Introduction to the Workshop

Dr. Jamie Austin, Workshop Moderator, NOAA OER





Workshop to Identify National Ocean Exploration Priorities in the Pacific Introduction

Moderator:

Dr. James Austin, University of Texas Institute for Geophysics - NOAA Office of Ocean Exploration and Research

> Co-Convenors: Admiral Jon White, Consortium for Ocean Leadership Dr. Alan Leonardi, NOAA Office of Ocean Exploration and Research

With profound thanks for support and organization:

Ms. Kristen Yarincik, Mr. Daniel Rogers, Ms. Katie Fillingham - Consortium for Ocean Leadership





A bit of history:

- 2014 Ocean Exploration Trust (OET) Workshop "Telepresence-Enabled Exploration of the Eastern Pacific Ocean" (white papers submitted prior to that meeting available for this workshop)
- 2015-2017 "Campaign to Address Pacific monument Scie Technology and Ocean Needs" (CAPSTONE) (OKEANOS EX FALKOR [Schmidt Ocean Institute])
- 2015-2019 OET operations off the U.S. west coast, the P Northwest and across the Pacific Basin (NAUTILUS)







November 19, 2019 – Presidential Memorandum on Ocean Mapping of the United States Exclusive Economic Zone and the Shoreline and Nearshore of Alaska (building from the White House summit on Partnerships in Ocean Science and Technology)

- To improve our Nation's understanding of our vast ocean resources and to advance the economic, security, and environmental interests of the United States, it is the policy of the United States to support the conservation, management, and balanced use of America's oceans by exploring, mapping, and characterizing the U.S. EEZ, including mapping the Arctic and Sub-Arctic shoreline and nearshore of Alaska.
- Within 180 days of the date of this memorandum, the Ocean Policy Committee, working through its Ocean Science and Technology Subcommittee and in coordination with the Administrator of the National Oceanic and Atmospheric Administration, shall develop a proposed strategy to map the U.S. EEZ, to identify priority areas within the U.S. EEZ.



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NATIONAL STRATEGY FOR MAPPING, EXPLORING, AND CHARACTERIZING THE UNITED STATES EXCLUSIVE ECONOMIC ZONE

NATIONAL STRATEGY FOR MAPPING, EXPLORING, AND CHARACTERIZING THE UNITED STATES EXCLUSIVE ECONOMIC ZONE

> Prepared by the OCEAN SCIENCE AND TECHNOLOGY SUBCOMMITTEE of the

OCEAN POLICY COMMITTEE

Ideally, the report from this workshop would have preceded publication of the national strategy, but...

...we can now use the national strategy to help guide us in our workshop discussions between now and September.

June 2020





- Original workshop an in-person exercise to be held in DC at COL in late Marchearly April...
 - 1. About 40 participants, with good representation from federal agencies, academia and the private sector.
 - 2. 40 white papers detailing desired areas/topics for OE activities in the Pacific basin (in addition to availability of white papers submitted for the 2014 workshop).
- That has been replaced by the "hybrid" model we are presently following a virtual plenary (today), followed by a series of virtual breakout discussions, arranged broadly by discipline (to be discussed shortly, to take place in July-August), and what we originally thought would be a final "in-person" event in mid-September. Unfortunately, that in-person event is at the moment unlikely; it will be replaced by another virtual exercise at the same time.
 - 1. The good news is that the participants' list has actually increased, to more than 50, without sacrificing expertise + diversity of background...
 - 2. Thank you!
- Report deadline likely sometime in October, 2020.





- Following today's plenary, we will conduct five virtual breakout discussions over the
- next ~2 months:
- 1. Biology Characterization Amanda Demopoulos (USGS) and Daniel Wagner (Conservation International)
- 2. Seafloor Characterization Larry Mayer (CCOM/UNH) and David Millar (Fugro)
- 3. Water Column Characterization Mike Vecchione (NOAA NMFS NSL) and Nicole Raineault (OET)
- 4. Marine Resources Jeremy Potter (BOEM) and Ruth Perry (Shell)
- 5. Cultural Heritage Jim Delgado (SEARCH, Inc.) and Cameron Hume (Chair, OEAB + former ambassador)
- In addition to the breakout co-leads, each discussion group will have ~12 participants, along with observers from the participants list, NOAA OER, and others.
- Each breakout discussion will focus on: <u>what</u> OE should do in the Pacific, <u>how</u> desired mapping and characterization will take place, the <u>technologies</u> to be used, and the <u>partnerships</u> envisioned. Facets of a national OE program will also be discussed.
- Each discussion will be summarized in preparation for the wrap-up session in September.





The September meeting will:

- Hear and discuss results from the breakout sessions.
- Get updates on the status of OE funding based upon continued deliberations concerning the published national strategy.
- Consider inclusive and equitable partnerships in the Pacific and beyond.
- Discuss the format and content of the workshop report, and decide on a timeline for its development and publication.





Questions? Comments?

https://docs.google.com/forms/d/e/1FAIpQLSdUC4VXbZj MTaudI-9nudj7u0xUW4bN8Qaui24BIvGtnwbE5g/viewform?usp=sf _link

Remarks

Dr. Alan Leonardi, Director, NOAA OER





Ocean Exploration and Research

NOAA

Returning to the Pacific

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Ocean Exploration: A "New" Imperative

- E.O. 13817: A Federal Strategy to Ensure Secure and Reliable Supplies of Critical Minerals
- E.O. 13840: Ocean Policy to Advance the Economic, Security, and Environmental Interests of the U.S.
- Science and Technology for America's Oceans: A Decadal Vision
- White House Summit on Partnerships in Ocean Science and Technology
- Presidential Memorandum on Ocean Mapping of the United States Exclusive Economic Zone and the Shoreline and Nearshore of Alaska



Recent Strategies and Recommendations

National Strategy for Mapping, Exploring, and Characterizing the United States Exclusive Economic Zone

Mapping the Coast of Alaska: A 10-year Strategy in Support of the United States Economy, Security, and Environment

Recommendations for Increasing the Efficiency of Permitting for Ocean EXploration, Mapping, and Research Activities



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Gaps Mapping





Ocean Exploration: An Exponential Task

- Collect high-resolution bathymetry in areas with no (or lowquality) data
- Identify, map, and explore the diversity and distribution of benthic habitats and resources
- Investigate deep ocean biogeographic patterns and connectivity
- Collect data to better understand the characteristics of the water column and the fauna that live there
- Acquire data to support priority science and management needs



Exploration Campaigns



A series of expeditions over multiple years to a geographic area or theme of **exploration priority** interest



Complementary expeditions using a wide variety of platforms, technologies, and strategies



Package of **data and information sharing** across platforms serves as foundation of environmental intelligence



Robust **engagement** in education and outreach efforts are integral activities



Partners focus messaging on the breadth of work



Nested Approach to Expedition Planning

CAMPAIGN

The highest level is development of a Campaign in an operating region or basin focused on themes, agreements, or interests of key partners that connect multiple expeditions and platforms in support of common goals

COMMUNITY WORKSHOP

Conduct a community workshop to identify exploration priorities, themes, and partners in a region

CONSULTATIONS

Expeditions require the Expedition Manager to identify and consult with key partners in the region to understand their priorities, data needs, and interests

CALL FOR INPUT

+

A "Call for Input" to solicit general mapping, CTD, and ROV dive targets in the operating area from the science and management community

EXPEDITION PARTICIPATION

Any interested scientist, student, or manager with a relevant expertise is invited to join the expedition science and participate in the cruise and cruise planning meetings



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Existing Partners and Platforms









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Emerging Partners and Platforms





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NOAA S&T Strategies & Priorities





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In Summary: A Rich Opportunity

- There is general consensus on the need for ocean mapping, exploration, and characterization
- Administration and Congressional support mean legislation and needed budgets are possible
- Advances in technology mean cost is dropping while capability is increasing
- Convergence of institutions, stakeholders creates opportunities for leverage and partnership







Alan P. Leonardi, PhD Director, OER alan.leonardi@noaa.gov

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Ocean Exploration and Research

Cultural Heritage Breakout Introduction

Dr. Jim Delgado, SEARCH Inc.

UNDERWATER CULTURAL HERITAGE IN THE PACIFIC

James P. Delgado, Ph.D. Senior Vice President SEARCH, Inc.









The Pacific is the setting for some of the greatest human voyages of exploration and settlement.



The shores were where people settled and were sustained; indigenous cultures know this and remember their ancestors.











Europeans opened the Pacific to the world and changed it.



The Pacific was key to the global economy and it remains so to this day.

A vast assemblage of maritime activity rests at the bottom of the Pacific.

The white papers for this workshop are a small, but a very significant sampling.



The 20th century has left the largest number of wrecks.





Shipwrecks in shallow and deeper water speak to commerce, war, immigration, trade, and many other themes in history. They span a variety of cultures and nations.



The last decade has seen the greatest number of new discoveries and finds at greater depths.




















These discoveries make headlines, captivate the public, and connect people to the oceans. They "sell" ocean exploration.







Some shipwrecks help address difficult pasts and heal old wounds.



Not everyone wants every shipwreck to be "found" and shared.











The shorelines of the last Ice Age, now submerged, can rewrite the history of human settlement of the Americas. While one proposal addresses Beringea, there are other drowned shorelines ringing the Pacific. They are significant.





Some of the most significant wrecks will be difficult to find. We need to find them.





All exploration is human exploration. All discovery is human discovery. What can our discoveries tell us about humans?

The Pacific reflects thousands of years of interaction.

Our earliest history lies under water from the beaches to the 100-m level.

Exploration and characterization must engage with living human cultures, societies, and groups.

Not all underwater cultural heritage relates to shipwrecks.

Discoveries often happen by accident; we need to be prepared to act when we find cultural heritage.

Not every find should be openly shared or openly mapped.

Underwater cultural heritage often provides the "money shot" in addition to scientific, archaeological, and historical discoveries.

Don't leave "home" without us and keep us on speed dial.

Seafloor Characterization Breakout Introduction

David Millar, Fugro

Seafloor Characterization – Boundaries / Scope



Large Scale Mapping

- Bathymetry
 - Morphology
 - Roughness
 - Dynamics/Hazards
 - Cultural Heritage
- Seafloor Backscatter
 - Substrate
- Water Column
 - Gas seeps
 - Biological Targets
 - Oceanography



Medium Scale Mapping

Bathymetry

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- Morphology
- Roughness
- Dynamics/Hazards
- Cultural Heritage
- Seafloor Backscatter
 - Substrate
- Water Column
 - Gas seeps
 - Biological Targets
 - Oceanography
- + cm-scale 3D imagery & morphology



Fine Scale Mapping

- Bathymetry
 - Morphology
 - Roughness
 - Dynamics/Hazards
 - Cultural Heritage
- Seafloor Backscatter
 - Substrate
- Water Column
 - Gas seeps
 - Biological Targets
 - Oceanography
- + mm-scale 3D imagery & morphology



Sampling

- Grab Sampling
- Coring
- Drilling





Seafloor Characterization – Agenda

<u>Day 1</u>

Hour 1: Data and Capabilities

- Existing data requirements (at the appropriate scales)
- Existing collection capabilities (technologies, platforms, etc.)
- New data types
- New collection capabilities (technologies, platforms, etc.)

Hour 2: Partnerships

- Existing partnerships
- New partnerships

<u>Day 2</u>

Hour 1: Blue Economy

 Relevance / importance to sustainable Blue Economy

Hour 2: National Program

- Informing implementation of national program
- Benefits of National Program versus regionally managed programs
- Regional needs and geographic priorities





Biology Characterization Breakout Introduction

Dr. Amanda Demopoulos, USGS



Biological Characterization

Amanda Demopoulos (USGS) Daniel Wagner (Conservation International)



Bathyal biogeographic provinces

BY7

BY8

BY5

BY2

B

BY:

BY14

BY9

Abyssal biogeographic provinces

Watling et al 2013

AB13

AB11

AB7

What to do?



How to characterize?















What are the essential partnerships and who is missing?

How do we engage and include new partners, stakeholders?

Water Column Characterization Breakout Introduction

Dr. Mike Vecchione, NOAA NMFS NSL



Exploring in 4 dimensions Drivers light temperature oxygen no place to hide

Interactions with bottom

Webb TJ, Vanden Berghe E, O'Dor R (2010) Biodiversity's Big Wet Secret: The Global Distribution of Marine Biological Records Reveals Chronic Under-Exploration of the Deep Pelagic Ocean. PLoS ONE 5(8): e10223. doi:10.1371/journal.pone.0010223

Unexpected animals and behaviors





From Surface to Seafloor Exploration of the Water Column March 4-5, 2017



U.S. Department of Commerce National Oceanic and Atmospheric Administration Oceanic and Atmospheric Research Ocean Exploration and Research

NOAA Technical Memorandum OAR OER; 003 June 2018 DOI: https://doi.org/10.25923/mjx-vn79

- (1) refinement of seminal questions and key regions,
- (2) reconnaissance from longterm research monitoring tools,
- (3) technology development guided by the seminal questions,
- (4) dedicated midwater cruises with intensive sampling,
- (5) improvements to sample processing, data management, and analyses,
 (6) contribution to a global
- (6) contribution to a global rapid response network.

Water Column Discussion Objectives:

Identify Data Gaps Strategies, methods & tools for collecting baseline data Partnerships Regional priorities

Marine Resources Breakout Introduction

Jeremy Potter, BOEM

Marine Resources Break-out Group:

How can exploratory efforts inform a collective understanding of energy and mineral resources in U.S. Pacific waters?

Jeremy Potter & Ruth Perry

Marine Resources Break-out Group Co-Leads

Workshop to Identify National Ocean Exploration Priorities in the Pacific - Plenary

Washington, D.C. | July 10, 2020

Fundamental Questions: What? Where? How?

- What can we do through exploration to inform the identification and characterization of marine resources in U.S. waters?
- How do we make exploratory work more impactful to improving understanding of marine resources through public-private collaboration or other mechanisms?



Global Foundation for Ocean Exploration

Eifuku Dive 8 Daikoku Dive 9 S Daikoku **Chamorro Dive 7**

Scope of Marine Resources Break-out Group:

Focus on energy and minerals

- Oil, gas, offshore wind, methane hydrates
- Manganese nodules, ferromanganese crusts, seafloor massive sulfide deposits
- Limited discussion of marine genetic resources
- Exploration of resources and associated habitats
 - Marine Resources Greater focus on resources
 - Other Groups Greater focus on habitats
- Coordinating, leveraging & emphasizing relevant discussions from the other break-out groups



Framework for Session: Progression to Address Info Needs



- Exploration preliminary characterization of biological and physical environment
- Resource Characterization lab and data analysis implemented effort explicitly to identify extent and type of resource
- Resource Assessment detailed field and data analysis effort focused on the valuation of a resource. It is systematic, and more rigorous than a characterization

Session Specifics:

Resource Identification and Management

- What are the information needs?
- Where are the geographic priorities?
- Which technology do we need?

Partnerships to Inform Marine Resources

- Relevant recent or ongoing efforts
- Onique & innovative opportunities to capture
- How can we leverage the National Strategy?
- Each session will kick-off with lightning talks to set the discussion stage



Ocean Exploration Trust



Bruce Strickrott, WHOI

July 10, 2020

White Papers: Through a 'Marine Resources' Lens.

	COL 2020 (45)	OET 2014 (78)
TOTAL	23	14
US PACIFIC EEZ	19	6
CRITICAL		
MINERALS	16	8
OIL & GAS	5	2
RENEWABLE	1	1
HYDRATES	9	6
RESOURCE		
FOCUS	11	3



Vulcan



MBARI

Workshop to Identify National Ocean Exploration Priorities in the Pacific - Plenary

July 10, 2020

Breakout Group Members: July 30 and July 31

FIRST	LAST	ORGANIZATION
Bob	Ballard	Ocean Exploration Trust
Johan	Bergenas	Vulcan Inc.
Tom	Drake	ONR
Amy	Gartman	USGS
Jim	Kendall	BOEM
Brian	Kennedy	Boston University
Beth	Orcutt	Bigelow Laboratory for Ocean Sciences
Ruth	Perry	Shell (Co-Lead)
Jeremy	Potter	BOEM (Co-Lead)
Chris	Scholin	Monterey Bay Aquarium Research Institute
Hans	Smit	Ocean Minerals LLC
Janet	Watt	USGS





Workshop to Identify National Ocean Exploration Priorities in the Pacific - Plenary

July 10, 2020



Ruth Perry ruth.perry@shell.com

Jeremy Potter jeremy.potter@boem.gov

Inclusive and Equitable Partnerships in the Pacific and Beyond

Dr. Jamie Austin, Workshop Moderator, NOAA OER





Inclusive and Equitable Partnerships in the Pacific and Beyond

Dr. James Austin

University of Texas Institute for Geophysics – NOAA Office of Ocean Exploration and Research





Some historical perspective, and a renewed national focus on diversity, equity and inclusion (DE&I):

- Recent examples of racial injustice in the U.S. have galvanized the public, leading to strident calls for increased awareness and the need for change. Science must be part of this awareness.
- *The good news:* NOAA OER has consistently incorporated DE&I perspectives into its thinking and operations:
 - 1. Publication of the "All Hands on Deck" report (<u>https://oceanexplorer.noaa.gov/news/oer-updates/2018/2018-forum.html</u>) as part of the 2018 National Ocean Exploration Forum.
 - 2. OET, in particular, has always showcased DE&I in its presence, staffing, operations,...
 - 3. The OEAB is developing a position statement on D&I for NOAA leadership.
 - 4. The just-published National Strategy for mapping, exploration and characterization in the U.S. EEZ points to the value of enhancing inclusion in OE (section 5.3).
- The cautionary note: our OE shareholders can do more...to include a wide variety of communities (e.g., underrepresented minorities in STEM and ocean science, small island nations, indigenous populations in Alaska and elsewhere) in future OE activities and initiatives, in the Pacific and elsewhere. Pete Girguis (Harvard) has recently called a lack of diversity unacceptable at every level, leading to "compromised science".




- Our original intent, as part of this opening plenary, was to include a DE&I discussion panel, to raise awareness of how OE shareholders can engage and incorporate underrepresented communities into our ongoing work in the Pacific (and beyond, as we envision a national effort):
 - 1. We sought appropriate panelists, worked on discussion topics,...
 - 2.but ultimately decided that time was too short, and the overall topic too important, to do potential harm to a subject that requires a vital, continuing discussion through inadequate lip service.
 - 3. So...the organizers ask that this topic instead be included, to the degree possible, in all breakout discussions over the next couple of months:
 - What engagement strategies with these communities are necessary and appropriate as Pacific exploration moves forward?
 - Which elements of these strategies can be applied to a national OE program, should one develop?
- Our overall intent now is to use breakout discussions to help us put together a DE&I panel over the summer, for a substantive discussion of this topic during the September plenary. And that results of all discussions on this important initiative be included in the final report.



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Questions? Comments?

Workshop Timeline and Concluding Remarks

Dr. Jamie Austin, Workshop Moderator, NOAA OER COL staff





Workshop Timeline

- July 10 opening virtual plenary
- Virtual breakout discussions:
 - July 22 (1-3 PM EDT) and July 24 (1-3 PM EDT) Cultural Heritage
 - July 28 (1-3 PM EDT) and July 29 (3-5 PM EDT) Seafloor Characterization
 - July 30 (1-3 PM EDT) and July 31 (3-5 PM EDT) Marine Resources
 - August 7 (1-3 PM EDT) and August 11 (3-5 PM EDT) Water Column Characterization
 - August 10 (1-3 PM EDT) and August 13 (1-3 PM EDT) Biology Characterization

(Draft reports of breakout discussions will be available in time for the closing plenary.)

- September 16-17 closing <u>virtual</u> plenary (dates may shift + times of day TBD)
- Publication of the workshop report ~October 2020.





Concluding Remarks

- This workshop builds on momentum created by the 2014 Pacific (OET) workshop, and successful Pacific OE expeditions (CAPSTONE, OET, SOI).
- Timing coincides constructively with publication of the National Strategy for the U.S. EEZ, and generation of the Blue Economy subcommittee report to the OEAB.
- Beyond developing a continuing strategy for OE within the Pacific basin (particularly within the U.S. EEZ), workshop results will begin to outline a national program of OE worldwide, in expectation that additional resources will become available.