UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NOAA Marine and Aviation Operations
Marine Operations Center
439 W. York Street
Norfolk, VA 23510-1114

MEMORANDUM FOR: Commander Mark Wetzler, NOAA
Commanding Officer, NOAA Ship *Okeanos Explorer*

FROM: Captain Anne K. Lynch, NOAA
Commanding Officer, NOAA Marine Operations Center-Atlantic

SUBJECT: Project Instruction for EX-15-04 Leg 3
CAPSTONE NWHI Exploration Leg III

Attached is the final Project Instruction for EX-15-04 Leg 3, CAPSTONE NWHI Exploration Leg III, which is scheduled aboard NOAA Ship *Okeanos Explorer* during the period of August 28 – September 3, 2015. Of the 7 DAS scheduled for this project, 0 DAS are funded by OMAO allocations, 7 DAS are funded by a NMFS Line Office Allocation, 0 DAS are Program Funded, and 0 DAS are other agency funded. This project is estimated to exhibit a High Operational Tempo. Acknowledge receipt of these instructions via e-mail to **OpsMgr.MOA@noaa.gov** at Marine Operations Center-Atlantic.

cc:
Deputy Director, Office of Ocean Exploration & Research
Expedition Coordinator, Office of Ocean Exploration & Research

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I. OVERVIEW

A. Brief Summary and Project Period

From July to September 2015, NOAA Ship *Okeanos Explorer* will conduct four telepresence-enabled ocean exploration cruises as part of the "Hohonu Moana: Exploring the Deep Waters off Hawai'i" Expedition. These cruises will collect critical baseline information to meet NOAA science and management needs within the Hawaiian Archipelago and Johnston Atoll.

This document contains project instructions for EX-15-04 Leg III, the second ROV cruise of the 2015 Hohonu Moana Expedition. Operations for this cruise will include ROV, mapping, CTD rosette and telepresence-based remote participation. The expedition will be staged in and out of Pearl Harbor, HI with operations beginning on August 28th and concluding on September 3rd. Operations will use the ship's deep water mapping systems (Kongsberg EM302 multibeam sonar, EK60 split-beam fisheries sonar, and Knudsen 3260 chirp sub-bottom profiler sonar), NOAA's two-body 6000 m remotely operated vehicle (ROVs *Deep Discoverer* and *Seirios*), CTD rosette, and the ship's high-bandwidth satellite connection for real-time ship to shore communications. Daytime ROV dives are planned every day from August 28 to September 3. ROV dives will include high-resolution visual surveys, instrument recoveries, and limited rock and biologic specimen sampling. Mapping operations will be conducted overnight and when the ROV is on deck. CTD casts are not currently planned, but may be requested during the cruise to collect more environmental information at sites of interest. This cruise will collect data and information in support of NOAA's Deep Sea Coral Research and Technology Program, and will help establish a baseline of information in the region to catalyze further exploration, research and management activities.

NOAA Ship *Okeanos Explorer* systematically explores the ocean every day of every cruise to maximize public benefit from the ship's unique capabilities. With 95% of the ocean unexplored, we pursue every opportunity to map, sample, explore, and survey at planned destinations as well as during transits; "Always Exploring" is a guiding principle. An integral element of *Okeanos Explorer*'s "Always Exploring" model is the ship's seafloor and water column mapping capabilities. All three mapping sonars (EM 302, EK 60, Knudsen sub-bottom) will be operational on all transits during this expedition for 24-hour seabed, water column, and sub-bottom data collection and selected processing.

As a telepresence-enabled ROV cruise, EX-15-04 Leg III is anticipated to have a robust complement of shore-based science experts participating from their home institutions and Exploration Command Centers around the country. This shore-based science team will actively engage with the at-sea team in real-time using *Okeanos Explorer*'s state-of-the art telepresence technology, including during ROV dives and daily ship-to-shore science planning meetings. In general, operations will focus in the areas highlighted in Figure 1.

B. Days at Sea (DAS)

Of the 7 DAS scheduled for this project, 0 DAS are funded by an OMAO allocation, 0 DAS are funded by an OAR Line Office Allocation, 7 DAS are program funded through NMFS Deep Sea Coral Research and Technology Program (DSCRTP), 0 Days are Program Funded through the Office of Ocean Exploration and Research (OER), and 0 DAS are other agency funded. This project is estimated

to exhibit a High Operational Tempo due to daily ROV operations, nighttime mapping, and possible evening CTD work.

C. Operating Area

Leg III of the CAPSTONE Expedition is a seven day, telepresence-enabled ROV cruise with shore-based science participation funded by the Deep Sea Coral Research and Technology Program. The first three dives will be used to recover instruments that are presently monitoring environmental conditions on precious coral beds off the islands of Oahu and the Big Island, and to conduct a dive in support of a coral disturbance/recovery study. The next three days will be used to explore for deep sea coral and sponge communities, as well as manganese crust communities in the Geologists seamounts located about 100 miles south of Honolulu. Mapping operations will be conducted between dives at the Geologists seamounts (McCall, Ellis and Swordfish) primarily to acquire multibeam backscatter data. The final ROV dive will investigate the WWI-era S19 Submarine, recover previously deployed instruments, and will also be a demonstration dive for invited guests. This demonstration dive will require a small boat transfer in the morning, followed by a return to port with the invited guests onboard. During the cruise we will take measures to protect the location of this submarine as described

The ship will conduct 24 hour operations consisting of daytime ROV dives and evening/nighttime mapping operations including during transit. During this cruise we will conduct 8 hour ROV dives on most days with occasional 10 or 12 hour dives (at the ship's discretion) on particularly interesting or deep dive sites. ROV operations will focus on depths between 350 and 3,000 meters and will include high-resolution visual surveys and limited sample collection. Mapping operations will be conducted in 250 m of water and deeper, and include overnight multibeam, water column backscatter, and sub-bottom data collection. Opportunistic CTD rosette operations may be requested to collect more information about the environmental parameters at ROV dives sites, or opportunistically at selected sites where collecting the data is considered important to understanding the physical or chemical properties of the overlying water column.

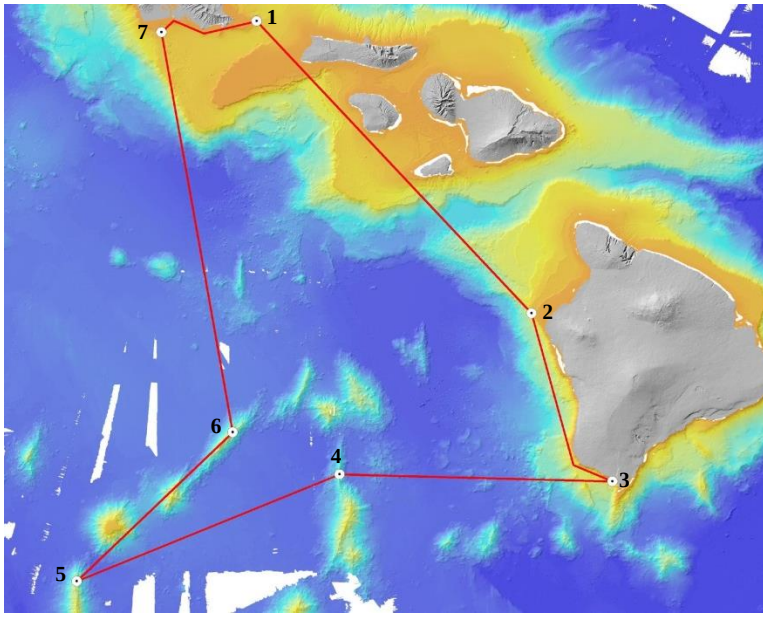

Table 1: Bounding Coordinates of Operating Area	
Latitude (N)	Longitude (W)
21.42518006	-158.21944439
18.04948138	-158.64117136
18.77420795	-155.45646453
19.72123908	-155.83834703
21.57190365	-157.71674906
21.42518006	-158.21944439

Figure 1: This figure shows the planned operating area of Okeanos Explorer for EX-15-04-Leg III.

The red lines show the draft cruise tracks; the white dots show the approximate location of ROV dives. The cruise will start and end in Pearl Harbor, Oahu. Operations are planned to extend from south of Oahu to the Big Island, and west to the Geologists Seamounts.

<table>
<tr><th colspan="7">Table 2. Planned ROV Dive Sites</th></tr>
<tr><th>Dive #</th><th>Date</th><th>Location</th><th>Latitude (N)</th><th>Longitude (W)</th><th>Depth (m)</th><th>Instrument</th></tr>
<tr><td rowspan="3">1</td><td rowspan="2">08/28</td><td>Offshore Oahu Makapuu # 1</td><td>21° 16.553</td><td>157° 32.559</td><td>426m</td><td>Flowmeter #1 (2013)</td></tr>
<tr><td># 2</td><td>21° 16.581</td><td>157° 32.578</td><td>425m</td><td>Flow meter #2 (2013)</td></tr>
<tr><td colspan="6">Primary Objective: Recover two flow meter instruments.
 

Makapuu total path - 60.5 m - 0:10 @ 0.2 knots (normal ship move speed)</td></tr>
<tr><td rowspan="5">2</td><td rowspan="4">08/29</td><td>Hawai’i - Keahole 1</td><td>19° 48.2831</td><td>156° 07.5480</td><td>379m</td><td>Aannderra current meter (2012)</td></tr>
<tr><td>1</td><td>Same</td><td>Same</td><td>Same</td><td>Flowmeter (2012)</td></tr>
<tr><td>2</td><td>19° 48.164</td><td>156° 07.596</td><td>385m</td><td>Flow meter A(2012)</td></tr>
<tr><td>3</td><td>19° 48.1645</td><td>156° 07.5963</td><td>398m</td><td>Flow meter B (2012)</td></tr>
<tr><td colspan="6">Primary Objective: Recover the Aandderra current meter and three flow meter instruments.
 

Keahole total path - 235 m - 0:38 @ 0.2 knots (normal ship move speed)</td></tr>
<tr><td rowspan="2">3</td><td>08/30</td><td>Hawai’i - South Point</td><td>18.945307150</td><td>155.713230499</td><td>450m</td><td>Dive site TBD – General Location</td></tr>
<tr><td colspan="6">Objective: Survey precious corals both on and off a known lava flow feature. Overnight transit followed by mapping</td></tr>
<tr><td rowspan="2">4</td><td>08/31</td><td>McCall Seamount</td><td>18° 58.748’</td><td>157° 6.525’</td><td>2,700 - 3,000m</td><td>Dive site TBD – General Location</td></tr>
<tr><td colspan="6">Objective: General exploration dive and sample collection. Overnight transit and mapping</td></tr>
<tr><td rowspan="2">5</td><td>09/01</td><td>Swordfish Seamount</td><td>18°23'23.01"</td><td>158°27'25.06"</td><td>1,000 - 2,000m</td><td>Dive site TBD – General Location</td></tr>
<tr><td colspan="6">Objective: General exploration dive and sample collection. Overnight transit and mapping</td></tr>
<tr><td>6</td><td>09/02</td><td>Ellis Seamount</td><td>19° 9'50.37"</td><td>157°41'9.51"W</td><td>1,000 - 2,000m</td><td>Dive site TBD – General Location</td></tr>
</table>

	Objective: *General exploration dive and sample collection. Overnight mapping, Transit mapping*					
7	**09/03**	Offshore Oahu – #1 S19 Submarine				Flowmeter (2013)
	Objective: *Recover flow meter instrument from the S19 submarine. Also a VIP demonstration dive to examine nearby golden corals and possibly explore further afield.*					

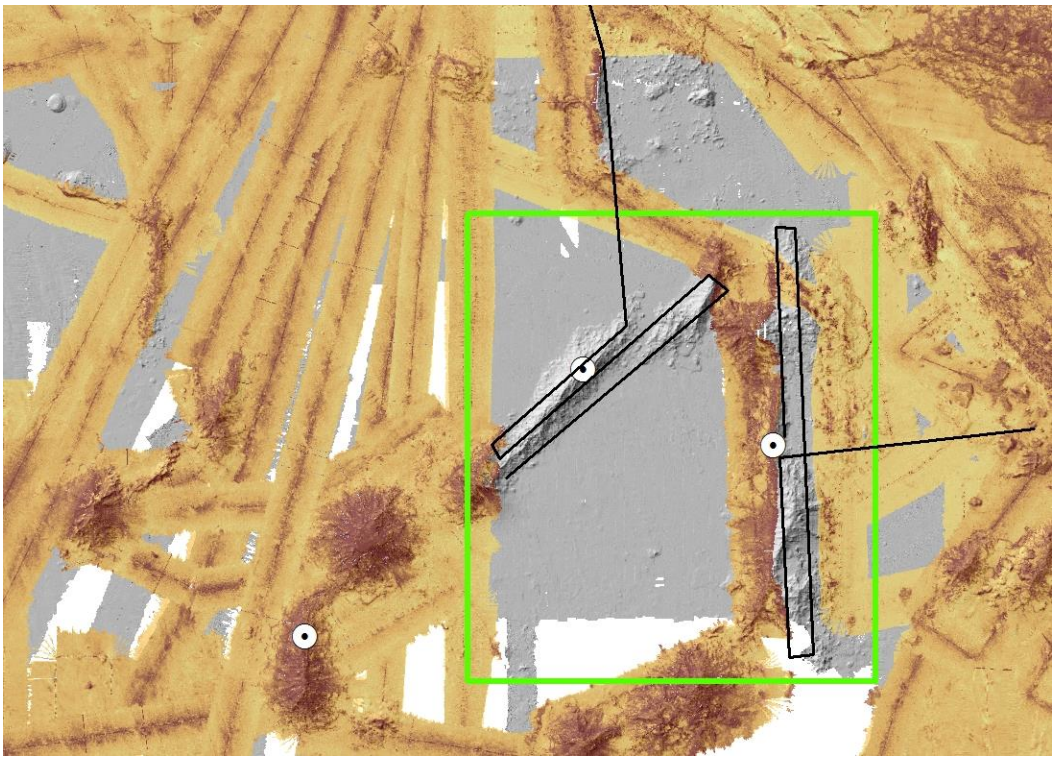

Figure 2: Map showing backscatter coverage (shown in brown) around the Main Hawaiian Islands and Geologists Seamounts. The white dots are approximate ROV dive locations. The green box encompasses a wide area of the Geologists Seamounts with little to no backscatter coverage, especially over McCall and Ellis Seamount. A cruise objective is to collect backscatter data here during overnight mapping operations. Black lines show preliminary ship tracklines that could be run to obtain multibeam backscatter data over McCall and Ellis Seamounts.

D. Summary of Objectives

Leg III: August 28 – September 3 (Honolulu, HI to Honolulu, HI) Telepresence-enabled ROV cruise with mapping and CTD operations

EX-15-04 Leg III operations will focus on Pacific Islands Fisheries Science Center (PIFSC) instrument recovery around the Main Hawaiian Islands, a dive in support of a coral disturbance/recovery study off South Point on the Big Island, and several dives at the Geologists Seamounts to support NMFS Pacific Islands deep-sea coral priorities. The primary goal for this cruise is instrument recovery and collection of baseline data to support priority NOAA science and management needs.

Mission objectives for EX-15-04 Leg III include a combination of operational, science, education, outreach, and data management objectives:

1. Science
    a. Recover previously deployed NMFS instruments
    b. Acquire data to support priority NMFS Pacific Islands deep-sea coral science and management needs
    c. Discover and characterize vulnerable marine habitats - particularly high density deep sea coral and sponge communities;
        i. Collect data on: habitat size and extent, animal quantities and densities;
        ii. Focus close-up imaging operations on potential new, rare and poorly documented animals;
        iii. Collect samples of potential new species or potential range extensions for the Hawaii region, primarily focused on deep sea corals, sponges and their incidentally collected commensals;
    d. Collect backscatter data on and in the vicinity of the Geologists seamounts
    e. Collect data and geologic samples to characterize seamounts within the Prime Crust Zone;
    f. Continue to test specimen collection protocols and processing procedures
    g. Ground-truth acoustic data using video imagery and characterize associated habitat
    h. Engage a broad spectrum of the scientific community and public in telepresence-based exploration
    i. Successfully conduct operations in conjunction with shore-based Exploration Command Centers and remote science team participants
    j. Create and provide input into standard science products to provide a foundation of publicly accessible data and information products to spur further exploration, research, and management activities.

2. Remote Science/Exploration Command Centers
    a. Test and facilitate remote science participation from the new Exploration Command Center at the University Hawaii, Manoa and the NOAA Inouye Regional Center (IRC).
    b. Provide operational support and training to scientists and managers to enable remote participation in at-sea operations.
    c. Facilitate outreach and engagement activities and events at the ECCs.
    d. Test and refine ship-to-shore communications procedures that engage multiple ECCs and other remote participants
    e. Test and refine operating procedures and products

3. ROV
    a. Integrate ROV into ship systems
        i. Possible ROV systems testing while alongside (8/27)
        ii. Conduct ROV launch and recovery training for new crew members
    b. Daytime ROV dives on exploration targets
    c. Ongoing training of pilots
        i. Continue to train team members on use of ROV manipulator’s during operations
    d. Ongoing system familiarization, documentation, and training

e. Test and refine new ROV systems and pilot sampling protocol

4. Telepresence (VSAT 20 mb/sec ship-to-shore; 2 mb/sec shore-to-ship)
    a. Turn on and test terrestrial and high-speed satellite links
    b. Support telepresence-enabled ROV operations
    c. Collect/create all standard video products
    d. Facilitate live outreach events between ship and shore
    e. Continue to refine protocols for the new WOWZA servers at the Inner Space Center
    f. Continue to refine protocols for using YouTube live to host live video
    g. Formalize/Finalize parallel processing of imagery and video compression routines
    h. Work to develop protocols and procedure for using the Telestream video recording suite
    i. Continue to test and bring online two new Exploration Command Centers – one at University of Hawaii Manoa and the other at the NOAA Inouye Regional Center on Ford Island, Honolulu, HI
    j. Get footage of new ECCs at UH and IRC for archival B-roll.

5. Mapping
    a. Collect high resolution mapping data from all three sonars in priority areas as dictated by operational needs as well as science and management community needs
    b. Support ROV operations with mapping products and expertise
    c. Collect backscatter data on and in the vicinity of the Geologists seamounts
    d. Conduct mapping operations during transit, with possible further development of exploration targets
    e. Collect XBT casts at regular intervals no longer than 4-6 hours, as data quality requires, during mapping operations
    f. Create daily standard mapping products
    g. Collection of sun photometer measurements as part of survey of opportunity

6. CTD operations
    a. Conduct CTD cast for comparison to ROV CTDs after first ROV dive if needed
    b. Conduct CTDs to collect environmental data, possibly including water sample collection, as requested by the science team

7. Data Management
    a. Provide a foundation of publicly accessible data and information products to spur further exploration, research, and management activities, as detailed in the 2014 post-cruise product list
    b. Provide daily products to shore for operational decision making purposes, as detailed in the 2015 field products list
    c. Continue to test the ability to record ProRes quality deck to deck video footage of a full dive onboard the ship
    d. Continue capture of streamed deck to deck video for submission to NOAA CLASS
    e. Develop and test protocols and procedures for handling the data from the Telestream video recording system.
    f. Continue to develop and test protocols and procedures for handling data from pilot sampling efforts

g. Continue cross training of video / data management personnel
h. Cross train existing ROV dedicated personnel
i. Continue development of operational Data Management SOP (Pre / Post cruise procedures as well as Pre / Mid / Post dive procedures)
j. Formalize / Finalize parallel processing of imagery and video compression routines
k. Evaluate telestream / pipeline outputs and anticipated workflow with NCEI SS MC personnel for engineering review to NOAA CLASS, and in preparation for FY15 product review

8. Outreach
   a. Conduct a demonstration dive with invited guests on the S-19 submarine
   b. Engage the general public in ocean exploration through live video and timely content (daily updates, topical essays and web logs, highlight videos, video clips, still imagery and mapping products) posted on the Ocean Explorer website
   c. Host live events with shore, TBD

E. Participating Institutions

NOAA Fisheries, Office of Habitat Conservation, Deep Sea Coral Research and Technology Program, 1315 East-West Highway, SSMC3 14th Floor F/HC, Silver Spring, MD 20910 USA

NOAA Fisheries, Pacific Islands Fisheries Science Center, 1845 Wasp Blvd, Building 176 Honolulu, HI 96818

National Oceanic and Atmospheric Administration (NOAA), Office of Ocean Exploration and Research (OER)–1315 East-West Hwy, Silver Spring, MD 20910 USA

NOAA, National Oceanographic Data Center, National Coastal Data Development Center, Stennis Space Center MS, 39529 USA

NOAA, Office of Coast Survey, Hydrographic Surveys Division, Pacific Hydrographic Branch, 7600 Sand Point Way NE, Seattle, WA 98115 USA

University Corporation for Atmospheric Research Joint Office for Science Support (JOSS), PO Box 3000 Boulder, CO 80307 USA

University of Hawai'i Manoa, 2500 Campus Rd, Honolulu, HI 96822

University of New Hampshire (UNH) Center for Coastal and Ocean Mapping (CCOM) Jere A. Chase Ocean Engineering Lab, 24 Colovos Rd, Durham, NH 03824 USA

F. Personnel (Mission Party)

Table 1: Leg II—Full list of sea going mission party members and their affiliations

Name (Last, First)	Title	Date Aboard	Date Disembark	Gender	Affiliation	Nationality

Elliott, Kelley	Expedition Coordinator	8/25	9/4	F	NOAA OER (Collabralink)	USA
Sowers, Derek	Mapping Lead	8/26	9/4	M	NOAA OER (ERT Inc)	USA
Raymond ,Annie	Mapping Watch Lead	8/26	9/4	M	NOAA OCS PHB	USA
Reser, Brendan	Data Engineer	8/25		M	NOAA NCDDC (DGIT)	USA
Kelley, Chris	Science Co-Lead	8/27	9/4	M	UH-Manoa	USA
Parrish, Frank	Science Co-Lead	8/27	9/4	M	NOAA NMFS	USA
Woodard, Katharine	Scientist/Data Manager	8/25		F	NOAA NCEI	USA
Ritter, Chis	ROV Engineer	8/26		M	UCAR	USA
Wright, Dave	ROV Engineer	8/25		M	UCAR	USA
O'Brian, Andy	ROV Engineer	8/25		M	UCAR	USA
Mohr, Bobby	ROV Engineer	8/25		M	UCAR	USA
Lanning, Jeff	ROV Engineer	8/25		M	UCAR	USA
Bingham, Brian	ROV Dive Supervisor	8/26		M	UCAR	USA
Smithee, Tara	Video Engineer	8/25		F	UCAR	USA
Gregory, Todd	ROV Engineer	8/26		M	UCAR	USA
Carlson, Joshua	ROV Engineer	8/25		M	UCAR	USA
Rogers, Dan	Video Engineer	8/25		M	UCAR	USA
Howard, Art	Video Engineer	8/25		M	UCAR	USA
Biscotti, Joe	Video Engineer	8/25		M	UCAR	USA
O'Brien, Andy	Data Engineer	8/25		M	UCAR	USA
Relph, John	Video Data	8/26	9/4	M	NCEI	USA

Table 2: Leg III—Shore-based Operations Team

Last Name	First Name	Organization	Area of interest or expertise.	Location
Drewniak	Jared	NOAA OER	Shore-side Ops	UH Manoa/ NOAA IRC
Martinez	Catalina	NOAA OER	Shore-side Ops	ISC
Potter	Jeremy	NOAA OER	Shore-side Ops	SS
TBD		NOAA OER	Web Coordinator	TBD
Crum	Emily	NOAA OER (ERT)	Communications Coordinator	Key West
Graddy	Sarah	NOAA OER (Acentia)	Media specialist	SS ECC

Table 3: Leg III -- Shore Based Science Team

Description of Participation Levels	
Level 1	"Core" team member of the interdisciplinary science team guiding science operations and providing input into a core suite of science products during a significant portion or all of the expedition.
Level 2	Focused team member participating during operations focused on areas, topics or dates of

	interest.
Level 3	Occasional team member participating when convenient and likely unable to commit to specific dives or dates.
Level 4	"Doctors-on-call" who are actively engaged only when called upon by the core science team.

First Name	Last Name	Organization	Area of interest or expertise.	What is your level of intended/desired participation?
Sam	Khang	HPU	Hawai'i coral disturbance/recovery study off Hawai'i	Level 2
Meagan	Putz	HPU	Hawai'i coral disturbance/recovery study off Hawai'i	Level 2
Jamie	Austin	UT Austin	Geology	Level 3 "Occasional"
Jesse	Ausubel	Rockefeller University	All	Level 3 - Occasional
Amy	Baco-Taylor	FSU	All	Available for all cruises. Would like to be core for some.
Samantha	Brooke	NOAA	Monuments	Level 1 "Core"
David	Clague	MBARI	Submarine Volcanism, esp. formation and degradation of oceanic volcanoes, particularly Hawaiian volcanoes, mid-ocean ridges, and isolated seamounts	Level 4 Doctor on Call
Erik	Cordes	Temple University	Biology. Deep Sea Corals and Seep Communities.	Level 3 Occasional
Melanie	Damour	BOEM	Archaeology	Level 2 - Archaeology Dives. 4 - Doctor on Call for unexpected wrecks.
Jim	Delgado	NOAA	Archaeology	Level 4 Doctor on Call
Dan	Distel	Northeastern University	Biological sampling across all taxonomic groups, locations and ecotypes. Priorities: organic falls (wood), hydrothermal vents/cold seeps, deep sea corals.	Level 2 (all biosampling)
Jeff	Drazen	UH	Fish	Occasional
Stephanie	Farrington	HBOI at FAU	Deep Sea Corals	TBD
Kim	Faulk	ACUA/GEMS	Archaeology	TBD
Mike	Ford	NOAA NMFS	Water Column; Gelatinous Zooplankton	1. Core for Midwater work
Ben	Frable	Oregon State University Ichthyology Collection	Meso-, bathy- and bethopelagic fishes and have worked on dragonfish and lizardfish systematics	Level 2 or 3
Michael	Garcia	UH	Geology & Geophysics	Level 1 and 2 except for August 8-22nd.

Chris	German	WHOI	Hydrothermal Vents	3 Doctor-on-Call
Steve	Haddock	MBARI	Midwater	Midwater
Esprit	Heestand Saucier	University of Louisiana at Lafayette	Biology	TBD
Santiago	Herrera	University of Toronto / WHOI	Biology	Level 1 and 2
Kim	Hum	The Nature Conservancy	Interest in deep water ecology and marine conservation in general region	TBD
Reed	John	HBOI- Florida Atantic University	Deepwater and Mesophotic Coral Ecosystems	TBD; CORE at HBOI-ECC
Chris	Kelley	UH	DSC, Ecology, Biology	1. Science Team Lead
Astrid	Leitner	UH - Masters Students	Fish	TBD
List	Levin	UCSD, Director CMBC	Deep sea Ecology	Level 3 "Occasional"
Jennifer	McKinnon	ECU	Archaeology	Level 2 - Archaeology Dives
Margaret	McManus	UH	primarily interested in plankton video from the descents and ascents	occasional in ECC and on own
Bruce	Mundy	NOAA NMFS Pacific Islands Fisheries Science Center	The fish fauna of the 200 nmi Exclusive Economic Zones of the U.S.-affiliated central Pacific islands	Occasional team member for the ROV surveys
Risa	Oram	NOAA PIFSC	Monuments Science, Fisheries, NOAA	Level 3 "Occasional"
Michael	Parke	NOAA NMFS	Deep Sea Corals	Rep for DSCRTP
Frank	Parrish	NMFS, PRD & DSCRTP	Deep Sea Corals, Fish	1. Core, Onboard Co-Lead, NMFS Rep for EX DAS
Andrea	Quattrini	USGS	Deep Sea Corals, Fish	Level 2 or 3
Waller	Rhian	University of Maine	Cold water coral ecosystems	Level 3
Brendan	Roark	Texas A&M University, College Station	Deep Sea Corals, Ecology	Level 1-2
Sonia	Rowley	UH	Deep Sea Corals	Level 3
Ken	Rubin	UH	Geology - Carbonate Terraces	Level 3 "Occasional". Interested in dives during Leg 3 and possibly the drowned reef terrace at Gardner Pinnacles.

Carolyn	Ruppel	USGS	Geology- hydrates	
Charlotte	Seid	Northeastern University, Nahant, MA	Biological sampling across all taxonomic groups, locations and ecotypes. Priorities: organic falls (wood), hydrothermal vents/cold seeps, deep sea corals.	Level 2 (all biosampling)
Hans	Van Tilburg	NOAA MHP - HI Region	Archaeology	1 for Archaeology
Mike	Vecchione	NOAA NMFS/ SI National Systematic Lab	Cephalopods; Water Column Transects	2. Core for Midwater transects. Occasional for midwater work?
Daniel	Wagner	PMNM	Deep Sea Corals, PMNM	1. Core, Onboard Co-Lead
Scott	White	USC	Geology	TBD
Mary	Wicksten	Texas A&M University, College Station	Biology - crustaceans	TBD
Gary	Williams	CA Academy of Natural Sciences	Deep Sea Corals, especially octocoral cnidarians, including soft corals, (sea fans) gorgonians, and sea pens (pennatulaceans)	TBD

G. Administrative

1. Points of Contact:

Ship Operations

Marine Operations Center, Atlantic (MOA)
439 West York Street
Norfolk, VA 23510-1145
Telephone: (757) 441-6776
Fax: (757) 441-6495

Chief, Operations Division, Atlantic (MOA)
LCDR Don Beaucage, NOAA
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E-mail: Chiefops.MOA@noaa.gov

Mission Operations

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NOAA Office of Ocean Exploration and Research
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NOAA Ship *Okeanos Explorer*
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Derek Sowers
Mapping Lead
NOAA Office of Ocean Exploration

LT Emily Rose, NOAA
Operations Officer
NOAA Ship *Okeanos Explorer*

and Research (ERT)
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C: (714) 321-6084
E-mail : Derek.Sowers@noaa.gov

Phone: (808) 659-9197 (Ship's Iridium)
E-mail: Ops.Explorer@noaa.gov

Dave Lovalvo
Engineering Group Lead
NOAA Office of Ocean Exploration
and Research (ERT)
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Other Mission Contacts

John McDonough, Deputy Director
NOAA Ocean Exploration & Research
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LT Brian Kennedy, EX1504L4 Expedition Coordinator
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Jared Drewniak
Telepresence
NOAA Office of Ocean Exploration &
Research (ERT)
Phone: (401) 874-6250 / (401) 330-9662
Email: jared.drewniak@noaa.gov

Vessel shipping address:

Shipments:
Send an email to the *Okeanos Explorer* Operations Officer at OPS.Explorer@noaa.gov indicating the size and number of items being shipped.

Items sent to Honolulu should arrive at the below address prior to **COB August 26, 2015**.

LT Emily Rose
NOAA Ship Okeanos Explorer
1897 Ranger Loop
Ford Island Bldg. 184
Honolulu, HI 96818

2. Diplomatic Clearances

   None Required.

3. Licenses and Permits

No licenses or permits are required to conduct work in the operating area. NEPA compliance includes completion of a Categorical Exclusion (Appendix A) and ESA Section 7 consultation (Appendix B).

One of the planned ROV dive sites (dive 3 on August 30th) is located in state waters. Data collected at this site will support a multi-year coral disturbance/recovery project. No biological samples will be collected on this dive. A request to collect a few small rock samples during the dive has been submitted to the State, and the decision is pending and expected within the week.

The U.S. Navy submarine S-19 is protected by the U.S. Navy (Navy History and Heritage Command) under the Sunken Military Craft Act (SMCA). The actions of federal agencies do not fall under the permitting system of the Sunken Military Craft Act (SMCA), and no permits are required to for visual non disturbance survey at this site. The project leads have consulted with the Navy History and Heritage Command head archaeologist Robert Neyland about the planned operations at S-19 submarine site.

While NOAA Ship Okeanos Explorer conducts non-disturbance underwater cultural heritage (UCH) exploration activities, project data and information may contain site location information that could lead to adverse impacts. A primary concern with UCH is potential harm that may be inflicted on the resource by revealing its location. NOAA adheres to the policies of the Federal Archaeology Program and has responsibility under Federal law (Appendix C) to preserve and protect historically significant, or potentially significant, cultural resources. The agency must take into account the effects its activities have on cultural resources to prevent harm from actions it permits. Information relating to the location or character of cultural resources encountered by our operations must be kept strictly confidential, and the location of these sites should not be disclosed to any third party. During the expedition, we will implement measures to protect the location of the S-19 submarine.

II. OPERATIONS

The Expedition Coordinator is responsible for ensuring the scientific staff are trained in planned operations and are knowledgeable of project objectives, priorities and environmental compliance procedures. The Commanding Officer is responsible for ensuring all operations conform to the ship's accepted practices and procedures.

A. **Project Itinerary** *(All times and dates are subject to prevailing conditions and the discretion of the Commanding Officer)*

We will conduct primarily 8 hour ROV dives, and operate on Hawaii time. CTD casts are expected and requested, but will be TBD based on the availability of ship personnel and operational constraints.

Table 3: Leg III Detailed Itinerary
This is an approximate itinerary and is subject to change

Date	Activity	Notes and Requirements

8/26/2015	Crew Rest. Mission personnel will start arriving.	Crew Rest, mission preparation, and training of new mission personnel.
8/27/2015	Fueling	Shift to the fuel pier at 1000.
8/28/2015	Dive 1 – Makapuu (Offshore Oahu)	Cruise gets underway in morning – departing from the fuel pier about 0900. Afternoon dive and instrument recoveries. Nighttime transit mapping.
8/29/2015	Dive 2 – Keahole (Big Island)	ROV dive to recover the Aandderra current meter and three flow meter instruments. Nighttime transit mapping.
8/30/2015	Dive 3 – South Point (Big Island).	ROV dive to survey precious corals both on and off a known lava flow feature. Dive is within state waters. Nighttime transit mapping.
8/31/2015	Dive 4 – McCall Seamount	General exploration dive and sample collection. Overnight transit and mapping
9/1/2015	Dive 5 – Swordfish Seamount	General exploration dive and sample collection. Overnight transit and mapping
9/2/2015	Dive 6 – Ellis Seamount	General exploration dive and sample collection. Overnight mapping, Transit mapping
9/3/2015	Dive 7 – S19 Submarine	Early morning dive to recover a flow meter instrument from the S19 Submarine and document the degradation state of the submarine. Also a demonstration dive. Visitors will take a small boat out to meet the ship and then stay onboard for the return to port with the rest of the crew.
9/4/2015	Demob	Morning ship tours for IRC personnel. Demob, Mission personnel start to depart.
9/5/2015	Demob	Demob, mission personnel depart, preparation for Leg 4. Mission personnel that will be sailing on Leg 4 will stay on the ship through the inport period, pending ship approval.

B. Staging and Destaging

A. The majority of the ROV mobilization effort took place prior to this cruise. ROV personnel will need to be on board a few days before the cruise to run systems checks on new sampling equipment. EX1504L4 is also an ROV cruise, so there will be no significant destaging after Leg III. Recovered samples and equipment will be moved off the ship starting on September 3, and HAZMAT will be refilled in preparation for Leg IV.

C. **Operations to be Conducted**

Telepresence Events

A. Dates TBD- there will be additional live events that come up as the cruise progresses. These events will have little to no effect on the ship's operations and will be raised during daily operations briefings.

Demonstration Dive

A. We will conduct a demonstration dive on September 3rd for a small group of invited guests. There will be a small boat transfer in the morning to bring the guests to the ship. They will take a tour of the ship and then participate and observe the ROV as interested/appropriate. This group will then ride with the ship as *Okeanos* returns to port.

D. SCUBA Dive Plan

All dives are to be conducted in accordance with the requirements and regulations of the NOAA Diving Program (http://www.ndc.noaa.gov/dr.html) and require the approval of the ship's Commanding Officer. No SCUBA dives are currently planned for this cruise.

E. Applicable Restrictions

Sonar Operations
EM 302, EK 60, and sub-bottom profiler data acquisition is planned for this cruise. All data acquisition will be conducted in accordance with established standard operating procedures under the direction of the mapping team lead. These operating procedures will include protection measures when operating in the vicinity of marine mammals, sea turtles or Endangered Species Act-listed species. The final decision to operate and collect 24-hour sub-bottom profiler data will be at the discretion of the Commanding Officer.

III. EQUIPMENT

A. Equipment and capabilities provided by the ship

- Kongsberg Simrad EM302 MultibeamEchosounder (MBES)
- Kongsberg Simrad EK60DeepwaterEchosounder
- Knudsen Chirp 3260 Sub-bottom profiler (SBP)
- LHM Sippican XBT (Deep Blue probes)
- Seabird SBE 911Plus CTD
- Seabird SBE 32 Carousel and 24 2.5 L Niskin Bottles
- Light Scattering Sensor (LSS)
- Oxidation – Reduction Potential (ORP)
- Dissolved Oxygen (DO) sensor
- Altimeter Sensor and battery pack

- CNAV GPS
- POS/MV
- Seabird SBE-45 (Micro TSG)
- Kongsberg Dynamic Positioning-1 System
- NetApps mapping storage system
- CARIS HIPS Software
- IVS Fledermaus Software
- SIS Software
- Hypack Software
- Scientific Computing System (SCS)
- ECDIS
- Met/Wx Sensor Package
- Telepresence System
- VSAT High-Speed link (Comtech 20 Mbps ship to shore; 1.54 Mbps shore to ship)
- Cruise Information Management System (CIMS)
- Three VoIP telephone lines
- NOAA OER 6000 m *Deep Discoverer* ROV
- NOAA *Seirios* Camera Platform

B. Equipment and capabilities provided by the scientists

- Microtops II Ozone Monitor Sunphotometer and handheld GPS required for NASA Marine Aerosols Network supplementary project.
- Equipment associated with new sampling protocol
- Equipment to be recovered during this cruise: Flowmeter and Tilt Current Meter

IV. HAZARDOUS MATERIALS

A. Policy and Compliance

The Expedition Coordinator is responsible for complying with FEC 07 Hazardous Materials and Hazardous Waste Management Requirements for Visiting Scientific Parties (or the OMAO procedure that supersedes it). The Expedition Coordinator and Science Team Lead will be responsible for transporting all samples and HAZMAT on and off the ship. By Federal regulations and NOAA Marine and Aviation Operations policy, the ship may not sail without a complete inventory of all hazardous materials by name and quantity, MSDS, appropriate spill cleanup materials (neutralizing agents, buffers, or absorbents) in amounts adequate to address spills of a size equal to the amount of chemical brought aboard, and chemical safety and spill response procedures. Documentation regarding those requirements will be provided by the Chief of Operations, Marine Operations Center, upon request.

Per OMAO procedure, the scientific party will include with their project instructions and provide to the CO of the respective ship 30 days before departure:

- List of chemicals by name with anticipated quantity
- List of spill response materials, including neutralizing agents, buffers, and absorbents
- Chemical safety and spill response procedures, such as excerpts of the program's Chemical Hygiene Plan or SOPs relevant for shipboard laboratories
- For bulk quantities of chemicals in excess of 50 gallons total or in containers larger than 10 gallons each, notify ship's Operations Officer regarding quantity, packaging and chemical to verify safe stowage is available as soon as chemical quantities are known.

Upon embarkation and prior to loading hazardous materials aboard the vessel, the scientific party will provide to the CO or their designee:

- An inventory list showing actual amount of hazardous material brought aboard
- An MSDS for each material
- Confirmation that neutralizing agents and spill equipment were brought aboard sufficient to contain and cleanup all of the hazardous material brought aboard by the program
- Confirmation that chemical safety and spill response procedures were brought aboard

Upon departure from the ship, scientific parties will provide the CO or their designee an inventory showing that all chemicals were removed from the vessel. The CO's designee will maintain a log to track scientific party hazardous materials. MSDS will be made available to the ship's complement, in compliance with Hazard Communication Laws.

Scientific parties are expected to manage and respond to spills of scientific hazardous materials. Overboard discharge of hazardous materials is not permitted aboard NOAA ships.

B. Inventory

Item	Use	Aprox. Locations
95% Denatured Ethanol (10 gallons)	Sample preservation	Wetlab, under the chemical hood
10% Buffered Formalin (3 gallons)	Sample preservation	Wetlab, under the chemical hood
Chaos Buffer (0.5 gallons) (4 M guanidine thiocyanate, 0.5% N-laurosyl sarcosine, 25 mM Tris pH 8.0, 0.1 M beta-mercaptoethanol)	Sample preservation (genetics)	Wetlab, under the chemical hood
Aqua Shield	Underwater Lubricant	ROV Workshop Fire Cabinet, Pit
Dow Corning 4	Electrical insulating compound	ROV Workshop Fire Cabinet, Pit
Fluid Film Spray	Silicone Lubricant	ROV Workshop Fire Cabinet
Isopropanol Alcohol	Solvent	ROV Workshop Fire cabinet

Scotchkote	Electrical insulating compound	ROV Workshop Fire cabinet
3M Silicone Spray	Silicone Lubricant	ROV Workshop Fire cabinet
Synthetic AW Hydraulic Oil, ISO-22	Amsoil (AWG-05)	Hanger, Pit, Vehicles
Tap Magic Cutting Fluid	Cutting/Machining Lubricant	ROV Workshop Fire cabinet
Tap Magic Heavyweight Cutting Fluid	Cutting/Machining Lubricant	ROV Workshop Fire cabinet
Tuff Coat M	Marine Lubricant	ROV Workshop Fire cabinet
Dow Corning Molykote 111	Valve Lubricant and Sealant	ROV Workshop Fire cabinet, Pit
WD40	Lubricant	ROV Workshop Fire cabinet
Loktite	Bolt adhesive	ROV Workshop Fire cabinet
Mineral Oil	Vitrea	Hanger, Vehicles
Por-15	Paint Kit	ROV Workshop Fire cabinet
Univis HVI 13	Hydraulic Fluid	Hanger, ROV D2
Ultratane	Butane fuel	ROV Workshop fire cabinet
Rust-oleum	Protective Enamel	ROV Workshop fire cabinet
Flux-Off	Soldering Flux remover	ROV Workshop fire cabinet
Propane	Torch Fuel	ROV Workshop fire cabinet

C. Chemical safety and spill response procedures
    A. All safety and spill response procedures will be handled according to OMAO guidelines and following the manufacturers MSDS which has been provided to the ship's ECO.

D. Radioactive Materials

NOT APPLICABLE TO THIS CRUISE

V. ADDITIONAL PROJECTS

A. Supplementary Projects

NASA Maritime Aerosol Network

During the cruise the marine aerosol layer observations will be collected for the NASA Maritime Aerosol Network (MAN). Observations will be made by mission personnel (Mapping Lead) with a sun photometer instrument provided by the NASA MAN program. Resulting data will be delivered to the NASA MAN primary investigator Alexander Smirnov by the Mapping Lead. All collected data will be archived and publically available at:
http://aeronet.gsfc.nasa.gov/new_web/maritime_aerosol_network.html

Equipment resides on the ship and is stewarded by the Expedition Coordinator.

See Appendix D for full Survey of Opportunity Form.

B. NOAA Fleet Ancillary Projects

No NOAA Fleet Ancillary Projects are planned.

VI. DISPOSITION OF DATA AND REPORTS

A. Data Responsibilities

All data acquired on *Okeanos Explorer* will be provided to the public archives without proprietary rights. All data management activities shall be executed in accordance with NAO 212-15, Management of Environmental and Geospatial Data and Information [http://www.corporateservices.noaa.gov/ames/administrative_orders/chapter_212/212-15.html].

Ship Responsibilities

The Commanding Officer is responsible for all data collected for missions until those data have been transferred to mission party designees. Data transfers will be documented on NOAA Form 61-29. Reporting and sending copies of project data to NESDIS (ROSCOP form) is the responsibility of OER.

NOAA OER Responsibilities

The Expedition Coordinator will work with the *Okeanos Explorer* Operations Officer to ensure data pipeline protocols are followed for final archive of all data acquired on *Okeanos Explorer* without proprietary rights. See Appendix E for detailed data management plans.

Deliverables

a. At sea
   - Daily plans of the Day (POD)
   - Daily situation reports (SITREPS)
   - Daily summary bathymetry data files
   - Summary forms for each ROV dive
   - Summary forms for each sample collection
   - Summary forms for each CTD rosette cast

b. Post cruise

- Refined SOPs for all pertinent operational activities
- Assessments of all activities

c. Science
   - Multibeam and XBT raw and processed data (see appendix E for the formal cruise data management plan)
   - EK 60 raw data
   - Knudsen 3260 sub-bottom profiler raw data
   - Mapping data report
   - Cruise Report

Archive

- OER and ship will work together to ensure documentation and stewardship of acquired data sets in accordance with NAO 212-15. The Cruise Information Management System is the primary tool used to accomplish this activity.

VII. Meetings, Vessel Familiarization, and Project Evaluations

Shipboard Meetings

A safety brief and overview of POD will occur on the Bridge each morning at 0800. Daily Operations Briefing meetings will be held at 1330 in the forward lounge to review the current day, and define operations, associated requirements, and staffing needs for the following day. A Plan of the Day (POD) will be posted each evening for the next day in specified locations throughout the ship. Daily Situation Reports (SITREPS) will be posted as well and shared daily through e-mail and/or the EX FTP site.

A. Pre-Project Meeting: The Expedition Coordinator and Commanding Officer will conduct a meeting of pertinent members of the scientific party and ship's crew to discuss required equipment, planned operations, concerns, and establish mitigation strategies for all concerns. This meeting shall be conducted before the beginning of the project with sufficient time to allow for preparation of the ship and project personnel. The ship's Operations Officer usually is delegated to assist the Expedition Coordinator in arranging this meeting.

B. Vessel Familiarization Meeting: The Commanding Officer is responsible for ensuring scientific personnel are familiarized with applicable sections of the standing orders and vessel protocols, e.g., meals, watches, etiquette, drills, etc. A vessel familiarization meeting shall be conducted in the first 24 hours of the project's start and is normally presented by the ship's Operations Officer.

C. Post-Project Meeting: The Commanding Officer is responsible for conducting a meeting no earlier than 24 hrs before or seven days after the completion of a project to discuss the overall success and short comings of the project. Concerns regarding safety, efficiency, and suggestions for future improvements shall be discussed and mitigations for future projects will be documented for future use. This meeting shall be attended by the ship's officers, applicable crew, the Expedition Coordinator, and members of the scientific party and is normally arranged by the Operations Officer and Expedition Coordinator.

D. Project Evaluation Report:

Within seven days of the completion of the project, a Customer Satisfaction Survey is to be completed by the Expedition Coordinator. The form is available at http://www.omao.noaa.gov/fleeteval.html and provides a "Submit" button at the end of the form. Submitted form data is deposited into a spreadsheet used by OMAO management to analyze the information. Though the complete form is not shared with the ships, specific concerns and praises are followed up on while not divulging the identity of the evaluator.

VIII. MISCELLANEOUS

A. Meals and Berthing

The ship will provide meals for the scientists listed above. Meals will be served 3 times daily beginning one hour before scheduled departure, extending throughout the project, and ending two hours after the termination of the project. Since the watch schedule is split between day and night, the night watch may often miss daytime meals and will require adequate food and beverages (for example a variety of sandwich items, cheeses, fruit, milk, juices) during what are not typically meal hours. Special dietary requirements for scientific participants will be made available to the ship's command at least twenty-one days prior to the survey (e.g., Expedition Coordinator is allergic to fin fish).

Berthing requirements, including number and gender of the scientific party, will be provided to the ship by the Expedition Coordinator. The Expedition Coordinator and Operations Officer will work together on a detailed berthing plan to accommodate the gender mix of the scientific party taking into consideration the current make-up of the ship's complement. The Expedition Coordinator is responsible for ensuring the scientific berthing spaces are left in the condition in which they were received; for stripping bedding and linen return; and for the return of any room keys which were issued. The Expedition Coordinator is also responsible for the cleanliness of the laboratory spaces and the storage areas utilized by the scientific party, both during the cruise and at its conclusion prior to departing the ship.

All NOAA scientists will have proper travel orders when assigned to any NOAA ship. The Expedition Coordinator will ensure that all non-NOAA or non-Federal scientists aboard also have proper orders. It is the responsibility of the Expedition Coordinator to ensure that the entire scientific party has a mechanism in place to provide lodging and food and to be reimbursed for these costs in the event that the ship becomes uninhabitable and/or the galley is closed during any part of the scheduled project.

All persons boarding NOAA vessels give implied consent to comply with all safety and security policies and regulations which are administered by the Commanding Officer. All spaces and equipment on the vessel are subject to inspection or search at any time. All personnel must comply with OMAO's Drug and Alcohol Policy dated May 7, 1999 which forbids the possession and/or use of illegal drugs and alcohol aboard NOAA Vessels.

B. Medical Forms and Emergency Contacts

The NOAA Health Services Questionnaire (NHSQ, NF 57-10-01 (3-14)) must be completed in advance by each participating scientist. The NHSQ can be obtained from the Expedition Coordinator or the NOAA website http://www.corporateservices.noaa.gov/noaaforms/eforms/nf57-10-01.pdf.

All NHSQs submitted after March 1, 2014 must be accompanied by NOAA Form (NF) 57-10-02 - Tuberculosis Screening Document in compliance with OMAO Policy 1008 (Tuberculosis Protection Program).

The completed forms should be sent to the Regional Director of Health Services at the applicable Marine Operations Center. The NHSQ and Tuberculosis Screening Document should reach the Health Services Office no later than four weeks prior to the start of the project to allow time for the participant to obtain and submit additional information should health services require it, before clearance to sail can be granted. Please contact MOC Health Services with any questions regarding eligibility or completion of either form. Ensure to fully complete each form and indicate the ship or ships the participant will be sailing on. The participant will receive an email notice when medically cleared to sail if a legible email address is provided on the NHSQ.

The participant can mail, fax, or email the forms to the contact information below. Participants should take precautions to protect their Personally Identifiable Information (PII) and medical information and ensure all correspondence adheres to DOC guidance (http://ocio.os.doc.gov/ITPolicyandPrograms/IT_Privacy/PROD01_008240).

The only secure email process approved by NOAA is Accellion Secure File Transfer which requires the sender to setup an account. Accellion's Web Users Guide is a valuable aid in using this service, however to reduce cost the DOC contract doesn't provide for automatically issuing full functioning accounts. To receive access to a "Send Tab," after your Accellion account has been established send an email from the associated email account to accellionAlerts@doc.gov requesting access to the "Send Tab" function. They will notify you via email, usually within one business day of your approval. The "Send Tab" function will be accessible for 30 days.

Contact information:

Regional Director of Health Services
Marine Operations Center – Atlantic
439 W. York Street
Norfolk, VA 23510
Telephone (757) 441.6320
Fax (757) 441.3760
E-mail: MOA.Health.Services@noaa.gov

Please make sure the medical.explorer@noaa.gov email address is cc'd on all medical correspondence.

Prior to departure, the Expedition Coordinator must provide a listing of emergency contacts to the Operations Officer for all members of the scientific party, with the following information: name, address, relationship to member, and telephone number.

Emergency contact form is included as Appendix F.

C. Shipboard Safety

Hard hats are required when working with suspended loads. Work vests are required when working near open railings and during small boat launch and recovery operations. Hard hats and work vests will be provided by the ship when required.

Wearing open-toed footwear or shoes that do not completely enclose the foot (such as sandals or clogs) outside of private berthing areas is not permitted. Steel-toed shoes are required to participate in any work dealing with suspended loads, including CTD deployments and recovery. The ship does not provide steel-toed boots. Hard hats are also required when working with suspended loads. Work vests are required when working near open railings and during small boat launch and recovery operations. Hard hats and work vests will be provided by the ship when required.

Operational Risk Management: For every operation to be conducted aboard the ship (NOAA-wide initiative), risk management procedures will be followed. For each operation, risks will be identified and assessed for probability and severity. Risk mitigation strategies/measures will be investigated and implemented where possible. After mitigation, the residual risk will have to be assessed to make Go-No Go decisions for the operations. Particularly with new operations, risk assessment will be ongoing and updated as necessary. This does not only apply to over-the-side operations, but to everyday tasks aboard the vessel that pose risk to personnel and property.

- CTD, ROV (and other pertinent) ORM documents will be followed by all personnel working onboard *Okeanos Explorer*.
- All personnel onboard are in the position of calling a halt to operations/activities in the event of a safety concern.

D. Communications

A daily situation report (SITREP) on operations prepared by the Expedition Coordinator will be relayed to the program office. Sometimes it is necessary for the Expedition Coordinator to communicate with another vessel, aircraft, or shore facility. Through various modes of communication, the ship is able to maintain contact with the Marine Operations Center on an as needed basis. These methods will be made available to the Expedition Coordinator upon request, in order to conduct official business. The ship's primary means of communication with the Marine Operations Center is via e-mail and the Very Small Aperture Terminal (VSAT) link. VSAT bandwidth at 20Mbps will be provided by OER.

Specific information on how to contact NOAA Ship *Okeanos Explorer* and all other fleet vessels can be found at http://www.moc.noaa.gov/MOC/phone.html#EX

Important Telephone and Facsimile Numbers and E-mail Addresses

Ocean Exploration and Research (OER):

OER Program Administration:
Phone: (301) 734-1010

Fax: (301) 713-4252
E-mail: Firstname.Lastname@noaa.gov

University of New Hampshire, Center for Coastal and Ocean Mapping

Phone: (603) 862-3438
Fax: (603) 862-0839

NOAA Ship *Okeanos Explorer* - Telephone methods listed in order of increasing expense:

Okeanos Explorer Cellular: (401) 713-4114
Okeanos Explorer Iridium:(808) 659-9179
OER Mission Iridium (dry lab): (808) 851-3827

EX INMARSAT B
Line 1: 011-870-764-852-328
Line 2: 011-870-764-852-329

Voice Over IP (VoIP) Phone:
(301) 713-7785
(301) 713-7791
(301) 713-7792

E-Mail: Ops.Explorer@noaa.gov - (mention the person's name in SUBJECT field)

expeditioncoordinator.explorer@noaa.gov For dissemination of all hands emails by Expedition Coordinator while onboard. See ET for password.

E. IT Security

1. Any computer that will be hooked into the ship's network must comply with the *OMAO Fleet IT Security Policy* 1.1 (November 4, 2005) prior to establishing a direct connection to the NOAA WAN. Requirements include, but are not limited to: Installation of the latest virus definition (.DAT) file on all systems and performance of a virus scan on each system.
2. Installation of the latest critical operating system security patches.
3. No external public Internet Service Provider (ISP) connections.

Completion of these requirements prior to boarding the ship is required.

Non-NOAA personnel using the ship's computers or connecting their own computers to the ship's network must complete NOAA's IT Security Awareness Course within three days of embarking.

F. Foreign National Guests Access to OMAO Facilities and Platforms

There are no Foreign Nationals sailing during this cruise.

Wearing open-toed footwear or shoes that do not completely enclose the foot (such as sandals or clogs) outside of private berthing areas is not permitted. Steel-toed shoes are required to participate in any work dealing with suspended loads, including CTD deployments and recovery. The ship does not provide steel-toed boots. Hard hats are also required when working with suspended loads. Work vests are required when working near open railings and during small boat launch and recovery operations. Hard hats and work vests will be provided by the ship when required.

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OER Mission Iridium (dry lab): (808) 851-3827

EX INMARSAT B
Line 1: 011-870-764-852-328
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(301) 713-7791
(301) 713-7792

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2. Installation of the latest critical operating system security patches.
3. No external public Internet Service Provider (ISP) connections.

Completion of these requirements prior to boarding the ship is required.

Non-NOAA personnel using the ship's computers or connecting their own computers to the ship's network must complete NOAA's IT Security Awareness Course within three days of embarking.

F. Foreign National Guests Access to OMAO Facilities and Platforms

There are no Foreign Nationals sailing during this cruise.

Appendix A: Categorical Exclusion

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
OCEANIC AND ATMOSPHERIC RESEARCH
Office of Ocean Exploration and Research
Silver Spring, MD 20910

August 17, 2015

MEMORANDUM FOR: The Record

FROM: John McDonough
Deputy Director, NOAA Office of Ocean Exploration and Research (OER)

SUBJECT: Categorical Exclusion for NOAA Ship *Okeanos Explorer* Cruise EX-15-04 Leg 3

NAO 216-6, Environmental Review Procedures, requires all proposed projects to be reviewed with respect to environmental consequences on the human environment. This memorandum addresses NOAA Ship *Okeanos Explorer's* scientific sensors possible effect on the human environment.

Description of the Project
This project is part of the NOAA Office of Ocean Exploration and Research's "Science Program" and entails ocean mapping activities, Remotely Operated Vehicle (ROV) Operations, and water column profiling using CTD casts designed to increase knowledge of the marine environment. This Categorical Exclusion addresses NOAA Ship *Okeanos Explorer* cruise EX-15-04 Leg III "CAPSTONE Main Hawaiian Islands and Geologists Seamounts (ROV/Mapping)" led by Kelley Elliott, Expedition Coordinator for NOAA OER. Leg III will be conducted from August 28 to September 3, 2015 with operations focused primarily on deep water areas (greater than 350m) offshore of the Main Hawaiian Islands (Oahu and Hawai'i), at the Geologists Seamounts (McCall, Swordfish and Ellis seamounts), and the vessel transit areas. A tandem 6,000 meter ROV system will be deployed and CTD rosette casts may be conducted during the expedition. The Kongsberg EM 302 multibeam (30 kHz), Kongsberg EK 60 singlebeam (18 kHz), and Knudsen 3260 Sub-Bottom Profiler (3.5 kHz) will be operated during the project. Additionally, expendable bathythermographs (XBTs) will be conducted in conjunction with multibeam data collection. Mapping operations will be conducted primarily in the evening/overnight, and at all times during the transit.

This cruise is entirely funded by NOAA NMFS Deep Sea Coral Research and Technology Program. The overarching goal of the project is to collect data and information to support priority

NMFS Pacific Islands deep-sea coral science and management needs. The first three dives will be used to recover instruments that are presently monitoring environmental conditions on precious coral beds off the islands of Oahu and the Big Island, and to conduct a dive in support of a coral disturbance/recovery study. The next three days will be used to explore for deep sea coral and sponge communities, as well as manganese crust communities in the Geologists seamounts located about 100 miles south of Honolulu. The last dive will be used to recover an instrument that is presently monitoring environmental conditions on precious corals that are covering a scuttled WWI-era submarine, and collect information on the submarine's state of degradation. The information and data generated by this project will lead to a better understanding of the deep water habitats, ecosystems and geologic history of the Hawaiian Islands, providing basic information about the about the rich and unique biological resources and habitats of this region. Ideally, the findings from this cruise will spur further exploration and research and ultimately contribute to effective resource management decisions.

Mapping

The acquisition of high-resolution seafloor mapping data is an essential precursor to making significant biological, geological, archaeological and oceanographic discoveries. The *Okeanos Explorer* cruises will collect seafloor mapping data to supplement previous multibeam mapping in the region. These maps form the basis for selecting ROV dive targets. NOAA Ship *Okeanos Explorer* has three scientific sonars that are configured to operate simultaneously without interference: a 30 kHz multibeam echosounder (Kongsberg EM 302), an 18 kHz singlebeam echosounder (Kongsberg EK60), and a 3.5 kHz sub-bottom profiler (Knudsen Chirp 3260). Sonar operations with all three systems running simultaneously are planned to occur continuously throughout the day and night except when the ROV is deployed or CTD operations are occurring. Additionally, expendable bathythermographs (XBTs) will be deployed at regular intervals in association with multibeam data collection. All of these systems are routinely used by this exploration vessel.

Bridge Officers and Watch Standers will be on watch during all hours and will look for marine mammals and other observable species potentially sensitive to the sound of the sonars. If cetaceans are sighted, knowledgeable personnel would follow established best management practices to minimize disturbance. If cetacean species are present within 400 m of the ship, the vessel will stop until the animals depart the area.

Multibeam

Multibeam sonar data will produce high-resolution bathymetry and acoustic backscatter maps. These maps will provide critical baseline information to scientists and resource managers interested in identifying and expanding our understanding of the important biological habitats and ecological connections in the Hawaiian Archipelago. Additionally, the data collected will help scientists better understand the size and character of seafloor habitats in the area, allowing for improved targeting of future exploration and research, including the selection of sites for further investigation with a ROV.

Expendable bathythermographs (XBT):

XBTs are deployed to obtain sound velocity profiles. The profiles are required to calibrate the multi-beam system and ensure accurate bathymetric mapping. During the Leg III ROV cruise, mapping operations would be conducted mainly at night in transit to the next dive location,

resulting in a total of 2 XBT deployments in a 24-hour period, or an estimated 14 XBTs during the duration of the cruise. The very fine wire connecting the XBT probe to the ship is extremely easy to break by hand once the probe reaches maximum depth. The minimal tensile strength of the wire should represent a minimal entanglement risk for marine animals. The expended materials are unlikely to result either in any significant environmental impacts to the sea floor or in a significant degradation of marine water quality. Over a period of years, these materials would degrade, corrode, and become incorporated into the sediments.

Single Beam and Split Beam Sonar:
The Kongsberg EK 60 (18 kHz) single beam is used to collect information about the water column, such as at gas plume or seep sites, and to obtain information about biomass. The EK60 split-beam sonar is used as a quantitative scientific echosounder to identify water column acoustic reflectors - typically biological scattering layers, fish, or gas bubbles – providing additional information about water column characteristics and anomalies. Fishery scientists have developed methods to analyze EK60 data to support fish stock assessment (e.g. Atlantic herring, pollock, capelin) and to predict hot spots of large fish in coral reefs. Split beam sonars are also being used to help develop "acoustic signatures" of different marine species, which will greatly enhance existing efforts to assess abundance, distribution, and behavior using remote sensing methods. Additionally, split beam sonars are being used to generate gaseous seep flux rates and their contribution to ocean and atmospheric chemistry.

Sub Bottom Profiler:
The primary purpose of this Knudsen Chirp 3260 (3.5 kHz) sonar is to provide echogram images of surficial geological sediment layers underneath the seafloor to a maximum depth of about 80 meters below the seafloor. The Sub Bottom Profiler is normally operated to provide information about the sedimentary features and the bottom topography that is simultaneously being mapped by the multibeam sonar. The data generated by this sonar is fundamental in helping geologists interpret the shallow geology of the seafloor. Collecting this data in the Leg III operating area may provide improved insights into the geology of the region.

CTD Rosette Operations
The CTD rosette instrument does not emit an acoustic signal and is used to obtain conductivity, temperature, depth and other oceanographic data (dissolved oxygen, light scattering, oxygen reduction potential). The system would be lowered to a maximum depth of 6800 m by an embedded scientific winch and wire while the vessel would be stopped and hold station using dynamic positioning. The average time to conduct a CTD cast varies from one to several hours depending on water depth (the CTD is lowered through the water column at 60m/min). CTD casts are not currently planned during this cruise by may be conducted at selected sites including locations where ROV dives are conducted to allow for an improved understanding of the environmental conditions by measuring the physical or chemical properties of the water column overlying or hosting a particular habitat. The CTD would not touch the seafloor and would have limited time and presence in the marine environment.

ROV Operations
ROV cruises would use the ROV system to retrieve previously deployed instruments that are currently monitoring environmental conditions on precious coral beds off the islands of Oahu and

the Big Island, to conduct a dive in support of a coral disturbance/recovery study, and to explore for deep sea coral and sponge communities, as well as manganese crust communities in the Geologists seamounts located about 100 miles south of Honolulu. The dives will enable scientists and managers to have a better understanding of known, sensitive deep sea coral and sponge habitats to enable more effective management decisions. ROV dives are planned at the Geologists Seamounts to conduct interdisciplinary site characterization at priority sites on never before visited seamounts. Interdisciplinary site characterization would be achieved by visually surveying priority targets while simultaneously acquiring environmental data with in situ sensors (CTD and Dissolved Oxygen) mounted on the ROVs. ROV targets include seamount summits, flanks and rift zone ridges where high density deep water coral and sponge communities are likely to occur.

The *Okeanos Explorer* is equipped with OER's dedicated, fully integrated, two-body ROV system. ROV operations are conducted primarily during daylight hours while the vessel is stopped and holds station using dynamic positioning. ROV operations will typically take place within several meters of the seafloor, and are conducted in a way to minimize seafloor disturbances. During Leg III, up to 7 deployments of the ROV would occur during the expedition, resulting in 56 hours total dive time (~8 hours for each dive).

During these dives, limited sampling operations are planned to collect very selective specimens with the ROV that have the potential to contribute significant scientific discoveries. Biological specimen collections will focus on deep sea corals and sponges (and their incidentally collected commensals). Only biological specimens suspected of being new species or new records for Hawaiian waters will be targeted. When possible, only a sub-sample will be taken of biological specimens (e.g., only a piece or branch of corals and sponges will be collected, not the entire organismal community). Selective rock specimens, that have the potential to contribute significant scientific discoveries, as outlined in the expedition goals, will also be targeted. These are expected to include rocks from seamounts and manganese-coated rocks. When possible, rock samples will be selected in a way to minimize disturbance to the surrounding environment and to minimize the take of attached organisms.

Permits

OER has also completed an informal consultation with NOAA's National Marine Fisheries Service (NMFS) under section 7 of the Endangered Species Act of 1973 that addresses the potential impacts of project activities to ESA-listed species and critical habitat within the project operating area. A Letter of Concurrence was received from NMFS on July 7, 2015, concurring with OER's determination that EX-15-04 cruise 1-4 activities are not likely to adversely affect ESA-listed marine species, and would have insignificant effects on designated or proposed critical habitat.

Although the proposed action will occur within a geographic area with unique characteristics, i.e., sensitive ecosystems and historic/cultural resources, it has been determined that the characterization and monitoring undertaken by this project will not pose the possibility of significant impact and, hence, do not warrant preparation of an EA or EIS, as prescribed in NAO 216.6 Section 5.05c. Arguably, such natural and cultural resources need to be clearly identified, inventoried, assessed and monitored in order for managers to effectively manage and protect them.

Effects of the Project

As expected for ocean research with limited duration or presence in the marine environment, this project will not have the potential for significant impacts. Knowledgeable experts who are aware of the sensitivities of the marine environment will conduct the at-sea portions of this project. The potential gains or beneficial effects of the project seem to outweigh any potential adverse effects. This expedition will provide data and information on known and poorly understood deep water habitats contained within the U.S. Exclusive Economic Zone (EEZ). This work will provide essential information for further research, exploration, conservation and management of marine habitats within the U.S. EEZ.

As defined in Sections 5.05 and 6.03.c.3 (a) of NAO 216-6, this is a research project of limited size or magnitude and will not result in individually or cumulatively significant impacts on the quality of the human environment. Specifically, this research cruise would have only short-term effects with the principle goals of natural resource inventories and environmental monitoring over a wide geographic area. Furthermore, this action would not be subject to any of the exceptions for categorical exclusion provided at NAO 216-6 section 5.05c. As such, this project is categorically excluded from the need to prepare a NEPA environmental assessment.

Signed:_____ Date:_____

John McDonough, Acting Director

Appendix B: ESA Section 7

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Pacific Islands Regional Office
1845 Wasp Blvd., Bldg 176
Honolulu, Hawaii 96818
(808) 725-5000 • Fax: (808) 725-5215

JUL 07 2015

Dr. John J. McDonough
Deputy Director
National Oceanic and Atmospheric Administration
Office of Ocean Exploration and Research
Silver Spring, MD 20910

Dear Dr. McDonough:

This letter responds to your June 10, 2015 Request for Consultation by the NOAA Office of Exploration and Research (OER) regarding efforts aboard the NOAA vessel *Okeanos Explorer* that would include four telepresence-enabled ocean exploration cruises from July to September 2015, to collect critical baseline information to meet NOAA science and management needs within the Hawaiian Archipelago and offshore Johnston Atoll. You have requested our concurrence under Section 7 of the Endangered Species Act of 1973 (ESA), as amended (16 U.S.C. §1531 et seq.), with your determination that the proposed action may affect but is not likely to adversely affect green, hawksbill, leatherback, olive ridley, and north Pacific loggerhead sea turtles; Main Hawaiian Islands false killer whale distinct population segment, humpback whales, blue whales, fin whales, sei whales, sperm whales, north Pacific right whales, the Indo-West Pacific distinct population segments of the scalloped hammerhead shark, Hawaiian monk seals, and monk seal critical habitat.

Proposed Action/Action Area: The proposed activities are described in the OER request for consultation and the associated biological evaluation (CAPSTONE 2015). In summary, the proposed action consists of activities to explore and improve understanding of the distribution and diversity of deep water habitats. The activities would occur during four different research cruises aboard the Okeanos Explorer scheduled between July – October 2015. No activities would occur on land. Up to 60 individuals (20 rotating scientists/technicians on 3 expedition legs) would be authorized to conduct mapping and ROV surveys using the vessel's multibeam, single beam and subbottom profiling sonar systems, conducting conductivity-temperature depth (CTD) casts, and deploying an ROV.

The action area covered by this biological evaluation encompasses the marine environment of the Papahānaumokuākea Marine National Monument (PMNM); the marine environment around Johnston Atoll in the Pacific Remote Islands Marine National Monument (PRIMNM); the marine environment around Ni'ihau, Oahu and the big island of Hawai'i; the Geologists

Seamounts located about 100 miles south of Honolulu; and the vessel transit areas between Honolulu, Hawai'i and these locations where ESA-listed marine species or their habitats may be impacted by the proposed activities.

Within the PMNM, focused operations are planned from Middle Bank on the southern border of the Monument northwest reaching up to Pearl and Hermes Atoll. Within the Johnston Atoll portion of PRIMNM, focused operations are planned at Horizon tablemount, through both the Karin and Johnston Seamount chains, and offshore of Johnston Atoll. Operations offshore of Oahu are planned on the south and southeast side of the island, and on the west/southwest side of the Hawai'i.

Species That May Be Affected: OER has determined that the proposed action may affect but is not likely to adversely affect green sea turtles (*Chelonia mydas*), hawksbill sea turtles (*Eretmochelys imbricata*), North Pacific distinct population segment of loggerhead sea turtles (*Caretta caretta*), olive ridley sea turtles (*Lepidochelys olivacea*), leatherback sea turtles (*Dermochelys coriacea*), Main Hawaiian Islands false killer whale distinct population segment (*Pseudorca crassidens*), humpback whales (*Megaptera novaeangliae*), sperm whales (*Physeter macrocephalus*), fin whales (*Balaenoptera physalus*), blue whales (*Balaenoptera musculus*), sei whales (*Balaenoptera borealis*), North Pacific right whales (*Eubalaena japonica)*, the Indo-West Pacific distinct population segment of the scalloped hammerhead shark (*Sphryna lewini*), Hawaiian monk seals (*Neomonachus schauinslandi*), and Hawaiian monk seal critical habitat. Detailed information about the biology, habitat, and conservation status of sea turtles can be found in their recovery plans and other sources at http://www.nmfs.noaa.gov/pr/species/turtles/. The same can be found for Hawaiian monk seals and cetaceans at http://www.nmfs.noaa.gov/pr/species/mammals/; and for scalloped hammerhead sharks at http://www.fpir.noaa.gov/PRD/prd_scalloped_hammerhead_shark.html.

Critical Habitat: The proposed action would take place within designated monk seal critical habitat. Critical habitat was designated under the ESA for the Hawaiian monk seal on April 30, 1986 and revised on May 26, 1988. Designated critical habitat includes all beach areas, lagoon waters, and ocean waters out to a depth of 20 fathoms around Kure Atoll; Midway Islands (except Sand Island), Pearl and Hermes Reef, Lisianski Island, Laysan Island, Gardner Pinnacles, French Frigate Shoals, Necker Island, Maro Reef, and Nihoa Island. On June 2, 2011, NMFS proposed revising critical habitat for monk seals by extending the current designation out to the 500 meter depth contour and including Sand Island at Midway Island but this proposal is not yet final.

Analysis of Effects: In order to determine that a proposed action is not likely to adversely affect listed species, NMFS must find that the effects of the proposed action are expected to be insignificant, discountable, or beneficial as defined in the joint USFWS-NMFS Endangered Species Consultation Handbook: (1) insignificant effects relate to the size of the impact and should never reach the scale where take occurs; (2) discountable effects are those that are extremely unlikely to occur; and (3) beneficial effects are positive effects without any adverse effects (USFWS & NMFS 1998). This standard, as well as consideration of the probable duration, frequency, and severity of potential interactions, was applied during the analysis of effects of the proposed action on ESA-listed marine species, as is described in detail in the OER

consultation request. The OER determined that the risk of collisions with vessels and the risk of entanglement would be discountable; and that the risk from exposure to elevated noise level, disturbance from human activity, as well as exposure to wastes and discharges would result in insignificant effects on ESA-listed sea turtles, marine mammals and the scalloped hammerhead shark, and that the potential effects of the proposed action to designated or proposed critical habitat would also be insignificant.

Considering the information and assessments presented in the OER consultation request, and in the best scientific information available about the biology and expected behaviors of the ESA-listed marine species considered in this consultation; NMFS agrees that: 1) the list of ESA-listed species and critical habitats potentially exposed to the effects of the action is correct, 2) the suite of identified stressors is comprehensive, and 3) the assessment of exposure risk and significance of exposure to those stressors is accurate. Therefore, NMFS agrees that the risk of collisions with vessels and the risk of entanglement would be discountable for marine mammals, sea turtles and the scalloped hammerhead shark; and that those animals would be unlikely to respond to elevated noise level, disturbance from human activity, as well as exposure to wastes and discharges, and if perchance a response were to occur, it would be temporary in nature and never reach the scale where it would affect the individual's health, and as such, cause insignificant effects; and that the action would have insignificant effects on critical habitat.

Conclusion: NMFS concurs with your determination that the proposed cruises of the Okeanos Explorer are not likely to adversely affect ESA-listed marine species, and would have insignificant effects on designated or proposed critical habitat. This concludes your consultation responsibilities under the ESA for species under NMFS's jurisdiction. However, this consultation focused solely on compliance with the ESA. Additional compliance review that may be required of NMFS for this action (such as assessing impacts on Essential Fish Habitat) would be completed by NMFS Habitat Conservation Division in separate communication, if applicable.

ESA Consultation must be reinitiated if: 1) a take occurs; 2) new information reveals effects of the action that may affect listed species or designated critical habitat in a manner or to an extent not previously considered; 3) the identified action is subsequently modified in a manner causing effects to listed species or designated critical habitat not previously considered; or 4) a new species is listed or critical habitat designated that may be affected by the identified action.

If you have further questions please contact Richard Hall on my staff at (808) 725-5018. Thank you for working with NMFS to protect our nation's living marine resources.

Sincerely,

Michael D. Tosatto
Regional Administrator

cc: Kelley Elliott, NOAA/OER
Justin Rivera, NOS/ONMS/PMNM
Aaron Nadig, ESA Section 7 Program, USFWS, Honolulu

NMFS File No.: PIR-2015-9649
PIRO Reference No.: I-PI-15-1283-AG

Literature Cited

Campaign to Address Pacific Monument Sciecne, Technology and ocean Needs (CAPSTONE) 2015. Request for Informal Consultation. Letter from John McDonough to Ann Garrett dated June 10, 2015 and attachments.

U.S. Fish and Wildlife Service and National Marine Fisheries Service. 1998. Endangered Species Consultation Handbook. Procedures for Conducting Consultation and Conference Activities Under Section 7 of the Endangered Species Act.
http://www.nmfs.noaa.gov/pr/pdfs/laws/esa_section7_handbook.pdf

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
OCEANIC AND ATMOSPHERIC RESEARCH
Office of Ocean Exploration and Research
Silver Spring, MD 20910

June 10, 2015

Ann Garrett
Assistant Regional Administrator
Protected Resources Division
NMFS Pacific Islands Regional Office
1845 Wasp Blvd., Building 176
Honolulu, HI 96818

Re: Request to Initiate Consultation under Section 7 of the Endangered Species Act for the Campaign to Address Pacific Monument Science, Technology and Ocean Needs (CAPSTONE Project)

Dear Ms. Garrett:

Operating under a partnership with NOAA's Office of Ocean Exploration and Research and the Office of Marine and Aviation Operations, the *Okeanos Explorer* team is preparing to conduct four telepresence-enabled ocean exploration cruises from July to September 2015 to collect critical baseline information to meet NOAA science and management needs within the Hawaiian Archipelago and offshore Johnston Atoll. The overarching goal of the project is to extend and improve the understanding of the distribution and diversity of deepwater habitats within the Monument. Data and information from the cruises will build on the recent work conducted by the Schmidt Ocean Institute research vessel *Falkor* and provide a foundation of publicly-accessible baseline information to improve management and spur further exploration and research. Like previous expeditions in the Gulf of Mexico, western Atlantic, and Indonesia, NOAA will work with the scientific community and public to characterize unknown and poorly-known areas through telepresence-based exploration. Operations will use the ship's deep water mapping systems, NOAA's 6000m remotely operated vehicles (ROV), CTD rosette, and a high-bandwidth satellite connection for real-time ship to shore communications. These expeditions will help establish a baseline of information in the region to catalyze further exploration, research and management activities.

We propose to conduct activities to explore and improve understanding of the distribution and diversity of deep water habitats. The activity would occur during four different research cruises aboard NOAA Ship *Okeanos Explorer* scheduled between July – October 2015. No activities would occur on land. Up to 60 individuals (20 rotating scientists/technicians on 4 expedition legs) would be authorized to conduct mapping and ROV surveys using the *Okeanos Explorer's* multibeam, single beam and subbottom profiling sonar systems, conducting conductivity-temperature depth (CTD) casts (The CTD would be lowered into the water column via the

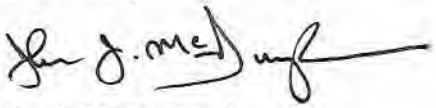
vessel's winch system and would not touch the seafloor), and deploying an ROV.

Enclosed is a Biological Evaluation (BE) to initiate consultation under Section 7(a)(2) of the Endangered Species Act (ESA). As described in the BE, we have determined that the proposed 2015 CAPSTONE cruises may affect, but are not likely to adversely affect, the following ESA-listed marine species: green sea turtles (*Chelonia mydas*), hawksbill sea turtles (*Eretmochelys imbricata*), North Pacific distinct population segment of loggerhead sea turtles (*Caretta caretta*), olive ridley sea turtles (*Lepidochelys olivacea*), leatherback sea turtles (*Dermochelys coriacea*), Main Hawaiian Islands false killer whale distinct population segment (*Pseudorca crassidens*), humpback whales (*Megaptera novaeangliae*), sperm whales (*Physeter macrocephalus*), fin whales (*Balaenoptera physalus*), blue whales (*Balaenoptera musculus*), sei whales (*Balaenoptera borealis*), north pacific right whales (*Eubalaena japonica)*, the Indo-West Pacific and Central Pacific distinct population segments of the scalloped hammerhead shark (*Sphryna lewini*), Hawaiian monk seals (*Neomonachus schauinslandi*), and Hawaiian monk seal critical habitat.

We request your concurrence with our 'not likely to adversely affect' determination for the species listed above and for Hawaiian monk seal critical habitat.

Please contact Kelley Elliott (**Kelley.Elliott@noaa.gov**, 301-734-1024) with questions regarding this consultation request.

Respectfully,



John J. McDonough
Deputy Director
NOAA Office of Ocean Exploration and Research

Biological Evaluation
Campaign to Address Pacific Monument Science, Technology and Ocean Needs
(CAPSTONE Project)

Background

NOAA Ship *Okeanos Explorer*, "America's Ship for Exploration", is the nation's first and only federal vessel with a mandate to systematically explore our mostly unknown ocean for the purpose of discovery and the advancement of knowledge. Operating under a partnership with NOAA's Office of Ocean Exploration and Research and the Office of Marine and Aviation Operations, the overarching goal of the project is to extend and improve the understanding of the distribution and diversity of deepwater habitats within the Monuments, and collect data and information to address NOAA science and management priorities. Data and information from the cruises will build on the recent work done by the Schmidt Ocean Institute vessel Falkor, and provide a foundation of publicly-accessible baseline information to improve management and spur further exploration and research. Like previous expeditions in the Gulf of Mexico, western Atlantic, and Indonesia, NOAA will work with the scientific community and public to characterize unknown and poorly-known areas through telepresence-based exploration. Operations will use the ship's deep water mapping systems, NOAA's 6000m remotely operated vehicles (ROV), CTD rosette, and a high-bandwidth satellite connection for real-time ship to shore communications. These expeditions will help establish a baseline of information in the region to catalyze further exploration, research and management activities.

Action Area

The action area covered by this biological evaluation encompasses the marine environment in and around the Papahānaumokuākea Marine National Monument (PMNM); the marine environment around Johnston Atoll in the Pacific Remote Islands Marine National Monument (PRIMNM); the marine environment around Ni'ihau, Oahu and the big island of Hawai'i; the Geologists Seamounts located about 100 miles south of Honolulu; and the vessel transit areas between Honolulu, Hawai'i and these locations where ESA-listed marine species or their habitats may be impacted by an applicant's activities.

Within the Papahānaumokuākea Marine National Monument, focused operations are planned from Middle Bank on the southern border of PMNM northwest reaching up to Pearl and Hermes Atoll. Within the Johnston Atoll portion of PRIMNM, focused operations are planned at Horizon tablemount, through both the Karin and Johnston Seamount chains, and offshore of Johnston

Atoll. Operations offshore of Oahu are planned on the south and southeast side of the island, and on the south and southwest side of the Hawai'i (see Appendix A for maps).
All mapping and ROV operations are expected to be in Federal waters at depths of 250m and greater, including within the boundaries of PMNM, PRIMNM (Johnston Atoll) and the U.S. EEZ, but will not include work within state waters (0-3 nautical miles from shore). Transit mapping operations are planned between all areas mentioned, and in the high seas between PMNM and Johnston Atoll. CTD rosette operations may be conducted in marine areas within state waters. Monument boundaries are further specified under the code of federal regulations 50 CFR Part 404.

Proposed Action
The applicant proposes to conduct activities to explore and improve understanding of the distribution and diversity of deep water habitats. The activity would occur during four different research cruises aboard the NOAA Ship Okeanos Explorer scheduled between July – October 2015. No activities would occur on land. Up to 60 individuals (20 rotating scientists/technicians on 3 expedition legs) would be authorized to conduct mapping and ROV surveys using the Okeanos Explorer's multibeam, single beam and subbottom profiling sonar systems, conducting conductivity-temperature depth (CTD) casts (The CTD would be lowered into the water column via the vessel's winch system and would not touch the seafloor), and deploying an ROV.

The overarching goal of the project is to extend and improve the understanding of the distribution and diversity of deepwater habitats within the Monument. Data and information from the cruises will build on the recent Falkor work and provide a foundation of baseline data to improve management and spur further exploration and research. NOAA priorities for the work include a combination of science, education, outreach, and open data objectives that will support management decisions at multiple levels. The effort also serves as an opportunity to highlight the uniqueness and importance of this national symbol of ocean conservation.

The acquisition of high-resolution seafloor mapping data is an essential precursor to making significant biological, geological, archaeological and oceanographic discoveries in the monument. The Okeanos Explorer cruises will collect seafloor mapping data to supplement previous work. These maps form the basis for selecting ROV dive targets. ROV cruises would take the next major step in baseline habitat characterization by using the ROV system to visually investigate unknown and little known deep water habitats within the monument identified as priority by scientists and managers, including providing the first ever look at deep water communities living below 2,000 m. CTD casts may be conducted to collect additional

information about the physical and chemical properties of the water column, including at sites of interest identified from mapping and ROV investigation.

The information and data generated by this project will directly contribute to a better understanding of the deep water habitats, ecosystems and geologic history of the NWHI, the PRIMNM, the marine environment around Ni'ihau, Oahu and the big island of Hawai'i; and the Geologists Seamounts by providing basic information about the about the rich and unique biological resources and habitats of this region. It is this understanding that provides continuous support for the monument and its protection of these resources.

MAPPING

NOAA Ship Okeanos Explorer has three scientific sonars that are configured to operate simultaneously without interference: a 30 kHz multibeam system, 18 kHz split-beam fisheries sonar, and 3.5 kHz chirp sub-bottom profiler sonar. The multibeam is used to map broad swaths for bathymetry and water column feature detection (e.g. gaseous seeps), the split-beam gathers calibrated target strength measurements of biologic and gaseous targets in the water column, and the sub-bottom profiler provides data useful for interpreting sub-seafloor geology. The ship's ROVs utilize an ultrashort baseline (USBL) system for underwater positioning, which would be energized at all times when the ROVs are in the water. All of these systems are routinely used by this exploration vessel and have provided invaluable scientific data for marine researchers and managers, including numerous National Marine Sanctuaries, the Bureau of Ocean Energy Management and the U.S. Geological Survey.

Mapping activities would occur continuously throughout the day and night except when the ROV is deployed. If cetacean species are present within 400 m of the ship, the vessel would stop until the animals depart the area but the mapping sonar would continue transmitting. Observers would continuously monitor for the presence of protected species during the 24-hour mapping cruise and document all encounters with these species.

In addition to a dedicated observer monitoring for the presence of protected species during the 24-hour mapping cruise, standard practice during all Okeanos Explorer cruises and operations include Officers or Watch Standers on the Bridge around-the-clock, monitoring the surrounding ocean for the presence of other ships, unanticipated hazards, and marine animals – especially Cetaceans. If a Cetacean is observed, the Mapping Watch Stander or Science Lead is notified and if appropriate the team then proceeds with protocols to continue monitoring the animal or shut down mapping or other ship operations until the animal has departed the area for an appropriate period of time. When marine mammals are able to be

identified by Bridge Officers or Watch Standers, these observations are noted in the NOAA fleet marine mammal observation log as part of standard practice. During the July to September CAPSTONE expedition these procedures will include monitoring for the presence of sea turtles and, when appropriate, taking protection measures.

Multibeam :
Multibeam sonar mapping will be conducted with a Kongsberg EM 302 (30 kHz) sonar in areas within and in the vicinity of the PMNM and the PRIMNM where gaps are present in the existing coverage, or the existing data is poor quality. Specifically this is planned to include: offshore of Johnston Atoll along Horizon tablemount, the Karin and Johnston seamount ranges; and along the Geologists seamounts groups. Multibeam mapping will also take place during the transits to and from sites where other operations will be conducted, and are planned to continue to build upon previous mapping surveys as much as feasible. Multibeam sonar data will produce high-resolution bathymetry and acoustic backscatter maps. These maps will provide critical baseline information to scientists and resource managers interested in identifying and expanding our understanding of the important biological habitats and ecological connections in the Monuments, and the geology of the NWHI. Additionally, the data collected will help scientists better understand the size and character of seafloor habitats in the area, allowing for improved targeting of future exploration and research, including the selection of sites for further investigation with a ROV.

Expendable bathythermographs (XBT):
XBTs are deployed to obtain sound velocity profiles. The profiles are required to calibrate the multi-beam system and ensure accurate bathymetric mapping. The XBT type is the Deep Blue probe produced by Lockheed Martin Sippican. A single Deep Blue XBT is 8.5 in. length x 2 in. width and weighs 2.53 lbs. It consists of a plastic spool, hair thin copper wire (< 1mm width), zinc weight, thermistor (comprised of two short wires (< 8.5 in. length)) and is contained in a clear plastic housing. The Deep Blue XBT contains no chemical solutions. During the Okeanos Leg 1 dedicated mapping cruise, XBTs will likely need to be deployed once every 4-6 hours to ensure accurate bathymetric data collection (resulting in 4-6 total XBT deployments in a 24-hour period, and an estimated 58 to 88 XBTs during the duration of the mapping cruise). During the three planned ROV expeditions, mapping operations would be conducted mainly at night in transit to the next dive location, resulting in a total of 2 XBT deployments in a 24-hour period, or an estimated 108 XBTs during the duration of the three ROV cruises. While CTD casts every 4-6 hours are an alternative method to obtain sound velocity profiles, the ship must interrupt survey operations for approximately 3.5 hours to conduct a single cast in 3000-6000 meters of water.

The impact would be highly detrimental and cost prohibitive in terms of efficient use of ship time for mapping. Assuming we would need 166-196 sound velocity profiles, and given that the ship can map 10,000 sq. km in 4.7 days at depths between 3000-6000 m, conducting CTD casts instead of XBTs would reduce the seafloor area mapped during the three legs by 42,000-50,000 square km. For comparison purposes, the total area of the state of Hawaii including all of its lands and surrounding territorial waters is 28,313 square kilometers. Given that most of the areas the Okeanos Explorer will be mapping have never been mapped with high resolution multibeam, foregoing the mapping of such a massive area would be a huge missed opportunity to characterize the marine environment of the region. Additionally, ROV dive site locations are often spaced far apart and the ship will need to transit overnight to dive sites planned for the following day – taking 3.5 hours of this time to conduct a CTD would severely limit ROV dive options. For these reasons XBT deployments are requested.

The very fine wire connecting the XBT probe to the ship is extremely easy to break by hand once the probe reaches maximum depth. The minimal tensile strength of the wire should represent a minimal entanglement risk for species of concern. The potential for XBT deployments to impact ESA-listed species was the topic of an informal consultation request from the PMNM to NMFS during PMNM permit review for the Falkor expeditions. The determination was that the Falkor's use of XBTs may affect, but is not likely to adversely affect, Hawaiian monk seals, green sea turtles, hawksbill sea turtles, leatherback sea turtles, olive ridley sea turtles, North Pacific loggerhead sea turtles, MHI Insular false killer whales, humpback whales, sperm whales, fin whales, blue whales, sei whales, and north pacific right whales. We expect the same determination would be made with respect to the deployment of XBTs by the Okeanos Explorer.

Single Beam and Split Beam Sonar:
The Kongsberg EK 60 (18 kHz) single beam is used to collect information about the water column, such as at gas plume or seep sites, and to obtain information about biomass. The EK60 split-beam sonar is used as a quantitative scientific echosounder to identify water column acoustic reflectors - typically biological scattering layers, fish, or gas bubbles – providing additional information about water column characteristics and anomalies. Fishery scientists have developed methods to analyze EK60 data to support fish stock assessment (e.g. Atlantic herring, pollock, capelin) and to predict hot spots of large fish in coral reefs. Split beam sonars are also being used to help develop "acoustic signatures" of different marine species, which will greatly enhance existing efforts to assess abundance, distribution, and behavior using remote sensing methods. Additionally, split beam sonars are also being used to generate gaseous seep flux rates and their contribution to ocean and atmospheric chemistry.

Sub Bottom Profiler:
The primary purpose of this Knudsen Chirp 3260 (3.5 kHz) sonar is to provide echogram images of surficial geological sediment layers underneath the seafloor to a maximum depth of about 80 meters below the seafloor. The Sub Bottom Profiler is normally operated to provide information about the sedimentary features and the bottom topography that is simultaneously being mapped by the multibeam sonar. The data generated by this sonar is fundamental in helping geologists interpret the shallow geology of the seafloor. Collecting this data within the CAPSTONE project area will provide greatly improved insights into the geology of the region, and supplement existing magnetometer and gravity measurements obtained by other vessels. If only limited sub-bottom operations are allowed, the profiler would be used at selected sites to provide additional insight into the geologic history of the project area.

ROV OPERATIONS:
The purpose of conducting ROV operations is to conduct interdisciplinary site characterization at priority targets in the monuments. Interdisciplinary site characterization would be achieved by visually surveying priority targets while simultaneously acquiring environmental data with in situ sensors mounted on the ROVs (CTD and DO). ROV targets include seamount summits and flanks, rift zone ridges, drowned reef terraces, guyots (i.e., flat topped tablemounts), a submerged crater, submarine canyons, and other types of topography where high density deep water coral and sponge communities are likely to occur. The combined dives will enable scientists and managers to have a better understanding of the diversity and distribution of deep water habitats in the monuments, and should contribute to enhanced protection of these resources. The ROVs 6000m depth capability puts areas of the monuments within reach that have never been seen before.

The Okeanos Explorer is equipped with OER's dedicated, fully integrated, two-body ROV system. The first body of the system is the ROV Deep Discoverer (D2), a 10.4ft long x 6.4ft wide x 8.5ft high vehicle weighing approximately 9150 lbs (in air), and capable of diving to 6000 meters. D2's primary data set is high definition video collected by two HD cameras. In addition to the HD video cameras, D2 carries a CTD with dissolved oxygen sensors. The second body of the system is the camera platform Seirios, an 11.5ft long x 3.67ft wide x 4.05ft high vehicle that weighs 2925 lbs and provides additional lighting and an "aerial" view of D2 while she investigates the seafloor. Like D2, Seirios carries two HD cameras, a Sea Bird 9/11+ CTD with DO2 sensors. During operation, the two vehicles are connected to each other by a "soft" electro-optical tether 30 meters in length. Seirios is also attached to the ship by an 8,200-meter armored fiber-optic cable that provides power and telemetry to the vehicles. ROV operations are

conducted primarily during daylight hours while the vessel would be stopped and holding station using dynamic positioning.

ROV operations will typically take place within several meters of the seafloor, and are conducted in a way to minimize seafloor disturbances. On occasion, the ROV is set down on the seafloor in order to acquire very close imagery of habitats or features of interest. Common procedure includes visually scanning the seafloor to ensure the area the ROV is set on does not include corals or other animals, however some animals may reside beneath the sediment or may be too small to see. The ROV also has a temperature probe that may be shallowly inserted into the seafloor sediment to measure the depth or temperature of features of interest. Finally, though we try to prevent any unnecessary seafloor disturbance, it is likely that at some point the ROV will inadvertently touch some benthic fauna (e.g., sea whip) or that water moving through the ROV thrusters will stir up small amounts of seafloor sediment. Any disturbance would likely be similar to that seen during normal near bottom SCUBA dives.

Up to 52 deployments of the ROV would occur during the expedition, resulting in 416 hours total dive time (~8 hours for each dive). Currently 17 deployments of the ROV are planned in PMNM waters, and 13 ROV deployments are planned offshore Johnston Atoll in the PRIMNM.

ROV Sampling:
A pilot sampling program is being conducted during the July to September ROV cruises to collect very selective specimen collections with the ROV that have the potential to contribute significant scientific discoveries. Biological specimen collections will focus on, but are not limited to, corals and sponges (and their incidentally collected commensals). Only biological specimens suspected of being new species or new records for Hawaiian waters will be targeted. When possible, only a subsample will be taken of biological specimens (e.g., only a piece or branch of corals and sponges will be collected, not the entire organism). Selective rock specimens that have the potential to contribute significant scientific discoveries as outlined in the expedition goals will also be targeted. These are expected to include rocks from seamounts; manganese-coated rocks; and rock samples to support the United States Extended Continental Shelf effort. When possible, rock samples will be selected in a way to minimize the amount of attached organisms.

Ultra Short Base Line Acoustic Navigation (USBL):
The Tracklink TL10000MA system is used to track and record the position of the ROVs during the course of a dive. It functions by the transmission of an acoustic pulse from the surface ship,

which travels through the water column and triggers a responding acoustic pulse from the ROV. The measurement of the travel time and direction of arrival of the responding acoustic pulse from the ROV enables calculation of the position of the submerged ROV with respect to the surface ship. Integration of this relative position information with the surface ship position as determined by GPS allows the calculation of the position of the ROV on the seafloor. In this way, observations made by the ROV can be geo-referenced to standard latitude, longitude and depth coordinates. The USBL is used during ROV operations, which are conducted daily and primarily during daylight hours while the ship holds station using dynamic positioning. Although such frequencies are within the hearing range of marine mammals, the USBL navigation system is commonly used by researchers and has no known adverse impact on marine life.

The Tracklink operates at frequencies from 7.5 kHz to 12.5 kHz. Acoustic emissions by the USBL system occur at the surface from the hull of the ship, and at both of the ROVs as they travel through the water column and at the seafloor. The repetition rate of emissions is typically no faster than once 2 every seconds, increasing by 1.33 seconds for every 1000 meters of depth of the ROVs. The character of these emissions is detailed below:

Surface transceiver, Okeanos Explorer:
Tracklink model TL10000MA
Frequency of operation: 7.5 kHz - 12.5 kHz Spread Spectrum
Beam width: 120º directed at nadir
Peak electrical power: 100 W
Peak acoustic power: 187db relative to 1 micro Pascal at 1 meter.

ROV transponder, Seirios:
Tracklink model TL10010C
Frequency of operation: 7.5 kHz - 12.5 kHz Spread Spectrum
Beam width: 210º directed at zenith
Peak electrical power: 200 W
Peak acoustic power: 190db relative to 1 micro Pascal at 1 meter.

ROV transponder, Deep Discoverer:
Tracklink model TL10015C
Frequency of operation: 7.5 kHz - 12.5 kHz Spread Spectrum
Beam width: 30º directed at zenith

Peak electrical power: 500 W
Peak acoustic power: 200db relative to 1 micro Pascal at 1 meter.

CTD OPERATIONS:
The CTD rosette instrument does not emit an acoustic signal and is used to obtain conductivity, temperature, depth and other oceanographic data (dissolved oxygen, light scattering, oxygen reduction potential). The instrument would be attached to an open cylindrical steel frame approximately 1.15 m in diameter and 1.4 m high with a 24-position rosette carousel containing 24 2.5 L niskin bottles for collecting water samples. The system would be lowered to a maximum depth of 6800 m by an embedded scientific winch and wire while the vessel would be stopped and hold station using dynamic positioning. The average time to conduct a CTD casts varies from one to several hours depending on water depth (the CTD is lowered through the water column at 60m/min). CTD casts would be conducted at selected sites including locations where ROV dives are conducted to allow for an improved understanding of the environmental conditions by measuring the physical or chemical properties of the water column overlying or hosting a particular habitat. The CTD would not touch the seafloor.

Analysis of Effects
Our analysis considers potential impacts or stressors to identified marine resources within the PMNM and PRIMNM (Johnston Atoll), the marine environment around Ni'ihau, Oahu and the big island of Hawai'i; and the Geologists Seamounts on green sea turtles (*Chelonia mydas*), hawksbill sea turtles (*Eretmochelys imbricata*), North Pacific distinct population segment of loggerhead sea turtles (*Caretta caretta*), olive ridley sea turtles (*Lepidochelys olivacea*), leatherback sea turtles (*Dermochelys coriacea*), Main Hawaiian Islands false killer whale distinct population segment (*Pseudorca crassidens*), humpback whales (*Megaptera novaeangliae*), sperm whales (*Physeter macrocephalus*), fin whales (*Balaenoptera physalus*), blue whales (*Balaenoptera musculus*), sei whales (*Balaenoptera borealis*), north pacific right whales (*Eubalaena japonica)*, the Indo-West Pacific distinct population segments of the scalloped hammerhead shark (*Sphryna lewini*), Hawaiian monk seals (*Neomonachus schauinslandi*), and Hawaiian monk seal critical habitat. We believe that the most likely potential impacts or stressors are:

1. Exposure to elevated noise levels;
2. Temporary disturbance from human activity;
3. Entanglement;
4. Collisions with vessels; and
5. Exposure to waste and discharge.

1. Exposure to elevated noise levels

As described earlier, the proposed action would include the operation of NOAA Ship Okeanos Explorer's mapping sonar systems, as well as the underwater positioning systems associated with the ROVs Deep Discoverer and Seirios.

The effects on marine life from exposure to high intensity noise vary with the frequency, intensity, and duration of the sound source, and the physiology and hearing characteristics of the exposed animal. Exposure to very high levels of sound can cause soft tissue injuries that could directly result in fatality. Exposure to lower levels at frequencies within the animal's range of hearing may cause injury in the form of permanent hearing damage, also referred to as permanent threshold shift (PTS). Exposure to even lower levels may cause behavioral effects that include temporary threshold shifts (TTS), temporarily masked communications and/or acoustic environmental cues, alteration of ongoing behaviors, and areal avoidance.

Okeanos Explorer sonars will be turned on for the entirety of each cruise during CAPSTONE and will only be turned off during ROV dives or CTD casts. We will minimize turning the system on and off as a precautionary measure to avoid possible startling of the animals. When the sonars are powered down for ROV and CTD operations, the flexible "soft start" mode will be used to restart the multibeam first. The soft start mode is a delay function, starting the sonar transmissions at a low output level and then gradually increasing to the level required for optimal bathymetry data collection. The soft start modes can either be set at -10 or -20 decibels with a 0 to 15 minute ramp up time to the desired power. We can select -10 dB, -20 dB or maximum transmit power. Maximum transmit power is recommended by Kongsberg for maximizing the mapping swath coverage. In the deepest operating mode the EM302 is 243 dB re 1 microPa. When operating in shallow modes the decibels are 238 dB re 1 microPa. Because the EK60 and SBP sonars are of lower intensity than the multibeam, and are run simultaneously with the multibeam, these protective measures will help avoid inadvertant exposure of marine mammals, sea turtles, and hammerhead sharks to all three sonars.

We therefore do not believe the Okeanos Explorer mapping activities will have any significant adverse effects on ESA-listed species in the monuments and the waters around the Main Hawaiian Islands. Similar opinions regarding the safety of multibeam mapping activities have been expressed by the NMFS Southwest Fisheries Science Center in their draft programmatic environmental assessment. Even so and in order to mitigate impacts to marine mammals, observers on the Okeanos Explorer's bridge will carefully monitor for the presence of marine

protected species, and permitted personnel would follow established best management practices to minimize disturbance. If cetaceans are present within 400 meters of the ship, the vessel would stop until the animals depart the area. We will try to minimize turning the multibeam system on and off to reduce the possibility of startle responses by marine mammals that could be in the vicinity of the ship, particularly at night. Leaving them on also provides marine mammals advanced warning that the ship is in the vicinity, further reducing the possibility of a collision. When the systems have been shut down for any reason, such as during an ROV dive or CTD cast, the multibeam soft start mode – a delay function, starting sonar transmissions at a low output level and gradually increasing - would be used to minimize any impact on cetaceans. Only after the multibeam has been brought from soft start to full power would the SBP sonar then be turned back on.

NMFS Shift Thresholds

The current NMFS-defined threshold for the onset of PTS in cetaceans from exposure to in-water sounds is ≥ 180 dB re 1 µPa. The same threshold for pinnipeds is ≥ 190 dB re 1 µPa. Exposure to impulsive in-water sounds at ≥ 160 dB re 1 µPa is the threshold for the onset of TTS and behavioral disturbance for all marine mammals, whereas the same threshold for exposure to non-impulsive sound (continuous noise) is ≥ 120 dB re 1 µPa. Because the sonar systems to be used in this action are considered impulsive sources, the 160 dB re 1 µPa threshold for the onset of TTS and behavioral disturbance would apply, and significant exposure above that level at a frequency within the animal's hearing range would be considered an adverse impact.

Acoustic Modeling

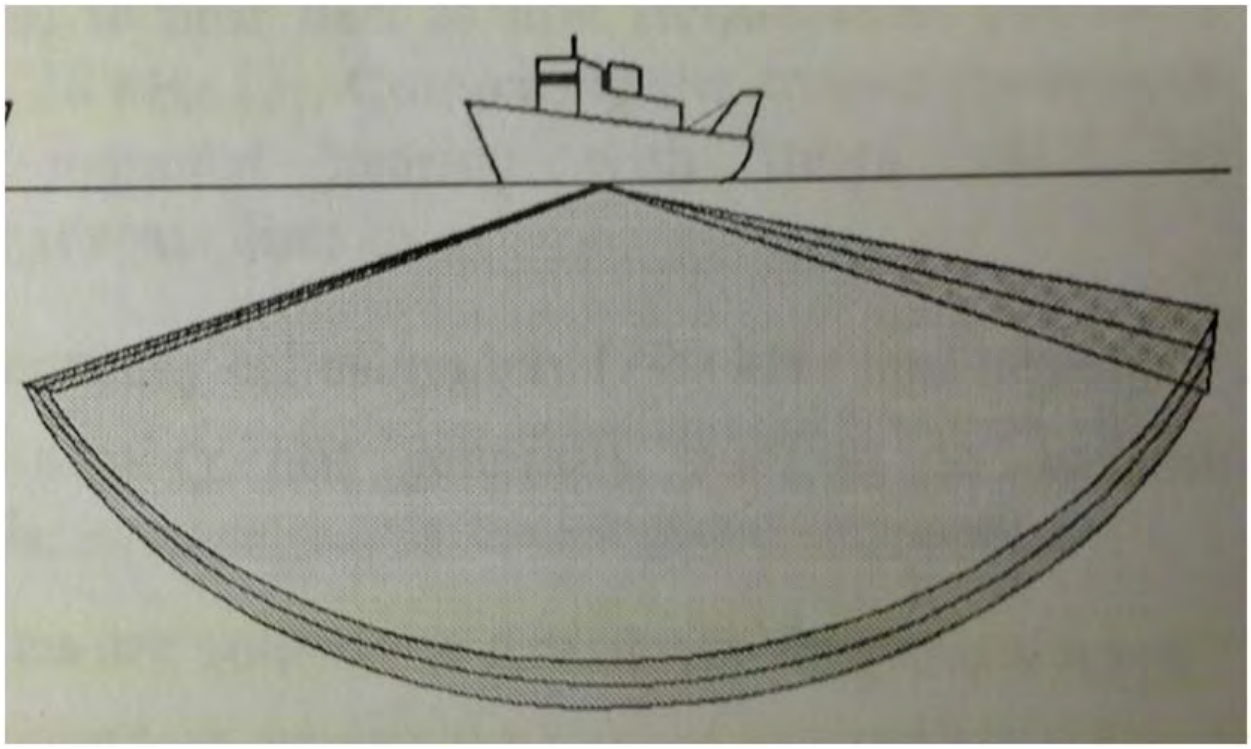
Accurately predicting the 160 dB re 1 µPa isopleth from any sound source is difficult, but particularly so for multibeam sonar. Using the simplest example, that of an unfocused, omni-directional single point source in unbounded homogenous water, sound will disperse from the source in a spherical pattern. In this example, the equation $RL = SL – (20\text{Log}R + \alpha R)$ estimates spherical spreading loss where RL = received level; SL = source level; R = range in meters, and α is the absorption coefficient in water at 1 m as a function of frequency (Lurton & DeRuiter 2011). In addition to source level and frequency, the distance for which different decibel levels are experienced away from the source is also dependent on a number of other factors that include density, salinity, and the amount of suspended solids in the water. Detailed information on these naturally occurring factors in the marine environment is rarely available and consequently they are generally not considered in the equations.

Assuming for the moment that the EM 302 system is a simple omni-directional point source, then the 180 dB and 160 dB re 1 microPa isopleths would fall at approximately 1,000 m and 2,800 m, respectively, based on a α value of 6 dB/km (@30 kHz) as computed from representative CTD casts of local oceanographic conditions in the vicinity of the monuments.

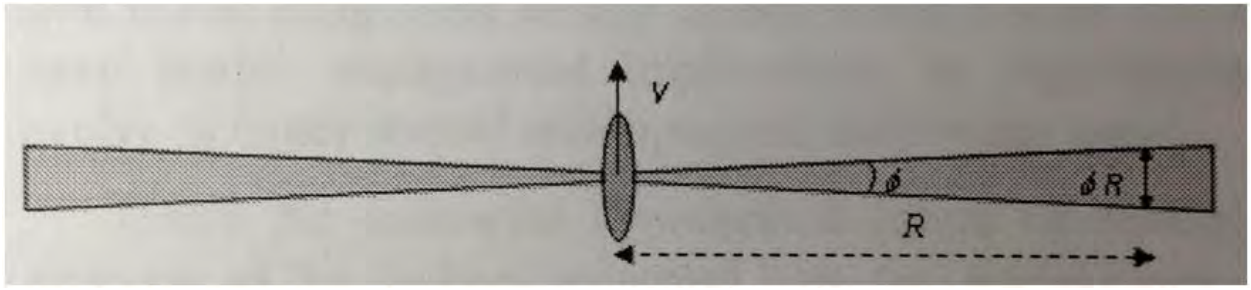
Acoustic Modeling - Generic Multibeam

However, multibeam systems are not simple omni-directional point sources but rather are focused sonar arrays that use "selective angular directivity" and furthermore transmit "very short pulses at limited ping rates" (Lurton & DeRuiter 2011). These two characteristics of this type of sonar decrease the potential sound exposure level as well as decrease the probability of the animals being subjected to TTS threshold intensity levels. Figure 1 provides diagrams excerpted from Lurton & DeRuiter (2011) showing the generalized ensonification volume of a generic multibeam sonar system from both horizontal (Fig 1a) and overhead (Fig. 1b) perspectives. Fig 1b also provides the variables used to estimate the exposure time of a stationary animal as the ship passes on its survey track. The exposure time can be estimated by ØR/V where Ø is the longitudinal transmitting lobe aperture in radians, R is the range from the source to the animal, and V is the speed of the ship.

The aperture of the EM 302 on the Okeanos is 0.5° but since it would operate in dual swath mode in shallower water it will be conservatively treated as 1° (same as the Falkor), yielding a Ø value of 0.02 radians. The ship will be mapping at 8 knots (4.116 m/s). At 200m distance, the exposure times for a stationary animal caught in the ensonification plane of the EM 302 are therefore calculated to be 1 second. This exposure time increases linearly with R so that at 1000 m distance, the exposure time increases to 5 seconds.



1a)



1b)

Figure 1: Diagrams showing a typical multibeam ensonification volume from a) the horizontal and b) the overhead prospective (From Lurton & DeRuiter 2011).

Acoustic Modeling - Okeanos Explorer EM 302 Multibeam

Dr. Xavier Lurton (IFREMER) has recently created a simplified model of the specific behavior of the *Okeanos Explorer's* EM302 system in terms of direct radiated level inside the water. Model output graphics showing radiated sound transmission patterns in the horizontal and

vertical planes of the water column are provided in Appendix C (Case Study: Okeanos Explorer - EM 302 - Hawaii). This analysis represents our best estimates of radiated sound levels given the current configuration of the sonar. The assumptions behind the model are:

1) The Deep Mode of the EM302 was used (i.e., longest pulse length and highest power -- or worst case scenario).
2) The model uses the current best understanding of the directivity pattern of the sonar that includes both the individual transducer directivity and the transmit sector beam forming.
3) The model does not include any masking effects by the hull or gondola. The draft of the transducer "gondola" on the Okeanos Explorer is 5.65 m below the water line. This configuration causes a baffle effect from the gondola structure and the hull above, and further reduces the likelihood of direct ensonification of an animal on or near the surface, especially a short distance away from the ship.
4) A value of 6 dB/km @ 30 kHz was used as a first-order approximation of the absorption coefficient representative of oceanographic conditions in the vicinity of PMNM, the PRIMNM, the Main Hawaiian Islands and the Geologists Seamounts.

Figure 1c (below) shows horizontal plane (top-down) views of sound pressure levels at three different receiving depths within the water column directly below the transducer: 10m, 50m, and 200m. These figures demonstrate the remarkably narrow zone of ensonification in the along-track direction. Note the difference in the 160 dB/µPa isopleth in the beam plane and elsewhere around the ship. For all but this plane, the isopleth occurs at 400 m or less from the ship. For animals directly within the beam plane, sound pressure levels drop below 160 dB/µPa within 1500 m of the ship near the surface, and within 1800 m at a depth of 200 m. Submerged animals more than 400 m from the ship that are caught in the ensonification volume as the ship passes will be only briefly subjected to the elevated sound levels occurring inside the transmitter beam pattern. Furthermore, the narrow fan-shaped beam patterns of the Okeanos Explorer system provide ample possibilities for the animals to quickly escape the sound. The only possible scenario for more extended exposure would be if the animal were to suddenly start moving in the exact direction and speed as the ship while within the narrow ensonification beam, which is unlikely. This very selective spatial pattern of the sound radiation makes this configuration very different from seismic airgun sources (omnidirectional) or military mid-frequency active sonars that are often directed horizontally through the water column.

Figure 1d (below) shows the across track radiation pattern for the full water column below the EM302 transducer, with a close up of the near surface region. The 160 and 180 dB/µPa isopleths

are plotted to show ranges from the sonar relevant to potential PTS and TTS impacts on cetaceans.

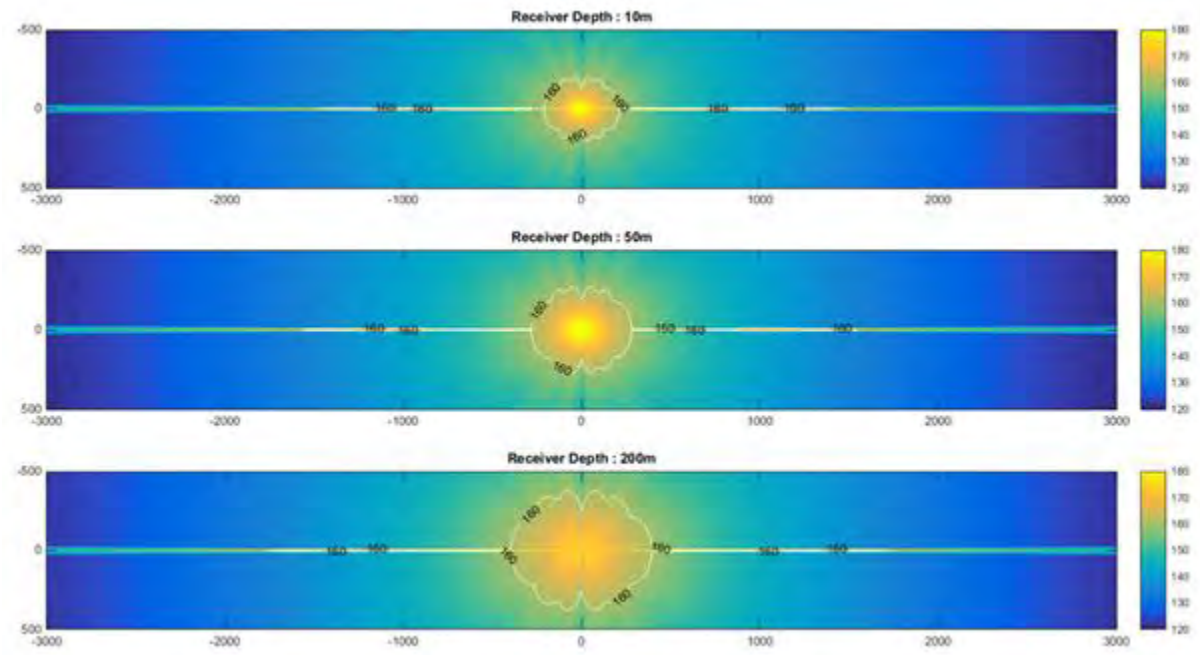


Fig. 1c: Top down view image of the EM302 radiated beam pattern at several depths (10m, 50m and 200m created by Dr. Xavier Lurton (IFREMER). The ship track is straight up, the Y axis is distance in meters while the X axis in distance in meters. The color scale is signal strength in decibels (dB).

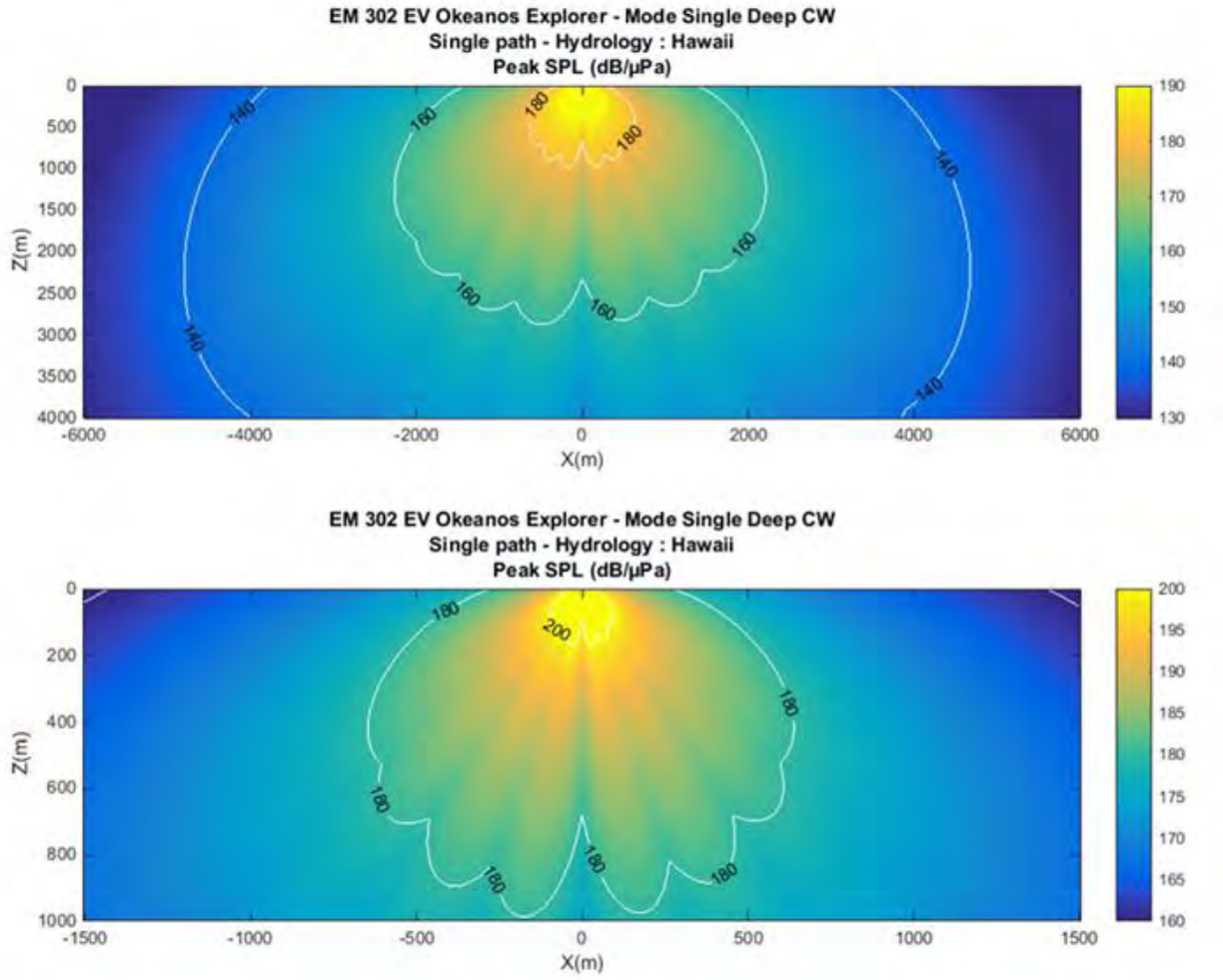


Fig. 1d: Model created by Xavier Lurton (IFREMER) of the EM302 radiated transmission patterns with the 140, 160 and 180 dB/µPa isopleths plotted for the full water column (top) and of the near surface region (bottom) of a single ping, looking forward through the water column in the along track direction. The y axis is depth below sea surface in meters, and the x axis is distance in meters. The color scale is signal strength in decibels (dB).

Additional Considerations Specific to EM 302 Multibeam

Transmit pulse forms and rates are yet two other differences that distinguish multibeam sonar from other types of sonar and acoustic sources and further reduce their potential threat to ESA-listed species. Sound is not transmitted continuously from these systems but rather in extremely short pulses (i.e., pings). Ping durations obtained from the EM302 manual (page 36) are very

brief -- 0.7 to 5.0 milliseconds. The ping rate or in other words, how frequently pings are emitted, is depth dependent and is provided for different depths in tables 2 and 3 of the manual and show that at a depth of 400 m, the ping rate is 30 pings/min, decreasing to 3.6/min at 4000 m. Another way of putting it is that when the ship is mapping in 400 m of water, any submerged animal within the ensonification volume will be subjected to only a 0.7 millisecond ping every 2 seconds. When the ship is mapping in 4,000 m of water, a submerged animal could potentially experience a 5-40 millisecond ping every 17 seconds. The fore-aft width of the ensonification volume at 200 m distance from the ship is approximately 4 meters. Based on a mapping speed of 8 knots and using this width as an example, this distance will be traversed by the ship in 1 second. Therefore, a submerged stationary animal 200m from the ship while it is surveying depths of 400 m should be subjected to at most a single ping of 0.7 milliseconds of duration. If the encounter occurs where the water depth is 4,000 m, the chances are low that it will even be subjected to a single ping.

Another consideration is the hearing range of the various species covered under the ESA. As mentioned earlier, the EM 302 system is 30 kHz. Figure 1e provides a general diagram of the hearing ranges of the various groups of marine mammals that was originally presented as Fig 4.2-3 of the Southwest Fisheries Science Center's Draft Programmatic Environmental Assessment released in April, 2013. The frequency range of the EM 302 system was superimposed on the bars. The first observation from this figure is that the system is not expected to produce sound audible to the low frequency cetacean group (baleen whales or Mysticetes) whose hearing range is believed to be below 30 kHz.

The second observation is that the system is also transmitting at the upper portion of the pinniped hearing range. Together, these observations suggest that toothed whales are likely to be the ESA group potentially most affected by the mapping activities. Within the project area, the sperm whale and the false killer whale, are the only species of toothed whales that are ESA listed. Observers will therefore pay particular attention to spotting and avoiding these two species.

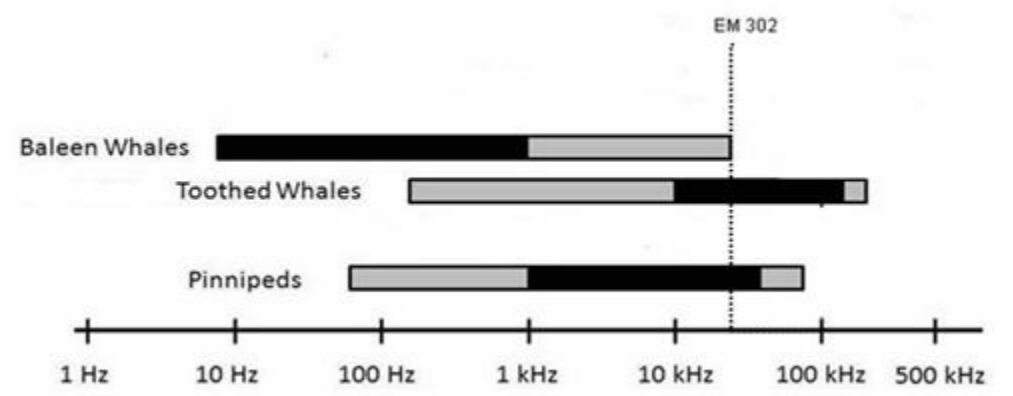


Fig. 1e: Hearing ranges of ESA-listed marine mammals groups in Hawaiian waters. Black bars show the most sensitive portion of these ranges. This figure was modified from Figure 4.2-3 of NOAA's Southwest Fishery Science Center draft Programmatic EA (see text for more details).

On December 23, 2013, NOAA released for public comment it's new "Draft Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammals: Acoustic Threshold Levels for Onset of Permanent and Temporary Threshold Shifts". The document is anticipated to be finalized winter 2015. Included are updated acoustic threshold levels for the onset of both PTS and TTS that "will replace those currently in use by NOAA." The updates include PTS and TTS levels for both impulsive and non-impulsive sound sources for 5 marine mammal functional hearing groups that include low, mid, and high-frequency cetaceans, phociid pinnipeds, and otariid pinnipeds. In addition, the updates include the addition of a second new metric for assessing acoustic activities: PTS and TTS cumulative sound exposure level (SELcum) thresholds. These thresholds are calculated with and without marine mammal auditory weighting functions. Since SELcum is not as yet being used for ESA recommendations, we only examined what the new sound intensity thresholds will be, now calculated as dB peak values instead of dB rms values. Tables 6a and 7 in that guidance document provide these threshold values. TTS peak decibel levels range from 195 dB re 1 microPa for high frequency cetaceans, 224 dB re 1 microPa for low frequency cetaceans, and 229 dB re 1 microPa for both families of pinnipeds. While dBpeak (maximum value) is calculated differently than dBrms, the rule of thumb is that the latter are generally 3 dB less than the former (Tom Weber, pers comm and see Fig 1f below). These new TTS thresholds are based on the most current science available and suggest that the Okeanos Explorer multibeam system will not exceed these levels for any of the functional groups if they are further than 100 m from the ship at the surface and 300 m from the ship if diving directly below the transducer.

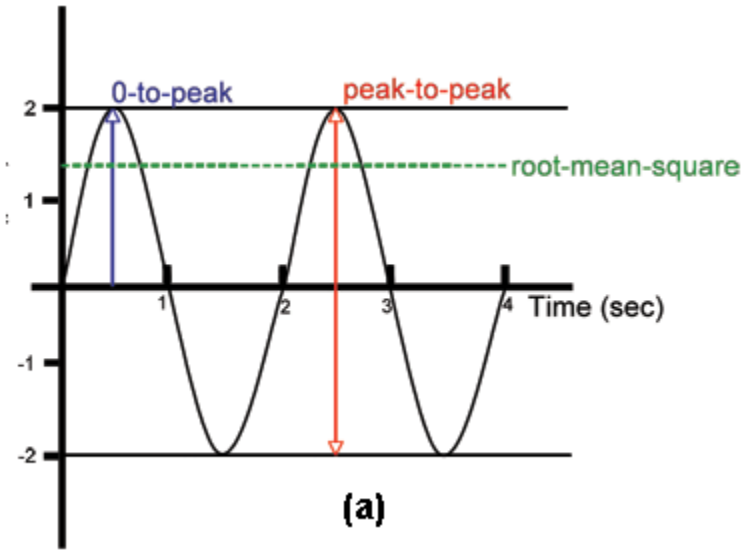


Fig. 1f: Relationship between RMS and Peak dB measurements (from http://www. http://acousticslab.org).

Background Information: NSF 2011 Programmatic EIS

The National Science Foundation's 2011 document "Programmatic Environmental Impact Statement/Overseas Environmental Impact Statement for Marine Seismic Research Funded by the National Science Foundation or Conducted by the U.S. Geological Survey" provides a detailed analysis of potential impacts of seismic, multibeam, and sub-bottom sonars on sea turtles and marine mammals and provides useful information. The document evaluates deep water multibeam systems ranging from 12-95 kHz. The EM302 operates at 30 kHz so falls within the frequency, source levels, pulse lengths and beam widths evaluated by this report. The SBP on the *Okeanos* is of the same type evaluated in the report. With respect to multibeam echosounders (MBES) and sub-bottom profilers (SBP), the following direct excerpts are conclusions of this document regarding the potential impact on sea turtles, mysticetes, odontocetes, and pinnepeds:

Sea Turtles

"Operation of the MBES, SBP, or pingers is not expected to affect sea turtles, because the associated frequency ranges are above the known hearing range of sea turtles. The SBP operates at 3.5 kHz with a maximum source output of 222 dB re 1 µPa-m. Thus, the frequency range of the SBP is outside the known detection range of sea turtles based on available data. As a result,

sea turtles are not expected to be capable of hearing the higher frequency sounds produced by SBPs. Furthermore, the intermittent and narrow downward-directed nature of the MBES and SBP as emitted from the transiting seismic vessel would result in no more than one or two brief ping exposures."

Mysticetes

"During the proposed marine seismic surveys, the pings from the MBES, SBP, and pingers would be very short (<1-64 ms) (Table 2-5).

Table 2-5. Acoustic Parameters of MBESs, SBPs, ADCPs, Pingers, and Acoustic Releases Used by NSF-Funded or USGS Research Vessels Conducting Marine Seismic Research.

Acoustic Source		*Frequency (kHz)*	*Source Level (dB re 1 µPa-m)*	*Pulse Length (ms)*	*Beam Width**	
					Fore-aft	*Athwart.*
MBES	Seabeam 2000	12	234	7-20		
	Seabeam 2100/12	12	237	<1 – 12	2^o x 2^o	
	Kongsberg EM122	12	242	2-15	1^o x 2^o	150^o
	Simrad EM 120/122	12	242	2, 5,15	1^ox1^o, 1^o x2^o	150^o
	Simrad EM 300	30	237 (1^o), 231 (2^o)	0.7, 2,15	1^ox1^o, 1^o x2^o	
	Simrad EM 1002	95	225 (3^o)	0.2, 0.7, 2	2^o x 2^o	
	Krupp-Atkas HydroSweep DS	15.5	237		2.3^o	
SBPs		3.5	222	64	27^o	
ADCPs		38-1,200	224		30^o	
Pingers		55-110	183			
Pingers		12	192	0.5, 2, 10		
Acoustic Releases		9-15	187	8		

Notes: *The beams of all acoustic sources would be directed downward from the research vessel. Athwart = athwartship. *Sources:* USCG 2001; L-DEO and NSF 2003e; SIO and NSF 2003; University of Washington 2003; SIO and NSF 2004; SIO 2005a, b; UAF and NSF 2005; University of Hawaii 2005; WHOI.

Thus, a given mammal would not receive many of the downward-directed MBES or SBP pings as the vessel passes by. In the case of the MBESs that operate at 30 kHz or higher, their operating frequencies are too high to have any effects on mysticete behavior. Source levels of the SBPs, another type of echosounder, are lower (maximum source level 222 dB re 1 microPa [rms]) than those of the MBES discussed above (Table 2-5). Thus, there is even less likelihood of TTS occurring through exposure to SBP sounds, even in an animal that is briefly near the source. The SBP is usually operated simultaneously with other higher-power acoustic sources. Many marine mammals, particularly mysticetes, move away in response to the approaching higher-power sources or the vessel itself before the mammals are close enough for there to be

any possibility of effects from the SBP's less-intense sounds. The possibility of PTS through exposure to MBES or SBP sounds is considered negligible and PTS is not expected to occur. Burkhardt et al. (2008) concluded that immediate direct injury was possible only if a cetacean dived under the vessel into the immediate vicinity of the transducer. Furthermore, PTS (or any injury or pathological effect) has never been demonstrated for any marine mammal exposed to echosounders such as the proposed MBESs and SBPs."

Odontocetes

"In summary, sounds from all the MBESs would be readily audible to most and possibly all odontocetes when animals are within the narrow angular extent of the intermittent sound beam. As with baleen whales, odontocete communications will not be masked appreciably by MBES, SBP, or pinger signals given their low duty cycles, the brief period (i.e., seconds) when an individual mammal would potentially be within the downward-directed MBES or SBP beam from a transiting vessel, and the relatively low source level of a pinger. Operation of MBESs, SBPs, and pingers is not likely to impact odontocetes. The project MBESs, SBPs, and pingers are not expected to induce TTS. The possibility of PTS through exposure to MBES or SBP sounds is considered negligible."

Pinnipeds

"The SBPs associated with the proposed marine seismic activities operate in the MF range of approximately 3.5 kHz with a maximum source output of 222 dB re 1 µPa-m (rms). The frequency range of the SBPs is within the frequency band audible to pinnipeds. Masking effects due to MBES, SBP, or pinger signals are expected to be minimal or non-existent. Thus, brief exposure of pinnipeds to small numbers of signals from the MBES or SBP would not result in a —take by harassment as defined by NMFS and the ESA. The project MBESs, SBPs, and pingers are not expected to induce TTS. Although the MBESs, SBPs, and pingers can presumably be heard by pinnipeds, their operation is not likely to affect pinnipeds. The intermittent and narrow downward-directed nature of the MBESs and SPBs would result in no more than one or two brief ping exposures of any individual pinniped given the movement and speed of the vessel and animal; such brief exposure to this sound is not expected to cause injury or PTS based on results of limited studies of some pinniped species."

As described above, no marine mammals or turtles would be exposed to sound intensity at or above the levels required for the onset of TTS or PTS, but those species exposed may experience behavioral responses as the result of exposure to the project's sonar noise. Based on the best information available, including the motility of free-ranging marine mammals and turtles in the

water column, the propensity for these species (especially marine mammals) to avoid obtrusive sounds, and the proposed mitigation measures, mild alert and startle responses, avoidance of the survey vessel are the most probable responses to exposure. No measurable impacts are expected to occur on the ability of marine mammals and turtles exposed to forage, shelter, navigate, reproduce, and avoid predators and other threats such as vessels. Therefore, the expected behavioral responses expected to result from exposure to the project's sonar noise would have insignificant effects on ESA-listed marine mammals or turtles that may be in the area.

Acoustic Information Related to Elasmobranchs

A sound source produces both pressure waves and actual motion of the medium particles. In fish, particle motion is detected using the inner ear, while pressure signals are initially detected by the gas-filled swim bladder or other bubble of air in the body. These air filled spaces vibrate and serve as a medium to "reradiate" (or resend) the signal to the inner ear as a near field particle motion (Popper, 2008) in those species where a connection exists between the swim bladder and the inner ear.

While the air bladder in fish may play a role in sound detection, its primary purpose is for buoyancy. Elasmobranchs (sharks and rays) on the other hand do not have air bladders. Instead elasmobranchs have developed overly large livers which provide buoyancy. Because of this lack of an air bladder elasmobranchs are unable to detect pressure waves, instead sharks detect the kinetic stimulus rather than the acoustic pressure wave. Unlike acoustic pressure, the kinetic stimulus is inherently directional, but its magnitude rapidly decreases as it propagates outward from the sound source in the near field (Corwin, 1981).

Although research has shown that the upper range of behavioral sensitivity to this kinetic stimulus is 600 to 800 Hz in both scalloped hammerheads, *Sphryna lewini* (Olla, 1962), and the lemon shark, *Negaprion brevirostris* (Nelson, 1967); sharks are more low frequency sensitive, with the most effective spectral range occurring from 40 Hz to 300 Hz (Myrberg, 1978). Above these frequencies both the behavioral sensitivity and the sensitivity of the ear fall off rapidly (Corwin, 1981).

As previously described, the NOAA Ship Okeanos Explorer's three scientific sonars operate at 30 kHz (the multibeam system), 18 kHz (split-beam fisheries sonar), and 3.5 kHz (the chirp sub-bottom profiler sonar). All three of these frequency ranges are well above the hearing sensitivity ranges for elasmobranchs based on the research that has been done to date.

Based on the best available scientific information which indicates that the multibeam, split-beam and chirp sub-bottom profiler operate and frequencies above the hearing ability for all

elasmobranchs (including scalloped hammerheads), and the propensity for the species to avoid human activities; no measurable impacts are expected to occur on the ability of the species to forage, navigate, reproduce, and avoid predators and other threats such as vessels. Therefore, the expected behavioral responses expected to result from exposure to the project's sonar noise would have insignificant effects on the ESA-listed Indo-Pacific distinct population segment of the scalloped hammerhead shark.

2. Temporary disturbance from human activity

Nearly all the activities associated with ROV dives and vessel operations in the PMNM, the PRIMNM, the marine environment around Ni'ihau, Oahu and the big island of Hawai'i; the Geologists Seamounts, and the vessel transit areas to these areas from Honolulu, Hawai'i involve work in the marine environment where ESA-listed species are known to occur. Marine species may experience a startle reaction and resulting stress should they encounter human activities in the water. The reaction could range from one extreme where an animal calmly approaches and investigates the person or gear, to a panicked response in which the animal flees, which could result in injury or reduce vitality.

Following the BMPs associated with the Marine Wildlife Viewing Guidelines for PMNM and Boat Operations and Diving Activities reduce the likelihood of interactions with ESA-listed species. These BMPs, which will be used in all project areas, include:

- All in-water work will be postponed when whales are within 100 yards, or other protected species are within 50 yards;
- Should a marine protected species enter the area while in-water work is already in progress, the activity may continue only when that activity has no reasonable expectation to adversely affect the animal(s); and
- No attempts will be made to feed, touch, ride, or otherwise intentionally interact with any marine protected species.

Sea turtles, marine mammals and sharks usually avoid human activity. The most likely effect on this interaction will be a moderate to high energy avoidance behavior resulting in the animal temporarily leaving the immediate area unharmed. Considering this avoidance behavior, in combination with the nature of the activities, and implementation of the above mentioned BMPs, we have determined that disturbances related to vessel operations and ROV dives will be infrequent, would be temporary in nature and never reach the scale where it would affect the

individual's health, and thus are expected to result in insignificant effects on ESA-listed marine species discussed in this biological evaluation.

3. Entanglement

The planned cruise would include the deployment of a CTD, which would be deployed over the side of the vessel with a cable; and a ROV, which would be tethered to the vessel; creating the potential for entanglement of the marine species considered in this consultation should any of those animals encounter the cable or tether. However, in addition to compliance with the BMP listed above, which would require maintaining watch for and avoiding protected marine species, we propose to postpone deployment of these devices when sea turtles, marine mammals or scalloped hammerhead sharks are within 50 yards of the vessel, and all individuals participating in the activity would closely monitor the instrument cables at all times while they are deployed. Based on the expected compliance with the required protective measures, and the expectation that protected marine species would be widely scattered throughout the proposed areas of operation, we consider it extremely unlikely that any of those animals would come into contact with any of the cables, and have determined that the risk of entanglement would be discountable.

4. Collisions with vessels

Sea turtles and marine mammals must surface to breathe, and they are known to rest or bask at the surface. Therefore, when at or near the surface, these animals are at risk of being struck by the vessel or its propellers during small boat operations and vessel transits to and from the monuments. Potential injuries and their severity will depend on the speed of the vessel, the part of the vessel that strikes the animal, and the body part impacted. Injuries may include bruising, broken bones or carapaces, and lacerations that can often result in death.

Existing information about sea turtle sensory biology suggests that sea turtles rely more heavily on visual cues, rather than auditory, to initiate threat avoidance. Research also suggests that sea turtles cannot be expected to consistently notice and avoid vessels that are traveling faster than 2 knots (kts) (Hazel et al., 2007). Vanderlaan and Taggart (2007) report that the severity of injury to large whales is directly related to vessel speed. They found that the probability of lethal injury increased from 21%, for vessels traveling at 8.6 kts, to over 79% for vessels moving at 15 kts or more. Additionally, since collisions with whales have been reported for both slow and fast moving craft, it appears that, in at least some situations, whales may either be unaware of a vessel's presence or unable to resolve the vessel's proximity and/or vector of approach based on

available acoustic cues. Consequently, vessel operators must be responsible to actively watch for and avoid sea turtles and marine mammals, and to adjust their speed based on expected animal density and on lighting and turbidity conditions to allow adequate reaction time to avoid marine animals.

All activities involving vessels and their tenders will comply with the BMPs associated with the Marine Wildlife Viewing Guidelines for PMNM and Boat Operations and Diving Activities, which require all individuals to maintain constant vigilance and avoid Federally-listed marine species. Further BMP requirements for boat operations include:

- Vessel operators shall alter course to remain at least 100 yards from humpback whales, and at least 50 yards from other marine mammals;
- Vessel speed will be reduced to 10 knots or less when operated in the vicinity of marine mammals;
- Vessel speed will be reduced to 5 knots or less when operated in the areas of known or suspected turtle activity;
- Vessels will be operated so as not to encircle or trap marine mammals and sea turtles between vessels or between vessels and the shore; and
- If a marine mammal or turtle approaches a vessel, the vessel's engine will be placed in neutral until the animal has passed.

The scalloped hammerhead shark is a circumglobal species that lives in coastal warm temperate and tropical seas. It occurs over continental and insular shelves, as well as adjacent deep waters, but is seldom found in waters cooler than 22° C (Compagno 1984, Schulze-Haugen and Kohler 2003). It ranges from the intertidal and surface to depths of up to 450-512 m (Sanches 1991, Klimley 1993), with occasional dives to even deeper waters (Jorgensen et al. 2009). Tagging studies indicate that the species rarely makes long-distance oceanic migrations, but instead disperses along continuous coastlines, continental margins, and submarine features, such as seamounts (Miller et al., 2013).

Although the species is present in much of the Pacific, ranging from Japan and China to New Caledonia in the west, to the Gulf of California to Ecuador in the east; the species range in the central Pacific Ocean is primarily comprised of the Hawaiian Archipelago, which includes the main islands and the Northwestern Hawaiian Islands (Miller et al, 2013). Johnston Atoll is also included in this range due to its proximity to the Hawaiian Archipelago (Miller et al., 2013). Individuals of the species may be found alone, in pairs, or in schools. Adult aggregations may be found offshore over seamounts and near islands, but are most common near the Galapagos, Malpelo, Cocos and Revillagigedo Islands, and within the Gulf of California (Compagno 1984, CITES 2010, Hearn et al. 2010, Bessudo et al. 2011).

Based on the low number of trips, expected adherence to established BMPs, the expectation that protected marine species would be widely scattered throughout the proposed areas of operation, and the limited populations of the protected species in these areas; we have determined that the risk of a vessel collision with a protected marine species would be discountable.

5. Vessel waste and discharge

While operating within the PMNM, all vessels are required to comply with the following regulations (71 FR 51134, 50 CFR Part 404) with regards to permitted types of discharge:

- Discharging or depositing any material or other matter into the Special Preservation Areas (SPAs) or the Midway Atoll Special Management Area (MASMA) except vessel engine cooling water, weather deck runoff, and vessel engine exhaust;
- Discharging or depositing any material or other matter into the Monument, or discharging or depositing any material or other matter outside the Monument that subsequently enters the Monument and injures any resources of the Monument, except fish part used in and during authorized fishing operations, or discharges incidental to vessel use such as deck wash, approved marine sanitation device effluent, cooling water, or engine exhaust.

While an accidental release of waste or discharge may occur which might put protected species at risk to exposure, based on the low number of vessels that operate within the waters of the monuments, expected adherence to above mentioned discharge regulations during all project operations, the expectation that protected marine species are widely scattered throughout the project area and the limited populations of ESA-listed species in these areas, we have determined that the risk of protected species being exposed to vessel waste and discharge would be insignificant.

6. Effects to designated & proposed Hawaiian monk seal critical habitat

Critical habitat for the Hawaiian monk seal was designated under the ESA (53 FR 18990) on April 30, 1986 and revised on May 26, 1988 (53 FR 18988). In the PMNM, critical habitat for monk seals includes all beach areas, lagoon waters, and ocean waters out to a depth of 20 fathoms around Kure Atoll, Midway Islands (except Sand Island), Pearl and Hermes Reef, Lisianski Island, Laysan Island, Maro Reef, Gardner Pinnacles, French Frigate Shoals, Necker Island, and Nihoa Island. On June 2, 2011, NMFS proposed revising critical habitat for monk seals (76 FR 32026) by extending the current designation out to the 500 meter depth contour and

including Sand Island at Midway Island. Using the best available scientific information, the proposed revision to critical habitat identifies six essential features for the conservation of monk seals that may require special management consideration or protection:

1. Areas With Characteristics Preferred by Monk Seals for Pupping and Nursing;
2. Shallow, Sheltered Aquatic Areas Adjacent to Coastal Locations Preferred by Monk Seals for Pupping and Nursing;
3. Marine Areas From 0 – 500 m in Depth Preferred by Juvenile and Adult Monk Seals for Foraging;
4. Area With Low Levels of Anthropogenic Disturbance;
5. Marine Area With Adequate Prey Quantity and Quality; and
6. Significant Areas Used by Monk Seals for Hauling Out, Resting, or Molting.

The proposed actions include activities that would occur within three essential features (numbers 3,4 and 5 above) of existing and proposed critical habitat, but the level of human activity that may occur annually in these areas is minimal and any disturbances caused by human presence would be temporary. Also, all permitted personnel are required to adhere to the Monument BMPs previously described that effectively prevents or minimizes interactions with monk seals and with critical habitat essential features. There is no Hawaiian monk seal critical habitat designated for the PRIMNM (Johnston Atoll).

Based on adherence to proposed BMPs, no known record of previous impacts to monk seal critical habitat, and the temporary introduction of human presence to conduct activities that would have minimal impact to the environment, we expect the likelihood of destruction or adverse modification to the current Hawaiian monk seal critical habitat and those habitats that are proposed to be insignificant

Effects Determination

We have evaluated the effects of the proposed actions on the following ESA-listed marine species: green sea turtle, hawksbill sea turtles, leatherback sea turtles, North Pacific loggerhead sea turtle DPS, olive ridley sea turtles, Main Hawaiian Islands false killer whale DPS, blue whales, fin whales, humpback whales, North Pacific right whales, sei whales, sperm whales, the Indo-West Pacific distinct population segments of the scalloped hammerhead shark, and Hawaiian monk seals. Based on our analysis of the potential effects of the proposed action on ESA-listed marine species presented above the proposed action would have insignificant effects

on the ESA-listed species under consideration, or the likelihood of exposure would be discountable. Therefore, we have determined that the proposed activities are not likely to adversely affect those species. We have also determined that the proposed activities would have insignificant effects on the essential features of designated and proposed critical habitat for Hawaiian monk seals, and therefore is not likely to adversely affect critical habitat. Therefore, we request informal consultation per Section 7(a)(2) of the ESA, and your concurrence with our determination that the proposed action may affect, but is not likely to adversely affect, green sea turtles, hawksbill sea turtles, leatherback sea turtles, North Pacific loggerhead sea turtle DPS, olive ridley sea turtles, Main Hawaiian Islands false killer whale DPS, blue whales, fin whales, humpback whales, North Pacific right whales, sei whales, sperm whales, the Indo-West Pacific distinct population segments of the scalloped hammerhead shark, Hawaiian monk seals or existing or proposed Hawaiian monk seal critical habitat.

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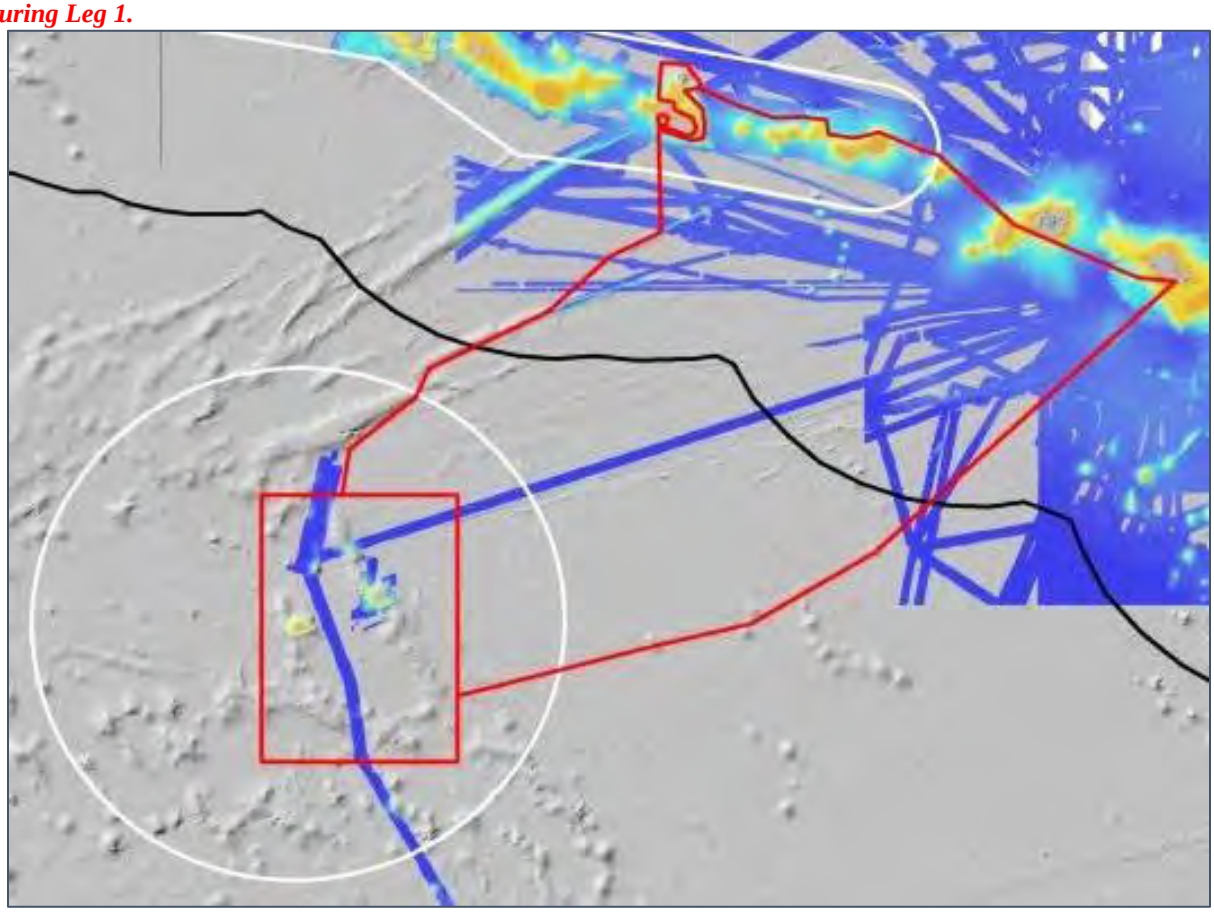
Appendix A. Cruise Operating Area Maps

EX-15-04 Cruise Leg 1:

North West Hawaiian Islands & Johnston Atoll Exploration

July 10 – 24, 2015

Note: Due to emergency dry dock repairs needed for Okeanos Explorer, the cruise is delayed by 7 days. The cruise is now planned to start on July 10th at the earliest, resulting in the loss of the mapping area shown within PMNM (the polygon to the north in this map). Mapping operations will instead focus only around Johnston Atoll during Leg 1.

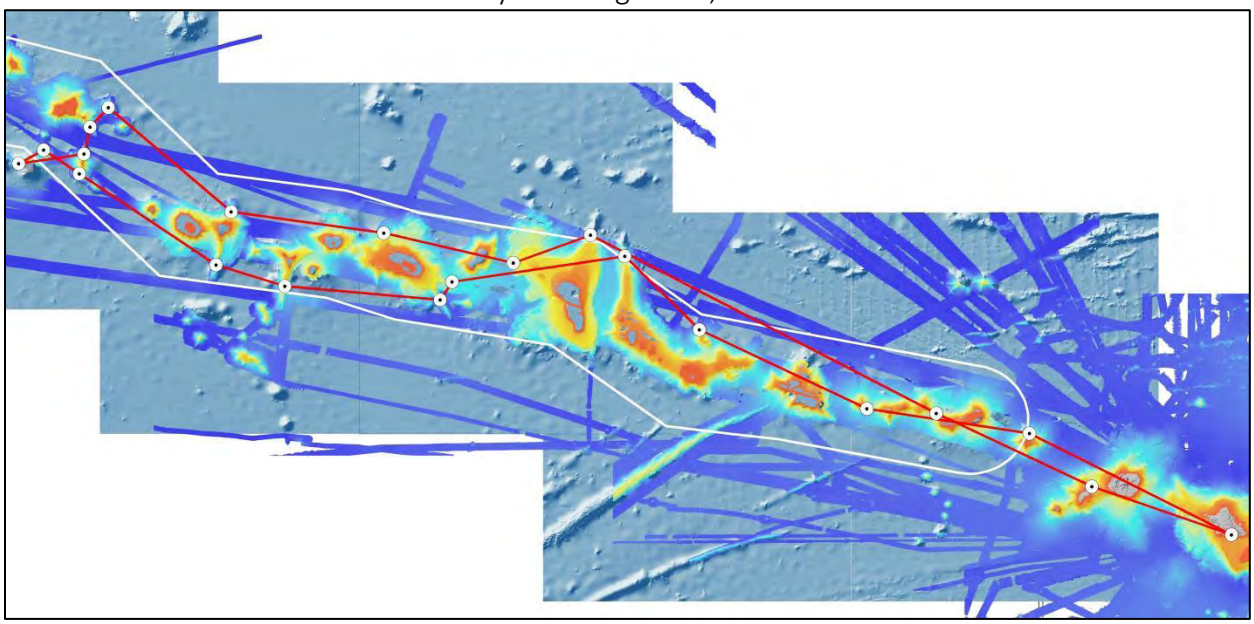


Map showing the operating areas for EX-15-04 Leg 1. The red lines show the draft cruise tracks, the red boxes and polygons show priority mapping areas for leg 1, and the white dots show the proposed ROV dive sites for leg 2. In the maps, the white lines are the boundaries of PMNM and the Johnston Atoll portion of the PRIMNM. The black line is the U.S. EEZ.

Leg 1 is a mapping exploration cruise that will conduct 24 hour mapping operations, including during transit, to address unmapped areas surrounding Johnston Atoll (PRIMNM). The ship will transit from Pearl Harbor, Oahu to the Johnston Atoll portion of PRIMNM. Mapping will take place along Horizon tablemount, down through the Karin seamount chain, then over to the

Johnston seamount chain before transiting back to Pearl Harbor, Oahu. Opportunistic CTD rosette operations may also be conducted.

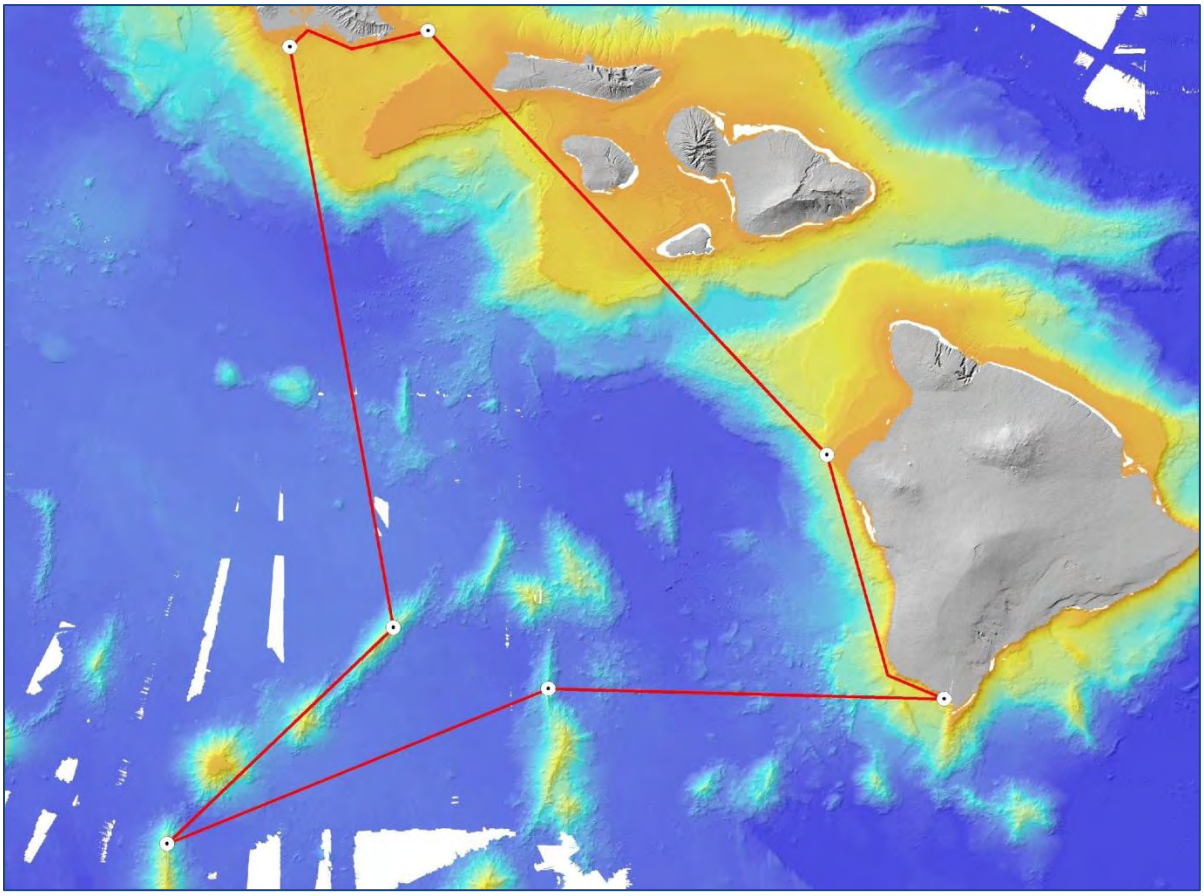
EX-15-04 Cruise Leg 2:
North West Hawaiian Islands Exploration
July 31 – August 22, 2015



Map showing the operating areas for EX-15-04 Leg 2. The red lines show the draft cruise tracks and the white dots show the proposed ROV dive sites. The cruise start and end port – Pearl Harbor, Oahu is also indicated with a white dot. The white lines are the boundaries of PMNM and the Johnston Atoll portion of the PRIMNM.

Leg 2 is a telepresence-enabled ROV cruise with full shore-based science participation focused on priority ROV dive targets for PMNM, and to support HIHWNMS's interest in habitats and resources around the island of Niihau en route to the Monument. The ship will conduct 24 hour operations consisting of daytime ROV dives and nighttime mapping operations including during transit. Opportunistic CTD rosette operations may also be conducted. The ship will depart Pearl Harbor, Oahu and head to Middle Bank on the southern border of PMNM to conduct an ROV dive, and then enter PMNM where the majority of ROV dives will be conducted, reaching almost up to Pearl & Hermes Atoll. Rift zone ridges and other types of abrupt topography will be targeted due to their likelihood of hosting extensive communities of deepwater corals and sponges, as well as likely manganese crust habitats from 1,000-2,500m. The deepest extent of important coral and sponge groups will also be explored during dives to depths of 3,000-5,000 m. The ship will then depart PMNM and head to Niihau for another dive, before heading back into port in Pearl Harbor, Oahu to complete the cruise.

EX-15-04 Cruise Leg 3:
Main Hawaiian Islands and Geologists Seamounts
August 28 – September 3, 2015



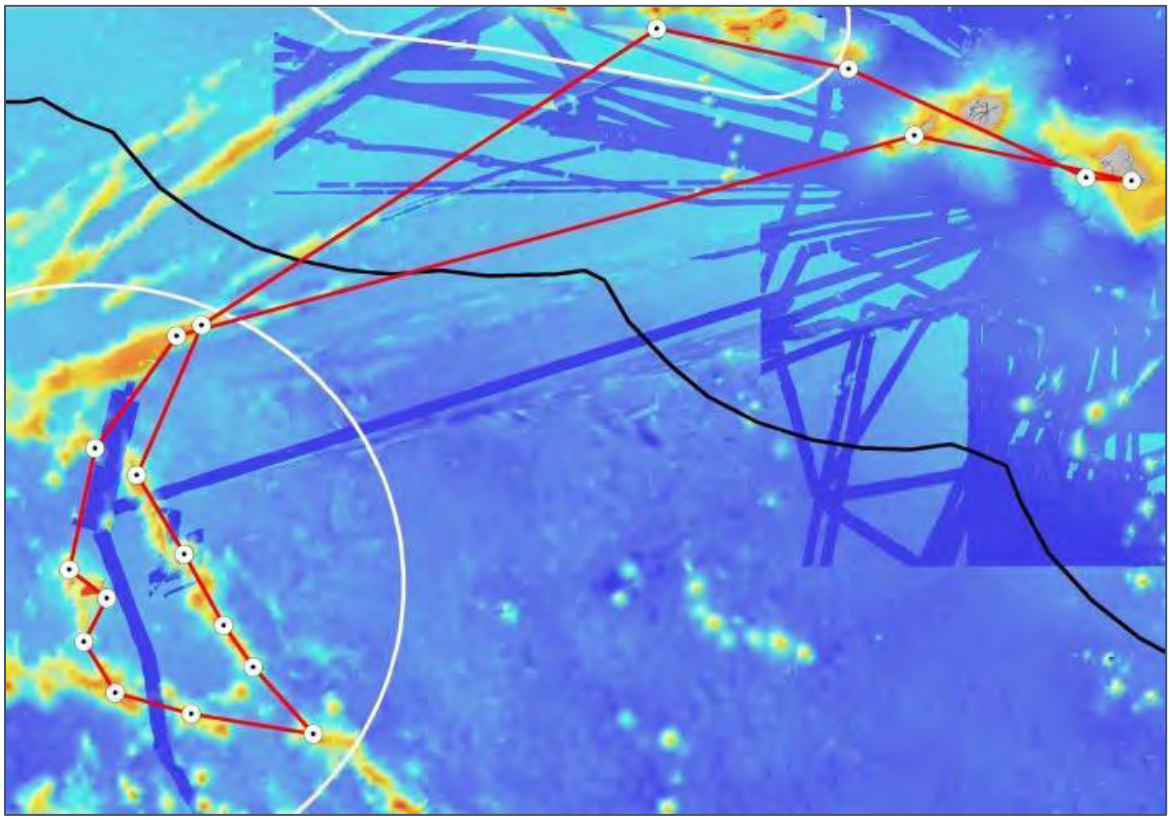
Map showing the operating areas for EX-15-04 Leg 3. The red lines show the draft cruise tracks and the white dots are ROV dive locations. The cruise start and end port – Pearl Harbor, Oahu is also indicated with a white dot.

Leg 3 is a seven day telepresence-enabled ROV cruise with shore-based science participation funded entirely by DSCRTP. The ship will conduct 24 hour operations consisting of daytime ROV dives and nighttime mapping operations including during transit. The first three and last ROV dives will be used to recover instruments that are presently monitoring environmental conditions on precious coral beds off the islands of Oahu and the Big Island, and to conduct a dive in support of a coral disturbance/recovery study. The remaining three days will be used to explore for deep sea coral and sponge communities, as well as manganese crust communities in the Geologist seamounts located about 100 miles south of Honolulu. Mapping operations would

be conducted between dives at the Geologists seamounts (McCall, Ellis and Swordfish) primarily to acquire multibeam backscatter data.

EX-15-04 Cruise Leg 4:

North West Hawaiian Islands & Johnston Exploration
September 7 – 30, 2015



Map showing the operating areas for EX-15-04 Leg 4. The red lines show the draft cruise tracks and the white dots are ROV dive locations. The cruise start and end port – Pearl Harbor, Oahu is also indicated with a white dot. The white lines are the boundaries of PMNM and Johnston Atoll portion of PRIMNM. The black line is the U.S. EEZ.

Leg 4 is a telepresence-enabled ROV cruise with full shore-based science participation focused on conducting ROV dives during transit into PMNM then moving south to focus exploration activity offshore of Johnston Atoll (PRIMNM). The ship will conduct 24 hour operations consisting of daytime ROV dives and nighttime mapping operations including during transit. Opportunistic CTD rosette operations may also be conducted. After departing Pearl Harbor, Oahu to commence the cruise, an ROV dive may be conducted at an archaeology site offshore of Oahu,

followed by a dive at Middle Bank and then Twin Banks rift in PMNM. Then the ship will transit down to Horizon seamount where a loop of dives are planned through the Karin seamounts, the Johnston seamounts, and up near the atoll, before returning to Horizon for a second dive. Actual dive locations on seamounts in Johnston Atoll (PRIMNM) will be further refined after mapping data is acquired during EX1504 Leg 1. Transiting back to Pearl Harbor, Oahu, a final ROV dive would be conduct offshore Niihau.

Appendix B. Case Study: Okeanos Explorer - EM 302 - Hawaii

Case study: Okeanos Explorer – EM 302 – Hawaii

The field is plotted as the peak sound pressure level (SPL). In the horizontal plane (Figure A), the depth is 10; 50; 200 m. The field is plotted on an area 1000x6000 m. In the vertical plane (Figure B), it is computed down to 4000 m (6000 m on each side) then zoomed to 1000-m depth (1500 m on each side). 140, 160, and 180 dB isopleths shown.

Figure A: Horizontal plane views of sound pressure levels at three different receive depths within the water column directly below transducer: 10m, 50m, and 200m.

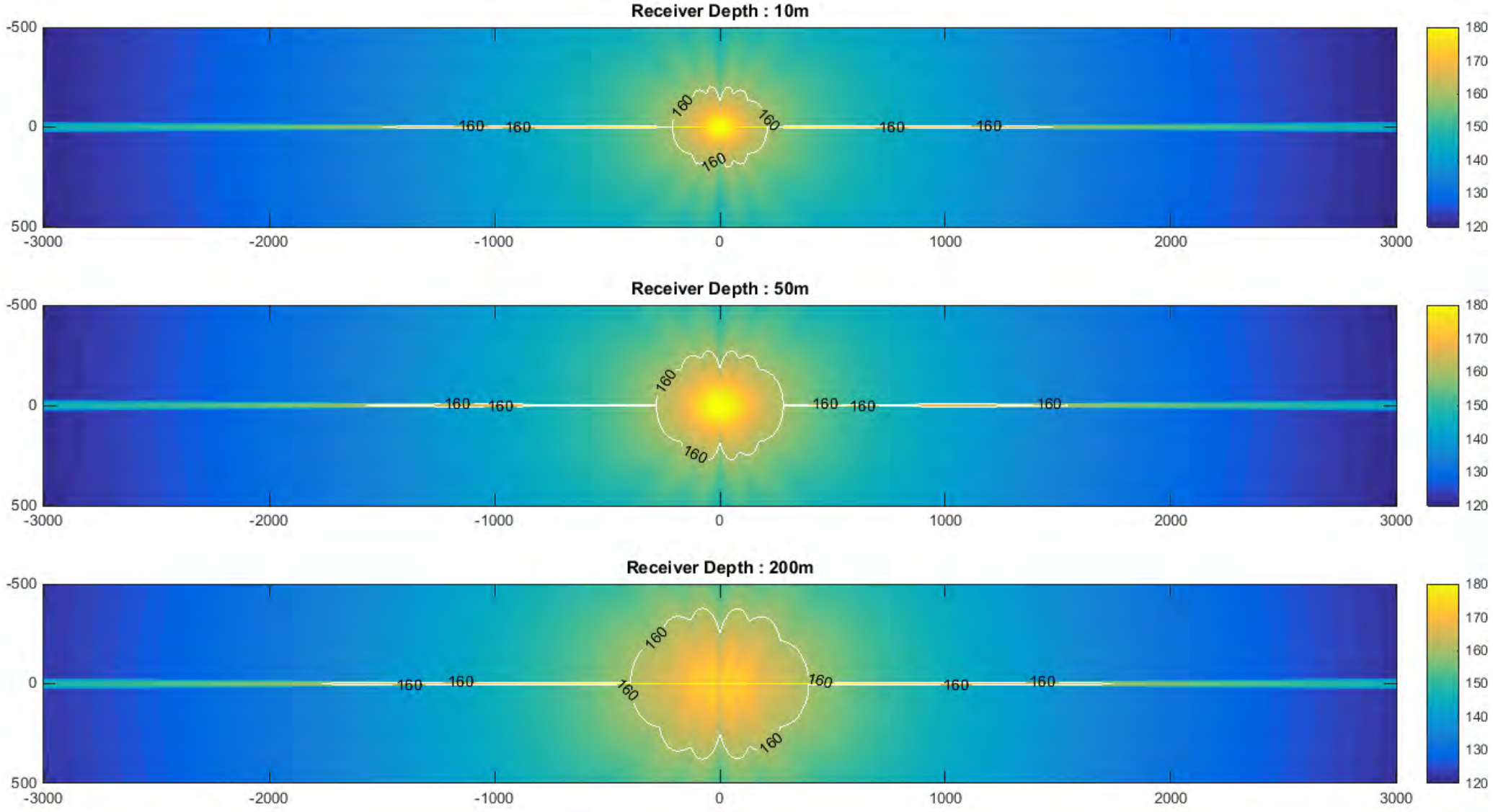
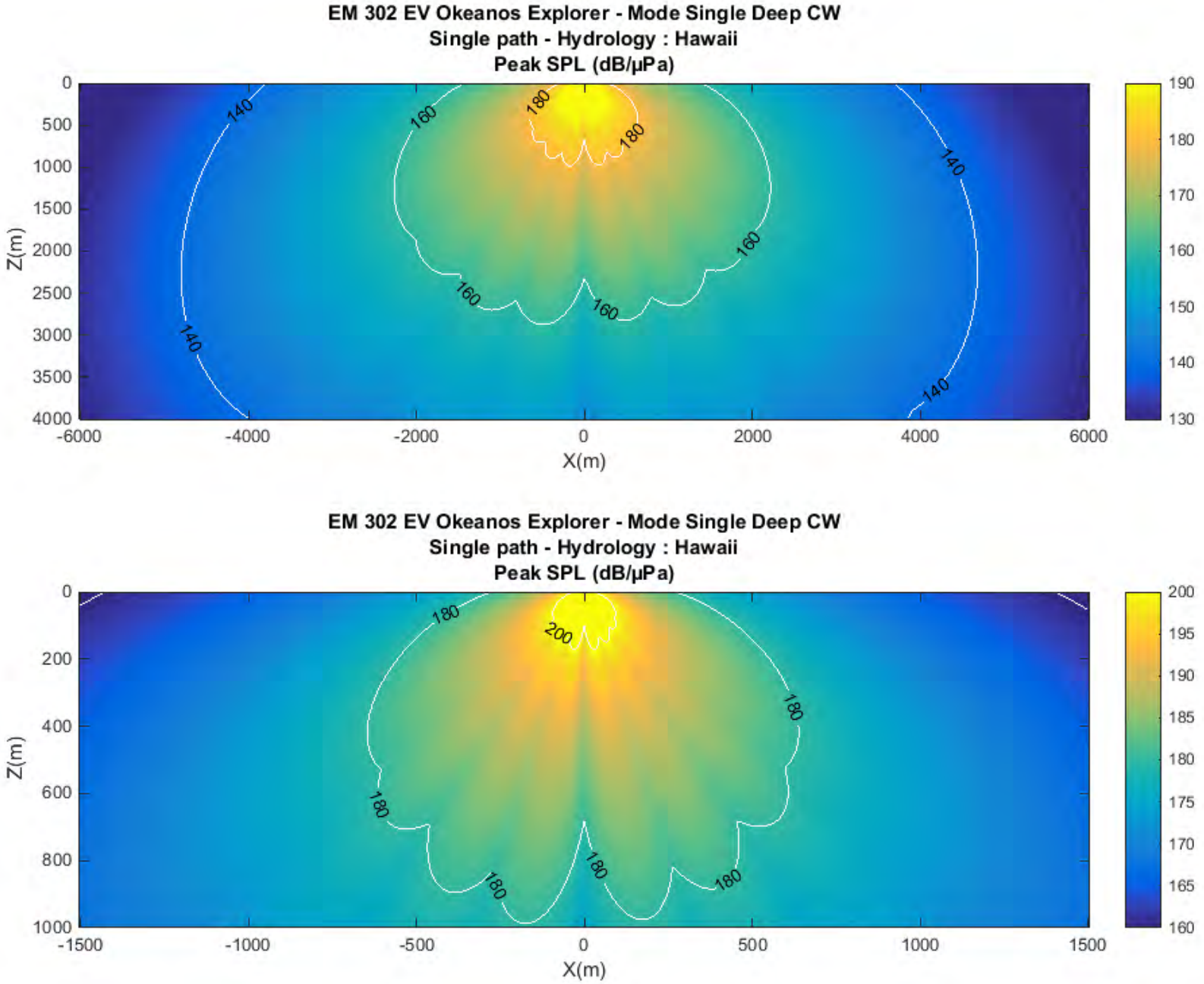


Figure B: Vertical plane view of sound pressure levels in the water column directly below the EM302 sonar transducer.



Model and Figures Provided by Dr. Xavier Lurton

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Appendix C: OER Marine Archaeology Background Doc

***Okeanos Explorer* Program**

NOAA Office of Ocean Exploration and Research

Maritime Archaeology Background Information

The mission of NOAA's Office of Ocean Exploration and Research (OER) is to explore the world's largely unknown oceans for the purpose of discovery and advancement of knowledge through innovative explorations, development of advanced undersea technology, undersea research, and outreach/education. OER's Marine Archaeology Program activities support the initial phases of exploration, discovery, and site characterization of underwater cultural heritage (UCH), - referring to traces of human existence historically and prehistorically that are totally or partially underwater - often through multidisciplinary investigations. This is done by systematically surveying, locating and evaluating sites for archaeological or historical significance, and properly documenting any information. Traditionally, these are non-disturbance activities that do not include site excavation and extensive artifact conservation.

OER accomplishes cultural resource work through the Ocean Exploration Marine Archaeology Grant Program, through partnerships (internal and external federal, state and academic - ONMS, BOEM, NPS, Navy, URI), and more recently through NOAA's ship of exploration the *Okeanos Explorer*. The National Undersea Research Program managed by OER also plays a part in the activities, past and present, through some of the National Undersea Research Centers and Cooperative Institute; HURL, UNCW, CIOERT, UCONN, NIUST.

OER supports the standards for conducting marine archaeological activities enumerated in the Annex Rules of the UNESCO Convention on the Protection of the Underwater Cultural Heritage (UCH). While OER and OER-supported exploration activities have no potential to directly cause impacts to UCH, project data and information may contain site location information that could lead to adverse impacts. The primary concern with UCH is potential harm that may be inflicted on the resource by revealing its location. Information about UCH obtained from OER-supported projects will be used to: identify the resources; determine origin where possible; evaluate sites for their archaeological or historical significance; work with federal, state and foreign governments to determine whether such sites merit protection under pertinent state, national or international legislation, treaties, or executive orders; or identify whether additional information is required to make such determinations.

NOAA adheres to the policies of the Federal Archaeology Program and has responsibility under Federal law to preserve and protect historically significant, or potentially significant, cultural resources. The agency must take into account the effects its activities have on cultural resources to prevent harm from actions it permits. Information relating to the location or character of cultural resources encountered by our operations must be kept strictly confidential, and the location of these sites should not be disclosed to any third party. Information already available in the public domain (e.g. websites) can be shared.

Project Planning

A goal of pre-cruise planning is to provide an opportunity to talk with agencies that have a legal or management interest in potential UCH in the survey area. Potential risks to cultural resources should be weighed and a decision made as to whether or not sites with potential historical or cultural significance should have information about their location restricted from public release. This decision will be made by the lead archaeologist for the cruise or by OER's Marine Archaeologist in coordination with other agencies as necessary. Agencies that may be consulted include NOAA ONMS Maritime Heritage Program, U.S. Navy History and Heritage Command, Bureau of Ocean Energy Management (BOEM), State Historic Preservation Officers, and others. While planning expeditions in any foreign country the host government should be made aware of the potential to discover UCH. Included below are five (but not all) agencies and entities with legal responsibilities for UCH:

1. State Historic Preservation Officer for UCH within state waters
2. Office of National Marine Sanctuaries for UCH within a National Marine Sanctuary
3. National Park Service for UCH within National Parks
4. Branches of the U. S. Department of Defense for sunken military craft (primarily naval aircraft and vessels)
5. Bureau of Ocean Energy Management enforces historic preservation law for energy and mineral development on the Outer Continental Shelf
6. Foreign countries for sovereign state vessels

PIs supported by grants or NOAA Ship *Okeanos Explorer* Expedition Coordinators are responsible for obtaining all necessary state, federal and international permits and approvals where necessary for the proposed work to be conducted. Projects involving UCH in a foreign country should involve an agency from the foreign country either directly or through oversight.

The OER data management team should carry out a consultation process with the agencies and entities with legal responsibilities for UCH, in collaboration with the OER marine archaeologist, as part of the data management protocols when a UCH mission occurs in any of these areas of responsibility. The expedition coordinator is responsible for the overall execution of the data management plan.

Relevant NOAA Operating Procedures

NOAA's Office of Coast Survey (OCS) is another field operations branch within NOAA with responsibilities under section 106 of the National Historic Preservation Act (NHPA, 16 U.S.C. 470 et seq.) to take into account the effects of its undertakings on historic properties. OCS has established procedures laid out in its 2011 Field Procedures Manual pertaining to the planning, collection, and disclosure of historic, or potentially historic underwater cultural heritage (UCH). Special consideration is given to all features which appear to be of cultural or historical significance, and appear anthropogenic in origin, during the hydrographic surveying process. All newly discovered uncharted shipwrecks are treated as significant and vulnerable historic resources. Data and information from these features are always protected and are only released in accordance with OCS policies and procedures, which include consultation with the designated local, state or federal management authorities**.** Specific information received during the consult period prior to, or after the survey, may prevent the public release of all or part of the survey data and products, following review.

Please see appendix B to view sections of the OCS 2011 Field Procedures Manual pertaining to underwater cultural heritage.

Pertinent Legislation and Executive Orders
UNITED STATES WATERS

As a federal agency, NOAA adheres to the Federal Archaeology Program (FAP). The program encompasses the archaeological activities of federal agencies as well as archaeological activities that are federally financed, licensed or permitted. FAP is guided by a collection of legislation, regulations and executive orders. Some but not all of the most relevant legislation is summarized below. Appendix A lists the National Register Criteria for determining the historical significance of prehistoric and historic sites. Cruise planning procedures include identifying and working with the State Historic Preservation Officer (SHPO) or relevant Historic/Archaeology contact at NOAA's Office of National Marine Sanctuaries (NMS) to request information on historical or potentially historic man-made features located within the survey area.

National Historic Preservation Act of 1966 as Amended (16 U.S.C. 470 et seq.) **See appendix A*

Section 1: The Congress finds and declares that –

(1) the spirit and direction of the Nation are founded upon and reflected in its historic heritage;
(2) the historical and cultural foundations of the Nation should be preserved as a living part of our community life and development in order to give a sense of orientation to the American people;
(3) historic properties significant to the Nation's heritage are being lost or substantially altered, often inadvertently, with increasing frequency;
(6) the increased knowledge of our historic resources, the establishment of better means of identifying and administering them, and the encouragement of their preservation will improve the planning and execution of Federal and federally assisted projects and will assist economic growth and development; and

(7) although the major burdens of historic preservation have been borne and major efforts initiated by private agencies and individuals, and both should continue to play a vital role, it is nevertheless necessary and appropriate for the Federal Government to accelerate its historic preservation programs and activities, to give maximum encouragement to agencies and the individuals undertaking preservation by private means, and to assist State and local governments and the National Trust for Historic Preservation in the United States to expand and accelerate their historic preservation programs and activities.

Section 2: It shall be the policy of the Federal government, in cooperation with other nations and in partnership with the States, local governments, Indian tribes, and private organizations and individuals to –

(1) use measures, including financial and technical assistance, to foster conditions under which our modern society and our prehistoric and historic resources can exist in productive harmony and fulfill the social, economic, and other requirements of present and future generations;

(4) contribute to the preservation of non-federally owned prehistoric and historic resources and give maximum encouragement to organizations and individuals undertaking preservation by private means;

(6) assist State and local governments, Indian tribes and Native Hawaiian organizations and the National Trust for Historic Preservation in the United States to expand and accelerate their historic preservation programs and activities.

Section 106: The head of any Federal agency having direct or indirect jurisdiction over a proposed Federal or federally assisted undertaking (see definition below) in any State and the head of any Federal department or independent agency having authority to license any undertaking shall, prior to the approval of the expenditure of any Federal funds on the undertaking or prior to the issuance of any license, as the case may by, take into account the effect of the undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register.

Section 110:

(a)(1) The heads of all Federal agencies shall assume responsibility for the preservation of historic properties which are owned or controlled by such agency.

(a)(2) Each Federal agency shall establish …, in consultation with the Secretary, a preservation program for the identification, evaluation, and nomination to the National Register of Historic Places, and protection of historic properties. Such program shall ensure –

(A) that historic properties under the jurisdiction or control of the agency, are identified, evaluated, and nominated to the National Register;

(C) that the preservation of properties not under the jurisdiction or control of the agency, but subject to be potentially affected by agency actions are given full consideration in planning;

(E) that the agency's procedures for compliance with section 106 of this Act –

(ii) provide a process for the identification and evaluation of historic properties for listing in the National Register and the development and implementation of agreements, in consultation with State Historic Preservation Officers, local governments, Indian tribes, Native Hawaiian organizations, and the interested public, as appropriate, regarding the means by which adverse effects on such properties will be considered.

Title III, General and Miscellaneous

Section 301: As used in this Act, the term –

(7) "**Undertaking**" means a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency, including –
   (A) those carried out by or on behalf of the agency;
   (B) those carried out with Federal financial assistance;
   (C) those requiring a Federal permit license, or approval; and
   (D) those subject to State or local regulation administered pursuant to a delegation or approval by a Federal agency.

(8) "**Preservation**" or "**historic preservation**" includes identification, evaluation, recordation, documentation, curation, acquisition, protection, management, rehabilitation, restoration, stabilization, maintenance, research, interpretation, conservation, and education and training regarding the foregoing activities, or any combination of the foregoing activities.

Section 304:

(a) The head of a Federal agency or other public official receiving grant assistance pursuant to this Act, after consultation with the Secretary, shall withhold from disclosure to the public, information about the location, character, or ownership of a historic resource if the Secretary and the agency determine that disclosure may –

(1) cause a significant invasion of privacy;
(2) risk harm to the historic resources; or
(3) impede the use of a traditional religious site by practitioners.

(b) When the head of a Federal agency or other public official has determined that the information should be withheld from the public pursuant to subsection (a) of this section, the Secretary, in consultation with such Federal agency head or official, shall determine who may have access to the information for the purpose of carrying out this Act.

(c) When the information in question has been developed in the course of an agency's compliance with section 106 or 110(f) of this Act, the Secretary shall consult with the Council in reaching determinations under subsections (a) and (b) of this section.

Archaeological Resource Protection Act of 1979 (16 U.S.C. 470aa-mm)

Section 2:

(a) The Congress finds that –

(1) archaeological resources on public lands and Indian lands are an accessible and irreplaceable part of the Nation's heritage;
(2) these resources are increasingly endangered because of their commercial attractiveness;
(3) existing Federal laws do not provide adequate protection to prevent the loss and destruction of these archaeological resources and sites resulting from uncontrolled excavations and pillage; and
(4) there is a wealth of archaeological information which has been legally obtained by private individuals for non-commercial purposes and which could voluntarily be made available to professional archaeologists and institutions.

(b) The purpose of this Act is to secure, for the present and future benefit of the American people, the protection of archaeological resources and sites which are on public lands and Indian lands, and to foster increased cooperation and exchange of information between governmental authorities, the professional archaeological community, and private individuals having collections of archaeological

resources and data which were obtained before October 31, 1979 [the date of the enactment of this Act].

Section 3: As used in this Act –

(1) The term "**archaeological resource**" means any material remains of past human life or activities which are of archaeological interest, as determined under uniform regulations promulgated pursuant to this Act. No item shall be treated as an archaeological resource under regulations under this paragraph unless such item is at least 100 years of age.

(2) The term "**Federal land manager**" means, with respect to any public lands, the Secretary of the department, or the head of any other agency or instrumentality of the United States, having primary management authority over such lands. In the case of any public lands or Indian lands with respect to which no department, agency, or instrumentality has primary management authority, such term means the Secretary of the Interior.

(3) The term "**public lands**" means –

(A) Lands which are owned and administered by the United States as part of –

(i) The national park system,

(ii) The national wildlife refuge system, or

(iii) The national forest system; and

(B) All other lands the fee title to which is held by the United States, other than lands on the Outer Continental Shelf and lands which are under the jurisdiction of the Smithsonian Institution.

Section 9

(a) Information concerning the nature and location of any archaeological resource for which the excavation or removal requires a permit or other permission under this Act or under any other provision of Federal law may not be made available to the public under subchapter II of chapter 5 of title 5 [of the United States Code] or under any other provision of law unless the Federal land manager concerned determines that such disclosure would-

(1) further the purposes of this Act or the Act of June 27, 1960 [the Reservoir Salvage Act, as amended, 16 U.S.C. 469-469c-1] and

(2) not create a risk of harm to such resources or to the site at which such resources are located.

(b) Notwithstanding the provisions of subsection (a) of this section, upon the written request of the Governor of any State, which request shall state –

(3) the specific site or area for which information is sought,

(4) the purpose for which such information is sought,

(5) a commitment by the Governor to adequately protect the confidentiality of such information to protect the resource from commercial exploitation,

the Federal land manager concerned shall provide to the governor information concerning the nature and location of archaeological resources within the State of the requesting Governor.

National Marine Sanctuary Act

(a)Findings - The Congress finds that -

(1) this Nation historically has recognized the importance of protecting special areas of its public domain, but these efforts have been directed almost exclusively to land areas above the high-water mark; certain areas of the marine environment possess conservation, recreational,

ecological, historical, scientific, educational, cultural, archeological, or esthetic qualities which give them special national, and in some cases international, significance;

(2) while the need to control the effects of particular activities has led to enactment of resource-specific legislation, these laws cannot in all cases provide a coordinated and comprehensive approach to the conservation and management of special areas of the marine environment; and

(3) a Federal program which establishes areas of the marine environment which have special conservation, recreational, ecological, historical, cultural, archeological, scientific, educational, or esthetic qualities as national marine sanctuaries managed as the National Marine Sanctuary System will

(A) improve the conservation, understanding, management, and wise and sustainable use of marine resources;

(B) enhance public awareness, understanding, and appreciation of the marine environment; and

(C) maintain for future generations the habitat, and ecological services, of the natural assemblage of living resources that inhabit these areas.

(b) Purposes and policies - The purposes and policies of this chapter are -

(1) to identify and designate as national marine sanctuaries areas of the marine environment which are of special national significance and to manage these areas as the National Marine Sanctuary System;

(2) to provide authority for comprehensive and coordinated conservation and management of these marine areas, and activities affecting them, in a manner which complements existing regulatory authorities;

(3) to maintain the natural biological communities in the national marine sanctuaries, and to protect, and, where appropriate, restore and enhance natural habitats, populations, and ecological processes;

(4) to enhance public awareness, understanding, appreciation, and wise and sustainable use of the marine environment, and the natural, historical, cultural, and archeological resources of the National Marine Sanctuary System;

(5) to support, promote, and coordinate scientific research on, and long-term monitoring of, the resources of these marine areas;

(6) to facilitate to the extent compatible with the primary objective of resource protection, all public and private uses of the resources of these marine areas not prohibited pursuant to other authorities;

(7) to develop and implement coordinated plans for the protection and management of these areas with appropriate Federal agencies, State and local governments, Native American tribes and organizations, international organizations, and other public and private interests concerned with the continuing health and resilience of these marine areas;

(8) to create models of, and incentives for, ways to conserve and manage these areas, including the application of innovative management techniques; and

(9) to cooperate with global programs encouraging conservation of marine resources.

(c)Establishment of system - There is established the National Marine Sanctuary System, which shall consist of national marine sanctuaries designated by the Secretary in accordance with this chapter.

Marine Protected Areas Executive Order (E.O. 13158)

The Marine Protected Areas (MPA) Executive Order (E.O. 13158) was created to help protect the significant natural and cultural resources within the marine environment for the benefit of present and future generations by strengthening and expanding the Nation's system of MPAs. Under E.O. 13158, the MPA Center is charged (Sec. 4(d)) to carry out, in cooperation with the Department of the Interior, the requirements of subsection 4(a) of this order. Section 4(a) directs the Department of Commerce and the Department of the Interior, in consultation with pertinent Federal agencies to develop a national system of MPAs. In addition, they shall coordinate and share information, tools, and strategies, and provide guidance to enable and encourage the use of the following in the exercise of each agency's respective authorities to further enhance and expand protection of existing MPAs and to establish or recommend new MPAs as appropriate, including:

(1) science-base identification and prioritization of natural and cultural resources for additional protection;
(4) an assessment of threats and gaps in levels of protection currently afforded to natural and cultural resources, as appropriate;
(5) practical, science-based criteria and protocols for monitoring and evaluating the effectiveness of MPAs;
(6) identification of emerging threats and user conflicts affecting MPAs and appropriate, practical, and equitable management solutions, including effective enforcement strategies, to eliminate or reduce such threats and conflicts.

The MPA Executive Order also specifically states that the E.O. is in furtherance of the purposes of the National Marine Sanctuaries Act, National Wildlife Refuge System Administration Act of 1966, National park Service Organic Act, the National Historic Preservation Act, and many other laws.

Sunken Military Craft Act (H.R. 4200, Title XIV)

The purpose of the Sunken Military Craft Act is to provide protection to U.S. sunken military craft from disturbance wherever they are located. Any activities that disturb a military craft require a permit from the relevant branch. By their nature, maritime archaeology activities of the *Okeanos Explorer* Program are designed to document cultural resources through imaging without touching or impacting sites. These activities do not cause disturbance and are not restricted in any way by the Act. The statute provides the following *(From the Navy Historical Center website):*

- Protection of sunken U.S. military ship and aircraft wherever located.
- Protection for the graves of lost military personnel.
- Protection of sensitive archaeological artifacts and historical information
- Codifies existing case law, which supports Federal ownership of sunken U.S. military ship and aircraft wrecks.
- Provides a mechanism for permitting and civil enforcement to prevent unauthorized disturbance.
- Encourages the Secretary of State, in consultation with the Secretary of Defense, to enter into bilateral and multilateral agreements with foreign countries for the protection of sunken military craft.
- Does not affect salvage of commercial merchant shipwrecks, or recreational diving.
- Does not impact commercial fishing, or the laying of submarine cables.
- Does not relate to the routine operation of ships.

National Environmental Policy Act

Sec. 101 [42 USC § 4331]

(a) The Congress, recognizing the profound impact of man's activity on the interrelations of all components of the natural environment, particularly the profound influences of population growth, high-density urbanization, industrial expansion, resource exploitation, and new and expanding technological advances and recognizing further the critical importance of restoring and maintaining environmental quality to the overall welfare and development of man, declares that it is the continuing policy of the Federal Government, in cooperation with State and local governments, and other concerned public and private organizations, to use all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans.

(b) In order to carry out the policy set forth in this Act, it is the continuing responsibility of the Federal Government to use all practicable means, consistent with other essential considerations of national policy, to improve and coordinate Federal plans, functions, programs, and resources to the end that the Nation may

> 4. preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity, and variety of individual choice;

Appendix A:

National Register of Historic Places, Criteria for Evaluation

Criteria for Evaluation

The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

A. That are associated with events that have made a significant contribution to the broad patterns of our history; or

B. That are associated with the lives of significant persons in or past; or

C. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

D. That have yielded or may be likely to yield, information important in history or prehistory.

Criteria Considerations

Ordinarily cemeteries, birthplaces, graves of historical figures, properties owned by religious institutions or used for religious purposes, structures that have been moved from their original locations, reconstructed historic buildings, properties primarily commemorative in nature, and properties that have achieved significance within the past 50 years shall not be considered eligible for the National Register. However, such properties *will qualify* if they are integral parts of districts that do meet the criteria or if they fall within the following categories:

a. A religious property deriving primary significance from architectural or artistic distinction or historical importance; or

b. A building or structure removed from its original location but which is primarily significant for architectural value, or which is the surviving structure most importantly associated with a historic person or event; or

c. A birthplace or grave of a historical figure of outstanding importance if there is no appropriate site or building associated with his or her productive life; or

d. A cemetery that derives its primary importance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events; or

e. A reconstructed building when accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and when no other building or structure with the same association has survived; or

f. A property primarily commemorative in intent if design, age, tradition, or symbolic value has invested it with its own exceptional significance; or

g. A property achieving significance within the past 50 years if it is of exceptional importance.

Appendix B:

NOAA Office of Coast Survey – Field Procedures Manual
Sections pertaining to Underwater Cultural Heritage

Section 2 – Pre-Survey Planning

2.2.2.5 Historic Preservation Correspondence (Page 66)
OCS, as a unit of a federal agency, has responsibilities under section 106 of the National Historic Preservation Act (NHPA, 16 U.S.C. 470 et seq.) to take into account the effects of its undertakings on historic properties. The process for federal agencies in complying with the NHPA is laid out in 36 C.F.R. Part 800, which prescribes consultation with the State Historic Preservation Officer (SHPO).The files related to that consultation will be saved in this folder. The Hydrographic Surveys Division is responsible for taking care of the consultation process. HSD will simply put the correspondence in this folder as background information for the field units.

2.4.5 Constituent Contact (Page 74)
The Project Instructions will list constituents who must be contacted at or near the beginning and end of field operations to discuss survey objectives and accomplishments. It is mandatory that the field unit contact the appropriate regional NOAA Navigation Manager as identified in the Project Instructions.

The Project Instructions will also list various local contacts for reference. These resources should not be overlooked and can often provide local knowledge regarding AWOIS items, shoaling, marine activities, traffic patterns, and other areas of concern. Local information sources include Port Authorities, Pilot Associations, local ferry companies, fishermen, towing companies, U.S. Coast Guard, U.S. Army Corps of Engineers, and local and state government agencies. Information regarding local survey requests or charting concerns that will not be addressed during the current project should be conveyed to either the Chief of Operations or the Chief of NRB.

2.4.5.1 Cultural or Historic Submerged Features
HSD Operations Branch will contact the State Historic Preservation Officer (SHPO) and Historical/Archaeological contact at NOAA's Office of National Marine Sanctuaries (NMS) during preparation of Project Instructions to request information on any historically significant manmade features on the seabed within the survey area. Any information provided by these groups will be included in the Project Instructions. The Project Instructions will also include the contact information of the SHPO and NMS for use in the event of discovery of a potentially historically significant man-made feature, in accordance with section 4.4.3.3.

2.5.4.3.2 Special Wreck Investigations (Page 83)
If a hydrographic field unit discovers a potentially significant historic wreck site, or conducts a special wreck investigation through a contract from another NOAA program or a request from a NOAA Navigation Manager, the field unit should make an effort to ensonify the wreck site and associated debris field with each type of sonar system that is readily available. When conducting side scan sonar operations, run parallel tracks on either side of the wreck, so that both sides are imaged, as well as two

additional tracks orthogonal to the site. The imagery and bathymetry data will provide clues to the wreck's status and identity, identify any obstructions, and provide researchers with an adequate baseline assessment with which to compare future surveys.

Section 4 – Data Processing and Analysis

4.4.3.3 Cultural or Historical Submerged Features (Pages 188-190)
In the course of acquiring or processing hydrographic data, features on the seafloor may be discovered which are of potential cultural or historical significance. These include wrecks of ships or aircraft, the recognizable debris from wrecks, or other items which may appear anthropogenic in origin and have some associated cultural or historical significance.

Chiefs-of-Party must always promptly assess the discovery of any features for significance to local surface navigation and report these accordingly. Any feature determined to be a Danger to Navigation shall be immediately reported through the standard DTON reporting process (see section 4.4.3.1).

It is Marine Chart Division (MCD) policy that all features recommended for charting by the Chief-of-Party be applied to the appropriate nautical charts. Chiefs-of-Party must continue to recommend for charting all features determined to be significant to surface navigation, as well as features determined to be significant or hazardous to other marine chart users engaged in activities such as fishing or trawling. This includes features which may have potential cultural or historical significance. This policy is unchanged and in accordance with the MCD Nautical Charting Manual.

All features which appear to be of cultural or historical significance, and appear anthropogenic in origin, do require special consideration during the hydrographic surveying process. Data and information from these features must always be protected and may only be released in accordance with OCS policies and procedures. Unless specified by the Project Instructions (or other written instructions from OCS):

1. Do not attempt to determine the cultural or historic significance of any features. And, do not expend any operational effort toward identification beyond what is necessary for assessment as a Danger to Navigation.
2. Do not speculate about a known or newly discovered feature's potential cultural or historical significance, either publicly or in writing.
3. Do not identify by name or otherwise associate with a name, any cultural or historical feature in the Descriptive Report (DR) or any part of the survey's data.
4. *DO* include an image, SSS or bathymetry, of the feature in the Pydro feature report for recognition by a historian or preservation official.

OCS, as a unit of a federal agency, has responsibilities under section 106 of the National Historic Preservation Act (NHPA, 16 U.S.C. 470 et seq.) to take into account the effects of its undertakings on historic properties. The process for federal agencies in complying with the NHPA is laid out in 36 C.F.R. Part 800, which prescribes consultation with the State Historic Preservation Officer (SHPO).

1. OCS will consult with the NOAA's Office of National Marine Sanctuaries (NMS) Marine Historian where hydrographic projects are located within Federal waters, including National Marine Sanctuary boundaries.
2. OCS will also consult with the appropriate SHPO where hydrographic projects are located in state waters.

OCS consultations for hydrographic projects provide information about planned survey activities, and about survey outcomes. A pre- or post-survey consult will allow NMS or a SHPO at least 30 days to respond.

In general, NOAA field units are not required to submit any data to NMS or a SHPO. All consultations will be conducted by OCS.

4.4.3.3.1 Pre-survey Consult A pre-survey consult will be initiated during the project planning process by OCS HSD Operations Branch or NSD Navigation Response Branch. Any responses or special handling that may be required of a NOAA field unit will be provided in the Project Instructions.

A pre-survey consult with NMS or a SHPO may be anticipated to result in one of three general outcomes:

1. **No Response** – HSD Operations branch will note this and the project instructions will not require any special data handling.

2. **Informational response** – Information about known or reported features of cultural or historical significance may be received by OCS following the pre-survey consult period. An informational response means information from NMS or a SHPO received by OCS is provided without any restriction for public release. This information will be included with the Project Instructions. The project instructions will not require any special data handling.

3. **Actionable response** – Specific information received following the NMS or SHPO pre-survey consult period may prevent the public release of all or part of the survey data or products. The specific information received following a pre-survey consult period will be evaluated by OCS HSD Operations Branch, and clear instructions for data handling will be provided.

4.4.3.3.2 Post-survey Consult A post-survey consult will be initiated by HSD's Atlantic Hydrographic Branch (AHB) or Pacific Hydrographic Branch (PHB). Immediately upon receiving a data submission, AHB or PHB will provide a copy of survey's composite Descriptive Report (DR) that includes the written DR, the feature report, and the Danger to Navigation report to the NMS and/or SHPO specified in the Project Instructions, and request a direct response within 30 days.AHB or PHB will provide courtesy copies of the DR Transmittal Letter to:

1. Chief, HSD or NSD
2. Chief, HSD Operations Branch or NSD Navigation Response Branch Regional Navigation Manager (as assigned in the Project Instructions)

The composite DR may be transmitted by e-mail or on letterhead, with a message in the following form:

The National Oceanic and Atmospheric Administration's Office of Coast Survey (OCS) previously contacted you regarding hydrographic surveys in [location] on or about [dates]. A Descriptive Report for one of those surveys is attached for your information. Please provide any comments regarding this survey within 30 days with reference to survey [insert registry number] to [insert name] Chief, [Atlantic or Pacific] Hydrographic Branch [insert telephone, e-mail, and mailing address]. If we have not received a response in 30 days, we will assume that the survey data may be made publicly available.

A post-survey consult with NMS or a SHPO may be anticipated to result in one of three general outcomes:

1. **No Response** – All survey data and products will be made publicly available through NGDC following an affirmative Survey Acceptance and Review (SAR) by the either the Atlantic or Pacific Hydrographic Branch.

2. **Informational response** – An informational response means information from NMS or a SHPO received by OCS is provided without any restriction for public release. If received following a post-survey consult, this information will be inserted into the survey's DR as supplemental correspondence. All survey data and products will be made publicly available through NGDC following an affirmative SAR by the assigned OCS HSD Hydrographic Branch.

3. **Actionable response** – Specific information received following a post-survey consult will be evaluated by the assigned OCS HSD Hydrographic Branch. This evaluation may result in all or some of the survey data and products to be not made publicly available through NGDC following an affirmative Survey Acceptance and Review (SAR) by the assigned OCS HSD Hydrographic Branch.

The policies and procedures described in this section should never cause a delay in the completion of a hydrographic survey and the immediate notification of potential Dangers to Navigation. Any questions regarding cultural or historical submerged features should be promptly directed to the Chief, HSD Operations Branch.

Section 5 – Data Management and Survey Deliverables

5.1.1.1.1 Special Data Handling Requirements (Page 212)
Special handling requirements will be described in the Project Instructions from HSD Operations Branch. Examples of situations requiring special data handling are below.

The acquisition, handling and release of high-resolution bathymetry (HRB) in US Navy submarine security zones deeper than 50 meters are subject to approval and restriction by the US Navy's HRB Review Panel. The memorandum of agreement between NOAA and the HRB Review Panel (included in Appendix 5) details the areas subject to approval and restriction by the US Navy and provides data handling guidance for HRB data and derived products. All newly discovered uncharted shipwrecks are to be treated as significant and vulnerable historic resources. This treatment entails following the data handling guidance in section 4.4.3.3 of this manual.

Certain homeland security survey data have special handling requirements prescribed by the US Naval Oceanographic Office and OCS. Those requirements are described in the following documents included in Appendix 2:

_ NAVMETOCCOMINST 3142A March 2007.pdf
_ NAVMETOCCOMINST 3142A March 2007 - OCS Deviations.pdf

Raw or processed data from sources external to NOAA are not to be made available to the public at any time.

5.1.1.2 Data Releasability (Page 212)
Field units or HSD/NSD office personnel should be aware that the policy information mentioned here is set such that the release of raw or working data do not provide a company an unfair competitive advantage within its industry or carry with it liability issues that may be associated with the dissemination of this data. These policies are also set to adhere to the National Historic Preservation Act of 1996 and the Archaeological Resources Protection Act of 1979. Information about all newly uncharted navigationally significant and potentially historical man-made features , particularly position coordinates, is considered sensitive material and this information shall not be released to the general public without first notifying designated local, state, or federal management authorities (refer to sections 2.4.5.1 and 4.4.3.3).

Appendix D: NASA Maritime Aerosols Network Survey of Opportunity

Survey or Project Name

Maritime Aerosol Network

Points of Contact (POC)

Lead POC or Principle Investigator (PI & Affiliation)	*Supporting Team Members ashore*
POC: Dr. Alexander Smirnov	*Supporting Team Members aboard (if required)*

Activities Description(s)*(Include goals, objectives and tasks)*

The Maritime Aerosol Network (MAN) component of AERONET provides ship-borne aerosol optical depth measurements from the Microtops II sun photometers. These data provide an alternative to observations from islands as well as establish validation points for satellite and aerosol transport models. Since 2004, these instruments have been deployed periodically on ships of opportunity and research vessels to monitor aerosol properties over the World Oceans.

Appendix E: Data Management Plan

Data Management Plan
Okeanos Explorer (EX1504L3): CAPSTONE Leg III: Main Hawaiian Islands and Geologists Seamounts (ROV/Mapping)

OER Data Management Objectives

Because the cruise is being funded by the Deep Sea Corals Research and Technology Program (DSCRTP), all data will be shared immediately with the science team via hard-drive. Data collected for exploration of the WWI era S19 submarine will be protected under the National Historic Preservation Act. Data pipelines will be managed as normal with special compensation for data collected near the marine archaeological site.

1. General Description of Data to be Managed

19.1 Name and Purpose of the Data Collection Project

Okeanos Explorer (EX1504L3): CAPSTONE Leg III: Main Hawaiian Islands and Geologists Seamounts (ROV/Mapping)

19.2 Summary description of the data to be collected.

The ship will conduct 24 hour operations consisting of daytime ROV dives and evening/nighttime mapping operations including during transit. During this cruise we will conduct 8 hour ROV dives on most days with occasional 10 or 12 hour dives (at the ship's discretion) on particularly interesting or deep dive sites. ROV operations will focus on depths between 350 and 3,000 meters and will include high-resolution visual surveys and limited sample collection. Mapping operations will be conducted in 250 m of water and deeper, and include overnight multibeam, water column backscatter, and sub-bottom data collection. Opportunistic CTD rosette operations may be requested to collect more information about the environmental parameters at ROV dives sites, or opportunistically at selected sites where collecting the data is considered important to understanding the physical or chemical properties of the overlying water column.

19.3 Keywords or phrases that could be used to enable users to find the data.

Oahu, Big Island, coral disturbance and recovery, Geologists Seamounts, WWI S19 Submarine, expedition, exploration, explorer, marine education, noaa, ocean, ocean discovery, ocean education, ocean exploration, ocean exploration and research, ocean literacy, ocean research, OER, science, scientific mission, scientific research, sea, stewardship, systematic exploration, technology, transformational research, undersea, underwater, Davisville, mapping survey, multibeam, multibeam backscatter, multibeam sonar, multi-beam sonar, noaa fleet, okeanos, okeanos explorer, R337, Rhode Island, scientific computing system, SCS, single beam sonar, singlebeam sonar, single-beam sonar, sub-bottom profile, water column backscatter, archaeological, archaeology, conservation, conserve, crm, cultural resource management, historic, marine archaeology, maritime, maritime archaeology, nautical, nautical archaeology, preserve, protect, protection, submerged cultural heritage, submerged cultural resource, uch, underwater cultural heritage, McCall Seamount, Ellis Seamount, Swordfish Seamount, Deep Sea Corals Research and Technology Program, DSCRTP

19.4 If this mission is part of a series of missions, what is the series name?

Okeanos ROV Cruises

19.5 Planned or actual temporal coverage of the data.

Dates: 8/28/2015 to 9/3/2015

19.6 Planned or actual geographic coverage of the data.

Latitude Boundaries: 18 to 21.6

Longitude Boundaries: -158.25 to -155.4

19.7 What data types will you be creating or capturing and submitting for archive?

SCS Output (native), Sub-Bottom Profile data, Water Column Backscatter, XBT (raw), Cruise Plan, Cruise Summary, Data Management Plan, Highlight Images, Quick Look Report, Bottom Backscatter, CTD (raw), Dive Summaries, EK60 Singlebeam Data, Expedition Cruise Report, GSF, HDCS, Highlight Video, HL Image captions/credits, HL Video captions/credits, Images, Mapping Summary, Multibeam (image), Multibeam (processed), Multibeam (product), Multibeam (raw), NetCDF, Raw Video (digital)

19.8 What platforms will be employed during this mission?

SEIRIOS Camera Sled, NOAA Ship Okeanos Explorer, Deep Discoverer ROV

2. Point of Contact for this Data Producing Project

Overall POC:	Christopher Kelley, Associate Professor, University of Hawai'I at Manoa, ckelley@hawaii.edu
Title:	Associate Professor
Affiliation/Dept:	University of Hawai`I at Manoa
E-Mail:	ckelley@hawaii.edu
Phone:	808-956-7437

3. Point of Contact for Managing the Data

Data POC Name:	Susan Gottfried and Robert McGuinn
Title:	OER Data Management Coordinator and DSCRTP Data Manager
E-Mail:	susan.gottfried@noaa.gov and robert.mcguinn@noaa.gov

4. Resources

4.1 Have resources for management of these data been identified? False

4.2 Approximate percentage of the budget devoted to data management. (specify % or "unknown")

unknown

5. Data Lineage and Quality

5.1 What is the processing workflow from collection to public release?

EX SCS data shall be delivered in its native format as well as an archive-ready, documented, and compressed NetCDF-3 format to NCEI-MD excluding the data within a buffer zone around the marine archaeological site; multibeam data and metadata will be compressed and delivered in a bagit format to NCEI-CO excluding the data considered "restricted". Deep Sea Corals data shall be post-processed and maintained by the Deep Sea Corals Research and Technology Program (DSCRTP).

5.2 What quality control procedures will be employed?

Quality control procedures for the data from the Kongsberg EM302 is handled at UNH CCOM/JHC. Raw (level-0) bathymetry files are cleaned/edited into new data files (level-1) and converted to a variety of products (level-2). Data from sensors monitored through the SCS are archived in their native format and are not quality controlled. Data from CTD casts and XBT firings are archived in their native format and are not quality controlled. CTDs are processed into profiles for display only on the Okeanos Atlas.

6. Data Documentation

6.1 Does the metadata comply with the Data Documentation Directive? True

6.1.1 If metadata are non-existent or non-compliant, please explain:

not applicable

6.2 Where will the metadata be hosted?

Organization: An ISO format collection-level metadata record will be generated during pre-cruise planning

URL: http://www.ncddc.noaa.gov/oer-waf/
discovery and access. The record will be harvested by data.gov.

Meta Std: ISO 19115-2 Geographic Information with Extensions for Imagery and Gridded Data will be the metadata standard employed; a NetCDF-4 standard for oceanographic data will be employed for the SCS data; the Library of Congress standard, MAchine Readable Catalog (MARC), will be employed for NOAA Central Library records.

6.3 Process for producing and maintaining metadata:

Metadata will be generated via xml editors or metadata generation tools.

7. Data Access

7.1 Do the data comply with the Data Access Directive? True

7.1.1 If the data are not to be made available to the public at all, or with limitations, provide a valid reason.

Data from EX integrated systems shall be partitioned into restricted and non-restricted access. The science data including the sampling database, the environmental data from the vessel and submersibles, and the underwater video and imagery will be managed also by the DSCRTP.

7.1.2 If there are limitations to public data access, describe how data are protected from unauthorized access or disclosure.

Account access to mission systems are maintained and controlled by the Program. Data access prior to public accessibility is documented through the use of Data Request forms and standard operating procedures. Data corresponding to exploration of a marine archaeological site will not be released for public access.

7.2 Name and URL of organization or facility providing data access.

Org: NCEI for EX data; DSCRTP for Deep Sea Corals data

URL: http://explore.noaa.gov/digitalatlas for EX data; https://deepseacoraldata.noaa.gov/ for DSC data

7.3 Approximate delay between data collection and dissemination. By what authority?

Hold Time: Data from the EX is not proprietary and will be released as soon as possible - usually 30-60 days.

Authority: Data surrounding to a marine archaeological site will not be released due to the National Historic

Preservation Act of 1966.

7.4 Prepare a Data Access Statement

No data access constraints, unless data are protected under the National Historic Preservation Act of 1966.

8. Data Preservation and Protection

8.1 Actual or planned long-term data archive location:

Data from this mission will be preserved and stewarded through the NOAA National Data Centers and the Deep Sea Corals Research and Technology Program. Refer to the Okeanos Explorer FY15 Data Management Plan at NOAA's EDMC DMP Repository (EX_FY15_DMP_Final.pdf) for detailed descriptions of the processes, procedures, and partners involved in this collaborative effort.

8.2 If no archive planned, why?

8.3 If any delay between data collection and submission to an archive facility, please explain.

30-60 days

8.4 How will data be protected from accidental or malicious modification or deletion?

Data management standard operating procedures minimizing accidental or malicious modification or deletion are in place aboard the Okeanos Explorer and will be enforced.

8.5 Prepare a Data Use Statement

Data use shall be credited to NOAA Office of Ocean Exploration and Research and the NOAA Deep Sea Corals Research and Technology Program.

Appendix F:

EMERGENCY CONTACT DATA SHEET

NOAA OKEANOS EXPLORER

Scientists sailing aboard the *Okeanos Explorer* should fill out the form found at the following link location:
https://docs.google.com/a/noaa.gov/forms/d/1pcoSgPluUVxaY64CM1hJ75l1iIYirTk48G-lv37Am_k/viewformwith their emergency contact information