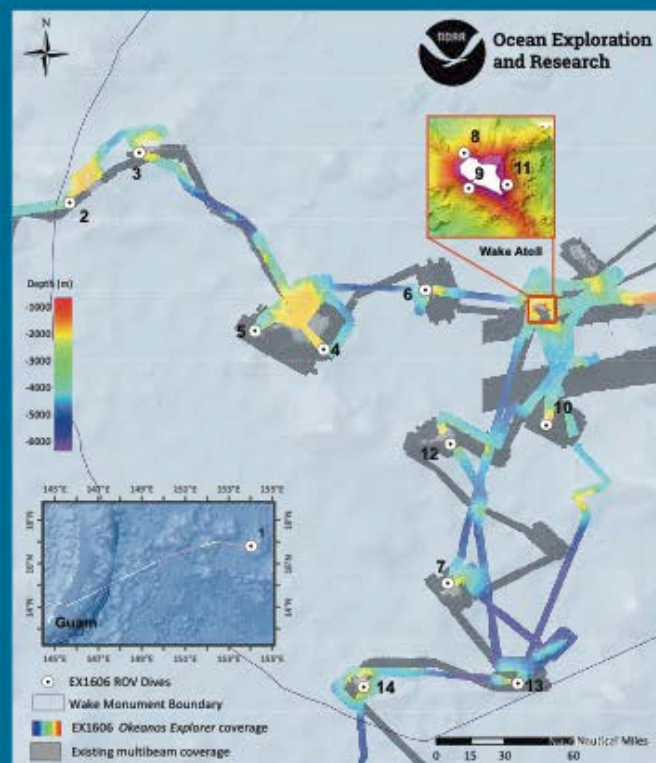


100 participating scientists, students, & managers



# Deepwater Wonders of Wake: Exploring the Pacific Remote Islands Marine National Monument

NOAA Ship *Okeanos Explorer*, July 27 – August 19, 2016 <http://oceanexplorer.noaa.gov/okeanos/explorations/ex1606/welcome.html>



Expedition Operating Area: Wake Atoll Unit of the Pacific Remote Islands Marine National Monument

This expedition is part of the three-year **Campaign to Address the Pacific monument Science, Technology, and Ocean NEEDS (CAPSTONE)**, an initiative to collect deepwater baseline information to support science and management decisions in and around U.S. marine protected areas in the central and western Pacific. Highlights include:



Located and identified the wreck of the *Amakasu Maru No. 1*, a Japanese water tanker that was sunk by a U.S. submarine in 1942. This shipwreck target was initially located during an earlier *Okeanos Explorer* mapping expedition and was hypothesized to be the Japanese Imperial Naval Destroyer, *Hayate*, which was sunk during the World War II Battle of Wake Island.



Conducted the first-ever deep submergence dives in the Wake Island Unit of the Monument. Prior to this expedition, only a small number of rock dredges had been conducted in the deep waters inside the Wake Atoll Unit of the Monument, and there had been no systematic exploration below SCUBA diving depths.



Discovered high-density biological communities at four dive sites. Knowledge about the conditions favorable for these communities will help researchers and managers predict other areas that are most likely to host similar communities and take steps to protect them.



36,000 square kilometers of seafloor mapped



14 remotely operated vehicle dives at a depth range of 350 - 3,136 meters



41 biological & 20 geological samples collected



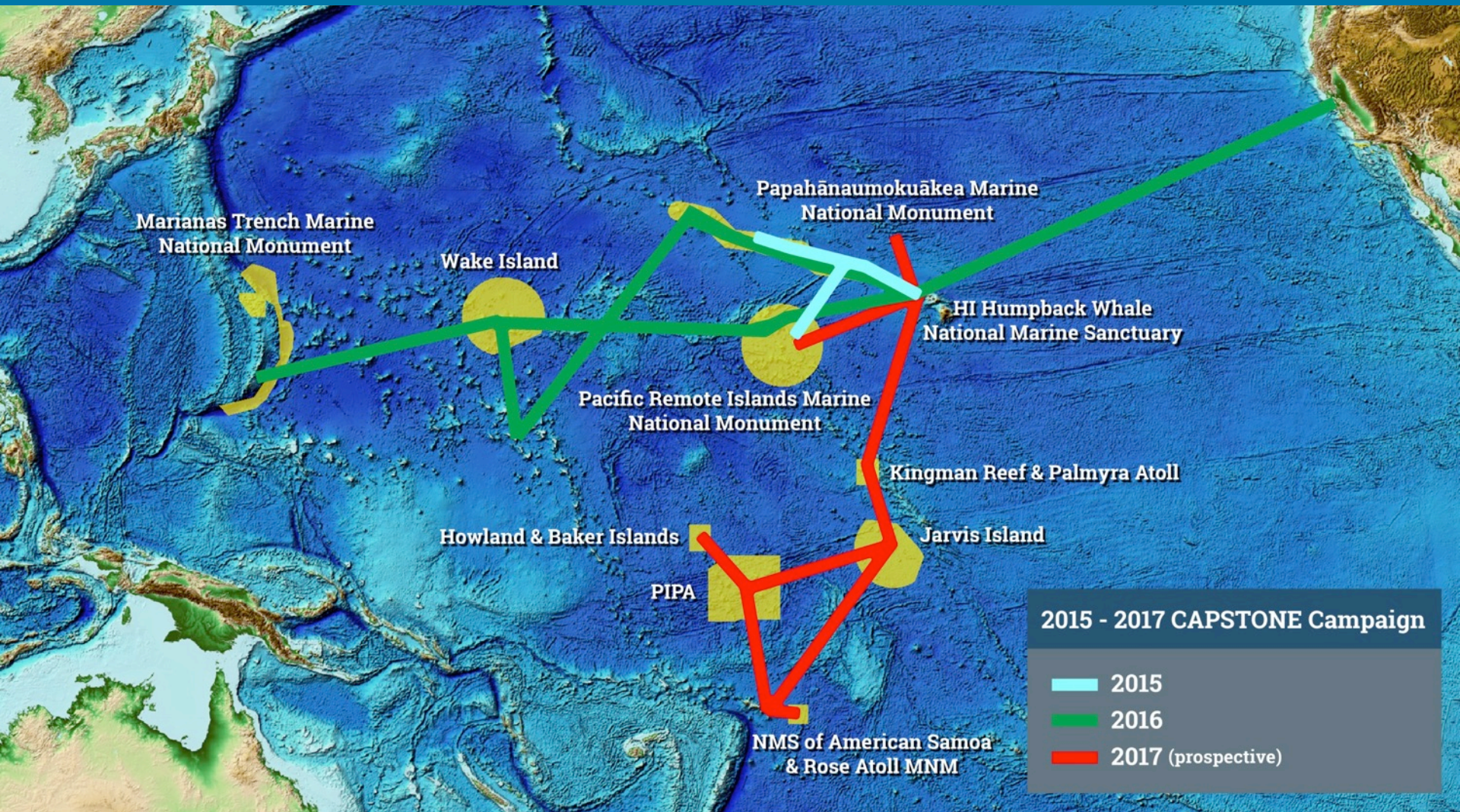
18+ undescribed species observed or collected



33 participating scientists, students, & managers



# CAPSTONE FY15-FY17



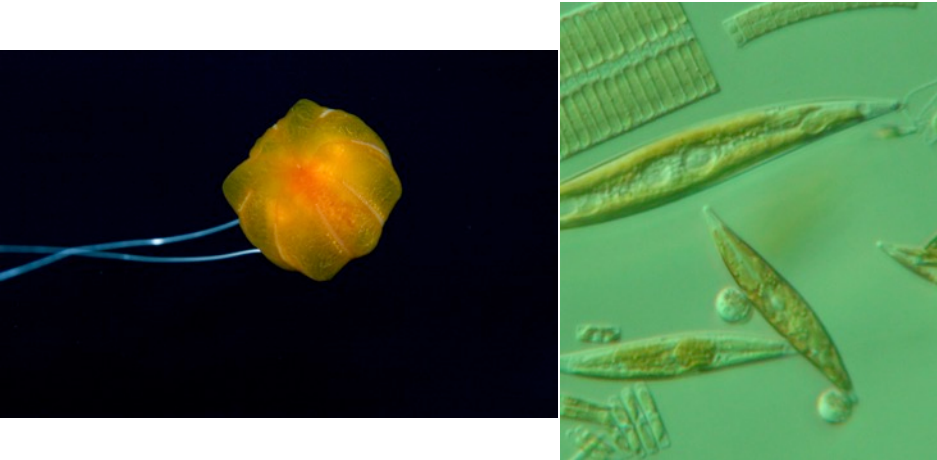


# Glacier Bay National Park Results



- First ever deepwater or ROV work in the Park
- Expedition discovered extensive, healthy, high density aggregations of very large corals (3m long and 3m wide) and first recorded stony corals in the Park
- Octocorals observed deeper than anywhere else in the world, and discovery of new corals showing succession as glaciers retreat
- FFO funding; expedition aboard chartered vessel using *KRAKEN II* ROV

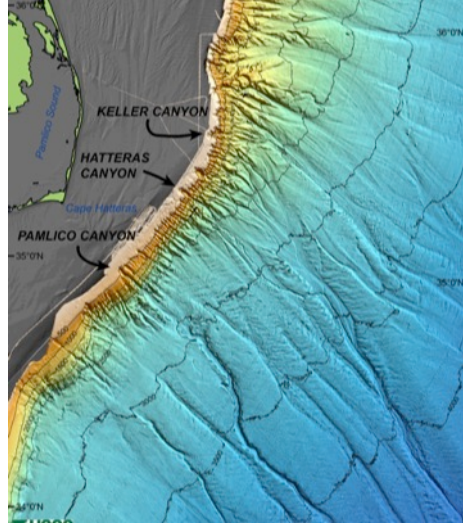
# Chukchi Borderlands



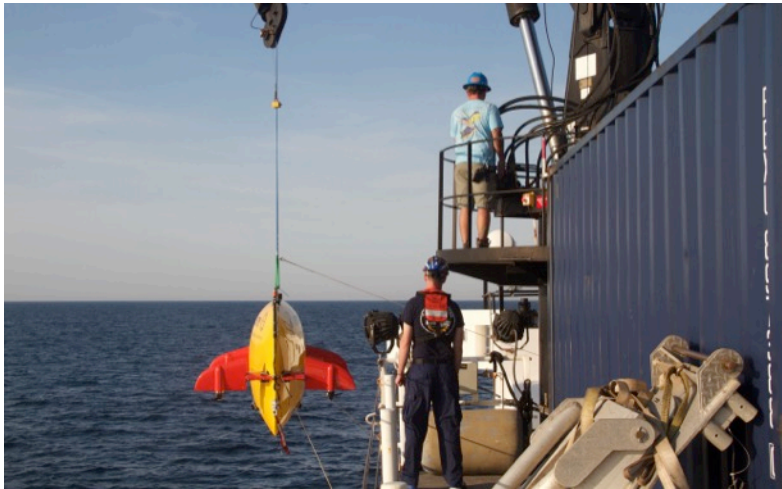
- University of Alaska Anchorage and Fairbanks, USCG, Japan, Norway, Oceaneering, NOAA, and many others formed expedition partnership
- Arctic ecosystem investigation: microbial to marine mammals and seabirds
- ECS bathymetry used to set targets



# Exploring Carolina Canyons



- First expedition of the SE Atlantic Bight Campaign using NOAA Ship *Pisces* and WHOI AUV *Sentry*
- Partnership among NOAA Fisheries, OER, USGS and others
- Objective to survey suspected deep-sea coral habitats in Pamlico and Hatteras Canyons
- Deep-sea corals confirmed in both canyons
- Additional analysis continues





# Battle of the Atlantic



- Expedition to the U-576 and SS Bluefields, sunk off North Carolina in 1942 to survey the wrecks and characterize the battlefield
- *Nomad* HOV deployed from the R/V *Baseline Explorer*
- Baseline characterization of the surrounding seafloor habitat and acoustically assess the water column habitat
- Expedition led by National Marine Sanctuary Program; partners include BOEM, National Centers for Coastal Ocean Science, Project Baseline, UNC, SRI International, 2G Robotics, and OER

# FY17: PRIMNM, American Samoa, & Musician Seamounts

- Final year of CAPSTONE
- Targets remaining U.S. MPAs in central and western Pacific
- PIFSC, ONMS, OER submitted integrated package of ship time request for ~190 DAS
- Potential for some external funding for a few DAS
- Coordinated operations with R/V *Falkor* and ECS effort
- NWS technology testing opportunity?