



**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

September 12, 2018

MEMORANDUM FOR: Commander Eric Johnson  
Commanding Officer, NOAA Ship *Okeanos Explorer*

FROM: Captain David Zezula, NOAA  
Commanding Officer, NOAA Marine Operations Center-Atlantic

SUBJECT: Project Instruction for EX-18-10  
ASPIRE to Map the Extended Continental Shelf

Attached is the final project instruction for EX-18-10, ASPIRE to Map the Extended Continental Shelf, which is scheduled aboard NOAA Ship *Okeanos Explorer* during the period of October 3 to October 24, 2018. Of the 22 DAS scheduled for this project, 22 days are funded by a Line Office Allocation. This project is estimated to exhibit a medium operational tempo. Please acknowledge receipt of these instructions via e-mail to [deputyops.moa@noaa.gov](mailto:deputyops.moa@noaa.gov) and [chiefops.moa@noaa.gov](mailto:chiefops.moa@noaa.gov) at Marine Operations Center-Atlantic.





# Final Project Instructions

Date Submitted:

Platform: NOAA Ship *Okeanos Explorer*

Project Number: EX-18-10

Project Title: ASPIRE to Map the Extended Continental Shelf

Project Dates: October 3, 2018 to October 24, 2018

Prepared by:

Michael P. White, NOAA  
Expedition Coordinator  
Office of Ocean Exploration and Research

Dated: Michael White  
Digitally signed by Michael White  
DN: cn=Michael White,  
o=NOAA/ERT, ou=OER,  
email=michael.white@noaa.  
gov, c=US  
Date: 2018.09.11 11:40:41  
-0400

Approved by:

Craig Russell, NOAA  
Program Manager  
Office of Ocean Exploration and Research

Dated: 9/11/2018

Approved by:

Captain David Zezula, NOAA  
Commanding Officer  
Marine Operations Center, Atlantic

Dated: \_\_\_\_\_

# I. Overview

“America’s future depends on understanding the ocean. We explore the ocean because its health and resilience are vital to our economy and to our lives. We depend on the ocean to regulate weather and climate; sustain a diversity of life; for maritime shipping and national defense; and for food, energy, medicine, and other essential services to humankind.”

- NOAA Office of Ocean Exploration and Research Strategic Plan

## A. Brief Summary and Project Period

This document contains project instructions for EX-18-10. Operations for this cruise will be conducted 24 hours/day and consist of telepresence enabled seafloor mapping operations. The expedition will commence on October 3, 2018 in Davisville, Rhode Island and conclude on October 24, 2018 in San Juan, Puerto Rico. Operations will include the use of the ship’s deep water mapping systems (Kongsberg EM302 multibeam sonar, EK60 split-beam fisheries sonars, Knudsen 3260 chirp sub-bottom profiler sonar, and Teledyne Acoustic Doppler Current Profiler), XBT and CTD casts in support of multibeam sonar mapping operations, and the ship’s high-bandwidth satellite connection for real-time ship-to-shore communications. Operations are planned south east of Bermuda in the high seas.

NOAA’s Office of Ocean Exploration and Research (OER) is the only federal organization dedicated to exploring the global ocean. OER works with partners to identify priority areas for exploration; support innovations in exploration tools and capabilities; and encourage the next generation of ocean explorers, scientists, and engineers to pursue careers in ocean exploration and related fields. The data and information collected during our expeditions and the research we fund gives resource managers, the academic community, and the private sector the information they need to identify, understand, and manage ocean resources for this and future generations of Americans.

NOAA Ship *Okeanos Explorer* is the only U.S. federal vessel dedicated to exploring our largely unknown ocean for the purpose of discovery and the advancement of knowledge. America’s future depends on understanding the ocean. We explore the ocean to make valuable scientific, economic, and cultural discoveries; we explore because ocean health and resilience are vital to our economy and to our lives. Exploration supports NOAA

mission priorities and national objectives by providing high-quality scientific information about the deep ocean to anyone who needs it.

In close collaboration with government agencies, academic institutions, and other partners, OER conducts deep-ocean expeditions using advanced technologies on the *Okeanos Explorer*. From mapping and characterizing previously unseen seafloor to collecting and disseminating information about ocean depths, this work helps to establish a foundation of information and to fill data gaps. Data collected on the ship follow federal open-access data standards and are publicly available shortly after an expedition ends. This ensures the delivery of reliable scientific data needed to identify, understand, and manage key elements of the ocean environment.

EX-18-10, from October 3 to October 24, will focus exploratory mapping operations in three adjacent priority areas east of the Blake Plateau, northeast of the Bahamas. These areas were designated as high priority areas by the U.S. Extended Continental Shelf (ECS) Project Office. These areas contain some publicly available transect multibeam bathymetric data. However, more complete coverage is required to meet the U.S. ECS Project and boundary negotiation (with The Bahamas) objectives. Exploration mapping operations will prioritize subsets of these priority areas that do not have any modern sonar data.

## B. Days at Sea (DAS)

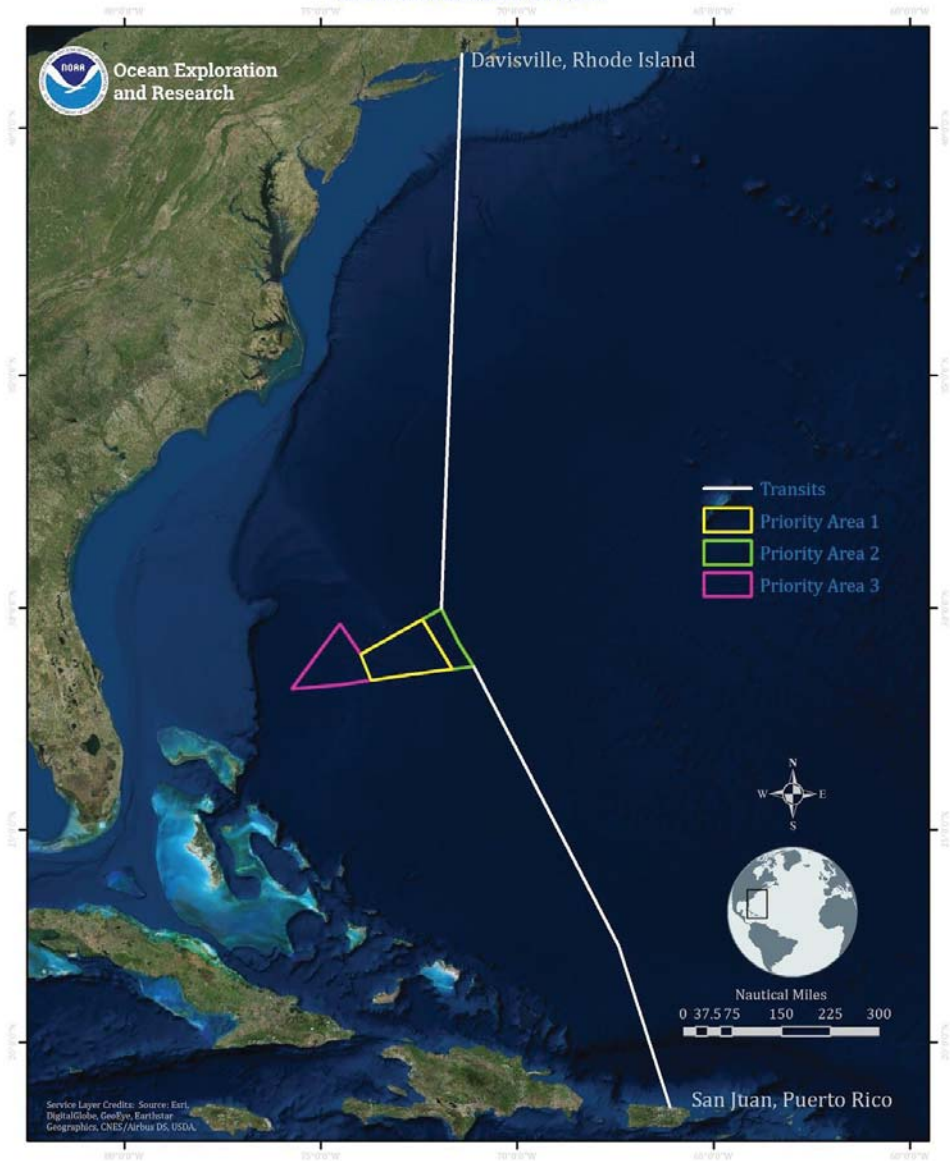
Of the 22 DAS scheduled for this project, 12 DAS are funded by OAR and 10 DAS are funded by the Office of Coast Survey. This project is estimated to exhibit a Medium Operational Tempo due to 24-hour operations consisting of 24-hour-per-day mapping and telepresence operations.

## C. Operating Area

EX-18-10 is a 24-hour mapping cruise that will focus operations in a survey area southeast of the U.S., in Bahamian and international waters.

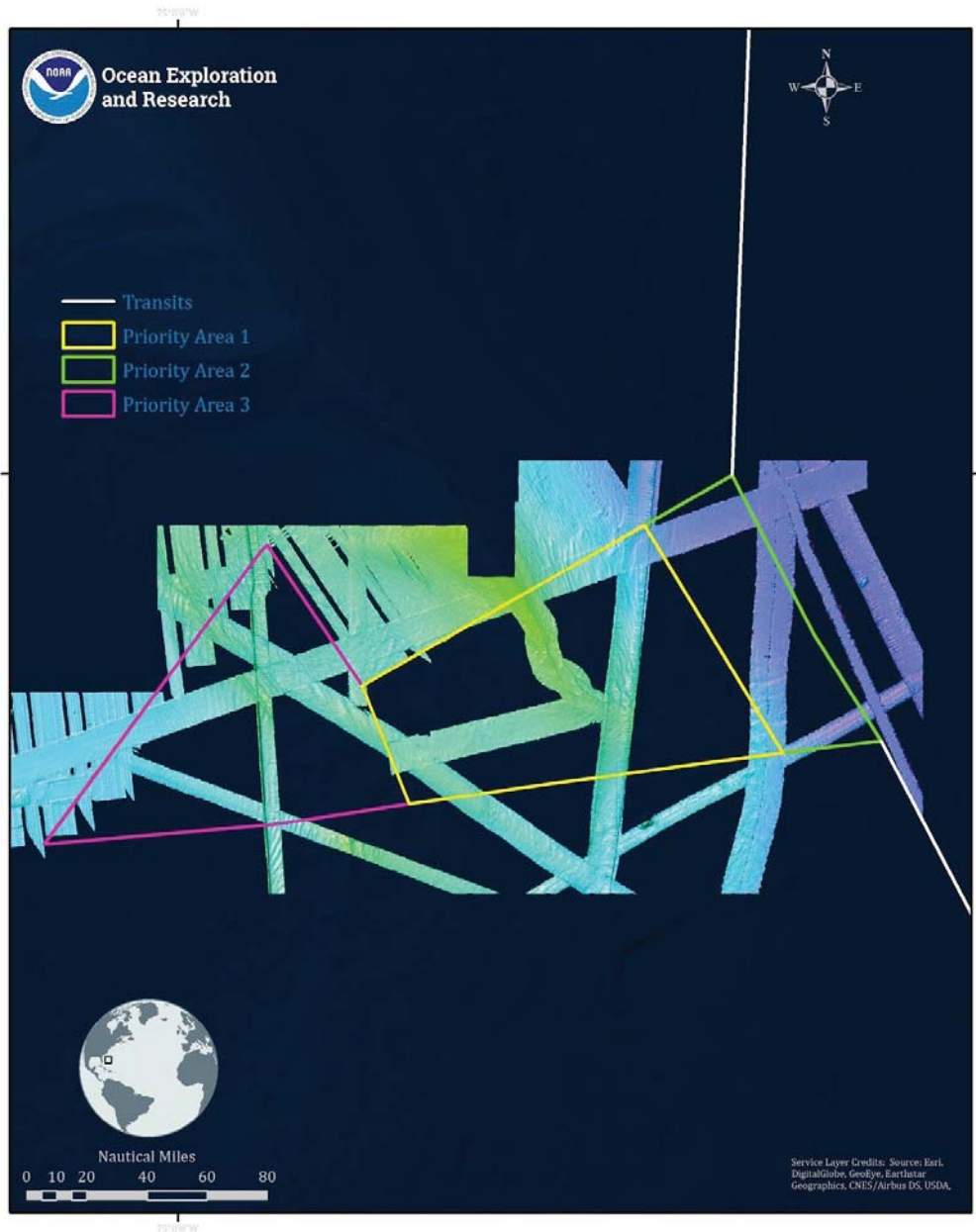
In the map below, the yellow polygon indicates the overall area of mapping operations. This area will be refined prior to the cruise, and will likely be focused on the northern and eastern sections.

## EX-18-10: ASPIRE to Map the Extended Continental Shelf



**Figure 1:** Overview map of EX-18-10. White lines represent ship mapping transits. Yellow, green and purple polygons are priority areas one, two and three respectively.

## EX-18-10: Existing Bathymetric Data from NCEI



**Figure 1:** Overview map of EX-18-10. Rainbow colored images represent bathymetric coverage in the area from publicly accessible data archived at NCEI. White lines represent ship mapping transits. Yellow, green and purple polygons are priority areas one, two and three respectively.

EX1810 Transit Coordinates		
Location	Latitude	Longitude
Depart Narragansett Bay, Rhode Island	41° 25.580' N	71° 24.725' W
Arrive Survey Area	29° 59.637' N	71° 56.088' W
Depart Survey Area	28° 42.519' N	71° 6.675' W
Transit	22° 17.242' N	67° 25.236' W
Arrive San Juan, Puerto Rico	18° 26.184' N	66° 6.548' W

**Table 1:** Latitude and Longitude in Degrees Decimal Minutes of currently planned EX1810 Transits.

EX1810 Priority Area 1		
Vertice	Latitude	Longitude
1	28° 58.698' N	073° 58.920' W
2	29° 45.204' N	072° 25.230' W
3	28° 38.964' N	071° 39.286' W
4	28° 36.222' N	072° 03.510' W
5	28° 32.976' N	072° 31.178' W
6	28° 31.5480' N	072° 43.005' W
7	28° 30.270' N	072° 53.525' W
8	28° 28.512' N	073° 07.693' W
9	28° 27.174' N	073° 18.328' W
10	28° 24.744' N	073° 37.305' W
11	28° 24.018' N	073° 43.284' W
12	28° 58.698' N	073° 58.920' W





**Table 2:** Latitude and longitude in degrees decimal minutes of the bounding coordinates of Priority Area 1.

EX1810 Priority Area 2		
Vertice	Latitude	Longitude
1	29° 45.189' N	72° 25.184' W
2	29° 59.652' N	71° 56.092' W
3	29° 13.630' N	71° 29.016' W
4	28° 42.522' N	71° 6.697' W
5	28° 38.980' N	71° 39.324' W

**Table 3:** Latitude and longitude in degrees decimal minutes of the bounding coordinates of Priority Area 2.

EX1810 Priority Area 3		
Vertice	Latitude	Longitude
1	28° 24.075' N	73° 43.213' W
2	28° 58.869' N	73° 59.001' W
3	29° 39.221' N	74° 30.532' W
4	29° 37.516' N	74° 32.549' W
5	28° 12.266' N	75° 44.211' W
6	28° 17.990' N	74° 27.381' W

**Table 3:** Latitude and longitude in degrees decimal minutes of the bounding coordinates of Priority Area 3.



## D. Summary of Objectives

### **EX-18-10 ASPIRE to Map the Extended Continental Shelf (Davisville, Rhode Island – San Juan, Puerto Rico) Telepresence-enabled 24 hour seafloor and water column mapping.**

EX-18-10 operations will begin with a transit through U.S. waters, complete focused survey operations in the Bahamas and the high seas, and end with transit mapping into port arriving in San Juan, Puerto Rico.. This cruise will include a combination of ship operations, mapping/operational, and data management objectives:

1. Ship
  - a. Small boat deployment (weather permitting); Develop and maintain proficiency with small boat operations for new and long term crew;
  - b. Conduct CTD operations as requested and able;
  - c. Man overboard / ship handling training
  - d. Additional safety training.
  
2. Onboard Mapping
  - a. Execute mapping line plans as defined by onboard personnel, with adjustments made in the field to obtain complete coverage as necessary.
  - b. Collect high resolution mapping data from sonars in priority areas as dictated by operational needs as well as science and management community needs.
  - c. Conduct 24 hr/day mapping operations for the entirety of the cruise.
  - d. Collect XBT and AXBT casts as mapping data quality requires.
  - e. Create daily standard bathymetry mapping products.
  - f. Collect sun photometer measurements as part of Exploration Project of Opportunity (EPO).
  - g. Average survey speeds of 8.5-9 kts will be utilized.
  - h. Transit speeds of 10-11 kts are requested to maximize survey time during this short cruise.
  
3. Data Management
  - a. Provide a foundation of publicly accessible data and information products to spur further exploration, research, and management activities;
  - b. Provide access to daily bathymetric mapping products for updating *Okeanos* Atlas for onshore situational awareness.
  
4. Science
  - a. Acquire data to support priority science and management needs.
  - b. Build capacity in the scientific community and public in telepresence-based mapping exploration.



- c. Successfully conduct operations in conjunction with shore-based Exploration Command Centers and remote science team participants.
  - d. Identify and map vulnerable marine habitats
  - e. Acquire a foundation of sonar and oceanographic data to better understand the characteristics of the water column and the fauna that live there.
  - f. Collect high-resolution bathymetry in areas with no (or low quality) sonar data.
- 5. Mapping Sound Velocity Profiling Objectives
  - a. Collect XBT casts as data quality requires, during mapping operations using handheld and AOML automatic XBT launcher. XBTs will need to be done frequently in the rapidly changing sound velocity environment of the Gulf Stream.
  - b. Maintain CTD capabilities as back up sound velocity profiling method for mapping data requirements.
- 6. Video Engineering (VSAT ~15 mb/sec ship-to-shore; 5 mb/sec shore-to-ship)
  - a. Provide onboard support for 24 hour mapping and telepresence mapping objectives.
  - b. Test terrestrial and high-speed satellite links;
  - c. Verify Global Foundation for Ocean Exploration (GFOE)-managed telepresence systems perform as expected
- 7. Data Management
  - a. Provide a foundation of publicly accessible data and information products to spur further exploration, research, and management activities;
  - b. Verify GFOE-managed data systems perform as expected
  - c. Update SOPs to reflect GFOE-managed network changes
  - d. Confirm mapping data file throughput to shoreside FTP.
    - i. EM 302 .all, .wcd
    - ii. EK 60 .raw, .idx
    - iii. SBP .segy, .keb, .kea
- 8. Live Interactions
  - a. Engage in live interactions as required by OER and partner needs
  - b. Scheduled Interactions:
    - 1. October 23, 2018, Interagency Working Group on Facilities and Infrastructure (IWG-FI) will be hosting a telepresence event during the Marine Technology Society/ Institute of Electrical and Electronics Engineers (IEEE) OCEANS 2018 Charleston Conference



## 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
- University Corporation for Atmospheric Research Cooperative Programs for the Advancement of Earth System Science (CPAESS), PO Box 3000 Boulder, CO 80307 USA.
- 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
- Global Foundation for Ocean Exploration, P.O. Box 417, Mystic, CT 06355
- University of Rhode Island, Inner Space Center, Narragansett, Rhode Island

## F. Personnel (Mission Party)

**Table 2:** Full list of mission party members and their affiliations

#	Name (First, Last)	Title	Date Aboard	Date Disembark	Gender	Affiliation	Nationality
1	Michael P. White	Expedition Coordinator	10/1/18	10/26/18	M	OER (CNSP)	US
2	Jason Meyer	Mapping Watch Lead	10/1/18	10/25/18	M	UCAR	US
3	Kevin Jerram	Mapping Watch Lead	10/1/18	10/25/18	M	UCAR	US
4	Cassandra Bongiovanni	Student Scientist	10/1/18	10/25/18	F	UNH/CCOM	US
5	Savannah Goode	Mapping Explorer in Training	10/1/18	10/25/18	F	UCAR	US
6	Rebekah Hernandez	Mapping Explorer in Training	10/1/18	10/25/18	F	NOAA EPP	US
7	Sophie Alpert	Mapping Explorer in Training	10/2/18	10/25/18	F	UCAR	US
8	Caroline Bradley	Mapping Explorer in Training	10/1/18	10/25/18	F	UCAR	



9	Joshua Carlson	Engineer	10/1/18	10/25/18	M	GFOE
10	Roland Brian	Engineer	10/1/18	10/25/18	M	GFOE

## 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 Joe Carrier, NOAA  
Telephone: (757) 441-6842  
Email: [Chiefops.MOA@noaa.gov](mailto:Chiefops.MOA@noaa.gov)

#### Mission Operations

Michael P. White  
Expedition Coordinator  
NOAA Office of Ocean Exploration &  
Research  
C: (301)938-8460  
Email: [Michael.white@noaa.gov](mailto:Michael.white@noaa.gov)

CDR Eric Johnson, NOAA  
Commanding Officer  
NOAA Ship *Okeanos Explorer*  
Phone: (401) 378-8284  
Email: [CO.Explorer@noaa.gov](mailto:CO.Explorer@noaa.gov)

LT Rosemary Abbitt  
Operations Officer  
NOAA Ship *Okeanos Explorer*  
Phone: [808-659-9179](tel:808-659-9179) x234  
Email: [ops.explorer@noaa.gov](mailto:ops.explorer@noaa.gov)

#### Other Mission Contacts

Craig Russell  
Program Manager  
NOAA Ocean Exploration & Research  
Phone: (206) 526-4803 / (206) 518-1068  
Email: [Craig.Russell@noaa.gov](mailto:Craig.Russell@noaa.gov)

CDR William Mowitt, Deputy Director  
NOAA Ocean Exploration & Research  
Phone: (301) 734-1023  
Email: [William.Mowitt@noaa.gov](mailto:William.Mowitt@noaa.gov)

Alan Leonardi, Director  
NOAA Ocean Exploration & Research  
Phone: 301-734-1016  
Mobile: 202-631-1790  
Email: [alan.leonardi@noaa.gov](mailto:alan.leonardi@noaa.gov)



## Vessel Shipping Address

### 1. Shipments

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

Mike Abbott or Apryl Corey  
NOAA Port Office  
NOAA Ship Okeanos Explorer  
2578 Davisville Rd  
North Kingstown, RI 02852

(NOTE: Call prior or Email [apryl.corey@noaa.gov](mailto:apryl.corey@noaa.gov) 508-495-2236 and [michael.s.abbott@noaa.gov](mailto:michael.s.abbott@noaa.gov) (508) 495-2298 to notify them of delivery)

### 2. Diplomatic Clearances

All personnel will need valid passports.

### 3. Licenses and Permit

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 will be 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 NAO 216-6 and NEPA, and authorizes the Marine Scientific Research conducted for the project (appendix C).

OER completed an EFH consultation with NOAA's Habitat Conservation Division (HCD) on July 19, 2018. A letter confirming HCD has reviewed information provided on project

activities and that adverse impacts have been minimized to the extent practicable was received on July 19, 2018 and is included as appendix D.

Informal consultation has been initiated under Section 7 of the Endangered Species Act (ESA), requesting NOAA Fisheries' Protected Resources Division concurrence with our biological evaluation determining that EX-18-10 and planned *Okeanos Explorer* operations during the summer of 2018 and 2019 field season, may affect, but are not likely to adversely affect, ESA-listed marine species. A Letter of Concurrence dated August 8, 2018 can be found in Appendix E.

## 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. Locations are approximate. Final dive sites will be delivered to the bridge at night for the next day's dive.

Date	Activities
10/1	EX-18-10 personnel arrive
10/3	Depart Davisville, Rhode Island for transit to survey area
10/7	Arrive survey area, commence focus mapping operations
10/20	Depart survey area, commence transit to Bermuda
10/24	Arrive San Juan, Puerto Rico
10/25	EX-18-10 mission personnel depart ship.

**Table 2:** Detailed Cruise Itinerary. This is an approximate itinerary and is subject to change based on objective completion.

### B. Staging and Destaging

Minimal staging is expected.

Minimal de-staging is anticipated.

## C. Operations to be conducted

### 1. Telepresence / Outreach Events

- a. Three live video feeds will be used throughout the cruise to provide situational awareness for onshore personnel.
- b. No live events are anticipated.

### 2. In-Port Events

- a. There are no major in-port events anticipated for EX-18-07

## 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. No science dives are planned during EX-18-05, but the ship may plan training, safety drill, or maintenance dives.

## 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 Multibeam Echosounder (MBES)
- Kongsberg Simrad EK60 Deepwater Echosounders and GPTs (18, 38, 70, 120, 200 kHz)
- Knudsen Chirp 3260 Sub-bottom profiler and GPTs(SBP)
- Teledyne RDI Workhorse Mariner (300 kHz) ADCP
- Teledyne RDI Ocean Surveyor (38 kHz) ADCP – not operable





- Teledyne Underway CTD
- LHM Sippican XBT Mark21 System(Deep Blue probes)
- AOML Automated XBT Launcher (Deep Blue probes)
- Seabird SBE 911Plus CTD and deck box
- Seabird SBE 32 Carousel and 12 2.5 L Niskin Bottles
- Light Scattering Sensor (LSS)
- Oxidation – Reduction Potential (ORP)
- Dissolved Oxygen (DO) sensor
- Altimeter Sensor and battery pack
- MarineStar GPS serial data feeds provided for GFOE network
- POS/MV with serial data feeds provided for the GFOE network
- Seabird SBE-45 (Micro TSG) data feeds provided for GFOE network
- Kongsberg Dynamic Positioning-1 System
- ECDIS
- Met/Wx Sensor Package with serial data feeds provided for GFOE network
- Three VoIP telephone lines
- 1 functioning and seaworthy SOLAS approved fast rescue boat
- 1 functioning and seaworthy work boat to support ROV operations and personnel transfers

## B. Equipment and capabilities provided by the OER and partners

- Microtops II Ozone Monitor Sun photometer and handheld GPS required for NASA Marine Aerosols Network supplementary project.
- QPS Fledermaus Software suite
- SIS Software and Kongsberg acquisition computer
- EK 60 acquisition computer
- Sub bottom profiler acquisition computer
- CTD acquisition computer
- Hypack Software
- GFOE provided VSAT High-Speed link (15 Mbps ship to shore; 5 Mbps shore to ship)
- Backscatter Mosaic computer
- GFOE exploration operations networking infrastructure
- Scientific Computing System (SCS)
- Telepresence System
- NCEI Cruise Information Management System (CIMS)
- GFOE VOIP system
- GFOE provided data storage



# 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 to be updated after EX1803

Item	Use	Approx. locations
95% Denatured Ethanol (12 gallons)	Sample preservation	Wetlab, under the chemical hood
10% Buffered Formalin (2 L)	Sample preservation	Wetlab, under the chemical hood
Chaos Buffer (0.5 gallons) (4 M guanidine thiocyanate, 0.5% N-lauroylsarcosine, 25 mM Tris pH 8.0, 0.1 M beta-mercaptoethanol)	Sample preservation (genetics)	Wetlab, under the chemical hood
Formaldehyde (6 L)	Sample preservation	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 (35 gallons)	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	Winch room
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
Shell Diala S2	Mineral oil	Hanger, Vehicles
Por-15	Paint Kit	ROV Workshop Fire cabinet
Aeroshell 41	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
Adhesive Pliobond 25	General adhesive	Tool room
AP 120 Metal Prep	Degreaser/cleaner for metal surfaces	Pit
Butane Fuel	Torch refill	Tool Room
PVC cement	Adhesive for PFV plastic piping	Tool Room
Phosphoric Acid	Ferrous metal rust removal	Tool room
Pipetite Paste	Plumbing sealant	Tool room/pit
Spindle Oil 10, ROS PT	Lubricant/compensation oil	Tool room
DC557	Silicon grease	Tool room/pit
Tether Potting Catalyst	Two part epoxy catalyst	Pit
Tether Potting Compound	Two part epoxy ingrediant	Pit
ThermaPlex Bearing Grease	Lubricant	Pit
Tritech Seaking	Compensator oil for sonar head	Pit

### C. Chemical safety and spill response procedures

All safety and spill response procedures will be handled according to OMAO guidelines and following the manufacturer's 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](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 G 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. Summary forms for each CTD rosette cast

- d. Daily summary bathymetry data files
- e. Raw sonar files (EM 302, EK 60, Subbottom, ADCP)
- 2. Post cruise
  - a. Refined SOPs for all pertinent operational activities
  - b. Assessments of all activities
- 3. 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
  - g. 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

## 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 a time and location determined by Operations Officer based on watch schedule, 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 produced by onboard Expedition Coordinator (EC). OMAO related information in SITREPS will be discussed during either safety or operations meetings. Additionally, EC and OPS will be meet as needed to discuss OMAO related information in SITREPS. The OPS Officer will be cc'd on SITREPS sent to shore to provide additional clarification as needed.

### 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 hours before or seven days after the completion of a project to discuss the overall success, challenges, and shortcomings 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 applicable 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 [https://docs.google.com/a/noaa.gov/forms/d/1a5hCCkgIwaSII4DmrHPudAehQ9HqhRqY3J\\_FXqblp9g/viewform](https://docs.google.com/a/noaa.gov/forms/d/1a5hCCkgIwaSII4DmrHPudAehQ9HqhRqY3J_FXqblp9g/viewform) 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 ship, 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 makeup 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 30 days in advance by each participating scientist. The NHSQ can be obtained from the Expedition Coordinator or the NOAA website

<http://www.corporateservices.noaa.gov/noaforms/eforms/nf57-10-01.pdf>.

All NHSQs submitted 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](http://ocio.os.doc.gov/ITPolicyandPrograms/ITPrivacy/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](mailto: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  
Email: [MOA.Health.Services@noaa.gov](mailto:MOA.Health.Services@noaa.gov)

Please make sure the [medicalexplorer@noaa.gov](mailto:medicalexplorer@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 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 email and the OMAO Very Small Aperture Terminal (VSAT) link.

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

Email: Firstname.Lastname@noaa.gov



**Ocean Exploration  
and Research**

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:

(541) 867-8932

(541) 867-8933

(541) 867-8934

Email: [Ops.Explorer@noaa.gov](mailto:Ops.Explorer@noaa.gov)- (mention the person's name in SUBJECT field)

Email: [expeditioncoordinator.explorer@noaa.gov](mailto: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

No Foreign Nationals will participate.



**Ocean Exploration  
and Research**

# Appendix A

## EMERGENCY CONTACT DATA SHEET–NOAA SHIP *OKEANOS EXPLORER*

Scientists sailing aboard *Okeanos Explorer* shall fill out the form found at the following link location:

[https://docs.google.com/forms/d/e/1FAIpQLSe0spa6ORrLrUXvl0bttA50tQNeCKmNpq2\\_VKnFh0\\_BHlhN1g/viewform](https://docs.google.com/forms/d/e/1FAIpQLSe0spa6ORrLrUXvl0bttA50tQNeCKmNpq2_VKnFh0_BHlhN1g/viewform) with their emergency contact information





# Appendix B: Data Management Plan

## Management Plan

Okeanos Explorer (EX1810):  
ASPIRE to Map the Extended  
Continental Shelf

*OER Data Management  
Objectives Monitoring  
normal data pipelines.*

10-

Sep-18

Page 1

### **10.1 Name and Purpose of the Data Collection Project**

Okeanos Explorer (EX1810): ASPIRE to Map the Extended Continental Shelf

### **10.2 Summary description of the data to be collected.**

Operations will include the use of the ship's deep water mapping systems (Kongsberg EM302 multibeam sonar, EK60 split-beam fisheries sonars, Knudsen 3260 chirp sub-bottom profiler sonar, and Teledyne Acoustic Doppler Current Profiler), XBT and CTD casts in support of multibeam sonar mapping operations, and the ship's high- bandwidth satellite connection for real-time ship-to-shore communications. Operations are planned south east of Bermuda in the high seas.

### **10.3 Keywords or phrases that could be used to enable users to find the data.**

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, oceans, Bermuda, Puerto Rico, Blake Plateau

### **10.4 If this mission is part of a series of missions, what is the series name?**

Okeanos Mapping Cruises

### **10.5 Planned or actual temporal coverage of the data.**

Dates:

10/3/2018 to

10/24/2018

### **10.6 Planned or actual geographic coverage of the data.**

Latitude Boundaries: Longitude Boundaries:

18.43 to



-75.74 to

41.43

-66.09

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

Cruise Plan, Cruise Summary, Data Management Plan, Highlight Images, Quick Look Report, CTD (processed), CTD (product), CTD (raw), EK60 Singlebeam Data, EK80 Echosounder, Mapping Summary, Multibeam (image), Multibeam (processed), Multibeam (product), Multibeam (raw), SCS Output (compressed), SCS Output (native), Sub-Bottom Profile data, Water Column Backscatter, XBT (raw)

## 1.8 What platforms will be employed during this mission?

NOAA Ship Okeanos Explorer

Overall POC: Michael White, Physical Scientist, OER,

michael.white@noaa.gov Title: OER Expedition

Coordinator

Affiliation/Dept: OER; UNH/JHC CCOM

E-Mail: michael.white@noaa.gov

Phone: 301-938-8460



**Ocean Exploration  
and Research**

Data POC Name: Megan Cromwell, Joshua Carlson

Title: Stewardship Data Manager,

Onboard/Shoreside Data Manager E-Mail:

megan.cromwell@noaa.gov, joshua.carlson@tgfoe.org

**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

**5.1 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](http://explore.noaa.gov/okeanosatlas)).

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

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

not applicable

## 6.2 Where will the metadata be hosted?

True

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:

Meta Std:

<https://www.ncddc.noaa.gov/oer-waf/ISO/Resolved/2018>

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.

### **7.1 Do the data comply with the Data Access Directive?**

**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.**

True

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: URL:

NOAA National Centers for Environmental Information (NCEI)  
<https://data.noaa.gov/datasearch>

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

Hold Time: Authority:

not applicable; data are made publicly available as soon as possible after the mission has ended 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.



## **8.1 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 FY18 Data Management Plan at NOAA's EDMC DMP Repository (EX\_FY18\_DMP\_Final.pdf) for detailed descriptions of the processes, procedures, and partners involved in this collaborative effort.

## **8.2 If no archive planned, why?**

not applicable

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

60-120 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



**Ocean Exploration  
and Research**

## Categorical Exclusion (CE) Evaluation Worksheet

**Project Identifier:** EX1810

**Date Review Completed:** 9/7/2018

**Completed by:** Michael White, Physical Scientist

**OAR Functional Area:** OER

**Worksheet File Name:** 2018-10-OER-G3-EX1810

### Step 1. CE applicability

- 1. Is this federal financial assistance, including via grants, cooperative agreements, loans, loan guarantees, interest subsidies, insurance, food commodities, direct appropriations, and transfers of property in place of money?**

yes

- 2. What is the proposed federal action?**

OER is proposing to conduct seafloor and water column sonar mapping operations during a dedicated mapping ocean exploration expedition on NOAA Ship Okeanos Explorer. In total the cruise will span 21 days at sea. During that time, the ship will be continuously acquiring data using deep water sonars and will not spend any significant amount of time in any one place. Due to the inherent nature of exploration mapping, the ship does not frequent specific areas more than once. The sonar data collected will provide critical baseline information about poorly mapped deep water areas about 400 miles east of Cape Canaveral, Florida. Target depth ranges are from 250 to 6,000 meters in depth. Transit mapping will occur within the U.S., Bahama, and Dominican Republic EEZ. Estimated number of transit mapping days are 8-9. Focused mapping operations may occur within U.S. and Bahamas EEZ, although the majority of the planned survey area is within international waters. Estimated number of focused mapping days are 10-13. This action is not associated with subsequent cruises.

- 3. Which class of CE in Appendix E of the NAO 216-6A Companion Manual is applicable to this action and why?**



- a. G3: Topographic, bathymetric, land use and land cover, geological, hydrologic mapping, charting, and surveying services that do not involve major surface or subsurface land disturbance and involve no permanent physical, chemical, or biological change to the environment.
- b. b. The main cruise objectives are to collect seafloor and water column sonar data, the acquisition of which will cause no permanent physical, chemical or biological change to the environment. The using of the sonar equipment in the manner proposed does not alter substrate and is not known to cause any permanent, long lasting or even short-term physical, chemical or biological changes. Exploration mapping operations are transitory in nature and effects, again unlikely, are ephemeral.

## Step 2. Extraordinary Circumstances Consideration

### 4. Would the action result in adverse effects on human health or safety that are not negligible?

No. Exploration in the EX-18-10 operational area, using the described techniques and best practices is not known or likely to affect human health and safety. Expedition EX-18-10 operational area for conducting seafloor and water column mapping are underwater and therefore have no human presence (see Figure 1 of EX-18-10 Project Instructions for a map of the survey area) and additionally do not involve any procedures or outcomes known to result in adverse effects on human health and safety.

### 5. Would the action result in adverse effects on an area with unique environmental characteristics that are not negligible?

No. These actions will not take place in or in proximity to: State or National Parks and Wildlife Refuges (various statutes); Wetlands (CWA et al); Prime Farmland (FPA); Wild and Scenic Rivers (WSRA); National Marine Sanctuaries (NMSA); archeological or historic resources listed in or eligible for listing in the National Register of Historic Places (NHPA); and coral reefs (E.O. 13089). Data collection will primarily occur in remote offshore, greater than 200 nautical miles, and deep, greater than 3,000 meters, water south, 400 miles east of Cape Canaveral. The effects will be negligible or less than negligible, as acoustic mapping operations will not cause any permanent impact on the seabed or water column. An Essential Fish Habitat (EFH) consultation for this same time period has resulted in the determination that the proposed cruises will not reduce the quality and/or quantity of EFH, provided there is adherence to the OER proposed procedures. The EFH consultation is provided in the project instructions of EX-18-10 in Appendix D. Operations will not occur in any sanctuaries and therefore NMSA does not apply.



**6. Would the action result in adverse effects on species or habitats protected by the ESA, MMPA, MSA, NMSA, or MBTA that are not negligible?**

OER has taken measures to ensure that any effects on species or habitats protected by the ESA, MMPA, MSA, or NMSA meet the definition of 'negligible.' An ESA letter of concurrence dated August 8, 2018 is provided in Appendix E of the EX-18-10 project instructions demonstrating no anticipated impacts on Okeanos field work through FY19 as currently planned. Given the offshore focus area of our work, it is highly improbable that we will encounter marine mammals protected under the MMPA or sea birds protected under the MBTA. If we did encounter any marine mammals or seabirds, our effect would be negligible because of the best management practices to which we adhere to avoid or minimize environmental impacts. An Essential Fish Habitat (EFH) consultation for this same time period has resulted in the determination that the proposed cruises will not reduce the quality and/or quantity of EFH, provided there is adherence to the OER proposed procedures. The EFH consultation is provided in the project instructions of EX-18-10 in Appendix D. Operations will not occur in any sanctuaries and therefore NMSA does not apply.

**7. Would the action result in the potential to generate, use, store, transport, or dispose of hazardous or toxic substances, in a manner that may have a significant effect on the environment?**

No. There are chemical stores onboard used during out cruise for ROV maintenance and preservation of biological samples, but these operations will not occur during this cruise. Additionally, cruise operations will be in compliance with FEC 07 Hazardous Materials and Hazardous Waste Management Requirements for Visiting Scientific Parties (or superseding OMAO procedures) to ensure generation, use, storage, transport and disposal of such substances will not result in significant impacts

**8. Would the action result in adverse effects on properties listed or eligible for listing on the National Register of Historic Places authorized by the National Historic Preservation Act of 1966, National Historic Landmarks designated by the Secretary of the Interior, or National Monuments designated through the Antiquities Act of 1906; Federally recognized Tribal and Native Alaskan lands, cultural or natural resources, or religious or cultural sites that cannot be resolved through applicable regulatory processes?**

There are no operations planned for this cruise that involve underwater cultural heritage sites.



**9. Would the action result in a disproportionately high and adverse effect on the health or the environment of minority or low-income communities, compared to the impacts on other communities (EO 12898)?**

No. The NOAA Ship Okeanos Explorer will be operating in remote areas in the mid-Atlantic Ocean (see figure 1, EX-18-10 cruise Project Instructions). There are no communities within or near the geographic scope of the cruise and the cruise does not involve actions known or likely to result in adverse impacts on human health.

**10. Would the action contribute to the introduction, continued existence, or spread of noxious weeds or nonnative invasive species known to occur in the area or actions that may promote the introduction, growth, or expansion of the range of the species?**

No. During EX-18-10, the ship will not make landfall in areas other than commercial ports. The ship and OER Mission team will comply with all applicable local and federal regulations regarding the prevention or spread of invasive species. At the completion of every CTD cast, the CTXD will be thoroughly rinsed with fresh water and completely dried to prevent spreading organisms from one site to another. Additionally, the Engineering Department aboard the NOAA Ship Okeanos Explorer attends yearly Ballast Management Training in accordance with the NOAA Form 57-07-13NPDES VGP Annual Inspection and Report to prevent the introduction of invasive species.

**11. Would the action result in a potential violation of Federal, State, or local law or requirements imposed for protection of the environment?**

The proposed action will not result in any violations of Federal, State, or local law or requirements imposed for protection of the environment. The survey coordinators obtained authorizations and/or consultations pursuant to applicable laws. See responses to questions #4, 5, and 6 for details.

**12. Would the action result in highly controversial environmental effects?**

No. Since there are no known resources to be impacted there is no known controversy regarding resources to be impacted and the severity and duration of any impacts is null. At the time of this response, this action is not the subject of any public controversy.





**13. Does the action have the potential to establish a precedent for future action or an action that represents a decision in principle about future actions with potentially significant environmental effects?**

No. While each cruise contributes to the overarching goal of exploring and mapping the ocean, this cruise is independently useful and not connected to any subsequent cruises.

**14. Would the action result in environmental effects that are uncertain, unique, or unknown?**

No. The techniques and equipment used are standard for this type of field activity are employed every cruise taken by the Okeanos Explorer. Based on ten years of cruises, the environmental effects, or more correctly lack thereof, are well understood.

**15. Does the action have the potential for significant cumulative impacts when the proposed action is combined with other past, present and reasonably foreseeable future actions, even though the impacts of the proposed action may not be significant by themselves?**

By definition, actions that a federal agency classifies as a categorical exclusion have no potential, individually or cumulatively, to significantly affect the environment. This cruise is consistent with a class of CE established by NOAA and there are no extraordinary circumstances for this action that may otherwise result in potentially significant impacts.

**CE Determination**

I have determined that a Categorical Exclusion is the appropriate level of NEPA analysis for this action and that no extraordinary circumstances exist that would require preparation of an environmental assessment or environmental impact statement.

I have determined that an environmental assessment or environmental impact statement is required for this action.

Signature:



Signed by: Michael  
Date Signed: White

Digitally signed by Michael White  
DN: cn=Michael White, o=NOAA/  
ERT, ou=OER,  
email=michael.white@noaa.gov,  
c=US  
Date: 2018.09.07 13:34:49 -0400





# Appendix D: ESA Section Letter of Concurrence




**Ocean Exploration  
and Research**



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL MARINE FISHERIES SERVICE  
GREATER ATLANTIC REGIONAL FISHERIES OFFICE  
55 Great Republic Drive  
Gloucester, MA 01930-2276

JUL 19 2018

MEMORANDUM FOR: Daniel Wagner, Ph.D.  
Expedition Coordinator, Cherokee Nation Strategic Programs  
NOAA Office for Ocean Exploration and Research

FROM: Louis A. Chiarella   
Assistant Regional Administrator, Habitat Conservation Division

SUBJECT: Essential Fish Habitat (EFH) Consultation for Deep-Sea  
Exploration Activities occurring within the Greater Atlantic  
Region aboard NOAA Ship *Okeanos Explorer* in 2018-2020

This responds to your request for an abbreviated EFH consultation for the field activities to be conducted aboard the NOAA Ship *Okeanos Explorer* in the Greater Atlantic Region between July 2018 and December 2020. During this time, up to 33 different research expeditions will be undertaken to collect critical baseline information in unknown or poorly known areas of the region at depths of 250 m or deeper through telepresence-based exploration. Specific activities to be undertaken include the use of deep-water mapping systems such as multi-beam, single beam, sub-bottom profiler and acoustic Doppler current profiler (ACDP) sonar systems, and the use of remotely operated vehicles (ROV), the ship's conductivity-temperature-depth (CTD) rosette, underway CDT, and high-bandwidth satellite connection for real-time ship to shore communications. New technologies and novel applications may be tested during the research expeditions. These technology demonstration projects are still under development at this time and will be evaluated individually for environmental impact. Your consultation request supplements a previously completed EFH consultation between NOAA's National Centers of Coastal Ocean Science (NCCOS) and NOAA Fisheries Southeast Regional Office (SERO) for research activities to be conducted in U.S. federal waters of the Gulf of Mexico, South Atlantic Bight and Caribbean in 2017-2019 using NOAA ships *Okeanos Explorer* and *Nancy Foster*.

As specified in the Magnuson Stevens Fishery Conservation and Management Act (MSA), EFH consultation is required for federal actions that may adversely affect EFH. We have reviewed information provided on the proposed activities as well as the protective measures and best management practices incorporated into the action and have determined that adverse impacts have been minimized to the extent practicable. As such, we have no EFH conservation recommendations to provide pursuant to Section 305(b)(2) of the MSA. Further EFH consultation on this action is not necessary unless future modifications are proposed that would change the basis of our determination.

cc: GAR/HCD- K. Greene  
SERO/HCD-V. Fay, D. Dale



Ocean Exploration  
and Research

# Appendix E: EFH Consultation Letter



**Ocean Exploration  
and Research**



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL MARINE FISHERIES SERVICE  
Silver Spring, MD 20910

AUG 08 2018

Refer to NMFS No: FPR-2018-9276

Commander William Mowitt  
Deputy Director  
Office of Ocean Exploration and Research  
1315 East West Highway  
Silver Spring, Maryland 20910

RE: Concurrence Letter for the National Oceanic and Atmospheric Administration's Office of Ocean Exploration and Research's Marine Operation Activities on the National Oceanic and Atmospheric Administration Ship *Okeanos Explorer* for the 2018 through 2019 Field Seasons

Dear Mr. Mowitt:

On July 6, 2018, the National Marine Fisheries Service (NMFS) received your request for a written concurrence that the National Oceanic and Atmospheric Administration (NOAA) Office of Ocean Exploration and Research's marine operations activities on the NOAA Ship *Okeanos Explorer* for the 2018 through 2019 field seasons under the Endangered Species Act of 1973, as amended (ESA; 16 U.S.C. 1531 et seq.) is not likely to adversely affect species listed as threatened or endangered or critical habitats designated under the ESA. This response to your request was prepared by NMFS pursuant to section 7(a)(2) of the ESA, implementing regulations at (50 C.F.R. §402), and agency guidance for preparation of letters of concurrence.

We reviewed the consultation request document and related materials submitted by your office. We requested that your office update the acoustic thresholds submitted in the biological evaluation to match NMFS's 2018 acoustic technical guidance (NMFS 2018a). This assisted NMFS's ESA Interagency Cooperation Division to determine the total amount of disturbance from acoustic sources during the 2018 through 2019 field season on the NOAA Ship *Okeanos Explorer* is not likely to adversely affect ESA listed species within the action area. In addition, our assessment considered prior analyses and determinations on recent ESA informal consultations which had the same activities in similar geographic locations and the implementation of all mitigation measures included in your biological evaluation (NMFS 2017; 2018b). Based on our knowledge, expertise, and the materials submitted in your request for informal consultation, we concur with the Office of Ocean Exploration and Research's conclusions that the proposed action is not likely to adversely affect ESA-listed species and/or designated critical habitat.

This concludes consultation under the ESA for species and/or designated critical habitat under NMFS's purview on the NOAA Office of Ocean Exploration and Research's marine operation activities on the NOAA Ship *Okeanos Explorer* for the 2018 through 2019 field seasons.



Printed on Recycled Paper



Ocean Exploration  
and Research

Reinitiation of consultation is required and shall be requested by the NOAA Office of Ocean Exploration and Research or by NMFS where discretionary Federal involvement or control over the action has been retained or is authorized by law and: (a) take occurs; (b) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered in this consultation; (c) the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not previously considered in this consultation; or (d) if a new species is listed or critical habitat designated that may be affected by the action (50 C.F.R. §402.16).

We look forward to further cooperation with you on other projects to ensure the conservation of our threatened and endangered marine species and designated critical habitat. If you have any questions on this consultation, please contact me at (301) 427-8495 or by email at [cathy.torrici@noaa.gov](mailto:cathy.torrici@noaa.gov) or Jonathan Molineaux at (301) 427-8440 or by email at [jonathan.molineaux@noaa.gov](mailto:jonathan.molineaux@noaa.gov).

Sincerely,



Cathryn E. Tortorici  
Chief, ESA Interagency Cooperation Division  
Office of Protected Resources



### Literature Cited

- NMFS. (2017). *Concurrence letter for activities to be conducted for National Centers for Coastal Ocean Science-led activities as part of the Southeast Deep Coral Initiative in 2017 through 2019*. Silver Spring, Maryland: National Marine Fisheries Service, Office of Protected Resources.
- NMFS. (2018a). *2018 Revision to: Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0)*. NOAA Technical Memorandum. U.S. Department of Commerce.
- NMFS. (2018b). *ESA Section 7 Consultation regarding to the proposed issuance of an Incidental Harassment Authorization to Garden State Offshore Energy for upcoming surveys*. Gloucester, Massachusetts: National Marine Fisheries Service, Greater Atlantic Regional Fisheries Office.





# 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.

