

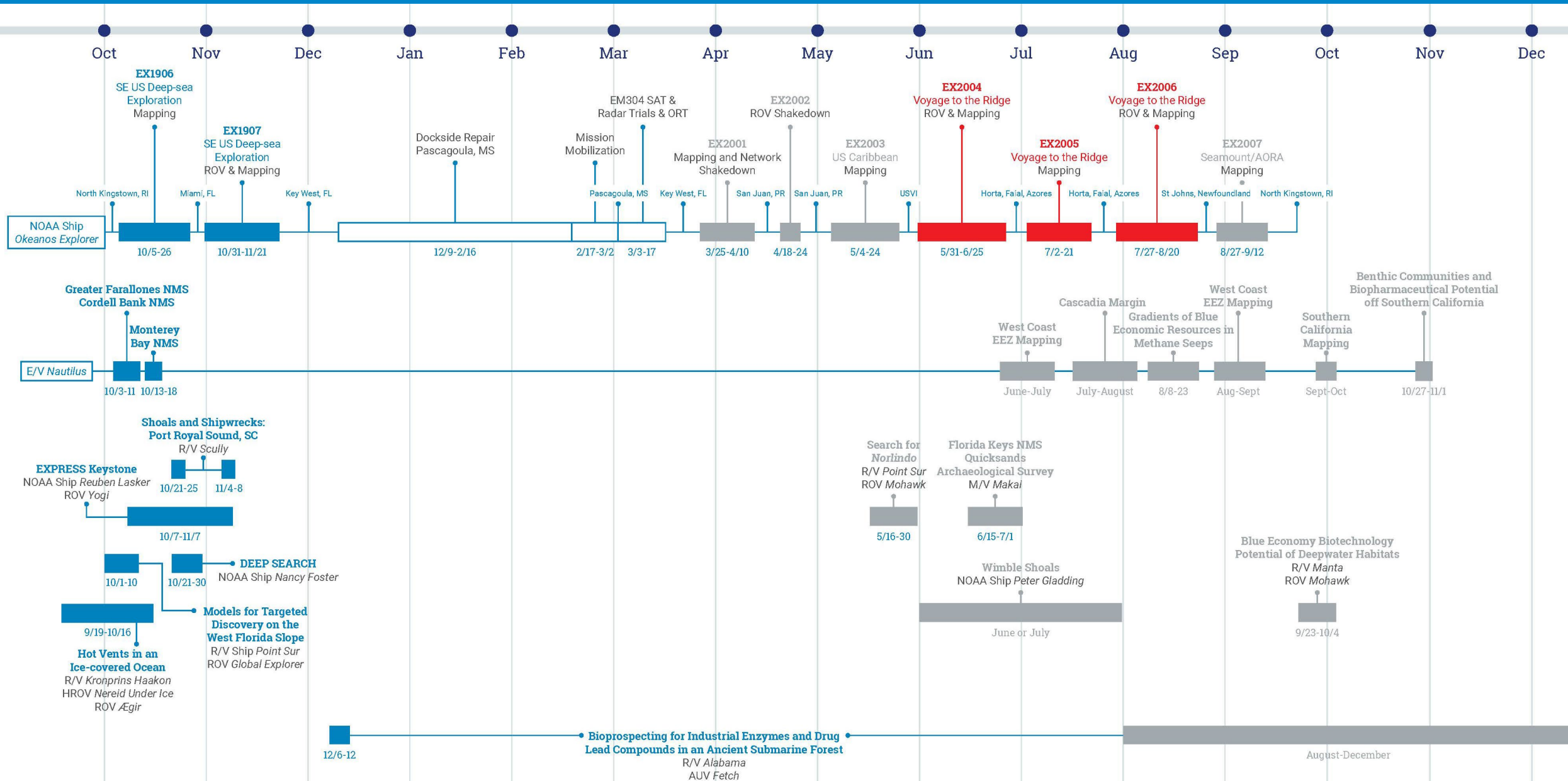
NOAA Office of Ocean Exploration and Research Update

Alan Leonardi, Director
Ocean Exploration Advisory Board
15th Meeting
April 8-9, 2020



Ocean Exploration
and Research

2020 Expeditions



ASPIRE EXPEDITIONS

Northern Neighbors: Transboundary Exploration of Deepwater Communities

June 2017, June 2019

NOAA NMFS/Dalhousie University, NOAA Ship *Henry B. Bigelow*

Northeast US Tech Demonstration

July 2019

NOAA OER, NOAA Ship *Okeanos Explorer*

Carolina Canyons

August 2016, August 2017

NOAA NMFS, NOAA Ship *Pisces*

DEEP SEARCH

2017-2019

BOEM/USGS/NOAA, Multiple Platforms

Blake Plateau Contract Mapping

Fall 2019

NOAA OER contract, *Fugro Brasilis*

Southeast US ROV and Mapping

Summer 2018, Spring 2019

NOAA OER/NMFS/ONMS, NOAA Ship *Okeanos Explorer*

US-Canada ROV and Mapping

Summer 2019

NOAA OER/ONMS, NOAA Ship *Okeanos Explorer*

High Seas Mapping

Summer 2020

NOAA OER, NOAA Ship *Okeanos Explorer*

Mid-Atlantic Ridge ROV and Mapping

Summer 2020

NOAA OER, NOAA Ship *Okeanos Explorer*

Southeast US ROV and Mapping

Fall 2019

NOAA OER/OCS, NOAA Ship *Okeanos Explorer*

US Southeast and Bahama Ridge Mapping

October 2018

NOAA OER/OCS, NOAA Ship *Okeanos Explorer*

ASMIWG Pilot Area Mapping

July 2018

NOAA OER, NOAA Ship *Okeanos Explorer*

US Caribbean ROV and Mapping

Fall 2018

NOAA OER/OCS, NOAA Ship *Okeanos Explorer*

US Caribbean Mapping

Spring 2020

NOAA OER/OCS, NOAA Ship *Okeanos Explorer*

Mid-Atlantic Ridge ROV and Mapping

Summer 2020

NOAA OER, NOAA Ship *Okeanos Explorer*

Mid-Atlantic Ridge Mapping

Summer 2020

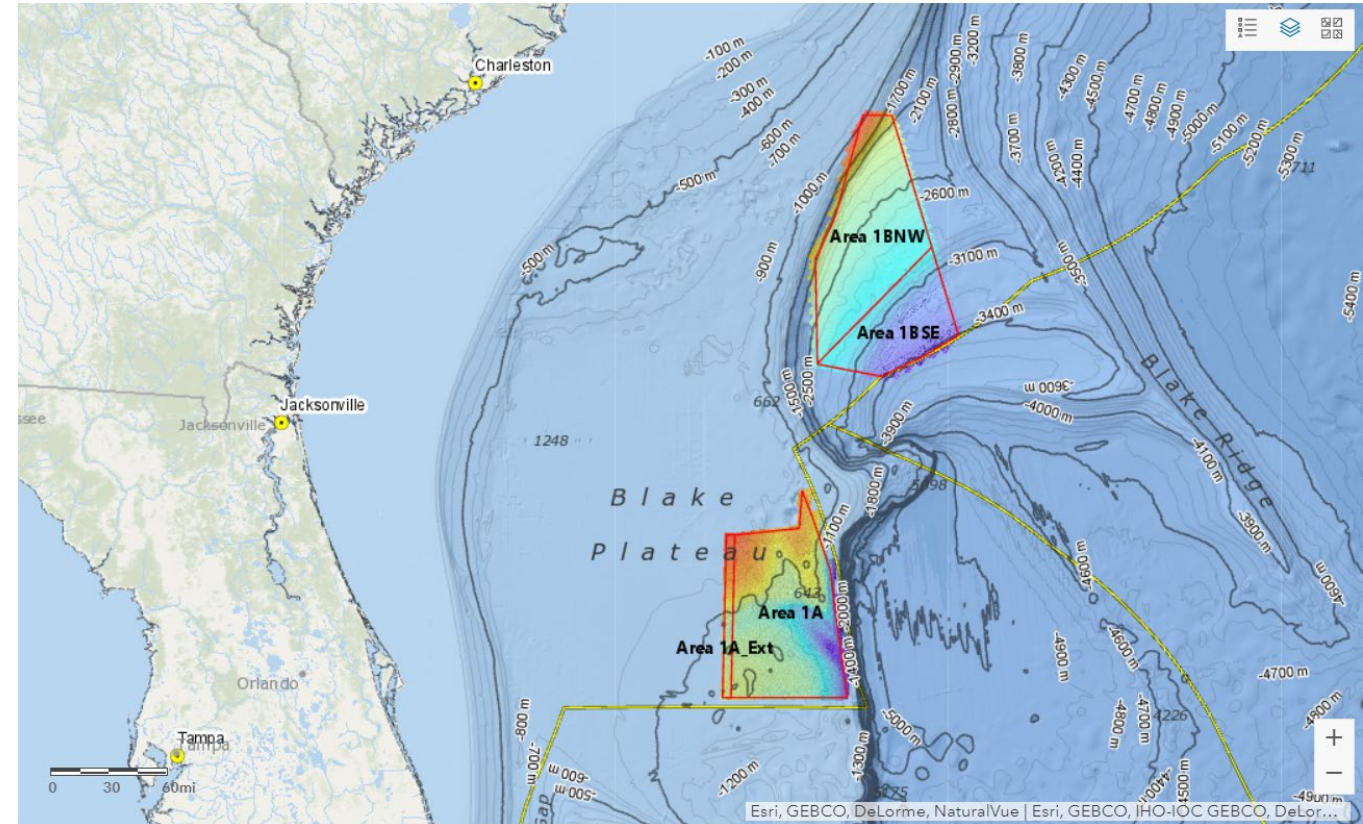
NOAA OER, NOAA Ship *Okeanos Explorer*

Last updated: 1/14/20

Atlantic Seafloor Partnership for Integrated Research and Exploration: Outcomes to Date



- Mapped over 282,000 square kilometers in support of NOAA goal of mapping U.S. EEZ by 2030
- Prioritized areas of interest to key partners and resource managers, including:
 - Southeast Deep Coral Initiative
 - South Atlantic Fishery Management Council
 - Northeast Canyons and Seamounts Marine National Monument
- Began Canadian and European collaborations for 2019-2020 expeditions
- Contracted Fugro to map ~27,000 square kilometers on Blake Plateau



Expeditions

National
Strategy

NOAA
Strategies

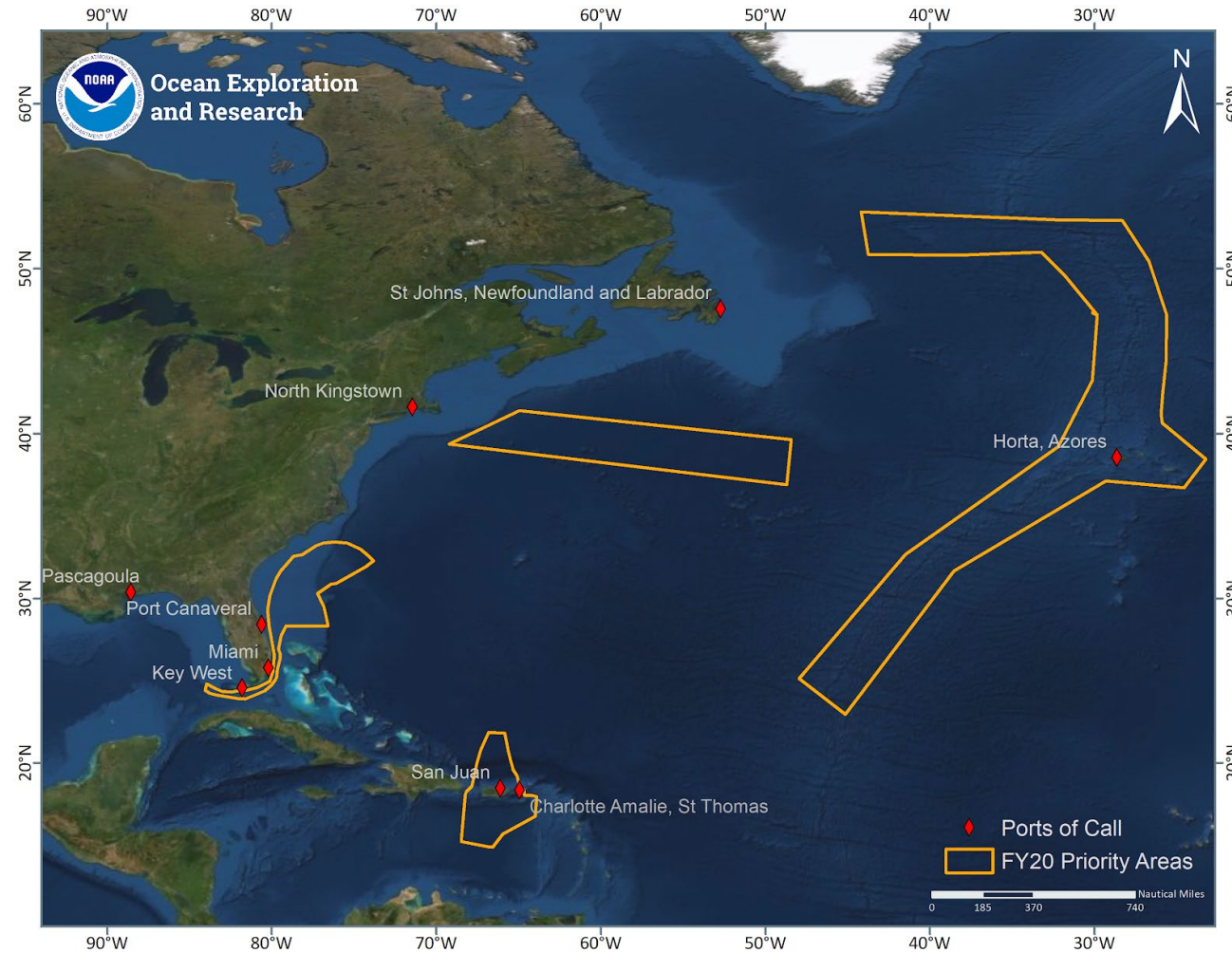
Grants and
Partnerships

Other OER
Updates



Ocean Exploration
and Research

Okeanos Explorer Draft 2020 Schedule



- 195 days at sea (~52% within U.S. EEZ /~47% international waters)
- Ship repairs completed successfully
- EM 304 installed and acceptance tests completed —upgrade sonar system
- Office of Marine and Aviation Operations on 30-day suspension of operations
- Caribbean Exploration Mapping (May)
- Voyage to the Mid-Atlantic Ridge (June-August)
- U.S.-Canada Mapping (September)

Voyage to the Ridge 2020

- Three cruises, ~70 days at sea
- Science objectives represent priorities from U.S., European, and Canadian federal agencies, international collaborators, nongovernmental organizations, and the broader science community
- Exploration will include hydrothermal vents, fracture zones, deep-sea coral and sponge habitats, rift zones, and areas inside International Seabed Authority lease blocks
- Region is of interest to inform understanding of connectivity of sensitive marine habitats across the Atlantic



Ocean Exploration Trust 2020 Expeditions

- Benthic Communities and Biopharmaceutical Potential off Southern California
- West Coast EEZ mapping
- Cascadia Margin
- Gradients of Blue Economic Resources in Methane Seeps
- West Coast EEZ Mapping
- Southern California Mapping



Expeditions

**National
Strategy**

**NOAA
Strategies**

**Grants and
Partnerships**

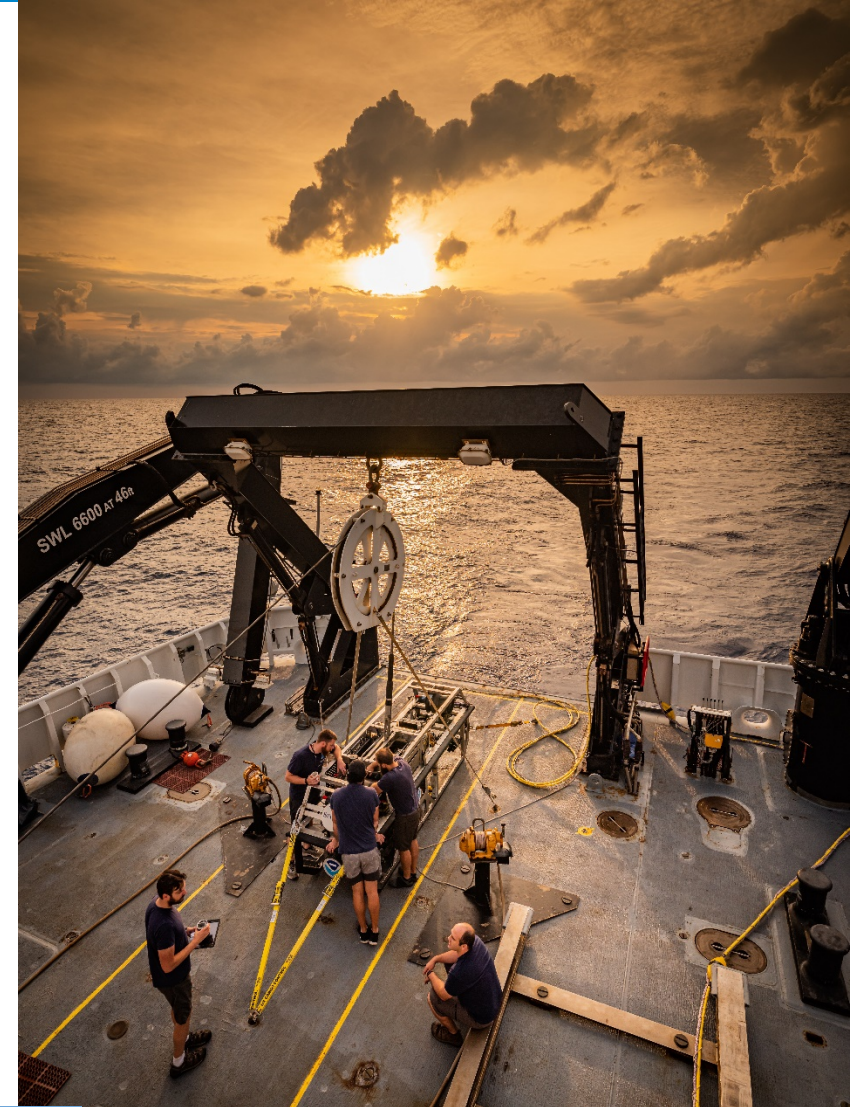
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Updates**



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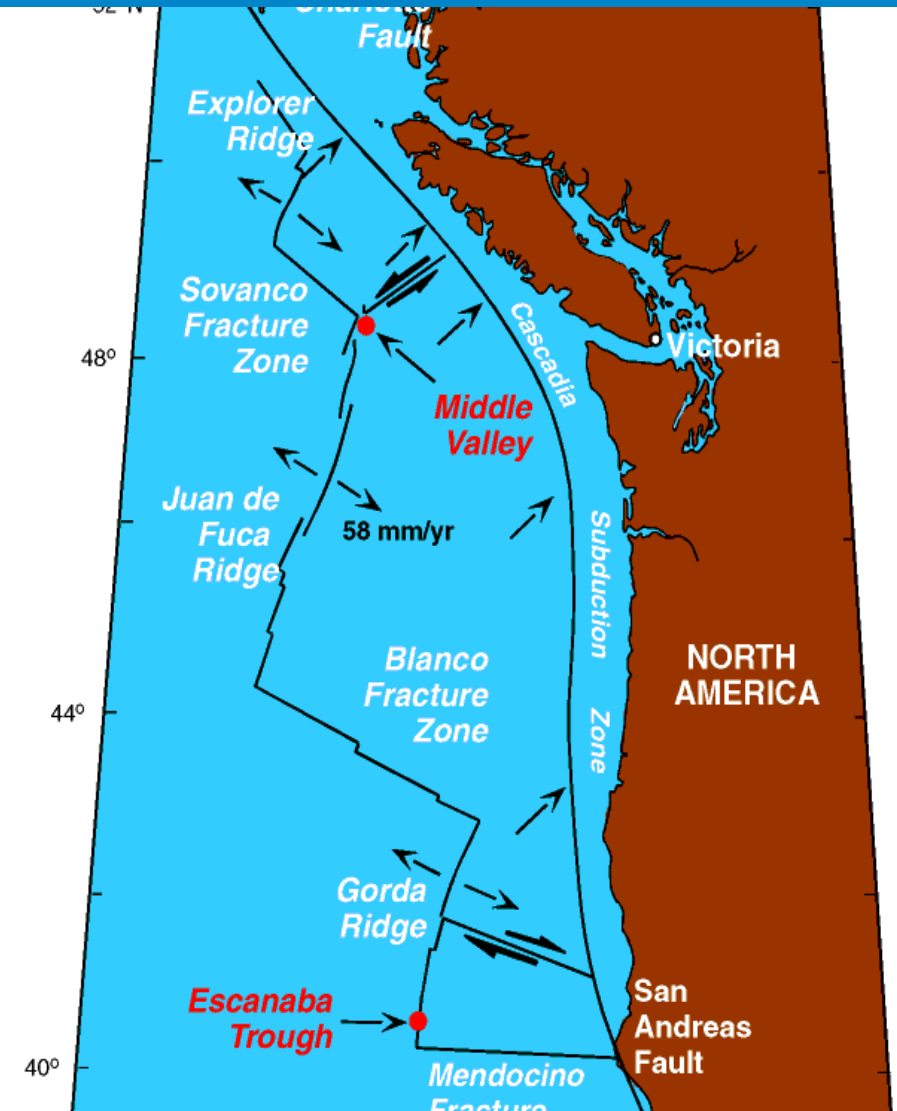
Opportunities in 2020 and Beyond

- 2020/2021 *Okeanos Explorer* priorities include:
 - U.S. Caribbean
 - Mid-Atlantic Ridge
 - U.S. Southeast
 - Corner Rise and New England Seamounts
 - Completing ASPIRE work with *Okeanos Explorer*
- *Okeanos Explorer* to transition from the Atlantic and into the Pacific in 2022
 - West Coast (EXPRESS), Alaska, and Pacific Islands— Campaign to Address Pacific monument Science, Technology, and Ocean Needs (CAPSTONE)
- E/V *Nautilus* and Mobile System
 - West Coast work in 2020 in support of EXPRESS
 - Extend and expand CAPSTONE



EXPRESS/NOPP Critical Minerals Expedition 2020

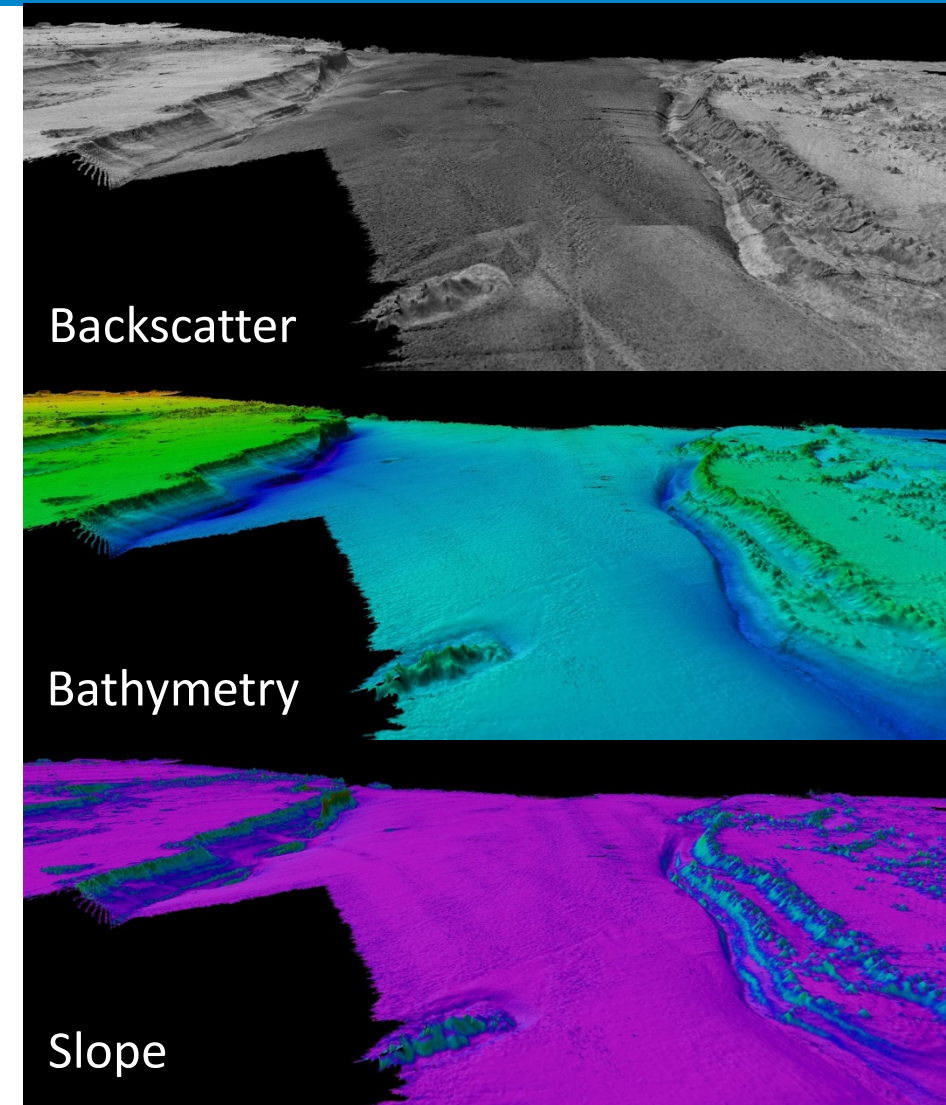
- September 2020: USGS, BOEM, and NOAA partnership on R/V *Roger Revelle* with ROV *Jason*
- Goal: Acquire baseline information on critical minerals within the U.S. Exclusive Economic Zone (EEZ) and their interactions with surrounding ocean environment, including hydrothermal vent and deepwater species
- Responsive to Executive Order 13817 Federal Strategy to Ensure Secure and Reliable Supplies of Critical Minerals

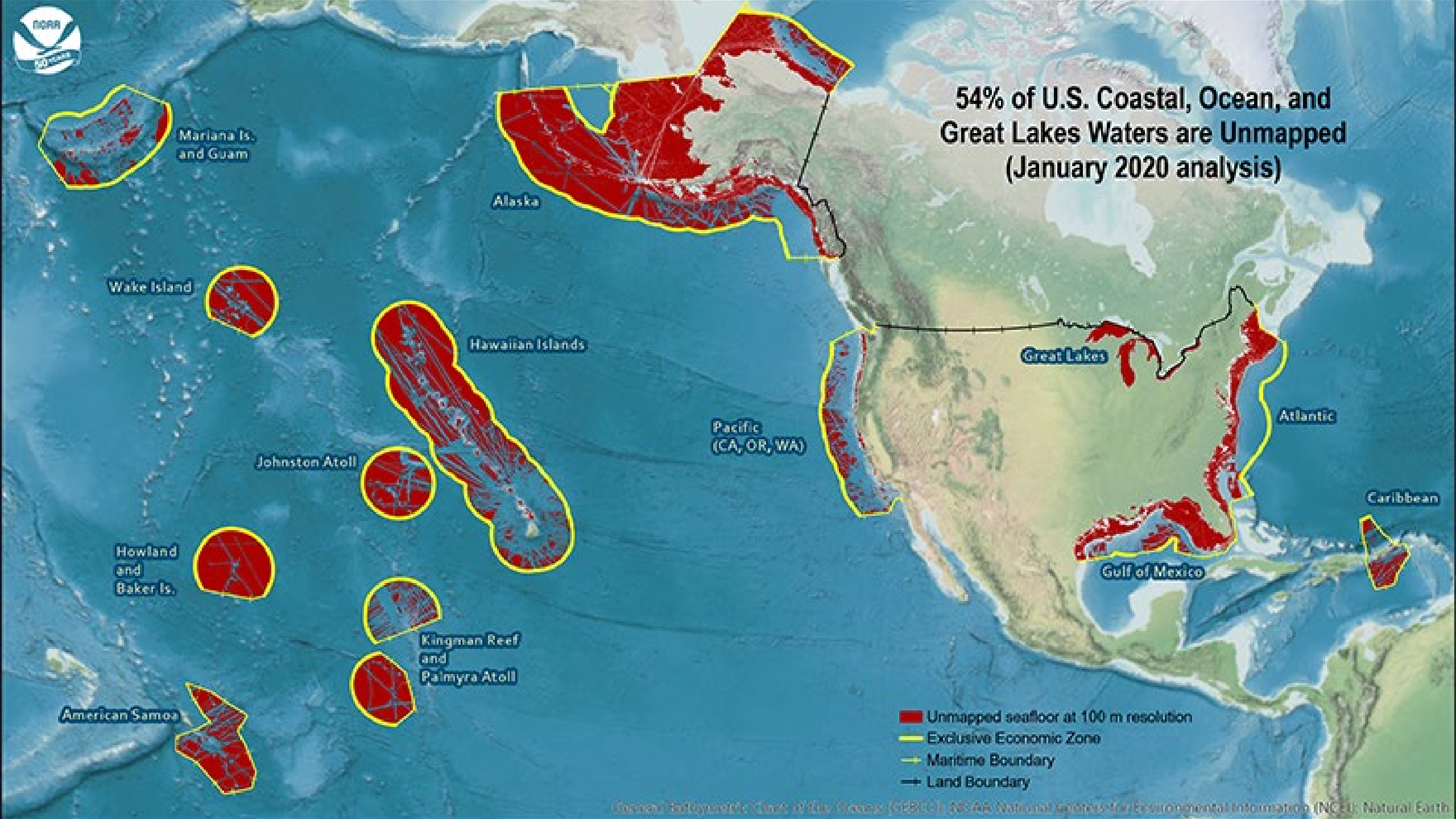


National Strategy for Mapping, Exploring, and Characterizing the U.S. Exclusive Economic Zone

Presidential Memorandum on Ocean Mapping of the United States Exclusive Economic Zone and the Shoreline and Nearshore of Alaska

- Develop a strategy to map the U.S. EEZ, to identify priority areas within the U.S. EEZ, and to explore and characterize the priority areas (Section 2)
- Develop a strategy to map the shoreline and nearshore of Alaska (Section 3)
- Identify opportunities/make recommendations to increase the efficiency of the permitting/authorization processes for ocean research, mapping, and characterization (Section 4)





54% of U.S. Coastal, Ocean, and Great Lakes Waters are Unmapped (January 2020 analysis)

- Unmapped seafloor at 100 m resolution
- Exclusive Economic Zone
- Maritime Boundary
- Land Boundary

Percent of U.S. Waters Still Unmapped in 2019

U.S. waters

Total Area = 3,592,000 square nautical miles (snm)

54%

57% - 2018

59% - 2017

1. Atlantic and Gulf of Mexico

Total Area = 472,200 snm

43%

48% - 2018

49% - 2017

2. Great Lakes

Total Area = 46,600 snm

95%

96%
2017
2018

3. Caribbean

Total Area = 61,600 snm

42%

44% - 2018

45% - 2017

4. Alaska

Total Area = 1,080,200 snm

72%

73% - 2018

74% - 2017

5. Pacific (CA, OR, WA)

Total Area = 239,700 snm

24%

29% - 2018

29% - 2017

6. Pacific Remote Islands & Hawaii

Total Area = 1,691,700 snm

50%

53% - 2018

55% - 2017

NOAA Science and Technology Strategies

NOAA Unmanned Systems Strategy Maximizing Value for Science-based Mission Support



NOAA Science & Technology Focus Areas:

Unmanned Systems • Artificial Intelligence • 'Omics • Cloud

February 2020

NOAA 'Omics Strategy Strategic Application of Transformational Tools



NOAA Science & Technology Focus Areas:

Unmanned Systems • Artificial Intelligence • 'Omics • Cloud

February 2020

NOAA Artificial Intelligence Strategy Analytics for Next-Generation Earth Science



NOAA Science & Technology Focus Areas:

Unmanned Systems • Artificial Intelligence • 'Omics • Cloud

February 2020

Draft NOAA Cloud Strategy Maximizing the Value of NOAA's Cloud Services



NOAA Science & Technology Focus Areas:

Unmanned Systems • Artificial Intelligence • 'Omics • Cloud

November 2019

Expeditions

National
Strategy

NOAA
Strategies

Grants and
Partnerships

Other OER
Updates



Ocean Exploration
and Research

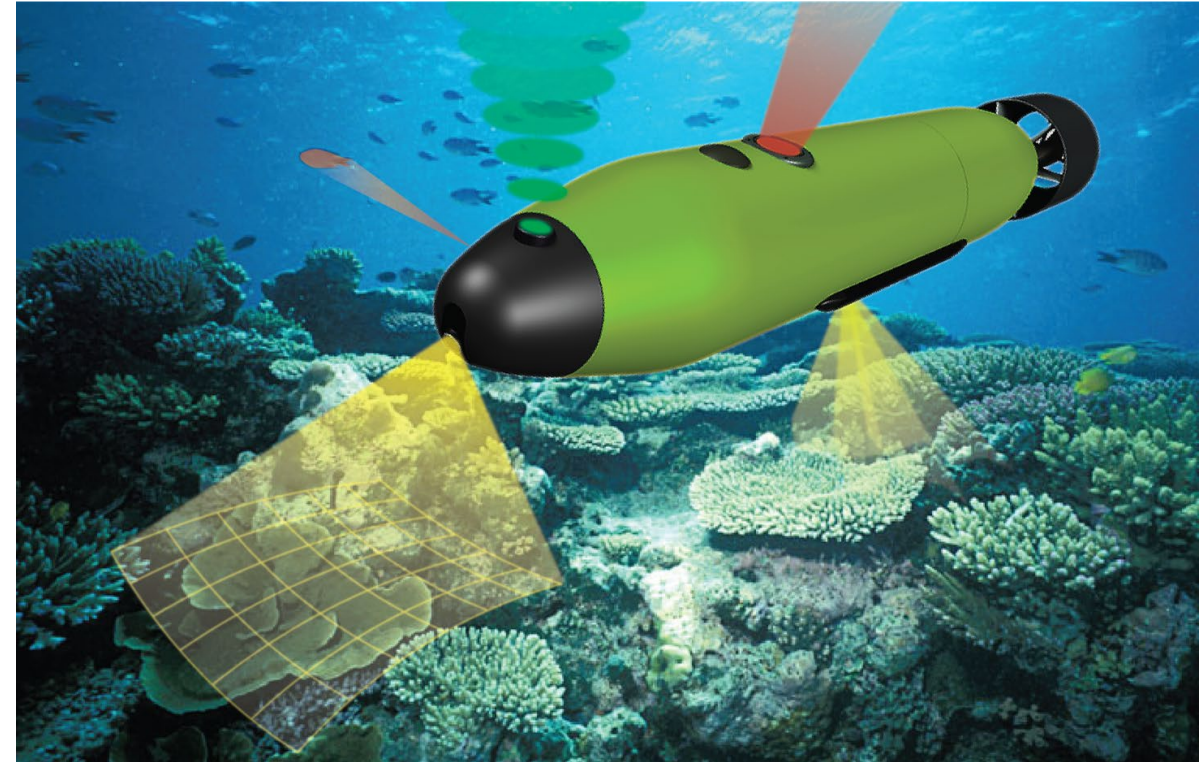
NOAA Unmanned Systems Update

- NOAA cross line office team to write Unmanned Systems Strategy implementation plan
- NOAA's Office of Marine and Aviation Operations received \$12M in FY 2020 to stand up unmanned systems operations within NOAA:
 - \$4M transferred to OAR to continue unmanned aircraft systems research and development
 - \$1.8M for an internal NOAA competition to fund unmanned systems projects
 - Funds for staff, including a GS15/O-6 level director
 - Funds for space leases in Gulfport, Mississippi



CENOTE Actions to Date

- NOAA/Navy senior staff/SES coordination group met three times in 2019 and is producing guidance documents for the new relationship
- NOAA and the Navy are revising memorandum of agreement annexes to allow for joint CENOTE work
- A NOAA Unmanned Systems Executive Oversight Board working group has drafted an initial CENOTE report to Congress



Competitive Grants for 2020

PI—Institution	Title
Daniel L. Distel—Northeastern University	Bioprospecting for Industrial Enzymes and Drug Lead Compounds in an Ancient Submarine Forest
James D. Spirek—South Carolina Institute of Archaeology and Anthropology, University of South Carolina	Shoals and Shipwrecks: Archaeological Explorations off Port Royal Sound, South Carolina
Arne R. Diercks—University of Southern Mississippi	The Search for Norlindo—The First World War II Casualty in the Gulf of Mexico
Lisa A. Levin/Paul Jensen—Scripps Institution of Oceanography/University of California, San Diego	Benthic Communities and Their Biopharmaceutical Potential Across Mineral-rich Biomes off Southern California
Joe Hoyt—NOAA Office of National Marine Sanctuaries	Wimble Shoals: An Exploration and Characterization of Submerged Cultural and Sediment Resources
Matthew Lawrence—NOAA Office of National Marine Sanctuaries	Florida Keys National Marine Sanctuary Quicksands Archaeological Survey
Andrew Thurber—Oregon State University	Gradients of Blue Economic Resources in and Around Deep-sea Methane Seeps
Amy E. Wright—Harbor Branch Oceanographic Institute, Florida Atlantic University	Exploring the Blue Economy Biotechnology Potential of Deepwater Habitats

Expeditions

National
Strategy

NOAA
Strategies

Grants and
Partnerships

Other OER
Updates



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Bioprospecting for Industrial Enzymes and Drug Compounds in an Ancient Submarine Forest



The New York Times

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Creatures in This Underwater Forest Could Save Your Life One Day

Before this 60,000-year-old submerged forest disappears, scientists recently raced to search for shipworms and other sea life that might conceal medicine of the future.

Expeditions

National
Strategy

NOAA
Strategies

Grants and
Partnerships

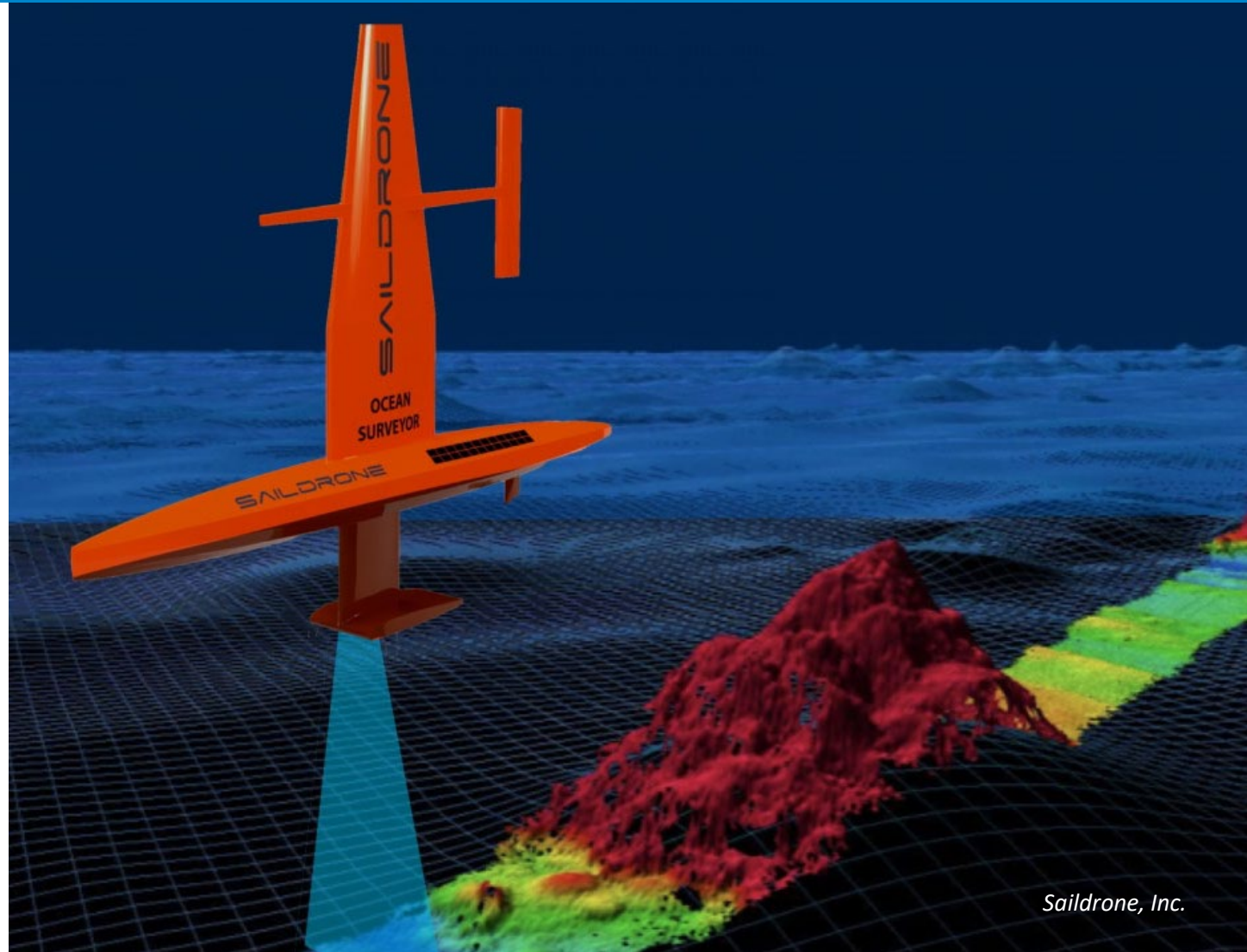
Other OER
Updates



Ocean Exploration
and Research

National Ocean Partnership Program (NOPP)

- The NOAA OAR NOPP line item for FY20 is approximately \$5M
- A NOPP Committee (the “NOPP-C”) was established under the NOAA Research Council to coordinate NOAA’s NOPP activities and provide guidance on the allocation of dedicated NOAA NOPP funds
- NOAA is soliciting projects across NOAA with selections to be made in April and funds applied May/June



FY20 NOAA NOPP Process: Focus Areas

- Regaining international leadership in numerical weather prediction
- Increasing American seafood production and competitiveness
- Powering the American blue economy through expanding ocean science partnerships in exploration and technological innovation
 - Through expanded use of transformative technologies such as unmanned systems, artificial intelligence, 'omics, and cloud computing



Ocean Exploration Cooperative Institute (OECI)

Field Program	OECI-Funded Portion	Area	Activity
Test Cruise (Ship TBD)	Woods Hole Oceanographic Institutions (WHOI) Field Equipment/Operations	Gulf of Mexico/ Continental Shelf, 134nm NW of Key West/Puerto Rico Trench	Test AUV interface w/ROV system; deploy ichthyoplankton imaging system to image midwater zone
USM Test Cruise <i>R/V Point Sur</i>	University of Southern Mississippi Field Equipment/Operations	Gulf of Mexico/Flower Garden Banks National Marine Sanctuary	Deploy AUVs to create bathymetric map and conduct series of mosaic maps
WHOI Test Cruise <i>R/V Point Sur</i>	Shiptime/WHOI Equipment/Operations	Gulf of Mexico/Flower Garden Banks National Marine Sanctuary	Test hybrid AUV visualization and sample collection capabilities
Ship of Opportunity Test Cruise	ShipTime/University of New Hampshire Field Equipment/Operations	TBD (likely Gulf of Mexico)	Acquire and test transportable, midwater multibeam mapping system (ASV)

Expeditions

National
Strategy

NOAA
Strategies

Grants and
Partnerships

Other OER
Updates



Ocean Exploration
and Research

New NOAA and OER Partnerships



Expeditions

National
Strategy

NOAA
Strategies

Grants and
Partnerships

Other OER
Updates

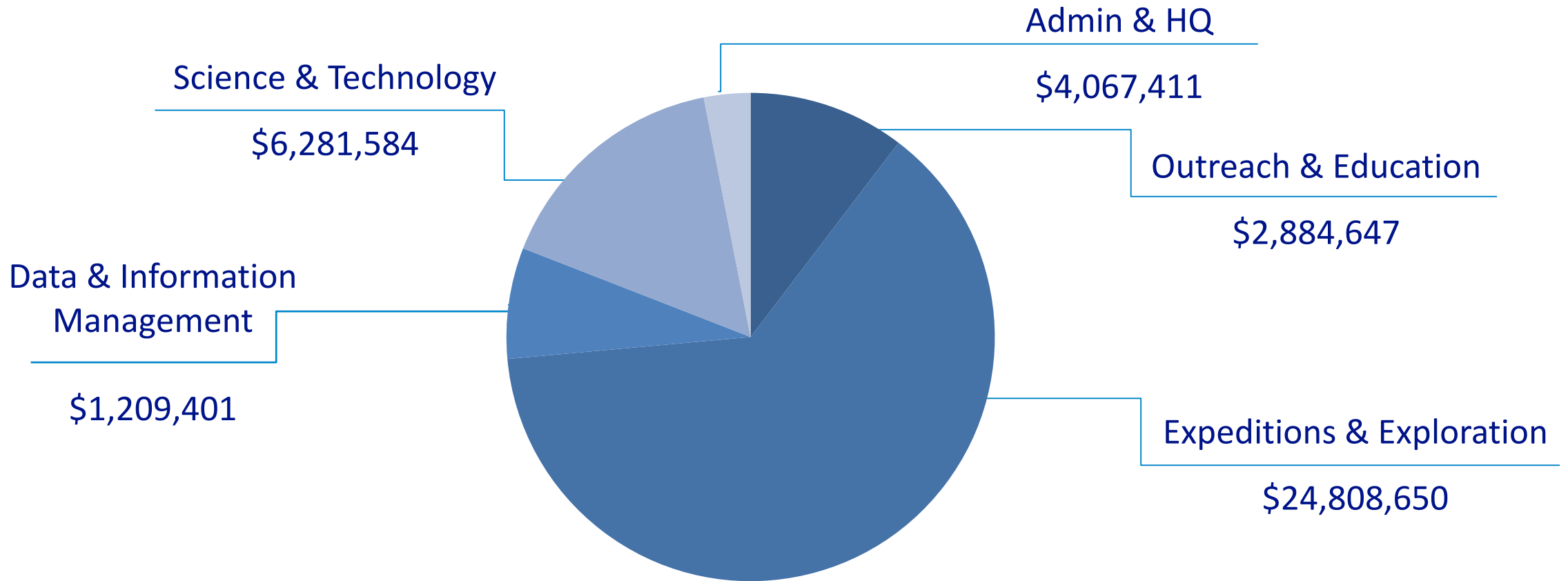


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Two New Oceanographic Vessels Will Join the NOAA Fleet



OER FY20 Budget*



TOTAL: ~ \$39.3 million

*Not final

Expeditions

National
Strategy

NOAA
Strategies

Grants and
Partnerships

Other OER
Updates



Ocean Exploration
and Research

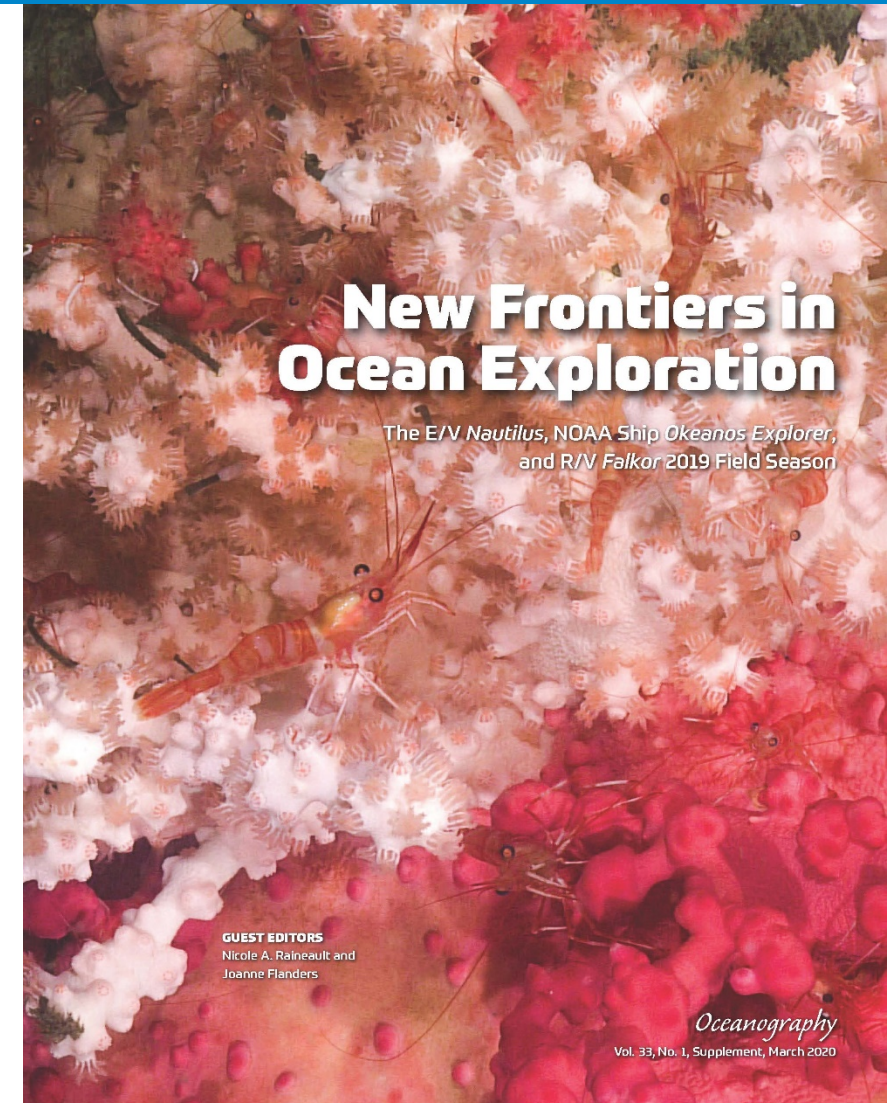
OER FY19-21 Budget Summary

Fiscal Year	Appropriation*	NOAA's Request*
2021	TBD	\$32,096
2020	\$42,000	\$19,638
2019	\$42,000	\$19,561

*Dollar amounts in thousands

More OER News

- OER hired Frank Cantelas as the Science and Technology Division lead
- OER hired new deputy to begin April 27
- OER released New Frontiers in Ocean Exploration (2019 field season)
- The OER Communications Team produced a 2020 communications strategy
- The OER Web Team is moving the OER website to the cloud
- The OER Education Team continues to respond to recommendations from the review



Expeditions

National
Strategy

NOAA
Strategies

Grants and
Partnerships

Other OER
Updates



Ocean Exploration
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Questions?

alan.leonardi@noaa.gov



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