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 Scott M. Sirois, NOAA
Commanding Officer, NOAA Marine Operations Center-Atlantic

SUBJECT: Project Instruction for EX-16-07
CAPSTONE Wake Island PRI MNM (Mapping)

Attached is the final Project Instruction for EX-16-07, CAPSTONE Wake Island PRI MNM (Mapping), which is scheduled aboard NOAA Ship *Okeanos Explorer* during the period of August 25 – September 11, 2016. Of the 19 DAS scheduled for this project, 19 days are funded by a Line Office Allocation. This project is estimated to exhibit a Medium Operational Tempo. Acknowledge receipt of these instructions via e-mail to ChiefOps.MOA@noaa.gov at Marine Operations Center-Atlantic.

Ocean Exploration and Research

FINAL Project Instructions

Date Submitted: August 23, 2016

Platform: NOAA Ship *Okeanos Explorer*

Project Number: EX-16-07

Project Title: CAPSTONE Wake Island PRI MNM (Mapping)

Project Dates: Aug 25 - Sept 11, 2016

Prepared by: ELizabeth Lobecker Digitally signed by ELizabeth Lobecker DN: cn=ELizabeth Lobecker, o=NOAA, ou=OER, email=elizabeth.lobecker@noaa.gov, c=US Date: 2016.08.24 11:12:49 -04'00' **Dated:** 8/24/16

Elizabeth Lobecker, NOAA
Expedition Coordinator
Office of Ocean Exploration & Research

Approved by: SWR **Dated:** 8/24/16

Craig Russell
Program Manager
Office of Ocean Exploration & Research

Approved by: **Dated:** 8/24/16

Captain Scott M. Sirois, NOAA
Commanding Officer
Marine Operations Center - Atlantic

I.OVERVIEW

A. Brief Summary and Project Period

From August 25 to September 11, 2016, NOAA and partners will conduct a telepresence-enabled ocean exploration cruise on NOAA Ship *Okeanos Explorer* to collect critical baseline information in and around the Wake Island Unit of the Pacific Remote Islands Marine National Monument (PRIMNM). EX-16-07 will commence in Kwajalein, Marshall Islands, with operations beginning on August 25 and conclude in Honolulu, Hawaii on September 11. Exploration operations for this cruise will focus on collecting seafloor mapping data over several seamounts within the Wake Island Unit of PRIMNM, and conducting targeted mapping exploration transits between the start and end ports and the working grounds. This expedition will help establish a baseline of information in the region to catalyze further exploration, research and management activities. This expedition is part of a three year Campaign to Address Pacific monument Science, Technology, and Ocean Needs (CAPSTONE) focused on systematically collecting baseline information to support science and management needs within and around the Monuments and other protected places in the Pacific, and serves as an opportunity for NOAA and the Nation to highlight the uniqueness and importance of these national symbols of ocean conservation. NOAA will work with the scientific and management community to characterize unknown and poorly-known areas through telepresence-based exploration.

Understanding biogeographic patterns between and among the Pacific Monuments and Sanctuaries is a coordinating theme for CAPSTONE science priorities. Themes and objectives for the expedition series include:

- Acquire data to support priority Monument and Sanctuaries science and management needs, including habitat surveys in recently expanded boundary areas;
- Identify and characterize vulnerable marine habitats - particularly potential locations for high density deep sea coral and sponge communities;
- Characterize seamounts within the Prime Crust Zone (PCZ). The PCZ is the area of the Pacific with the highest expected concentration of deep sea minerals, including rare metals and rare earth elements;
- Collect information on the geologic history of Central Pacific Seamounts, including those that are or may be relevant to our understanding of plate tectonics and subduction zone biology and geology; and

- Provide a foundation of publicly accessible data and information products to spur further exploration, research, and management activities.

Originally created by Presidential Proclamation 8336 of January 6, 2009, Pacific Remote Islands Marine National Monument (PRIMNM) boundaries were expanded by Presidential Proclamation 9173, dated September 29, 2014. The expansion includes waters adjacent to Jarvis and Wake Islands, and Johnston Atoll. Wake Island is the northernmost atoll in the Marshall Islands geological ridge, and according to the US Fish & Wildlife Service, is perhaps the oldest living atoll in the world. The Wake Island Unit of PRIMNM contains 406,307 km^2 of ocean area within the US Exclusive Economic Zone.

Earlier this year, EX-16-04 focused on ocean mapping of the Wake Island unit of PRIMNM for exploratory baseline characterization. Additionally, EX-16-06 will be a combined ROV and mapping expedition with a focus on the Wake Island unit of PRIMNM. Prior to OER's 2016 CAPSTONE expeditions, very little multibeam surveying had been completed in this region. Therefore, EX-16-04, EX-16-06, and EX-16-07 will be the most ambitious effort to date to systematically explore this very large US marine protected area. At the successful completion of this cruise, nearly all major seamounts within Wake Island Unit will have been mapped, leaving a lasting contribution to the understanding of this important marine area.

Operations will include 24 hour/day mapping operations using the ship's deep water mapping systems (Kongsberg EM302 multibeam sonar, EK60 split-beam fisheries sonars, and Knudsen 3260 chirp sub-bottom profiler sonar), CTD rosette, and the ship's high-bandwidth satellite connection for real-time ship to shore communications. Operations for this cruise will include 24 hour mapping, and continuous telepresence-based remote participation in mapping operations. Multibeam and singlebeam mapping operations will be conducted 24 hours a day throughout the cruise. Sub-bottom profile mapping will be conducted 24 hours a day at the discretion of the CO. XBT sound velocity casts in support of multibeam sonar mapping operations will be conducted at an interval defined by prevailing oceanographic conditions, but not to exceed 6 hours. All mapping data will be fully processed according to standard onboard procedures and will be archived with the National Centers for Environmental Information (NCEI).

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, and the ability to transmit new environmental baseline information to shore in near real time.

The transit routes between ports and the operating area will maximize mapping of discrete geologic features including seamounts and ridges with little or no existing modern sonar data coverage. The routes were chosen based on the most recent version of the global bathymetric compilation dataset compiled by J.J. Becker et al (http://topex.ucsd.edu/sandwell/publications/124_MG_Becker.pdf).

This expedition will be the fourth cruise to test telepresence enabled mapping operations on Okeanos Explorer. This will be the most dynamic of the four cruises thus far, with mapping efforts to include preplanned mapping surveys over several distinct seamounts within the Wake Island Unit of PRIMNM. In this test, the Expedition Coordinator for the cruise (Elizabeth Lobecker) will be based on shore at the Exploration Command Center (ECC) at University of New Hampshire Center for Coastal and Ocean Mapping/Joint Hydrographic Center (UNH CCOM/JHC) with regular and ongoing communications with the ship (OPS, CO) and onboard mapping lead (Amanda Bittinger).

The screens of the mapping acquisition systems (EM 302, EK 60, SBP etc.) will be broadcast 24 hours per day, and will be monitored by both onboard and onshore mapping scientists. A specially configured laptop has been prepared for remote access to all the sonar acquisition and data processing machines from shore. This setup will be extensively tested for its reliability and feasibility of controlling the mapping data acquisition from shore. The raw data will be transmitted to shore and further processing will be completed on shore. The onboard mapping lead will be the primary liaison between ship and OER operations and will be attending all the shipboard daily meetings and providing daily situation reports (SITREPS) to the onshore Expedition Coordinator, who will in turn communicate the daily SITREPS to the broader OER Okeanos operational team.

The protocols developed during this test telepresence enabled mapping expedition will open the possibility of the ship conducting operations with periodic minimal in-person participation onboard with most of data acquisition, processing and quality checks of mapping data being completed on shore. Value gained from this model will continue to expand as the model is tested. Initial predicted benefits include: reduction in travel costs to the ship, participation of a larger number of mapping trainees in expeditions, cruise participation from individuals who are unable to sail, enhanced rapid data processing and archival techniques, enhanced onshore partnership development opportunities, enhanced rapid data report creation, and expanded possibilities for utilizing multiple ECCs during mapping missions.

The onboard ship and mapping team will be provided with all information necessary to successfully conduct the mapping mission should the telepresence component experience significant challenges, such as lack of connectivity due to VSAT or network challenges.

B. Days at Sea (DAS)

Of the 19 DAS scheduled for this project, 0 DAS are funded by an OMAO allocation, 19 DAS are funded by an OAR Line Office Allocation, 0 DAS are Program Funded, and 0 DAS are other agency funded. This project is estimated to exhibit a Medium Operational Tempo due to 24 hour mapping operations. It is noted that on the schedule there are 18 DAS listed, however due to eastward crossing of international dateline, one day will be gained during the cruise, for a total of 19 DAS.

C. Operating Area

EX-16-07 of the CAPSTONE Expeditions is a 24 hour mapping cruise that will focus on previously unmapped sites around the Marshall Islands, within the Wake Island Unit of PRIMNM, in international waters during transit to Honolulu, and briefly Johnston Atoll Unit of PRIMNM (U.S. waters) during transit to Honolulu.

Mapping operations will focus in depths generally between 250 and 6,000 meters.

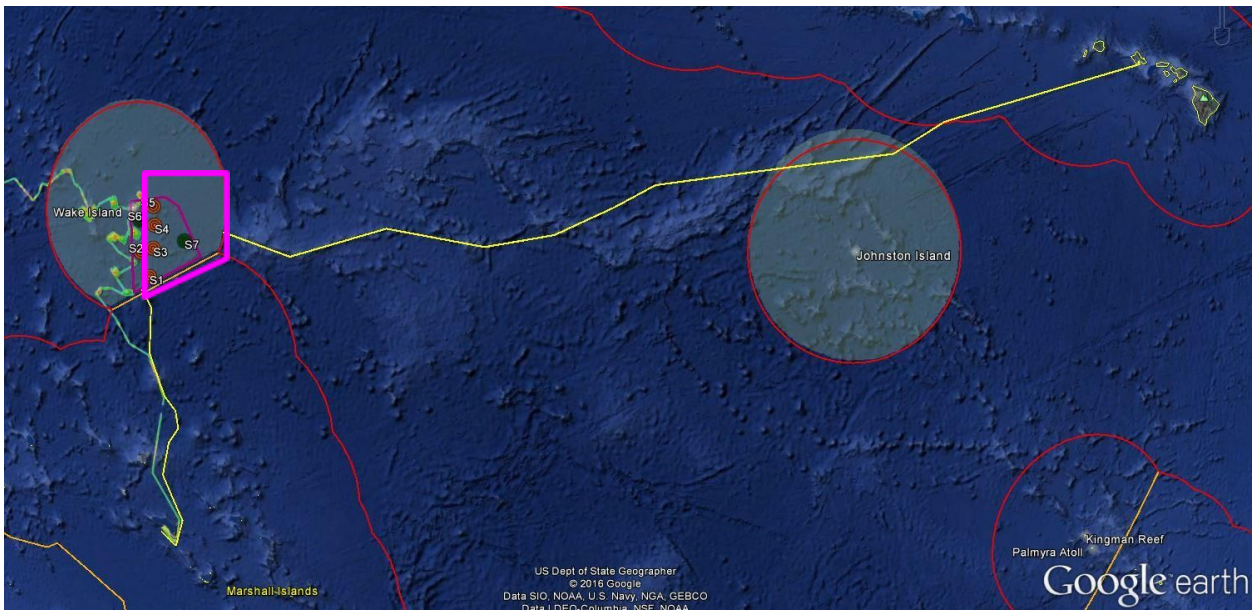

Figure 1:*Map indicating the overall operating area of Okeanos Explorer for EX-16-07. The yellow lines are estimated transit lines (may change slightly). The pink polygon is the focused seamount mapping area within the Wake Island Unit of PRIMNM. Red polygons indicate U.S. EEZ areas. Shaded circles indicate PRIMNM units.*

Overall Operating Area Bounding Coordinates		
ID	**Latitude**	**Longitude**
NW corner	19 42.5 N	166 23.0 E
NE corner	19 38.3 N	168 34.6 E
SE corner	17 44.2 N	169 13.4 E
SW corner	16 34.1 N	166 45.0 E

Table 1: *Bounding coordinates of the pink general operating area shown in Figure 1.*

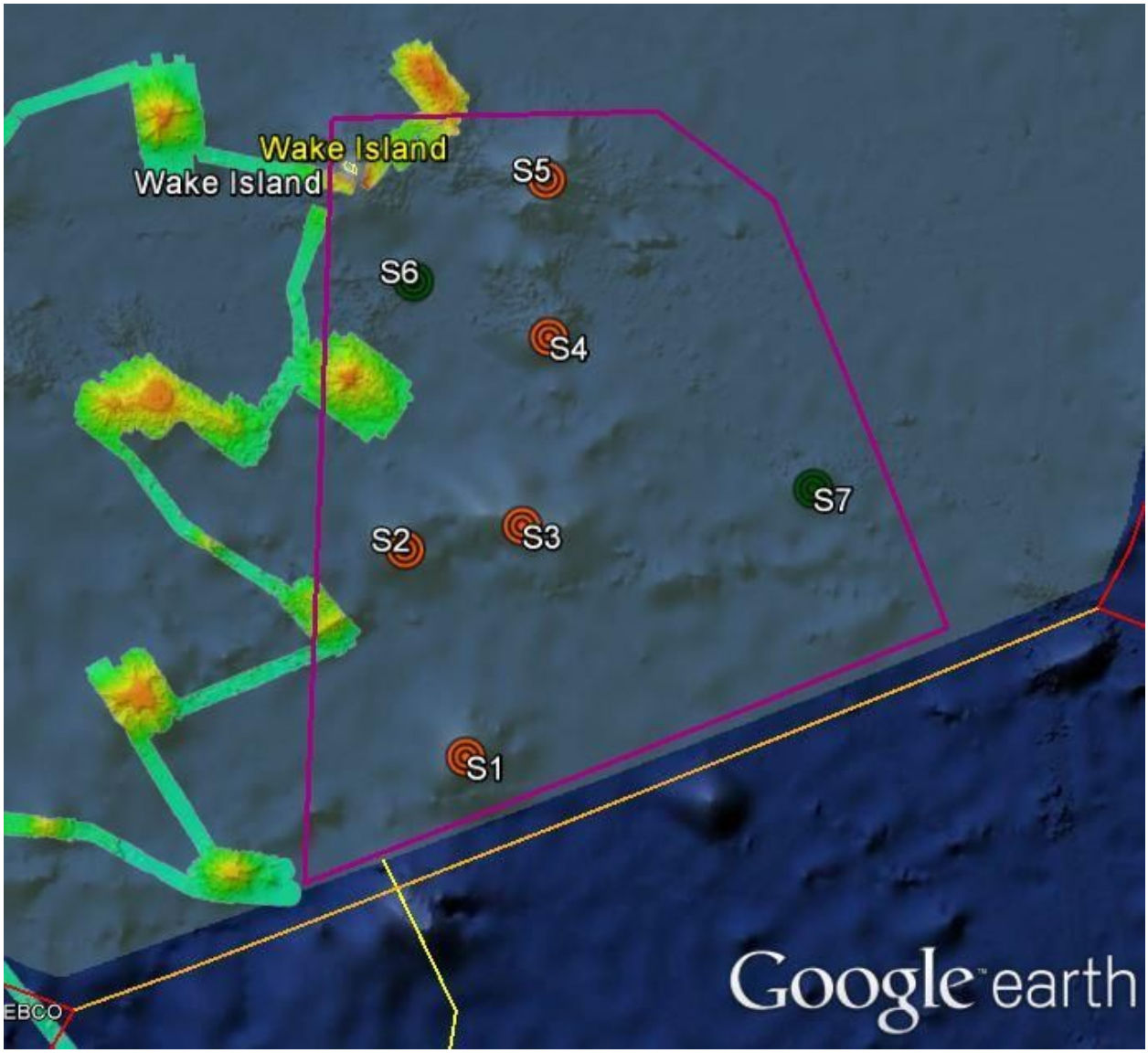

Figure 2:*Map indicating the locations of focused mapping operations for EX-16-07 the U.S. EEZ, the red polygon is the boundary of the Wake Island Unit of PRIMNM. The pink polygon is the focused seamount mapping area. Orange targets are first priority, larger seamounts (S1-S5), green targets are secondary priority, smaller seamounts (S6, S7). Background data layer shown is existing Okeanos bathymetry coverage collected during EX-16-04.*

Seamount Locations		
ID	**Latitude**	**Longitude**
Priority 1 Seamounts		
S1	17 6.996N	167 18.167E
S2	17 52.348N	166 59.143E
S3	18 0.163N	167 26.700E
S4	18 43.392N	167 29.415E
S5	19 19.118N	167 25.673E
Priority 2 Seamounts		
S6	18 53.016N	166 55.497E
S7	18 14.424N	168 36.965E

Detailed survey plans for Hypack and ECDIS for each focused seamount survey will be provided in advance of the cruise.

Tables of transit line coordinates will be provided as transit plans are finalized.

D. Summary of Objectives

August 25 - September 11 (Kwajalein, Marshall Islands to Honolulu, Hawaii)
Telepresence-enabled mapping operations

EX-16-07 operations will be focused primarily within the US EEZ, with transits occurring through international waters. This cruise will collect baseline data and information to support priority NOAA science and management needs.

Mission objectives for EX-16-07 include a combination of mapping/operational, science, education, outreach, and data management objectives:

1. Conduct 24 mapping operations for duration of the cruise
    a. Collect high resolution mapping data from sonars in priority areas as dictated by operational needs as well as science and management community needs
    b. Collect bathymetric, seafloor backscatter, and water column backscatter data
    c. Subbottom sonar 24 hour data collection will be at the discretion of the CO

d. Collect XBT casts at regular intervals no longer than 6 hours, as data quality requires, during mapping operations.
e. Average survey speeds of 8.5-9 kts will be utilized.
f. Onboard creation of daily standard mapping products.
g. Collection of sun photometer measurements as part of survey of opportunity.
h. Continue to test the integration of the new EK60 frequencies and the ADCPs.

2. Map previously unmapped seamount seamounts within Wake Island Unit of PRIMNM.
    a. Seven seamounts are proposed for focused mapping operations. They are listed S1 - S7 in this document, with S1 being the highest priority and S7 being the lowest. The higher priority seamounts are the larger, unmapped seamounts in the southeastern portion of Wake Island Unit of PRIMNM, and the lower priority seamounts are smaller.
    b. Characterization of seamounts within the Prime Crust Zone (PCZ). The PCZ is the area of the Pacific with the highest expected concentration of deep sea minerals, including rare metals and rare earth elements.
    c. Collect information on the geologic history of Central Pacific Seamounts, including those that are or may be relevant to our understanding of plate tectonics and subduction zone biology and geology.

3. Utilize transit from Kwajalein to the survey working grounds, and from the survey working grounds to Honolulu, to conduct exploratory mapping operations.
    a. Transit points will map significant geologic features, primarily seamounts and ridges, along a line not deviating far from the direct circle route.
    b. Average transit speeds of 10 - 10.5 kts will be utilized, however a more conservative 9-9.5 kts will be used for transit time calculation.

4. Telepresence enabled mapping operations (VSAT 10mbps ship to shore; 1.54 mbps shore to ship)
    a. Maintain two live video streams from ship to shore
        i. The primary stream will be the multibeam mapping display
        ii. The secondary stream will be the split EK60/Knudsen screen, Hypack line monitoring screen, or other relevant screens, including sonar processing computers or onboard video cameras as necessary.
    b. Hourly data transfer to shore to include all raw sonar files including multibeam (.all and .wcd) , spit beam, and subbottom.
    c. Daily transfer to shore of multibeam daily summary products

d. Explore telepresence enabled mapping possibilities for potential offering to individuals who may not have the ability to sail for a variety of reasons

5. Shoreside operation of sonar computers on the ship using desktop access through NOAA OMAO supplied laptop.
    a. Test telepresence mapping workflow with expedition coordinator based on shore (OER Physical Scientist at UNH)
    b. Provide training in operating sonar computers to onshore Explorers in Training
    c. Support onboard watchstanders by monitoring data collection from shore in realtime
    d. Provide data acquisition and processing troubleshooting from shore.

6. Science
    a. Acquire mapping data to support priority Monument and Sanctuaries science and management needs
    b. Collect mapping data to be used to generate baseline characterization maps to explore the diversity and distribution of benthic habitats –including bottom fish habitats, deep sea and precious coral communities, hydrothermal vent communities, mud volcanoes, trench and subduction zone habitats
    c. Collect acoustic mapping data at sites to aid the understanding of the geologic history of the Pacific seamounts
    d. Successfully conduct operations in conjunction with shore-based Exploration Command Centers and remote science team participants
    e. 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.

7. Conduct blue water SCUBA dive on the hull within two days of departing Kwajalein, depending on availability of dive chamber.

8. Conduct emergency drills. Drills may include some or all of the following as determined by CO:
    a. Fire/Damage Control
    b. Abandon Ship
    c. Man-Over-Board
    d. Steering Casualty
    e. Oil Spill/ Hazmat spill.

9. Conduct water column sound velocity profile measurements via XBT.
    a. Water column sound velocity casts will be collected at regular intervals of no more than 6 hours in support of multibeam sonar operations

10. Train onboard personnel in data collection and processing procedures as needed (continuous throughout cruise).
    a. Continue training of two onboard Explorers-in-Training who have each sailed with the ship earlier in the FY16 field season.

11. The longstanding NASA marine aerosols network survey of opportunity will continue for the cruise.

12. Data Management
    a. Provide a foundation of publicly accessible data and information products to spur further exploration, research, and management activities
    b. Provide daily products to shore for operational decision making purposes
    c. Ensure Underwater Cultural Heritage (UCH) data protection protocols are followed, if relevant

13. Outreach
    a. Basic live interactions may occur (TBD)

14. Education
    a. Host two EiTs onshore at the UNH CCOM/JHC
        i. Provide enhanced data processing training opportunities
    b. Host two at-sea EiTs on the ship
        i. Provide traditional offshore EiT experience including at-sea operations related to deep water sonar data acquisition and processing techniques

15. Ship
    a. Continue to refine SOPs for the New VSAT
    b. Provide high a high quality stable internet connection with the new VSAT.

E. Participating Institutions

- 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, Atlantic Hydrographic Branch, 439 W. York St., Bldg 2, Norfolk, VA 23510 USA
- University Corporation for Atmospheric Research Joint Office for Science Support (JOSS), PO Box 3000 Boulder, CO 80307 USA
- University of Hawai'i at 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
- NOAA National Marine Fisheries Service, Pacific Islands Regional Office, 1845 Wasp Blvd, Honolulu, HI 96818
- NOAA National Marine Fisheries Service,Marine National Monuments Program, 1845 Wasp Blvd, Honolulu, HI 96818
- NOAA National Marine Fisheries Service,Pacific Islands Fisheries Science Center, 1845 Wasp Blvd, Honolulu, HI 96818

F. Personnel(Mission Party)

Table 2:*Full list of shore based and sea going mission party members and their affiliations*

Name (First, Last)	Title	Location during cruise	Area of Interest		Affiliation	Nationality
Onshore Personnel						
Elizabeth 'Meme' Lobecker	Expedition Coordinator	University of New Hampshire	Mapping		NOAA OER (ERT, Inc.)	USA
Mashkoor Malik	Onshore Mapping Support	NOAA Silver Spring - OER	Mapping		NOAA OER	USA
Lindsay McKenna	Onshore Mapping Support	University of New Hampshire	Mapping		NOAA OER (ERT Inc.)	USA
Derek Sowers	Onshore	University of	Mapping		NOAA OER	USA

	Mapping Support	New Hampshire			(ERT Inc.)	
Caroline Cooper	Explorer in Training	University of New Hampshire	Marine Biology / Interdisciplinary		UCAR	USA
Chloe Baskin-Arboleda	Explorer in Training	University of New Hampshire	Oceanography		UCAR	USA
Name (First, Last)	**Title**	**Date Aboard**	**Date Disembark**	**Gender**	**Affiliation**	**Nationality**
Onboard Personnel						
Amanda Bittinger	Onboard Mapping Lead / Mapping Watch Lead	8/20	9/12	F	UCAR	USA
Daniel Freitas	Mapping Watch Lead	Already onboard from previous cruise	9/12	M	UCAR	USA
Annie Raymond	Mapping Watch Lead / Physical Scientist	8/20	9/12	F	NOAA OCS	USA
Megan Putts	Explorer in Training / Watch Stander	8/22	9/12	M	UCAR	USA
Calder Atta	Explorer in Training / Watch Stander	8/22	9/12	M	UCAR	USA

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 Telephone: (757) 441-6842 E-mail: Chiefops.MOA@noaa.gov

Mission Operations

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C: (714) 321-6084
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Onshore mapping support - NOAA Silver Spring

Lindsay McKenna
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Alan Leonardi, Director
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Phone: 301-734-1016/ Mobile: 202-631-1790
E-mail: alan.leonardi@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 Kwajalein should arrive at the following address prior to COB August 20, 2016.

Kwajalein Range Services, LLC
Shipping and Receiving
ATTN: NOAA Ship *Okeanos Explorer*/Operations Officer
993 Lagoon Rd
Kwajalein, MH 96555
(805) 355-2163

2. Diplomatic Clearances

This project involves Marine Scientific Research in waters under the jurisdiction of the Republic of the Marshall Islands. Diplomatic clearance has been approved under US Diplomatic Note 15-105 (Appendix E).

3. Licenses and Permits

The expedition is being planned and conducted by NOAA as an agency of the U.S. Federal government, in partnership with NOAA NMFS Pacific Islands Regional Office Marine National Monument Program. We do not require a permit to work in the PRIMNM.

In order to support or conduct Marine Scientific Research within the U.S. EEZ, work funded, authorized and/or conducted by NOAA must be compliant with the National Environmental Policy Act (NEPA). NOAA Administrative Order (NAO) 216-6 describes NOAA's specific obligations with regard to NEPA compliance. Among these is the need to review all NOAA-supported projects with respect to their environmental consequences. In compliance with NAO 216-6 and NEPA, a memorandum describing the project's scientific sensors' possible effects on the environment has been submitted for the project. As expected with ocean research with limited time or presence in the marine environment, the project has been determined to not have the potential to result in any lasting changes to the environment. 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 or with only short-term effects on the environment and for which any cumulative effects are negligible, and as such, the project is categorically excluded from the need to prepare a full-scale NEPA environmental assessment. The categorical exclusion met the requirements of NOA 216-6 and NEPA, and authorizes the Marine Scientific Research conducted for the project.

Additionally, informal consultation was initiated under Section 7 of the Endangered Species Act (ESA), requesting NOAA Fisheries' Protected Resources Division concurrence with our biological

evaluation determining that 2016 Marianas Expedition and all other planned *OkeanosExplorer* operations during the 2016-17 field season, may affect, but are not likely to adversely affect, ESA-listed marine species. The informal consultation was completed on February 3, 2016 when NOAA OER received a signed letter from the Regional Administrator of NMFS Pacific Islands Regional Office, stating that NMFS concurs with OER's determination that conducting proposed *Okeanos Explorer* cruises are not likely to adversely affect ESA-listed marine species.

The appendices of these project instructions contains all relevant documentation regarding licenses and permits, including categorical exclusion and ESA consultation.

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)

Date	Activities
8/22 & 8/23	Mission personnel arrive to ship in Kwajalein
8/24	Mission personnel safety training and mapping orientation
8/25	Depart Kwajalein for survey working grounds, commence exploration transit mapping immediately upon exiting port
8/25 - 8/28	Exploration mapping transit to working grounds@ 10 - 10.5 kts
8/28	Commence exploration mapping activities in priority mapping areas, speed: 8.5-9 kts
8/28 - 9/3	Continue exploration mapping activities in priority mapping areas, speed: 8.5-9 kts
9/3	Commence transit exploration mapping to Honolulu, HI @ 10-10.5 kts
9/11	Arrive in port, Honolulu, HI
9/12	Mission personnel depart from Honolulu, HI

Table 4: *Detailed Cruise Itinerary*

This is an approximate itinerary and is subject to change.

B. Staging and Destaging

Not applicable.

C. Operations to be Conducted

1. **Telepresence / Outreach Events**

a. Two live video feeds will be used throughout the cruise to provide situational awareness for onshore personnel, including the mapping lead and Explorers-In-Training.
b. Telepresence interactions will not be scheduled for specific times, but are expected to occur throughout the cruise between onshore personnel at the UNH ECC and onboard mapping watchstanders.

2. In-Port Events

a. None scheduled.

D. SCUBA Dive Plan

All dives are to be conducted in accordance with the requirements and regulations of the NOAA Diving Program and require the approval of the ship's Commanding Officer. One blue water SCUBA dive is planned by ship's divers to inspect the hull, within two days of leaving port.

E. Applicable Restrictions

Sonar Operations

EM 302, EK 60, ADCP, 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 as described in appendices of this document. 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 EK60DeepwaterEchosounders and GPTs (18, 70, 120, 200 kHz)
- Knudsen Chirp 3260 Sub-bottom profiler (SBP)
- Teledyne RDI Workhorse Mariner (300 kHz) ADCP
- Teledyne RDI Ocean Surveyor (38 kHz) ADCP
- Teledyne UnderwayCTD
- 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; 2 Mbps shore to ship)
- Cruise Information Management System (CIMS)
- Three VoIP telephone lines

B. Equipment and capabilities provided by the scientists

- Microtops II Ozone Monitor Sunphotometer and handheld GPS required for NASA Marine Aerosols Network supplementary project.

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	Approx. 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 mMTris 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

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 (as time allows) 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 expedition coordinator. 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 F 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

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 B for detailed data management plans.

Deliverables

1. At sea
    a. Daily plans of the Day (POD)
    b. Daily situation reports (SITREPS)
    c. Daily summary bathymetry data files
    d. Raw sonar files (EM 302, EK 60, Subbottom, ADCP)
    e. Refined SOPs for all pertinent operational activities
    f. Assessments of all activities
2. Science
    a. Multibeam raw and processed data (see appendix B for the formal cruise data management plan)
    b. XBT raw and processed data
    c. EK 60 raw data
    d. Knudsen 3260 sub-bottom profiler raw data
    e. ADCP raw data
    f. Mapping data 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

A. 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.

1. 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.

2. 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.

3. 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.

4. 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.htmland 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.govemail 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 A.

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 15Mbps will be paid by OER and provided by OMAO.

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
*OkeanosExplorer*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:
(541) 867-8932
(541) 867-8933
(541) 867-8934

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

E-mail: 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

Not applicable to this cruise.

Appendix A

EMERGENCY CONTACT DATA SHEET–NOAA SHIP*OKEANOS EXPLORER*

Scientists sailing aboard *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

Appendix B: Data Management Plan

Data Management Plan
Okeanos Explorer (EX1607): CAPSTONE Wake Island
PRI MNM (Mapping)

OER Data Management Objectives
While the mapping operations themselves will be handled via telepresence, the data pipelines will be managed according to normal standard operating procedures.

1. General Description of Data to be Managed

1.1 Name and Purpose of the Data Collection Project

Okeanos Explorer (EX1607): CAPSTONE Wake Island PRI MNM (Mapping)

1.2 Summary description of the data to be collected.

Operations will include 24 hour/day mapping operations using the ship's deep water mapping systems (Kongsberg EM302 multibeam sonar, EK60 split-beam fisheries sonars, ADCPs, and Knudsen 3260 chirp sub-bottom profiler sonar), CTD rosette, and the ship's high-bandwidth satellite connection for real-time ship to shore communications. Operations for this cruise will include 24 hour mapping, and continuous telepresence-based remote participation in mapping operations. Multibeam and singlebeam mapping operations will be conducted 24 hours a day throughout the cruise. Sub-bottom profile mapping will be conducted 24 hours a day at the discretion of the CO. XBT sound velocity casts in support of multibeam sonar mapping operations will be conducted at an interval defined by prevailing oceanographic conditions, but not to exceed 6 hours.

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

SCS, single beam sonar, singlebeam sonar, single-beam sonar, sub-bottom profile, water column backscatter, 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

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

Okeanos Mapping Cruises

1.5 Planned or actual temporal coverage of the data.

Dates: 8/25/2016 to 9/11/2016

1.6 Planned or actual geographic coverage of the data.

Latitude Boundaries:	16.56	to	19.72
Longitude Boundaries:	166.38	to	169.75

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

Mapping Summary, Multibeam (image), Multibeam (processed), Multibeam (product), Multibeam (raw), SCS Output (compressed), SCS Output (native), Water Column Backscatter, XBT (raw), Cruise Plan, Cruise Summary, Data Management Plan, Highlight Images, Quick Look Report, ADCP, CTD (processed), CTD (raw), EK60

Singlebeam Data, Expedition Cruise Report, GSF, HDCS

1.8 What platforms will be employed during this mission?

NOAA Ship Okeanos Explorer

2. Point of Contact for this Data Producing Project

Overall POC:	Elizabeth Lobecker, Multibeam Mapping Expert, Contractor (ERT, Inc.), NOAA Office of Ocean Exploration and Research, elizabeth.lobecker@noaa.gov
Title:	Expedition Coordinator
Affiliation/Dept:	NOAA OER
E-Mail:	elizabeth.lobecker@noaa.gov
Phone:	603-862-1475

3. Point of Contact for Managing the Data

Data POC Name:	Susan Gottfried, Andrew O'Brien
Title:	stewardship data manager, shoreside/onboard data manager
E-Mail:	susan.gottfried@noaa.gov, andrew.parson.obrien@gmail.com

4. Resources

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

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?

SCS data shall be delivered in its native format as well as an archive-ready, documented, and compressed NetCDF3 format to NCEI-MD; multibeam data and metadata will be compressed and delivered in a bagit format to NCEI-CO

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. CTDs are post-processed by the data management team as a quality control measure and customized CTD profiles are generated for display on the Okeanos Atlas (explore.noaa.gov/okeanosatlas).

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 and published in an OER catalog and Web Accessible Folder (WAF) hosted at NCEI-MS for public discovery and access. The record will be harvested by data.gov.
URL:	www.ncddc.noaa.gov/oer-waf/ISO/Resolved/2016/
Meta Std:	ISO 19115-2 Geographic Information with Extensions for Imagery and Gridded Data will be the metadata standard employed; a NetCDF3 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 will not be available to the public, or with limitations, provide a valid reason.

Not Applicable

7.1.2 If there are limitations, describe how data are protected from unauthorized access.

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.

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

Org:	National Centers for Environmental Information
URL:	explore.noaa.gov/digitalatlas

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

Hold Time:	no, data from the Okeanos Explorer is immediately publicly accessible unless protected under the Historic Preservation Act
Authority:	not applicable

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 Centers for Environmental Information. Refer to the Okeanos Explorer FY16 Data Management Plan at NOAA's EDMC DMP Repository (EX_FY16_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.

30-90 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.

Appendix C: 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

July 19, 2016

MEMORANDUM FOR: The Record

FROM: John J. McDonough, Deputy Director
Office of Ocean Exploration & Research (OER)

MCDONOUGH.JOHN.J.III.1365836678 Digitally signed by MCDONOUGH.JOHN.J.III.1365836678 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=OTHER, cn=MCDONOUGH.JOHN.J.III.1365836678 Date: 2016.08.04 12:45:16 -04'00'

SUBJECT: NEPA Categorical Exclusion for NOAA Ship *Okeanos Explorer* Cruise EX-16-07

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 and water column profiling using CTD, XBT, and Underway CTD casts designed to increase knowledge of the marine environment. This Categorical Exclusion addresses NOAA Ship *Okeanos Explorer* cruise EX-16-07 "CAPSTONE Wake Island PRIMNM (Mapping)" led by Elizabeth Lobecker, Expedition Coordinator for NOAA OER.

This cruise will be conducted from August 25, 2016 to September 11, 2016. This is an exploratory mapping expedition departing from Kwajalein Atoll in the Marshall Islands, conducting focused ocean mapping operations within the Wake Island Unit of the Pacific Remote Islands Marine National Monument (PRIMNM), and returning to port in Honolulu, Hawaii. This expedition is part of the multi-year Campaign to Address Pacific monument Science, Technology, and Ocean NEeds (CAPSTONE). NOAA priorities for the CAPSTONE campaign include a combination of science, education, outreach, and open data objectives that will support management decisions at multiple levels. Originally created by Presidential Proclamation 8336 of January 6, 2009, PRIMNM boundaries were expanded by Presidential Proclamation 9173, dated September 29, 2014. EX-16-07 focuses on ocean mapping of the Wake Island unit of PRIMNM for exploratory baseline characterization. The Wake Island Unit of PRIMNM contains 406,307 km^2 of ocean area within the US Exclusive Economic Zone. Very little multibeam sonar data exists in this region, and this cruise will therefore be the most ambitious effort to date to explore this very large US marine protected area.

NOAA Ship *Okeanos Explorer* will conduct sonar mapping operations at all times during the cruise. The Kongsberg EM 302 multibeam sonar (30 kHz), Kongsberg EK 60 singlebeam sonars (18, 38, 70, 120, 200 kHz), Knudsen 3260 Sub-Bottom Profiler sonar (3.5 kHz), and Teledyne RDI Workhorse Mariner (300 kHz) and an Ocean Surveyor (38 kHz) Acoustic Doppler Current Profilers (ADCPs) will be operated during the project. Additionally, expendable bathythermographs (XBTs), and potentially CTD rosette casts will be conducted in conjunction

with multibeam data collection. Mapping operations will be conducted continuously throughout the cruise, weather permitting.

Mapping Methods

The acquisition of high-resolution seafloor mapping data is an essential precursor to making significant biological, geological, archaeological and oceanographic discoveries. The *Okeanos Explorer* cruise will collect seafloor mapping data to supplement previous multibeam mapping in the region. NOAA Ship *Okeanos Explorer* can run several scientific sonars simultaneously without interference: the 30 kHz EM 302 multibeam, EK60 split-beam sonars (18, 70, 120, 200 kHz frequencies), and the 3.5 kHz sub-bottom profiler (Knudsen Chirp 3260). Sonar operations with all of these systems running simultaneously are planned to occur continuously throughout the day and night during the cruise except right when leaving and entering ports. 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 will 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 about the seafloor and water column within the poorly mapped Wake Island Unit of PRIMNM as well as transit areas that have never been previously mapped with multibeam sonar. At the successful completion of this cruise, in conjunction with sonar data collected earlier this year during Okeanos cruise EX-16-04, nearly all seamounts within the Wake Island Unit will be mapped. The data collected will help scientists better understand the marine geology and habitat characteristics of this region of the ocean, allowing for improved prioritization of future exploration and research.

Expendable bathythermographs (XBT):

XBTs are deployed to obtain sound velocity profiles. The profiles are required to calibrate the multibeam system and ensure accurate bathymetric mapping. Water column sound velocity profiles are required every 4-6 hours and will be conducted using XBTs. 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 low 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.

Split Beam Sonars:

Kongsberg EK 60 split-beam sonars are 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 estimate gaseous seep flux rates and improve assessments of their contribution to ocean and atmospheric chemistry. The *Okeanos Explorer* has five operational EK60 transducers at the following frequencies: 18 kHz, 38 kHz, 70 kHz, 120 kHz, and 200 kHz. One or more of these sonars will be operated during the majority of the cruise.

Sub Bottom Profiler:
The primary purpose of the 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.

CTD Operations
The CTD instrument package 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). CTD casts are not currently planned as part of this cruise, but may be conducted in order to obtain sound velocity profiles of the water column in the event that the XBT system falters. The CTD would not touch the seafloor and would have limited time and presence in the marine environment.

Effects of the Project
The methods used to map the ocean during this cruise are used routinely by NOAA and UNOLS research vessels and are non-destructive in nature. 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.

This expedition will provide data and information on poorly understood deep water features contained within both the U.S. Exclusive Economic Zone (EEZ) and in international waters. This work will provide essential information for further research, exploration, conservation and management of marine habitats. Providing the United States with scientifically credible and quality-controlled oceanographic data is a key benefit that will result from the cruise.

Categorical Exclusion
This project, given its limited size, scope, magnitude and focus on mapping, is in alignment with the list of activities described in NOAA Administrative Order Series 216-6, May 20, 1999 (NAO) Section 6.03c.3(a)&(d). These listed activities do not normally have the potential for significant impact on the environment and, therefore, are excluded from preparation of an environmental

assessment or environmental impact statement:

6.03c.3(a) Research Programs. Programs or projects, of limited size and magnitude or with only short-term effects on the environment and for which any cumulative effects, are negligible. Examples include natural resource inventories and environmental monitoring programs conducted with a variety of gear (satellite and ground-based sensors, fish nets, etc.) in water, air, or land environs. Such projects may be conducted in a wide geographic area without need for an environmental document provided related environmental consequences are limited or short-term.

6.03c.3(d) Administrative or Routine Program Functions. These include program planning and budgeting; strategic planning and operational planning; mapping, charting, and surveying services; ship support; ship and aircraft operations; fishery financial support services; grants for fishery data collection activities; basic and applied research and research grants, except as provided in Section 6.03b of this Order; enforcement operations; basic environmental services and monitoring; environmental satellite services; environmental data and information services; executive direction; and administrative services.

The project also does not trigger most of the extraordinary circumstances listed in Section 5.05c of the NAO and described below:

- The activity is the subject of controversy based on potential environmental consequences.
- The activity poses uncertain environmental impacts or unique or unknown risks.
- The activity establishes a precedent or decision in principle about future proposals.
- The activity may result in cumulatively significant impacts.
- The activity may have adverse effects upon endangered or threatened species and/or their habitats.

As such, this project is categorically excluded from the need to prepare a full-scale NEPA environmental assessment. In sum, this project will not result in any lasting changes to the environment. It will have, at most, short-term environmental effects for which any direct or cumulative consequences are negligible and requires no further evaluation pursuant to NEPA.

In fact, the potential gains or beneficial effects of this project are likely to outweigh any potential adverse effects. The high-resolution seafloor maps to be produced will provide a valuable guide for planning future exploration and research expeditions. They will undoubtedly greatly improve the archive of understanding that we have about the Central Pacific. All collected data will be available in NOAA's public data archives within 30-90 days of the conclusion of the cruise and will be accessible via the NOAA Office of Ocean Exploration (OER) and Research's Digital Atlas and NOAA's National Geophysical Data Center.

Appendix D: ESA Section 7 Initiation Letter, Biological Evaluation and Letter of Concurrence

January 14, 2016

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 continue the CAPSTONE campaign into the Central and Western Pacific during the 2016 and 2017 field seasons. The action area for the 2016 – 2017 season will include the marine environments in and around: the Papahānaumokuākea Marine National Monument (PMNM); Oahu and the big island of Hawai'i; the area south and west of Molokai, Lana'i, and Kaho'olawe, the Geologists Seamounts located about 100 nm south of Honolulu; the Musicians Seamounts located about 150 nm NNE of Nihoa Island; all of the Pacific Remote Island Areas composing the Pacific Remote Islands Marine National Monument (PRIMNM); the Commonwealth of the Northern Marianas Islands (CNMI) and the Marianas Trench Marine National Monument (MTMNM); the vicinity of American Samoa and the National Marine Sanctuary of American Samoa (NMSAS); the Rose Atoll Marine National Monument (RAMNM); and the vessel transit areas between Honolulu, Hawai'i, Guam, Saipan, Kwajalein, Pago Pago.

The activity would occur during two years and could include up to twenty different research cruises aboard the NOAA Ship *Okeanos Explorer* scheduled between February 2016 and December 2017. All cruises will focus on collecting critical baseline information in monuments and sanctuaries to meet NOAA science and management needs. The overarching goal of the project is to extend and improve the understanding of the distribution and diversity of deep-water habitats within the marine protected areas in the Pacific. Data and information from the cruises will build on previous work where appropriate, 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, Indonesia, and Hawaii, 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. No activities would occur on land. The expedition teams (26 crew and up to 20 rotating scientists/technicians on each cruise leg) would be authorized to conduct mapping and ROV surveys using the *Okeanos Explorer's* multibeam, split beam, subbottom profiler and acoustic Doppler current profiler (ADCP) sonar systems, utilizing the ship's conductivity-temperature-depth (CTD) sampling rosette for various water measurements 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 2016 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*), Hawaiian monk seal critical habitat; and the coral species *Acropora globiceps, A. jacquelineae, A. retusa, A. speciosa, Euphyllia paradivisa, Isopora crateriformis,* and *Seriatopora aculeata.*

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,

by Path
For John McDaugh

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

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

Dear Mr. McDonough:

This letter responds to your January 14, 2016 Request for Consultation by the Office of Exploration and Research (OER) regarding efforts aboard the NOAA vessel *Okeanos Explorer* with the proposed action consisting of activities to explore and improve understanding of the distribution and diversity of deep water habitats in the Pacific, and in particular in the Marine National Monuments. 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 and Central Pacific distinct population segment of the scalloped hammerhead shark, Hawaiian monk seals; and the coral species *Acropora globiceps, A. jacquelineae, A. retusa, A. speciosa, Euphyllia paradivisa, Isopora crateriformis,* and *Seriatopora aculeata.*

Proposed Action/Action Area: The proposed activity is more fully described in your request for consultation and the associated biological evaluation (CAPSTONE 2016). The proposed action (Okeanos Explorer cruises) includes the use of various ship and submersible-deployed electronic systems to collect data on the distribution and diversity of deep water habitats in the Marine National Monuments. The activity would occur during two years with up to 20 research cruises scheduled between February 2016 and December 2017. The expedition teams (26 crew and up to 20 rotating scientists and/or technicians on each cruise leg) would be authorized to conduct mapping and Remotely Operated Vehicle (ROV) surveys using the Okeanos Explorer's multibeam, split beam, subbottom profiler and acoustic Doppler current profiler (ADCP) sonar systems, utilizing the ship's conductivity-temperature-depth (CTD) sampling rosette for various water measurements and deploying an ROV. No activities are scheduled to occur on land.

The suite of sonars aboard the vessel includes a Kongsberg EM302 30 kHz multibeam system, which collect bathymetry and backscatter data; several Simrad EK 60 split-beam sonars that

range from 18 to 333 kHz which are designed to gather measurements of biological and gaseous targets in the water column; and a Knudsen 3.5 kHz chirp sub-bottom profiler. The 300 kHz and 38 kHz ADCPs provide information about current velocity and direction at various depths. Sonar mapping activities will be conducted throughout the proposed action area and during transits to and from sites where operations will be conducted in an effort to fill in gaps in data knowledge and to build on data already collected. The maps generated from these activities will improve understanding of the geology and important biological habitats in the project area.

Conductivity, temperature and depth data will be collected by both an Underway CTD and a CTD rosette instrument. The CTD rosette, which is deployed while the ship is stopped and holding dynamic position, is lowered by a winch and wire to a maximum depth of 6800 m to collect water samples through 24 2.5 L niskin bottles. The CTD rosette will be deployed at select sites where ROV operations are conducted to allow for an improved understanding of the environmental conditions at that particular site. The deployment and retrieval of the CTD rosette takes up to several hours (depending on depth), while the Underway CTD can be deployed while the ship is moving, saving hours of time and fuel. The instrument is mounted on the stern railing and outfitted with a re-useable probe that is deployed and retrieved through the use of motorized spool. The Underway CTD will be used to collect water column profiles to a maximum depth of 700 m.

ROV operations will be designed to provide interdisciplinary site characterization at priority targets in and around monuments, sanctuaries and protected areas, through visual observation of priority targets while acquiring environmental data with onboard sensors. Sampling will be focused on corals and sponges, but will target specimens believed to be new species or new records for an area. No ESA-listed corals would be sampled. As many as 200 deployments of the ROV may occur during the 2016 – 17 field season resulting in 1600 hours of total dive time. The dives will better enable scientists and managers to understand the diversity and distribution of deep water habitats.

The action area covered by the accompanying biological evaluation encompasses the marine environments of Papahānaumokuākea Marine National Monument (PMNM); Oahu and the big island of Hawai'i; the area south and west of Molokai, Lana'i, and Kaho'olawe, the Geologists Seamounts located about 100 nm south of Honolulu; the Musicians Seamounts located about 150 nm NNE of Nihoa Island; all of the Pacific Remote Island Areas composing the Pacific Remote Islands Marine National Monument (PRIMNM); the Commonwealth of the Northern Marianas Islands (CNMI) and the Marianas Trench Marine National Monument (MTMNM); the vicinity of American Samoa and the National Marine Sanctuary of American Samoa (NMSAS); the Rose Atoll Marine National Monument (RAMNM); and the vessel transit areas between Honolulu, Hawai'i, Guam, Saipan, Kwajalein, Pago Pago where ESA-listed marine species or their habitats may be impacted by the proposed activities.

Species That May Be Affected: OER 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 and Central Pacific distinct population segments of the scalloped hammerhead shark (*Sphryna lewini*), Hawaiian monk seals (*Neomonachus schauinslandi*), Hawaiian monk seal critical habitat and the coral species *Acropora globiceps, A. jacquelineae, A. retusa, A. speciosa, Euphyllia paradivisa, Isopora crateriformis,* and *Seriatopora aculeata*. 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 more information on listed corals can be found at http://www.fpir.noaa.gov/PRD/prd_coral.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 (53 FR 18988) and again on August 21, 2015 (80 FR 50926). Designated critical habitat includes all beach areas, lagoon waters, and ocean waters out to a depth of 200 m 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, and includes the seafloor and all subsurface waters and habitat within 10 meters of the seafloor. Around the Main Hawaiian Islands, critical habitat extends in designated areas from the beach out to the 200 meter depth contour, and includes the seafloor and subsurface waters within 10 meters of the seafloor.

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, sharks and corals; 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 for marine mammals, turtles, sharks and the listed coral species in the action area is discountable;
- the risk of entanglement with marine mammals, sea turtles and sharks is discountable; and,
- ESA-listed species in the action area are unlikely to respond to anticipated elevated noise levels, disturbance from human activity, and exposure to wastes and discharges. Further, if any 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, have insignificant effects.

Conclusion: NMFS concurs with your determination that conducting the proposed Okeanos Explorer cruises are not likely to adversely affect ESA-listed marine species. 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

Appendix E: Diplomatic Note No. 15-105

REPUBLIC OF THE MARSHALL ISLANDS
MINISTRY OF FOREIGN AFFAIRS
P.O. BOX 1349
MAJURO, MARSHALL ISLANDS 96960

US/98-15

The Ministry of Foreign Affairs of the Republic of the Marshall Islands presents its compliments to the Embassy of the United States of America and has the honor to make reference to U.S. ***Diplomatic Note No.15-105*** regarding request for an authorization for NOAA Chief of Scientist Jeremy Potter to conduct marine scientific research in area requiring the consent from the RMI Government. It is in this regard that the Ministry has the further honor to inform the Embassy that in compliance with the requirements of the MIMRA Act 1997, NOAA Research Vessel, "Okeanos Explorer", has been granted permission, on the condition that a copy of report of all data and other information from the research vessel in RMI WATERS be forwarded to the Ministry of Foreign Affairs and the Marshall Islands Resource Authority.

The Ministry has the further honor to advise that authorization is granted pursuant with the understanding that the said vessel, captain and crew will comply with all RMI laws and regulations, and in particular the Marine Water Quality (1992) regulations, Solid Waste (1989) regulations, and Toilet Facilities and Sewage Disposal (1990) regulations, copies of which are available for download at the RMI-EPA website http://rmiepa.org.

Furthermore, the Ministry wishes to forward herein, RMI's nominees from Marshall Islands Marine Resources Authority to participate in afore-named research.

Ms. Candice M. Guavis
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The Ministry of Foreign Affairs of the Republic of the Marshall Islands avails itself of this opportunity to renew to the Embassy of the United States of America the assurance of its highest consideration.

18 December, 2015

MINISTRY OF FOREIGN AFFAIRS

Embassy of the United States of America
Majuro, REPUBLIC OF THE MARSHALL ISLANDS

Appendix F: NASA Maritime Aerosols Network Survey of Opportunity

Survey or Project Name

Maritime Aerosol Network

Lead POC or Principle Investigator (PI & Affiliation)

POC: Dr. Alexander Smirnov

Supporting Team Members Ashore

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.