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

USCG Healy FFO

Norseman II FFO

Nautilus OET

Okeanos Explorer

CIOERT
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
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

- Explore, $18, 56%
- Evolve, $9, 28%
- Engage & Data Delivery, $5, 16%
FY 2016 OER Explore $18M

- General & Administrative Cost, $4, 20%
- OET, $6, 33%
- ECS, $2, 9%
- EX, $2, 12%
- GFOE, $3, 18%
- Other Investments, $1, 8%

FY16 - Explore
FY16 - Evolve

FY 2016 OER  Evolve $9M

- Federal Partnerships, $1M, 6%
- ECS, $1M, 7%
- CIOERT, $1M, 12%
- General & Administrative Cost, $3M, 34%
- FFO, $3M, 41%
FY16 – Engagement and Data Delivery

FY 2016 OER Engage & Data Delivery $5M

- Federal and Non Federal Partnerships, 3, 61%
- EX Data Delivery, 1, 23%
- General & Administrative Cost, 1, 12%
- Other Investments, 0.21, 4%
FY16 – Functional Categories

FY 2016 OER Major Investments of $37.8 by Functional Categories inc. Leverage Funds

- **Operations**
- **Science & Technology**
- **Engagement**
- **Data Management**

**Functional Categories**
- Federal Funding
- Leverage Funding

$ in M
- Operations: 20
- Science & Technology: 5
- Engagement: 2
- Data Management: 2
FY 2016 OER Major Investments of $22.2M by Recipient inc. Leverage Funds

Recipient

- **OET**
- **GFOE**
- **FFO**
- **CIOERT**
- **UNH**
- **URI**

$ in M

Federal Funding

Leverage Funding

OceanExplorer.NOAA.gov
“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
• 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?

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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.

OceanExplorer.NOAA.gov
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

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 octopod 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

Exploration Area: Papahānaumokuākea Marine National Monument

- ~38,000 square kilometers mapped
- 249 types of animals observed
- 26 shore-side science participants
- 34 samples collected
- 125,000+ live video views online
- 8 remotely operated vehicle dives
- 63+ hours dive time

http://oceanexplorer.noaa.gov/okeanos/explorations/exl603/
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 Mariana. 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!
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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.
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?