

# NOAA Ship *Okeanos Explorer* FY23 Field Season Instructions

**Date Submitted:** 03/09/2023

**Platform:** NOAA Ship *Okeanos Explorer*

This document provides an overview of Fiscal Year 2023 expeditions on NOAA Ship *Okeanos Explorer*. For further details, refer to the expedition-specific project instructions.

**Prepared by:**

**Dated:**

Sam Cuellar  
Expedition Coordinator, Expeditions and Exploration  
NOAA Ocean Exploration

**Approved by:**

**Dated:**

Kasey Cantwell  
Operations Chief, Expeditions and Exploration  
NOAA Ocean Exploration

**Approved by:**

**Dated:**

Rachel Medley  
Chief, Expeditions and Exploration Division  
NOAA Ocean Exploration

**Approved by:**

**Dated:**

Commander Amanda Goeller  
Commanding Officer  
NOAA Marine Operations Center  
— Atlantic

# 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 Strategic Plan (2016-2020)

## 1. NOAA Ocean Exploration Mission Summary

NOAA Ocean Exploration provides the data, information, and tools needed to bridge basic gaps in our understanding of the ocean, the resources it holds, and the services it provides. With priority placed on exploration of deep waters and the waters of the U.S. Exclusive Economic Zone (EEZ), the office applies the latest tools and technologies to explore previously unknown areas of the ocean, making discoveries of scientific, economic, and cultural value. NOAA Ship *Okeanos Explorer* is one such tool. Working in close collaboration with government agencies, academic institutions, and other partners, NOAA Ocean Exploration conducts deep-ocean exploration expeditions using advanced technologies on *Okeanos Explorer*—mapping, exploring, and characterizing areas of the ocean that have not yet been explored.

Expeditions on *Okeanos Explorer* to map, explore, gather data about deep waters and the seafloor—and the resources they hold—contribute to the establishment of a foundation of ocean information and fill gaps in the unknown. Collected data directly support the National Strategy for Mapping, Exploring and Characterizing the United States Exclusive Economic Zone (NOMECS Strategy) and Seabed 2030 efforts to produce a bathymetric map of the world ocean floor by 2030, contributing to key NOAA, national, and international goals to better understand and manage the ocean and its resources.

Data collected on *Okeanos Explorer* expeditions during fiscal years 2023 and 2024 will also contribute to the interagency EXpanding Pacific Research and Exploration of Submerged Systems (EXPRESS) and Seascape Alaska campaigns. EXPRESS is a multiyear, multipartner cooperative research campaign designed to collect deep-sea data to guide use of living marine resources and habitats, inform ocean energy and mineral resource decisions, and improve offshore hazard assessments along the U.S. West Coast. Seascape Alaska is a regional campaign aimed at fully mapping the U.S. waters off of Alaska in support of the NOMECS Strategy. All data collected during *Okeanos Explorer* expeditions adhere to 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.

Exploring, mapping, and characterizing the U.S. EEZ are necessary for a systematic and efficient approach to advancing the development of ocean resources, promoting the protection of the marine environment, and accelerating the economy, health, and security of our nation. With a dedicated mission to explore our largely unknown ocean, NOAA Ocean Exploration is uniquely situated to lead partners in delivering critical ocean information to managers, decision makers, scientists, and the public, coordinating efforts to meet national priorities and to advance global initiatives.

## A. Synopsis of *Okeanos Explorer* 2023 Field Season

This document describes planned NOAA Ocean Exploration mission operations aboard *Okeanos Explorer* for the Fiscal Year 2023 (FY23) field season. These plans are subject to change throughout the year. For a permanent record of actual accomplishments, individual expedition reports will be produced and publicly archived. Under this same DOI, additional supplemental materials, such as the FY23 Programmatic Letter of Concurrence and the Project Design Criteria of the Endangered Species Act, will be attached in their entirety. The geographic focus of exploration in FY23 will encompass the U.S. West Coast, Aleutian Islands, and Gulf of Alaska. NOAA Ocean Exploration work in these areas will look to add additional data to the EXPRESS and Seascape Alaska campaigns. Additionally, NOAA Ocean Exploration operations during the FY23 field season will likely extend beyond 250 nautical miles (nm) from the continental United States, and a medical officer is requested to be aboard for all expeditions.

The initial expedition of FY23, EX-22-08, will conduct 24-hour mapping operations along the California and southern Oregon coast lines, transiting from San Diego, CA to Newport, OR, examining unmapped or poorly mapped high priority areas in support of [EXPRESS](#) goals in an effort to better understand the fauna, geology, and improve offshore earthquake, landslide, tsunami, and nautical hazard assessments.

Following winter dockside repairs and stern thruster work, *Okeanos Explorer* will undergo a mapping shakedown off of the northern California and southern Oregon coasts, transiting from its winter port to San Francisco, CA. The ship will then transition to a combined remotely operated vehicle (ROV) shakedown and EXPRESS West Coast ROV and Mapping expedition. This expedition will feature daytime ROV dives and overnight mapping operations with shoreside telepresence input from members of the scientific community and federal and indigenous stakeholders. These west coast mapping and ROV expeditions will support the ongoing [EXPRESS](#) initiatives to better understand the living marine, offshore energy, and mineral resources off the Californian and Oregon coasts as well as provide high resolution mapping for further research and exploration initiatives.

Following the shakedowns and first ROV expedition, the ship will transit from Seattle, WA to Dutch Harbor, AK for a 24 day mapping expedition in support of Seascope Alaska as the ship transitions from the continental West Coast to the Alaskan coast and Aleutian Islands.

From Dutch Harbor, *Okeanos Explorer* will continue mapping in support of Seascope Alaska, focusing on the Aleutian Islands and collecting high resolution bathymetry in areas of significant interest before making a stop in Kodiak, AK. The data collected on this expedition will be used to improve fundamental understanding of the region and facilitate future ROV dive planning for the next expedition following this leg.

From Kodiak, the ship will set out again, conducting ROV dives and mapping operations along the Aleutian Island chain as it treks back to Dutch Harbor. Dives are anticipated to be in depths from 250 to 6,000 meters in depth, with transit days planned to optimize operations in priority areas. Real time video from ROV and multibeam sonar mapping operations will be shared with shore-based participants and the public.

After the completion of this ROV and mapping work, *Okeanos Explorer* will again transit to Kodiak, continuing mapping operations in further areas of interest along the Aleutian Island chain for 18 days. Following this mapping leg, the ship will pivot from exploring the Aleutian Islands to focusing on areas within the Gulf of Alaska as it transits to Seward, AK. A combined ROV and mapping expedition will collect video footage, bathymetry, and other data to help improve the understanding of the habitats, organisms, and geology that exist on the seabed of the Gulf of Alaska.

To conclude the FY23 season and transition into FY24, the ship will journey from Seward to San Francisco, CA over 18 days for its winter port call. During this transit, the ship will plot its course to cross areas of interest in the Gulf of Alaska, collecting bathymetric data over these locations as it makes its way south.

The NOAA Ocean Exploration FY23 expedition field season on *Okeanos Explorer* has been planned to maximize contributions to these key initiatives in U.S. and international waters of the U.S West Coast, Gulf of Alaska, and Aleutian Islands and incorporate the 2021 and 2022 Calls for Input, [EXPRESS](#) and Seascope Alaska objectives, and priorities from resource managers to establish expedition objectives and refine operating areas. The geographic focus of exploration work in FY23 will encompass the U.S. West Coast, Alaska, and the Aleutian Islands. These areas will be explored by leveraging expertise from other U.S. federal agencies such as the U.S. Geological Survey (USGS) and the Bureau of Ocean Energy Management (BOEM), academic partners, indigenous communities, and international partners from other transatlantic countries.

## 2. FY23 Okeanos Explorer Schedule

The general schedule for the field season is shown below in **Table 1**, and is subject to change at any time throughout the year. The most up to date information will be available in each expedition's Project Instructions.

**Table 1.** FY23 field season schedule.

Action	Dates	Ports	Expedition Name	Program <sup>1</sup>	DAS	Expedition Coordinator
Depart Arrive	10/16/22 11/3/22	San Diego, CA Newport, OR	<b>EX-22-08</b> EXPRESS: West Coast Mapping	OAR	19	Thomas Morrow
Depart Arrive	3/23/23 4/01/23	Portland, OR San Francisco, CA	<b>EX-23-01</b> Mapping Shakedown + Sea Trials + ORT	OAR PFD OMAO	8 2	Sam Candio
Depart Arrive	4/8/23 4/27/23	San Francisco, CA Seattle, WA	<b>EX-23-02</b> EXPRESS: Shakedown + West Coast Exploration (ROV and Mapping)	OAR PFD OAR	13 7	Thomas Morrow
Depart Arrive	5/5/23 5/27/23	Seattle, WA Dutch Harbor, AK	<b>EX-23-03</b> Seascape Alaska: Aleutians Exploration 1 (Mapping)	OAR	23	Sam Cuellar
Depart Arrive	6/2/23 6/20/23	Dutch Harbor, AK Kodiak, AK	<b>EX-23-04</b> Seascape Alaska: Aleutians Exploration 2 (Mapping)	OAR	19	Thomas Morrow

Action	Dates	Ports	Expedition Name	Program <sup>1</sup>	DAS	Expedition Coordinator
Depart	6/28/23	Kodiak, AK	<b>EX-23-05</b>	OAR	28	Shannon Hoy
Arrive	7/25/23	Dutch Harbor, AK	Seascope Alaska: Aleutians Exploration (ROV + Mapping)			
Depart	7/31/23	Dutch Harbor, AK	<b>EX-23-06</b>	OAR	18	Thomas Morrow
Arrive	8/17/23	Kodiak, AK	Seascope Alaska: Aleutians Exploration (Mapping)			
Depart	8/23/22	Kodiak, AK	<b>EX-23-07</b>	OAR PFD	25	Sam Candio
Arrive	9/16/23	Seward, AK	Seascope Alaska: Gulf of AK Exploration (ROV + Mapping)			
Depart	9/23/23	Seward, AK	<b>EX-22-08</b>	OAR	3	Abby Letts
Arrive	10/14/23	San Francisco, CA	Seascope Alaska: Gulf of AK (Transit Mapping)	OAR PFD OAR FY24	5 14	

<sup>1</sup> OMAO=Office of Marine and Aviation Operations; OAR=Office of Oceanic and Atmospheric Research, PFD= Program-funded day, 5% DAS = DAS allocated through 5% pool

### 3. Operating Area

Figure 1 shows the general operating areas for FY23. See the expedition-specific project instructions for specific operating areas.

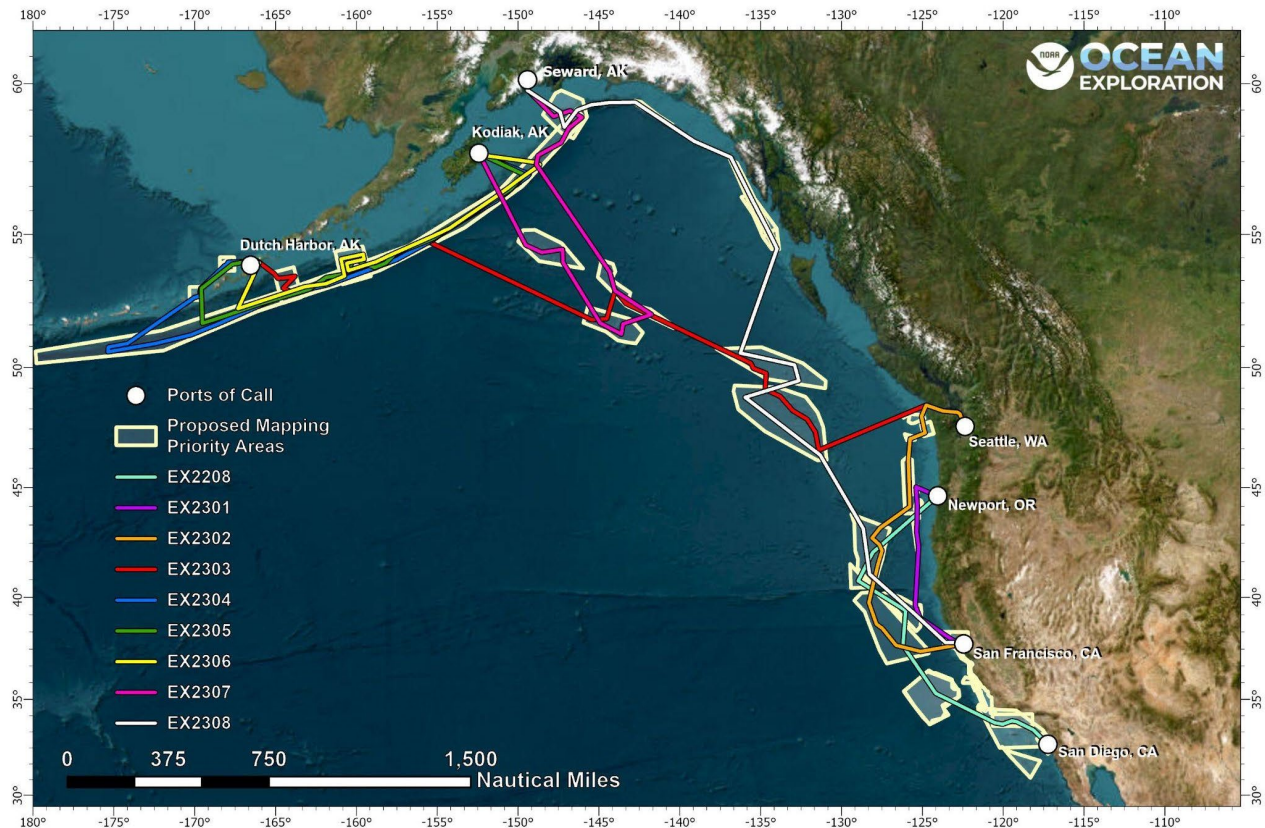


Figure 1. Expected NOAA Ocean Exploration field operations area for FY23 on NOAA Ship *Okeanos Explorer*. Colored lines indicate approximate tracklines for each expedition. The blue boxes indicate high priority mapping areas.

### 4. Fiscal Year 2023 Executive Summary of Objectives

#### A. Ship Objectives

- a. Sustain safe operations aboard the ship.
- b. Develop and maintain small boat deployment proficiency for new and long-term ship personnel (weather permitting).
- c. Conduct conductivity, temperature, depth (CTD) operations as requested and at least once per expedition to maintain equipment in working order and ensure proficiency of ship personnel.

- d. Conduct mariner overboard/ship handling training.
- e. Conduct additional safety training, including standard drills (fire, medical emergency, abandon ship, spill response, etc.).
- f. Provide opportunities for incoming officers to observe and train during mapping and ROV expeditions. This training may include aft-con and dynamic positioning training.
- g. Support training of ship personnel.
- h. Maintain proficiency and training in ROV emergency procedures.

## B. Sonar Mapping Objectives

- a. Continue to refine remote mapping watchstanding capabilities:
  - i. Work with the Global Foundation for Ocean Exploration (GFOE) to enable onshore control of sonar data acquisition settings and remote support from Kongsberg for troubleshooting the EM 304 multibeam sonar.
- b. Collect high-quality ocean mapping data:
  - i. Collect the maximum amount of mapping data possible, using all available time including strategic transit mapping. This entails 24-hour-a-day mapping operations for the entirety of the expedition on mapping-only expeditions and approximately 12-hour-per-day mapping operations on combination ROV/mapping expeditions.
  - ii. Execute mapping line plans as defined by onboard mapping personnel, with real-time adjustments made to obtain complete seabed coverage as necessary.
  - iii. Collect mapping data from all or most sonars (synchronization and community priority dependent) in priority areas, including multibeam, split-beam, sub-bottom, and acoustic Doppler current profiler (ADCP) sonars. Focused surveys may also be completed in contingency areas as time allows or to adapt to adverse weather conditions.
  - iv. Collect high-resolution bathymetry in areas with no or low-quality sonar data.
  - v.
  - vi.
  - vii. Ensure timely operational mode transition from daytime ROV operations to overnight mapping operations.
- c. Map high-priority areas:
  - i. Map seafloor, subseafloor, and water column as deemed priority by policy (NOMECS Strategy) and scientific and resource management community partners, as defined in the Science section below.
- d. Process data:
  - i. Create daily standard bathymetry and backscatter mapping products



- ii. Conduct ancillary mapping data processing objectives, including reviewing water column data for anomalies and produce images of processed sub-bottom data.
- iii. Generate a final expedition map showing bathymetric coverage obtained.
- iv. Generate field estimates of mapping area coverage in square kilometers.

## C. Mapping Sound Speed Profiling Objectives

- a. Collect expendable bathythermograph (XBT) casts as data quality requires, but no more than six hours apart, during mapping operations using handheld and Atlantic Oceanographic and Meteorological Laboratory automatic XBT launchers.
  - i. Maintain CTD capabilities as a backup sound speed profiling method for mapping data requirements. Test casts may be requested by the Chief Survey Technician on a regular basis to maintain this expertise.
  - ii. Collect CTD data with the CastAway-CTD, a handheld, hand-deployed CTD deployable up to 100 m depth, as needed. This will be done primarily during EK calibrations, but may be useful in other situations.
  - iii. Maintain a calibrated, hull-mounted Reson SVP-70 probe for sound speed measurement at the EM 304 sonar transducer face.
  - iv. Maintain a calibrated thermosalinograph as a backup system and do a quality-control check for sound speed values from the SVP 70 probe.

## D. Science Objectives

- a. Acquire data on deepwater habitats to support scientific and resource management needs and in support of EXPRESS, Seascope Alaska, and NOMECA goals.
- b. Map geological features to better understand the geological context of the region and improve knowledge of past and potential future geohazards.
  - i. Collect, document, and preserve geological specimens that can be used to age a geological feature, provide additional insight into the geological context of the region, or improve knowledge of potential geohazards.
- c. Acquire ROV, sonar, and oceanographic data as a foundation to better understand the characteristics of the water column and the pelagic fauna that live there.
- d. Collect high-resolution mapping data in priority areas as dictated by operational needs, as well as input received from the scientific and resource management communities to support EXPRESS, Seascope Alaska, NOMECA, and Seabed 2030 goals.
- e. Gather data to support priority underwater cultural heritage (UCH) needs. Acoustically identify potential UCH sites such as shipwrecks as requested by UCH partners and only in water depths where onboard sonars can be reasonably expected to detect such sites. Conduct ROV surveys over potential UCH targets.

- f. Explore areas relevant to resource managers such as essential fish habitat, habitat areas of particular concern, national marine monuments, marine protected areas, and other priority areas for resource management.
- g. Identify, map, and explore the diversity and distribution of benthic habitats, including potential deep-sea coral and sponge communities, fish habitats, and chemosynthetic communities.
- h. Continue to refine specimen collection procedures, including the use of the ROV suction sampler and the collection of eDNA samples via ROV-mounted Niskin bottles.
- i. Engage a broad spectrum of the scientific and resource management communities, as well as the public, in telepresence-based exploration.
- j. Create and provide input into standard science products to provide a foundation of publicly accessible data and information products to spur further exploration, research, and resource management activities.
- k. Collect sun photometer measurements as part of the Exploration Project of Opportunity collaboration with NASA.
- l. Explore the feasibility and functionality of technologies to advance science as it pertains to ocean exploration.

Additional science objectives can be found in the expedition-specific supplemental project instructions.

## E. Data Management Objectives

- a. Provide a foundation of publicly accessible data and information products to spur further exploration, research, and resource management activities.
- b. Use daily bathymetric mapping products, user datagram protocols, and scientific computing system mailers to update the [Okeanos Explorer Live Operations Map](#) for onshore situational awareness.
- c. Verify GFOE-managed data systems perform as expected.
- d. Confirm mapping data file throughput to the shoreside FTP, with raw and/or processed file types specified in the expedition-specific project instructions.
- e. Confirm ROV data and video file throughput to the shoreside FTP, with file types specified in the expedition-specific project instructions.
- f. Cross-train ROV personnel.
- g. Document and improve data management SOPs.
- h. Follow UCH SOPs for any archaeological sites that may be documented and explored during the expedition (see Appendix D).

- i. For ROV expeditions, document samples in the Sample Operations Database Application (SODA) database to create digital tracking and metadata records for all physical specimens.

## F. Video Engineering Objectives

- a. Provide onboard support for 24-hour mapping and telepresence objectives.
- b. Provide the following very small aperture terminal (VSAT) connectivity: ~20 Mbps ship-to-shore; 20 Mbps shore-to-ship.
- c. Test terrestrial and high-speed satellite links.
- d. Create, document, and collect standard video products.
- e. Facilitate live interactions between the ship and shore.
- f. Continue to test best practices for hosting live interactions.
- g. Verify GFOE-managed telepresence systems perform as expected.

## G. Outreach Objectives

- a. Engage the general public in ocean exploration through live video and timely content (dive summaries and other updates and mapping products) posted on the NOAA Ocean Exploration website.
- b. Conduct live interactions during all ROV expeditions and select mapping expeditions.
- c. Conduct ship tours and port events as COVID-19 protocols allow.

NOAA Ocean Exploration is interested in hosting ship tours and potentially port events in FY23. However, opportunities will be closely coordinated with the ship and scoped in light of current COVID-19 protocols. Additional details about any expedition-specific outreach activities will be articulated in the expedition-specific project instructions.

## H. Explorers-in-Training Objectives

- a. Train ship-based explorers-in-training to process sonar data and stand mapping watches to support field expeditions.

## I. ROV Engineering Objectives

- a. Conduct daytime, or as scheduled, ROV dives on exploration targets.
- b. Conduct ongoing training of engineers and pilots.
- c. Conduct ongoing system maintenance, documentation, and training.
- d. Continue training and testing sampling operations to refine methods for collecting physical specimens during ROV dives.

## J. Telepresence-Enabled Science and Exploration Command Centers

- a. Provide operational support and training to scientists and managers to enable remote participation in at-sea operations.
- b. Facilitate outreach and engagement activities and events at exploration command centers and other facilities that host interactions. This objective is COVID-dependent.
- c. Test and refine ship-to-shore communications procedures that engage multiple exploration command centers and other remote participants.
- d. Test and refine operating procedures and products.
- e. Continue refining the use of SeaTubeV3 software to conduct real-time science annotations during ROV dives.

## 5. Participating Institutions

Additional participating institutions will be identified in the expedition-specific supplemental project instructions, if applicable. The following institutions will participate in all FY23 missions.

- National Oceanic and Atmospheric Administration (NOAA), Office of Ocean Exploration and Research — 1315 East-West Highway, Silver Spring, MD 20910 USA
- NOAA, National Centers for Environmental Information — Stennis Space Center, MS, 39529 USA
- University Corporation for Atmospheric Research, Cooperative Programs for the Advancement of Earth System Science — P.O. Box 3000 Boulder, CO 80307 USA
- University of New Hampshire, Center for Coastal and Ocean Mapping/Joint Hydrographic Center — Jere A. Chase Ocean Engineering Lab, 24 Colovos Road, Durham, NH 03824 USA
- Global Foundation for Ocean Exploration — P.O. Box 417, Mystic, CT 06355 USA

## 6. Personnel (Mission Team)

The individuals sailing on each expedition will depend on the objectives of the specific mission. A detailed list of mission personnel sailing on each expedition will be provided in the expedition-specific project instructions.

## 7. Administrative

### A. Points of Contact

See expedition-specific project instructions.

## B. Diplomatic Clearances

See expedition-specific project instructions.

## C. Licenses and Permits

See Appendices A and B for information on the Endangered Species Act Section 7 Concurrence Letter and Essential Fish Habitat Consultation Letters, respectively.

Other expedition specific licenses and permits will be included in the expedition-specific project instructions, including National Environmental Policy Act documentation.

## D. Shipments

See the expedition-specific project instructions.

# II. Operations

The Expedition Coordinator will be responsible for ensuring the science personnel are trained in planned operations and knowledgeable of expedition objectives, priorities and environmental compliance procedures. The Commanding Officer will be responsible for ensuring all operations conform to the accepted practices and procedures for the ship.

## 1. Expedition Itinerary

See expedition-specific project instructions.

## 2. Staging and De-staging

See expedition-specific project instructions.

## 3. Operations to be conducted

See expedition-specific project instructions.

## 4. SCUBA Dive Plan

See expedition-specific project instructions.

## 5. Applicable Restrictions

See expedition-specific project instructions.

## A. Sonar Operations

EM 304, EK60/80, ADCP, and sub-bottom profiler sonar data acquisition are planned for the entire field season. All data acquisition will be conducted in accordance with established standard operating procedures under the direction of the Expedition Coordinator. 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 Appendix A of this document.

## III. Equipment

### 1. Equipment and Capabilities Provided by the Ship

See the expedition-specific supplemental project instructions for any equipment changes specific to an individual expedition.

- Kongsberg EM 304 multibeam echosounder
- Kongsberg Simrad EK60/80 split-beam sonars: general purpose transducers and transceivers (18, 120, 200 kHz) and wide band transducers (38 and 70 kHz)
- Knudsen Chirp 3260 sub-bottom profiler
- Teledyne RDI Workhorse Mariner ADCP (300 kHz)
- Teledyne RDI Ocean Surveyor ADCP (38 kHz)
- Lockheed Martin Sippican XBT Mark21 system (Deep Blue probes)
- Atlantic Oceanographic and Meteorological Laboratory automated XBT launcher (Deep Blue probes)
- Sea-Bird SBE 9-11Plus CTD and deck box
- Sea-Bird SBE 32 carousel and 12 10 L Niskin bottles
- Wet Labs ECO-FLNTU-RTD Fluorescence / Turbidity sensor
- PMEL Oxidation-reduction potential (ORP) sensor
- Sea-Bird SBE 43 Dissolved oxygen (DO) sensor
- PMEL Altimeter sensor and battery pack
- Scientific Computing System (SCS)
- POS/MV with serial data feeds for the GFOE network
- Seapath-380 with serial data feeds for the GFOE network
- Sea-Bird SBE 45 MicroTSG Thermosalinograph (Internal Sea Temp & Conductivity) data feeds for the GFOE network
- Sea-Bird SBE 38 Temperature Probe (External Sea Temp.)
- Scientific Seawater System (Wet Lab Water Sampling Capability)

- Kongsberg dynamic positioning system (DP1)
- Electronic Chart Display and Information System (ECDIS)
- Meteorological and weather sensor package with serial data feeds for GFOE the network
- Three Voice over Internet Protocol (VoIP) telephone lines
- One functioning and seaworthy Safety of Life at Sea (SOLAS)-approved fast rescue boat
- One functioning and seaworthy work boat to support operations and personnel transfers
- Hypack software (OMAO license)

## 2. Equipment and Capabilities Provided by NOAA Ocean Exploration and Partners

See the expedition-specific supplemental project instructions for any equipment changes specific to an individual expedition.

- NOAA Ocean Exploration 6,000 m rated *Deep Discoverer* and *Seirios* ROVs
- Microtops II ozone monitor sun photometer and handheld GPS required for NASA Marine Aerosols Network supplementary project
- Sontek CastAway-CTD
- Kongsberg synchronization unit (K-Sync)
- EK80 wideband transceivers (38 and 70 kHz)
- Kongsberg's Seafloor Information System software and acquisition computer
- EK60/80 acquisition computer
- Sub-bottom profiler acquisition computer
- CTD acquisition computer
- QPS software suite (two licenses)
- GFOE provided VSAT high-speed link (15 Mbps ship-to-shore; 5 Mbps shore-to- ship)
- Backscatter mosaic computer
- Exploration operations networking infrastructure
- MarineStar GPS with satellite corrections serial data feeds provided for the GFOE network
- Telepresence system
- NOAA's National Centers for Environmental Information's (NCEI) Cruise Information Management System (CIMS)
- GFOE VoIP system

- GFOE-provided data storage

## IV. Hazardous Materials

### 1. 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 Leads will be responsible for transporting all mission samples and hazardous materials on and off the ship. By federal regulations and OMAO operations policy, the ship may not sail without a complete inventory of all hazardous materials by name and quantity, material safety data sheets (MSDSs), 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 science team will include with their project instructions and provide to the Commanding Officer of the ship 30 days before departure:

- A list of chemicals by name with anticipated quantity;
- A list of spill response materials, including neutralizing agents, buffers, and absorbents; and
- 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, the science team will notify the 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 science team will provide to the Commanding Officer or their designee:

- An inventory list showing actual amount of hazardous material brought aboard
- An MSDS for each material,



- Confirmation that a sufficient amount of neutralizing agents and spill equipment were brought aboard to contain and clean up all of the hazardous material brought aboard by the program, and
- Confirmation that chemical safety and spill response procedures were brought aboard.

Upon departure from the ship, the science team will provide the Commanding Officer or their designee an inventory showing that all chemicals were removed from the vessel. The Commanding Officer's designee will maintain a log to track the science team's hazardous materials. MSDSs will be made available to the ship's complement, in compliance with hazard communication laws.

The science team is expected to manage and respond to spills of scientific hazardous materials. Overboard discharge of hazardous materials is not permitted aboard NOAA ships.

## 2. Inventory

See expedition-specific project instructions.

## 3. 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 have been provided to the ship's Environmental Compliance Officer (ECO).

## 4. Radioactive Materials

Standard NOAA Ocean Exploration operations aboard NOAA Ship *Okeanos Explorer* do not include any radioactive materials. Should this change, it will be noted in the expedition-specific project instructions.

## V. Additional Projects

### 1. Supplementary Projects

#### A. NASA Maritime Aerosol Network

During the expedition, 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.

NOAA Ocean Exploration's Expedition Coordinators will deliver the resulting data to the NASA MAN primary investigator, Alexander Smirnov. All collected data will be archived and publically available on the [NASA MAN website](#).

The equipment will reside on the ship and will be stewarded by NOAA Ocean Exploration's Expedition Coordinators. See Appendix C for the information from the survey of opportunity form.

## 2. NOAA Fleet Ancillary Projects

No NOAA fleet ancillary projects are planned. Should this change, it will be noted in the expedition-specific project instructions.

# VI. Disposition of Data and Reports

## 1. Data Responsibilities

Disposition of data gathered aboard NOAA ships will conform to [NOAA Administrative Order \(NAO\) 212-16 Policy on NOAA Observing Systems Portfolio Management](#), [NAO 212-15 Management of Environmental Data and Information](#), and the [NOAA Plan for Increasing Public Access to Research Results](#). [Procedural Directives](#) from NOAA's Environmental Data Management Committee guide the implementation of these orders.

All data acquired on *Okeanos Explorer* will be provided to public archives without proprietary rights.

## 2. NOAA Ocean Exploration Responsibilities

The Expedition Coordinator will work with the ship's Operations Officer(s) to ensure data pipeline protocols are followed for the final archiving of all data acquired on *Okeanos Explorer* without proprietary rights. Detailed data management plans will be included as an appendix to the expedition-specific project instructions.

## 3. Deliverables

### A. At Sea

- a. Daily plans of the day (PODs)
- b. Daily internal situation reports (SITREPs)
- c. Summary forms for each CTD rosette cast
- d. Daily summary bathymetry data files

- e. Raw sonar files (EM 304, EK60/80, Knudsen 3260, ADCP)

## B. Post Expedition

- a. Refined SOPs for all pertinent operational activities
- b. Assessments of all activities

## C. Science

- a. Multibeam raw and processed data (details noted in the expedition-specific project instructions)
- b. XBT and CTD raw and processed data
- c. EK60/80 raw data
- d. Knudsen Chirp 3260 sub-bottom profiler raw data and processed images
- e. ADCP raw data
- f. Expedition Report
- g. Dive summary reports
- h. Daily ROV and sampling products
- i. Raw ROV environmental data
- j. Raw ROV environmental sensor data
- k. Biological and geological specimens
- l. Summary fact sheet (ROV expeditions only, typically one summary for each expedition of a field season)

See the expedition-specific project instructions for any additional products or data deliverables.

## 4. Archive

NOAA Ocean Exploration and OMAO will work together with NCEI's Data Management Team to ensure the documentation and stewardship of acquired datasets in accordance with NAO 212-15. All expedition-specific project instructions will include a detailed data management plan with relevant information.

# VII. Meetings, Vessel Familiarization, and Expedition Evaluations

## 1. Shipboard Meetings

A safety brief and overview of the plan of the day typically will occur on the bridge each morning at 0800 (0745 for days with ROV dives). Daily operations briefing meetings will be held

at a time and location determined by the Operations Officer(s), based on watch schedule, to review the current day and define operations, associated requirements, and staffing needs for the following day. Safety meetings and daily operations briefing meetings may alternatively be conducted outside (ex: boat deck) as a COVID-19 mitigation measure, if still applicable at the time of the expedition. The POD will be posted each evening for the next day in specified locations throughout the ship. NOAA Ocean Exploration daily situation reports (SITREPs) will be produced by the Expedition Coordinator. OMAO-related information in SITREPs will be discussed during either the safety or operations briefing meetings. Additionally, the Expedition Coordinator and Operations Officer(s) will meet as needed to discuss OMAO-related information in SITREPs. The Operations Officer(s) will be included on SITREP emails sent to shore to provide additional clarification as needed.

## 2. Pre-expedition Meeting

The Expedition Coordinator and Commanding Officer will conduct a meeting of pertinent mission and ship personnel to discuss required equipment, planned operations, and concerns and establish mitigation strategies for all concerns. This meeting will be conducted before the beginning of the expedition with sufficient time to allow for preparation of the ship and mission personnel. Usually, the Operations Officer(s) will be delegated to help the Expedition Coordinator arrange this meeting.

## 3. Vessel Familiarization Meeting

The Commanding Officer is responsible for ensuring mission personnel are familiarized with applicable sections of the standing orders and vessel protocols, e.g., meals, watches, etiquette, drills, etc. A vessel familiarization meeting will be conducted in the first 24 hours of the expedition's start (prior to departure) and will usually be conducted by the Operations Officer(s).

## 4. Post-expedition Meeting

The Commanding Officer is responsible for conducting a meeting no earlier than 24 hours before or seven days after the completion of the expedition to discuss the overall successes, challenges, and shortcomings of the expedition. Concerns regarding safety and efficiency and suggestions for future improvements will be discussed and mitigations for future expeditions will be documented for future use. This meeting will be attended by the applicable ship personnel, the Expedition Coordinator, and mission personnel and will usually be arranged by the Operations Officer(s) and Expedition Coordinator.

## 5. Expedition Evaluation Report

Within seven days of the completion of the expedition, the Expedition Coordinator is to complete a [Marine Operations Customer Satisfaction Survey](#). Submitted form data will be deposited into a spreadsheet for analysis by OMAO management. Though the complete form will not be shared with all ship personnel, specific concerns and praises will be passed along without attribution.

## VIII. Miscellaneous

### 1. Meals and Berthing

The ship will provide meals for the mission personnel listed in the expedition-specific project instructions. Meals will be served three times daily throughout the expedition, beginning one hour before scheduled departure and ending two hours after completion of the expedition. 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, plates from meals missed, a variety of sandwich items, cheese, fruit, milk, juices, coffee) during what are not typically meal hours. Special dietary requirements for any mission personnel will be made available to the ship's Commanding Officer at least 21 days prior to the expedition.

Berthing requirements, including number and genders of the mission personnel, will be provided to the Operations Officer(s) by the Expedition Coordinator. The Expedition Coordinator and Operations Officer(s) will work together on a detailed berthing plan to accommodate the gender mix of the mission personnel, taking into consideration the current makeup of the ship's complement. The Expedition Coordinator will be 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 that were issued. The Expedition Coordinator will also be responsible for the cleanliness of the laboratory spaces and storage areas used by the science team, both during the expedition and at its conclusion prior to departing the ship.

All NOAA federal employees will have proper travel orders when assigned to any NOAA ship. The Expedition Coordinator will ensure that all non-NOAA or nonfederal mission personnel aboard also have proper orders. It will be the responsibility of the Expedition Coordinator to ensure there is a mechanism in place to provide lodging and food to all mission personnel and to reimburse them for associated costs in the event the ship becomes uninhabitable and/or the galley is closed during any part of the scheduled expedition.

Anyone boarding a NOAA vessel gives 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 alcohol and illegal drugs aboard NOAA vessels.

## 2. Medical Forms and Emergency Contacts

All mission personnel must complete the [NOAA Marine Health Services Questionnaire \(NHSQ, NF 57-10-01 \(3-14\)\)](#) in advance of the expedition. A copy of the NHSQ can be obtained from the Expedition Coordinator or the NOAA website. NHSQs must be accompanied by the Tuberculosis Screening Document\* ([NOAA Form 57-10-02](#)) in compliance with [OMAO Policy 1008: Tuberculosis Protection Program](#).

**\*NEW** as of 2022, yearly Tuberculosis Skin Testing or Blood Tests are not required (unless clinically indicated) and are now replaced with a new 57-10-02 Tuberculosis Screening Form. The questions on the 57-10-02 could clinically indicate the need for a TB test (but this should be far and few between). Please fill out Section A, sign, and submit to OMAO. OMAO will complete the "Provider's Recommendation" and will follow up if subsequent TB testing is required. \*

Tuberculosis Screening Document is valid for 1 year. For mission personnel under the age of 50, must submit an NHSQ every two years, and those age 50 and above must submit an NHSQ every year.

As of October 7th, 2021, the COVID-19 vaccine is mandatory for all personnel embarking on NOAA ships and aircraft. To sail on a NOAA platform, personnel must be fully vaccinated and boosted for COVID-19. Additional information about COVID-19 policies and requirements to sail can be provided by OMAO Marine Health Services.

Mission personnel must submit their completed COVID-19 vaccination card, NHSQ and Tuberculosis Screening Document, indicating the expedition ship (i.e., *Okeanos Explorer*), to Marine Health Services at the applicable Marine Operations Center (see below) so they are received no later than four weeks prior to the start of the expedition to allow time for additional information to be obtained and submitted should Marine Health Services require it before granting clearance to sail. Mission personnel should take precautions to protect their personally identifiable information (PII) and medical information. The only secure submission process approved by NOAA is [Kiteworks](#) by Accellion, which requires the sender to set up an account using a valid NOAA email address and password. User accounts may expire after 30 days of inactivity, but new ones can be created as needed to send and receive files.

Mission personnel will receive an email when Marine Health Services clears them to sail if they provide a legible email address on their NHSQ.

Forms and questions should be sent to:

Marine 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)

Prior to departure, the Expedition Coordinator will provide an electronic listing of emergency contacts to the Executive Officer for all embarked mission personnel with the following information: emergency contact name, address, relationship to mission personnel, and telephone number.

COVID-19 guidelines and expectations specific to mission personnel will be included in the expedition-specific project instructions. Any NOAA Ocean Exploration-specific guidelines and expectations will be in addition to OMAO COVID-19 requirements and the Commanding Officer's standing orders for the ship. All mission personnel will be responsible for ensuring their compliance with the COVID-19 guidelines and expectations from both NOAA Ocean Exploration and OMAO.

Mission personnel sailing aboard *Okeanos Explorer* must fill out a [Sailing Contact Form](#) that collects emergency contact information for each person. This information is available to the Operations Officer to fulfill safety requirements to sail.

### 3. 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 are 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.

Operational Risk Management (ORM): As part of a NOAA-wide initiative, risk management procedures will be followed for every operation to be conducted aboard the ship. 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. Risk assessment will be ongoing and updated as necessary, particularly for new operations. In addition to over-the-side operations, ORM will also apply 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 aboard *Okeanos Explorer*.
- All onboard personnel can call a halt to operations/activities in the event of a safety concern.

## 4. Communications

The Expedition Coordinator will prepare and submit daily SITREPs to NOAA Ocean Exploration. Sometimes it may be 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. Communication with the Marine Operations Center is primarily via email and the VSAT link.

[Specific information on how to contact \*Okeanos Explorer\* and all other fleet vessels](#) can be found on the OMAO website.

### Important Telephone and Facsimile Numbers and Email Addresses

#### NOAA Ocean Exploration

Kasey Cantwell, Operations Chief, Expeditions and Exploration Division

Email: [kasey.cantwell@noaa.gov](mailto:kasey.cantwell@noaa.gov)

Cell: (301) 717 - 7776

Rachel Medley, Division Chief, Expeditions and Exploration Division

Email: [rachel.medley@noaa.gov](mailto:rachel.medley@noaa.gov)

Cell: (301) 789 - 3075

NOAA Ocean Exploration Mission Iridium (dry lab): (808) 851 - 3827



## NOAA Ship *Okeanos Explorer*

Telephone methods are listed in order of increasing expense.

*Okeanos Explorer* Cellular: (401) 932-4114

*Okeanos Explorer* Iridium: (808) 659-9179

*Okeanos Explorer* INMARSAT B:

Line 1: 011-870-764-852-328

Line 2: 011-870-764-852-329

Voice over Internet Protocol (VoIP) Phone:

(541) 867-8932

(541) 867-8933

(541) 867-8934

Email: [Ops.Explorer@noaa.gov](mailto:Ops.Explorer@noaa.gov) (include addressee's name in the subject field)

Email: For dissemination of all hands emails while aboard, contact the Expedition Coordinator (firstname.lastname@noaa.gov).

## 5. IT Security

Data related to the mission will be accessible to mission personnel via the GFOE network, which will be accessible via a Wi-Fi connection. In the event that mission personnel require access to the ship's network in addition to the GFOE network, computers must comply with all OMAO IT policies prior to boarding the ship. Specifically, 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,
- Installation of the latest critical operating system security patches, and
- No external public internet service provider 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.

## 6. Foreign National Guest Access to OMAO Facilities and Platforms

See expedition-specific project instructions.

### References

NMFS. (2013). Compliance Guide for Right Whale Ship Strike Reduction Rule (50 CFR 224.105). U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service. OMB Control #0648-0580.

## Appendix A: Endangered Species Act Section 7 Concurrence Letter

As required under Section 7 of the Endangered Species Act (ESA), NOAA Ocean Exploration conducted a programmatic consultation with the NMFS Office of Protected Resources to request their concurrence with NOAA Ocean Exploration's biological evaluation determining that FY23 operations on *Okeanos Explorer* are not likely to adversely affect ESA-listed marine species. NMFS concurred with NOAA Ocean Exploration's determination.

The FY23 Programmatic Letter of Concurrence and the Project Design Criteria are attached as supplemental documents to this archived document in their entirety.

## Appendix B: Essential Fish Habitat Consultation Letters

NOAA Ocean Exploration has completed consultation with NOAA's Habitat Conservation Division on potential impacts of our operations to Essential Fish Habitat (EFH) in the West Coast and Alaska Regions. They concurred that our operations would not adversely affect EFH provided adherence to our proposed procedures and their guidance stated in the letter below.

Consultation documents are finalized. See the expedition-specific project instructions for applicable consultation letters.



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL MARINE FISHERIES SERVICE  
West Coast Region  
650 Capitol Mall Suite 5-100  
Sacramento, California 95814

August 3, 2022

**Refer to NMFS No: [WCRO-2022-01863]**

Geneve Fisher  
Deputy Director  
NOAA Office of Ocean Exploration and Research  
Silver Spring, Maryland 20910

Re: Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat  
Response for Deep-Sea Exploration Activities Aboard NOAA Ship *Okeanos Explorer* in 2022-2024

Dear Ms. Fisher:

NOAA's National Marine Fisheries Service (NMFS) has reviewed the NOAA Office of Ocean Exploration and Research's (OER) letter dated July 1, 2022 requesting an abbreviated essential fish habitat (EFH) consultation for the field activities to be conducted aboard the NOAA Ship *Okeanos Explorer* in the West Coast and Alaska Regions in 2022-2024. Section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) and the Fish and Wildlife Coordination Act (FWCA) require federal agencies to consult with us on all actions that may adversely affect EFH and other aquatic resources. The EFH consultation process is guided by the requirements of our EFH regulations at 50 CFR 600 Subpart K, which mandates the preparation of EFH assessments and generally outlines each agency's obligations in this consultation process. In support of this consultation process, you provided a notice of the proposed action and your agency's conclusion regarding impacts on EFH. Your request references previously completed EFH consultations between NOAA Fisheries Greater Atlantic and Southeast Regions and OER and NOAA's National Centers of Coastal Ocean Science (NCCOS) for similar research activities conducted in U.S. federal waters of the Gulf of Mexico, South Atlantic Bight and Caribbean in 2018-2020 and activities in the Greater Atlantic Region and Southeast Atlantic from 2019 to 2021. After reviewing the above information, NMFS provides this response pursuant to section 305(b)(4)(A) of the MSA and the FWCA.

Proposed Action

NOAA Ship *Okeanos Explorer* expeditions in 2022 thru 2024 will contribute to the West Coast Expanding Pacific Research and Exploration of Submerged Systems (EXPRESS) campaign and the regional Seascape Alaska campaign. EXPRESS is the latest evolution of the multi-year, multi-ship campaign that will help develop mitigation measures for operations occurring in the region and continued support of marine protected areas. Other initiatives include the Nippon Foundation-GEBCO Seabed 2030 initiative and the National Strategy for Ocean Mapping, Exploring, and Characterizing the United States Exclusive Economic Zone (NOMECS), which looks to produce a bathymetric map of the world ocean floor by 2030.

Consistent with previous expeditions in the Gulf of Mexico, western Atlantic, and Pacific, OER will work with the scientific community and public to characterize unknown and poorly-known areas through telepresence-based exploration including deep water mapping systems. Mapping and remotely operated vehicle (ROV) operations generally occur in water depths of 200 meters (m) and greater. During OER operations, expedition teams would conduct: seafloor, sub-bottom and water column mapping using multibeam, split-beam, sub-bottom profiler and acoustic Doppler current profiler (ADCP) sonar systems; oceanographic data collection primarily using the vessel's CTD rosette and expendable bathythermographs (XBTs); and seafloor and water column data collection using an integrated, two-body ROV system and additional unmanned surface vehicles (USVs) and autonomous underwater



vehicle systems (AUVs). Using ROV and AUV systems during expeditions to visually investigate unknown and poorly known deep water habitats within and around priority areas will help to establish baseline habitat characterization and species inventories for scientists and managers.

### **Magnuson-Stevens Fishery Conservation and Management Act Comments**

#### Action Area and Essential Fish Habitat Affected by the Project

The action areas covered by this request encompass the marine environment in the areas around the North Pacific Ocean, Eastern Pacific Ocean, the Gulf of Alaska (GOA) and the eastern Aleutian Chain, and the vessel transit areas between ports, including but not limited to ports of call located in North America and Pacific Islands. Separate EFH consultations will be submitted for operations located in the Pacific Island Region.

#### *U.S. West Coast*

OER anticipates spending the majority of the FY2022 and FY2024 field season along the U.S. Pacific Coast contributing to the EXPRESS campaign. This work will also address priorities identified from the 2020 Consortium for Ocean Leadership (COL) workshop. Mapping priorities include filling in the gaps in current mapping coverage deeper than 200 m with high-resolution data offshore of California, Oregon, and Washington, and providing baseline data for further exploration. ROV and AUV exploration priorities are to be determined depending on the needs of ocean resource managers and partners and the ocean science community, and are anticipated to include geological hazards, deep sea corals, seamounts, and critical minerals/seeps. Operations in the Pacific Ocean are expected to commence in October, 2022. The majority of these surveys will take place in the U.S. Exclusive Economic Zone (EEZ) but may deviate in track lines, locations, and timing for various reasons (e.g., crew safety, inclement weather, mechanical issues).

The proposed field activities off the West Coast occur within EFH for various federally managed fish species within the Pacific Coast Groundfish, Pacific Coast Salmon, Coastal Pelagic Species, and Highly Migratory Species Fishery Management Plans (FMPs). In addition, the project would occur within rocky reef and “areas of interest,” which are designated as habitat areas of particular concern (HAPC) for various federally managed fish species within the Pacific Coast Groundfish FMP. Although the proposed field activities would occur primarily in deeper waters, the proposed action could occur within the vicinity of other HAPCs identified in the Pacific Coast Groundfish and Pacific Coast Salmon FMPs, including canopy kelp, seagrasses, or estuaries, such as when leaving or returning to ports. HAPC are described in the regulations as subsets of EFH which are rare, particularly susceptible to human-induced degradation, especially ecologically important, or located in an environmentally stressed area. Designated HAPC are not afforded any additional regulatory protection under the MSA; however, federal projects with potential adverse impacts to HAPC will be more carefully scrutinized during the consultation process.

#### *Alaska*

NOAA OER’s operations in the region during FY2023 will focus on supporting the existing SeaScape Alaska effort. Mapping operation priorities include gaps in mapping coverage deeper than 200 m offshore of the GOA, and the eastern Aleutian chain. ROV and AUV exploration priorities include geological hazards, deep sea corals, seamounts, and critical minerals/seeps. OER plans to conduct operations in Alaskan waters with a concentrated effort in the GOA and the eastern Aleutian Chain. Weather conditions and transit times may impact operations causing exact start and end dates to vary by a few days or weeks expanding the duration of corresponding expeditions. The GOA can be accessible as early as April, and the Aleutians are best from June to September.

The North Pacific Fishery Management Council (NPFMC) has identified EFH for nearshore marine waters in the vicinity of the GOA and the eastern Aleutian Chain to include EFH for all five species of Pacific salmon. There are no anadromous rivers in the project area. The proposed project location is designated as EFH for groundfish and scallops. The proposed field activities off the coast of Alaska occur within EFH for various federally managed fish species within the Bering Sea and Aleutian Islands Groundfish, Gulf of Alaska Groundfish, Scallop, and Salmon FMPs. HAPCs within EFH are areas where fisheries management identifies a need to conserve sensitive, rare habitats from anthropogenic activities such as fishing practices or developmental stress. In order to protect HAPCs, certain habitat protection areas and habitat conservation zones have been designated. The following HAPCs have

been designated in the project area: Alaska Seamount Habitat Protection Areas, GOA Coral Habitat Areas of Particular Concern and Bowers Ridge Habitat Conservation Zone. As noted previously, there are no additional regulatory protections under the MSA for HAPCs; however, federal projects with potential adverse impacts to HAPC will be more carefully scrutinized during the consultation process.

#### Effects of the Action

The NMFS West Coast and Alaska Regions have reviewed information provided on the proposed activities, as well as the conservation measures and best management practices incorporated into the action to address adverse effects to EFH. Adverse effects to EFH would include bottom disturbance, increased turbidity, impacts associated with sample collection, and increased sound. However, the proposed action includes measures to avoid, minimize, or otherwise offset those adverse effects to EFH. For instance, to the extent practicable, hard-bottom and other sensitive habitats (e.g., corals, seagrass) would be avoided when anchoring or operating equipment, machinery will maintain an appropriate altitude off the bottom, cameras and other technology will be used to detect and avoid collisions, and speed and the type of equipment used will be adjusted depending upon the environmental conditions. In addition, only portions of specimens will be collected whenever possible to avoid mortality and minimize adverse effects to associated habitats. Increased sound in the marine environment from vessel operation or sonar emissions would only be expected to result in temporary behavioral effects. Therefore, in our joint assessment of the overall activity including the experimental design, the nature of collection, and the scope of the proposed activities, we have no additional EFH conservation recommendations to provide pursuant to Section 305(b)(2) of the MSA.

#### Supplemental Consultation

Pursuant to 50 CFR 600.920(l), OER must reinitiate EFH consultation with NMFS if the proposed action is substantially revised in a way that may adversely affect EFH, or if new information becomes available that affects the basis for NMFS' EFH conservation recommendations.

#### **Fish and Wildlife Coordination Act Comments**

The purpose of the FWCA is to ensure that wildlife conservation receives equal consideration, and is coordinated with other aspects of water resources development [16 U.S.C. 661]. The FWCA establishes a consultation requirement for Federal departments and agencies that undertake any action that proposes to modify any stream or other body of water for any purpose, including navigation and drainage [16 U.S.C 662(a)]. Consistent with this consultation requirement, NMFS provides recommendations and comments to Federal action agencies for the purpose of conserving fish and wildlife resources. The FWCA allows the opportunity to offer recommendations for the conservation of species and habitats beyond those currently managed under the MSA.

As described in the EFH effects analysis, NMFS has determined that bottom habitat, potentially including biogenic and rocky reef habitats, will be negatively impacted by proposed project activities. Given the importance of this habitat to a variety of fish and wildlife species, the proposed conservation measures to avoid or minimize adverse effects to EFH are also considered necessary to address negative impacts to fish and wildlife resources managed under the FWCA.

Thank you for consulting with NMFS and considering our comments. If you have any questions regarding this response, please contact Eric Chavez via email at [Eric.Chavez@noaa.gov](mailto:Eric.Chavez@noaa.gov) or Charlene Felkley at [Charlene.Felkley@noaa.gov](mailto:Charlene.Felkley@noaa.gov) for questions related to the West Coast or Alaska, respectively.

Sincerely,



Ryan J. Wulff  
Assistant Regional Administrator  
for Sustainable Fisheries  
West Coast Region

HARRINGTON.GRETCH  
EN.ANNE.1365893833  
893833  
Date: 2022.08.04 14:27:22 -0800

Gretchen Harrington  
Assistant Regional Administrator  
for Habitat Conservation  
Alaska Region

# Appendix C: NASA Maritime Aerosols Network Survey of Opportunity

The information below was provided from an exploration of opportunity form submitted to NOAA Ocean Exploration by Dr. Alexander Smirnov.

## Survey or Project Name

Maritime Aerosol Network

## Lead POC or Principle Investigator (PI & Affiliation)

Dr. Alexander Smirnov, NASA

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

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

# Appendix D: Operational Policies and Procedures for Explorations of Underwater Cultural Heritage Sites

## 1. Purpose

The purpose of this document is to provide guidance for NOAA Ocean Exploration mission activities conducted aboard NOAA Ship *Okeanos Explorer* when such mission activities involve either unexpected discovery or targeted exploration of potential underwater cultural heritage (UCH) sites.

## 2. Background

Since the inception of NOAA's ocean exploration program in 2000, NOAA Ocean Exploration data management practices have been guided by the 2000 President's Panel for Ocean Exploration report recommendations, which prioritized rapid and unrestricted data sharing as one of five critical exploration program components. More recently, Public law 111-11 [Section XII Subtitle A Part 1 Exploration] reinforced and expanded NOAA Ocean Exploration data management objectives, continuing to stress the importance of sharing unique exploration data and information to improve public understanding of the oceans, and for research and management purposes.

NOAA Ocean Exploration missions conducted aboard *Okeanos Explorer* offer a best-case scenario for meeting program mission objectives related to data sharing:

- Dedicated shipboard and shoreside teams work in tandem to ensure near real-time data product generation from shipboard and ROV sensors,
- Telepresence is used to share data products and information in real-time with shoreside participants and the public,
- Mission information is publicly communicated in real time via internet access to streamed video and related resources, and
- Data are managed throughout the lifecycle in accordance with all applicable policy directives and community best practices.

The nature of exploration defines the possibility of discovery, including unexpectedly exposing the location of underwater cultural resources; on some occasions, exploration targets are specifically focused on the exploration of suspected UCH sites. The need to protect the location of suspected UCH sites until they are fully understood, whether purposefully explored or fortuitously discovered, is an important statutory responsibility. During NOAA Ocean Exploration expeditions aboard *Okeanos Explorer*, a range of operational procedures must be



modified to ensure this protection occurs to the fullest extent possible. The following sections of this document define the methods for ensuring protection of these sensitive data throughout the data lifecycle.

## 3. Authority

### A. Marine Archaeology

This document is informed by: the Federal Archaeology Program, U.S. legislation on the treatment of cultural remains, and the UNESCO Convention for the Protection of the Underwater Cultural Heritage. NOAA Ocean Exploration supports the standards for conducting marine archaeological activities enumerated in the annex rules of the UNESCO Convention on the Protection of the Underwater Cultural Heritage.

Preservation and protection of prehistoric and historic cultural resources is the policy of the federal government, and NOAA Ocean Exploration has a responsibility to consider the effects of its activities on these resources. If data are found to be sensitive because they reveal the location of a historically significant cultural resource, Section 304 of the National Historic Preservation Act (NHPA) provides that the head of a federal agency or other public official shall withhold from public disclosure information about the location, character, or ownership of a historic property when disclosure may cause a significant invasion of privacy, risk harm to the historic property, or impede the use of a traditional religious site by practitioners. This document uses the term underwater cultural heritage, or UCH, to refer to historic and prehistoric traces of human existence that are totally or partially underwater.

### B. Data Management

Geospatial data are considered a national capital asset. National policy and international standards guide data management best practices to ensure timely and broad public accessibility to these data. Within NOAA, data management practices are informed by NOAA Administrative Order (NAO) 212-15 Management of Environmental Data and Information, which states in part:

*Environmental data will be visible, accessible, and independently understandable to users, except where limited by law, regulation, policy (such as those applicable to personally identifiable information or protected critical infrastructure information or proprietary trade information), or by security requirements.*

Sensitive UCH data collections require special handling while determinations are made as to whether a location will be nominated and will qualify for protection under the NHPA Section 304. NOAA Ocean Exploration considers these data to fall within the scope of the NAO 212-15 exceptions during this period.

## 4. Roles and Responsibilities

Particular to the NOAA Ship *Okeanos Explorer*, there are many methods employed to ensure rapid and broad data access. When the goal is to restrict access to precise positional information, several operational scenarios must be considered. Alternate operating procedures are then developed for:

- Real-time operations:
  - Routine data transmissions and events that broadcast the ship’s position
  - Seafloor mapping operations and data production
  - Telepresence-enabled remotely operated vehicle (ROV) operations
  - Video annotations and production
  - Public broadcast operations via website and maps
- Post-expedition data management

The tables below (Tables 1-2) summarize the roles and responsibilities of each team lead in implementing the policy through the management approaches described herein and the standard operating procedures (SOPs) as defined in Section V.

**Table 1. Mission personnel UCH roles and responsibilities (coordinated by the Expedition Coordinator)**

Responsible Team	Accountable for These (Primary) Actions
Expedition Coordinator	Notification of nondisclosure agreement to mission personnel; identify, communicate, and enforce UCH buffer zone; coordinate with team leads and key personnel; ensure SOP compliance.
Mapping Team	Segregate raw and processed data into marked files so that restricted data are held separately and are clearly marked.
Telepresence Team	Ensure broadcast data are free of any positional information.
Video Team	Ensure UCH dives and dive products are annotated as such; ensure all raw data and products are not geo-referenced.
Data Management Team	Ensure all UCH data are appropriately segregated and documented. Follow post-expedition and archiving procedures as specified.

Responsible Team	Accountable for These (Primary) Actions
Communications Team	Ensure all communications are controlled through one primary point of contact; ensure communications are not geo-referenced.

**Table 2.** *Okeanos Explorer* crew (ship personnel) UCH roles and responsibilities (coordinated by the Commanding Officer or designee)

Responsible Team	Accountable for These (Primary) Actions
OMAO Operations	Notification to crew of nondisclosure agreement responsibilities; stop scientific computing system (SCS) events (email notifications) upon entering buffer zone; start SCS events (email notifications) upon exiting buffer zone.

## 5. Standard Operating Procedures for UCH

### A. Mapping Operations

The following outlines the process for pre-expedition planning, mapping field operations, post-expedition follow-up, and data archiving procedures for the following scenarios:

- When UCH is unexpectedly discovered on a standard, non-UCH targeted mapping expedition.
- When the expedition is specifically targeted at UCH.
- When an isolated UCH survey is conducted as part of a broader expedition.
- When a large survey is conducted over a UCH area with potential to contain multiple instances of UCH.

### Pre-expedition Planning

#### Standard Mapping Pre-expedition Planning

These SOPs do not affect normal pre-expedition or data management processes for standard mapping expeditions that are not conducting targeted UCH mapping. During pre-expedition planning, the Expedition Coordinator is advised to consult with the NOAA Ocean Exploration Marine Archaeologist to discuss possible UCH targets in the mission area. The mapping team may be requested to optimize line planning as necessary to detect UCH and to process data,

when possible, to a smaller nonstandard grid size to create higher resolution mapping products to provide better images of potential UCH. If so, follow guidance in the UCH Mapping Pre-Expedition Planning section below.

### UCH Mapping Pre-expedition Planning

- Background information: The mapping team should be supplied with information about targets in the survey area that will help in their detection and identification. This information will be supplied by NOAA Ocean Exploration's Marine Archaeologist and collaborating archaeologists.
- Data processing and data products: Archaeologists involved with the survey will consult with the mapping team to discuss data processing and data products that will increase the potential to discover UCH. The Expedition Coordination and Mapping Team will work with NOAA Ocean Exploration's Marine Archaeologist to coordinate this activity.
- Consultation and data sensitivities: Expedition planning must also include a discussion on data sensitivity and data management/archiving. Pre-expedition is the appropriate time to collaborate with other federal and state agencies that may have a legal or management interest in potential UCH in the survey area. The risks to the resources should be weighed to inform a post-expedition decision on whether or not UCH with potential historical or cultural significance should have information about their location restricted from public release. This should be a collaborative discussion that includes NOAA Ocean Exploration's Marine Archaeologist, the Expedition Coordinator, and the expedition data manager along with cultural resource managers and archaeologists from other agencies with an interest in UCH. Possible interested parties include the NOAA Office of National Marine Sanctuaries (ONMS) Maritime Heritage Program, the Bureau of Ocean Energy Management (BOEM), the Bureau of Safety and Environmental Enforcement, the U.S. Navy History and Heritage Command, the National Park Service (NPS), state historic preservation officers, and others. While planning expeditions in any foreign country, the host government should be made aware of the potential to discover UCH.
- Survey areas where an agency has responsibility for UCH: If applicable, the data management team should carry out a consultation process with the agency with UCH responsibility to identify any special protocols that should be put in place to conform with the policies of the agency and these should be incorporated into the data management plan. The Expedition Coordinator is responsible for the overall execution of the data management plan.
- Mapping missions within the National Marine Sanctuary System: If applicable, pre-expedition discussions between the Expedition Coordinator and ONMS should include the ONMS Director of the Maritime Heritage Program and the Maritime Heritage

Coordinator at the sanctuary site. They will help determine the sensitivity of data and data products.

## Mapping Field Operations

### Standard Mapping Field Operations

- While standard mapping field operations are not affected by the marine archaeology SOP, any features which appear to be of cultural or historical significance, and appear anthropogenic in origin, do require special consideration. Cultural features include wrecks of ships or aircraft, the recognizable debris from wrecks, evidence of previous human settlements, and other items which may appear anthropogenic in origin and have some associated cultural or historical significance.
- The Expedition Coordinator will consult with NOAA Ocean Exploration's Marine Archaeologist immediately on the discovery of UCH in the field. The Expedition Coordinator should provide an image and location information by email. The NOAA Ocean Exploration Marine Archaeologist may request special data products that have higher resolutions than standard data products to aid in characterizing the UCH.
- If the UCH is determined not to be historically or culturally significant or it is determined that no harm will result by disclosing position information, no change to standard mapping field procedures is required.
- If the UCH is historically significant or potential to be historically significant, data and data products will be archived but not publicly accessible. The data can be obtained by request and approval from the NOAA Ocean Exploration Marine Archaeologist.
- The Expedition Coordinator is responsible for the overall execution of the data management plan.
- When appropriate, NOAA Ocean Exploration's Marine Archaeologist will contact relevant entities to notify them of the discovery and consult with them regarding the significance of the UCH.

### UCH Targeted Mapping Field Operations

- No informal information about the UCH should be released to the general public by ship or mission personnel. This includes posting information and images on social networking sites like Facebook, Twitter, or personal blogs. Mapping data will be released to the public following the normal process, and announcement of discoveries will be made through the appropriate offices and public affairs officials.
- A 5-nm buffer zone will be created around the UCH isolated survey box. The following steps will be taken just prior to entering the buffer zone in order to stop broadcasting the ship's location while the survey is conducted:

- NOAA Shiptracker: Disable the scientific computing system (SCS) feed from the ship going to Shiptracker.
- Automated information system (AIS): NOAA requires that the AIS feed that broadcasts information about the ship, including position, course and speed, must remain on at all times for collision avoidance and other safety reasons. Although the International Maritime Organization's (IMO) Maritime Safety Committee condemns the internet publication of AIS data, it is easily available for viewing. During the expedition planning phase, the Expedition Coordinator will provide the AIS broadcast range on Okeanos Explorer to the chief scientist and science team. The chief scientist, the science team, and other parties involved in a UCH mapping expedition should be made aware of this and decide whether the value of the operation merits acceptance of the potential issues/outcomes imposed.
- Telepresence video feeds: Do not stream any feeds that include a visible ship location (the multibeam acquisition screen does not have high enough resolution over the video feed to see ship position). Streams include, but are not limited to, the SCS data screen, any active mapping data acquisition screens, and video feeds that show the ship's location. It is acceptable to stream video feeds that do not include the ship's location.
- The Expedition Coordinator will ensure the survey department takes steps to distinguish and separate UCH mapping data from non-UCH mapping data as appropriate.
- Raw multibeam data acquisition: Raw data will be logged in the standard folder structure on the multibeam acquisition computer. Raw data will be copied into a "Restricted" folder in the RAW data network folder structure. Data acquisition and processing logs will clearly state which files are restricted.
- Multibeam data field processing: Restricted files will be processed and gridded separately from other nonrestricted data and will be clearly labeled as such in projects and filenames. The products will be created according to normal field quality-control procedures, but will not be sent to shore with the daily products so that they do not become publicly available via normal channels (e.g., FTP site, NOAA Ocean Exploration Digital Atlas).
- Raw EK60/80 and sub-bottom data acquisition: Raw data will be logged in the standard folder structure on the acquisition computers. Raw data will be copied into a "Restricted" folder on the RAW and CRUISE DATA data network folder structure. Data acquisition and processing logs will clearly state which files are restricted.
- Cruise data transfer (*Okeanos Explorer* to University of New Hampshire) Package: In the cruise data package carried from the ship by the Mapping Team Lead, a "Restricted" top-level directory will be added in the cruise data folder. Within the "Restricted" folder

the same directory structure as the unrestricted folder will be repeated (i.e., SCS, CTD, Multibeam, Imagery, etc.).

- CTD and XBT operations: CTD and XBT data collected within the buffer zone do not need to be isolated from non-UCH data or repressed from the NOAA Ocean Exploration Digital Atlas. CTD and XBT files should follow the normal unrestricted processing procedures and archiving.
- Daily updates: Daily updates are normally linked to the location of the ship at the time the update is posted. If daily updates are made during UCH surveys, no position will be provided. If a position is required, a nearby position outside the 5-nm buffer zone of the survey area can be provided.
- Normal transmissions from the ship will resume after finishing UCH survey operations and exiting the 5-nm buffer zone. Exiting the buffer zone should occur at approximately the same location as entry to prevent obvious data location gaps pointing to the UCH location.

## Post-expedition Follow-up

### Information Release

No informal information about UCH should be released to the general public by ship or mission personnel. This includes posting information and images on social networking sites like Facebook or personal blogs. Mapping data will be released to the public following the normal process, and announcement of discoveries will be made through the appropriate offices and public affairs officials.

### Standard Mapping Expedition Follow-up When UCH is Discovered

- The mapping team will provide a brief summary of the survey and target that includes a description of the survey, water depth, site location, site dimensions, bottom type, and images of the target at the best available resolution.
- The Expedition Coordinator and the NOAA Ocean Exploration Marine Archaeologist will have an initial consultation to discuss the nature of the UCH and its potential significance. This consultation may include other agencies or entities.
- If the UCH is determined not to be historically significant, no change to standard data management procedures is required.
- If the UCH has the potential to be historically significant but it is determined that no harm will result by disclosing position information, such as UCH in deep water, no change to standard data management procedures is required.
- If the UCH has the potential to be historically significant and disclosing information about the site poses a threat, further discussions will be held on how to minimize potential harmful impacts, including data management decisions outlined in the Post-

Expedition Data Management section of this document. The Expedition Coordinator, a representative from the data management team, NOAA Ocean Exploration's Marine Archaeologist, a representative from the ONMS Maritime Heritage Program, and any parties with jurisdiction, management, or other legal ties to the resource will meet to determine what measures are needed to protect the UCH while minimizing impacts on the distribution of data and data products.

### UCH Targeted Mapping Expedition Follow-up

- The mapping team will create a survey report that provides technical details on the survey, data processing, and data products. It should contain a list of targets that includes site location, water depth, site dimensions, bottom type/topography, and images of the target at the best available resolution. Other helpful products include .sd and .kmz files.
- The Expedition Coordinator, NOAA Ocean Exploration's Marine Archaeologist, a representative from the ONMS Maritime Heritage Program, archaeologists involved in the survey, and any parties with jurisdiction, management or other legal ties to the resource will meet to discuss the potential historical significance of the UCH and the sensitivities of releasing data to the public that can be protected under Section 304 of the NHPA. The outcome of this meeting will determine if it is necessary to protect site location information from public release.
  - If it is determined that releasing information and data on the UCH is not a threat, development of products and data management should follow the guidelines for a standard mapping expedition.
  - If it is determined that a site is or has the potential to be historically significant and eligible for nomination to the National Register of Historic Places, the location and data containing the location should not be released to the public.
  - Data products that contain position information will be forwarded to the Data Management Team, and data and products will be stored in an archive with restricted access.
  - Expedition plans, cruise reports, situation reports, mapping summary reports, and other documents that are publically available outside NOAA or freely accessible within NOAA will not provide location information for the UCH or survey areas. In certain circumstances, the Lead Marine Archaeologist for the expedition may request that certain UCH sites not be mentioned in the public reports.



## UCH Mapping Follow-up for National Marine Sanctuaries

When NOAA Ocean Exploration conducts UCH work on *Okeanos Explorer* inside a national marine sanctuary, the Expedition Coordinator will inform the NOAA Ocean Exploration Marine Archaeologist, ONMS Maritime Heritage Program Director, Sanctuary Superintendent and Sanctuary Maritime Heritage Coordinator on the availability of data products and initial results of the survey. ONMS shall determine the sensitivity of the data and whether or not they can be disclosed to the public. Published metadata will indicate that the point of contact for access to UCH data within the sanctuary system is the ONMS Director.

## B. Telepresence-enabled ROV Operations

The following outlines the process for pre-expedition planning, field operations, post-expedition follow up, and data archiving procedures for the following scenarios:

- When UCH is unexpectedly discovered during non-archaeological operations
- When the expedition includes ROV operations specifically targeted at UCH

### Unexpected UCH Discovery

- During the expedition: If UCH is unexpectedly discovered during an ROV dive, the onboard Expedition Coordinator should immediately contact NOAA Ocean Exploration's Marine Archaeologist and the archaeology “doctors-on-call” identified for that expedition. Those archaeologists should be engaged in the site investigation as soon as possible to provide information to help assess the site discovered. No changes to the data, video, or onboard data acquisition processes should be made. A post-dive and post-expedition discussion will be held with the NOAA Ocean Exploration Marine Archaeologist to determine whether any datasets should be withheld from the archive.
- Follow-up when UCH is unexpectedly discovered:
  - The Expedition Coordinator and the NOAA Ocean Exploration Marine Archaeologist will have an initial consultation to discuss the nature of the UCH and its potential significance. This consultation may include other agencies or entities.
  - If the UCH is determined not to be historically significant, no change to standard data management procedures is required.
  - If the UCH has the potential to be historically significant but it is determined that no harm will result by disclosing position information, such as UCH in deep water, no change to standard data management procedures is required.
  - If the UCH is or has the potential to be historically significant and disclosing location information about the site poses a threat, further discussions will be held on how to minimize potential harmful impacts, including data management

decisions outlined in the Post-Expedition Data Management section of this document. The Expedition Coordinator, a representative from the data management team, NOAA Ocean Exploration's Marine Archaeologist, a representative from the ONMS Maritime Heritage Program, and any parties with jurisdiction, management, or other legal ties to the resource will meet to determine what measures are needed to protect the UCH while minimizing impacts on the distribution of data and data products.

## Expeditions Conducted With ROV Operations Specifically Targeted at UCH

### Pre-Expedition Planning: ROV Exploration

Notifying the Team of their Responsibility to Protect Sensitive UCH Resources: Ship, mission, and NOAA Ocean Exploration personnel have a legal responsibility to protect sensitive archaeological information (primarily location information) from untimely release. For a planned UCH expedition, the Expedition Coordinator will notify the Commanding Officer, and each will be responsible for ensuring their personnel are aware of this responsibility. The Expedition Coordinator will provide an archaeology background document to familiarize personnel with the particular mission and its requirements. See the Non-Disclosure Agreement References section for details of the accountability mechanisms.

### Pre-Dive Planning

- Archaeologists will develop a dive plan based on the best available knowledge of the site that will maximize data recovery and minimize any potential impact to the site. The archaeology team will work closely with the Expedition Coordinator and Global Foundation for Ocean Exploration (GFOE) Team Lead to develop and implement the plan. The plan should include:
  - Objectives (cultural/interdisciplinary science)
  - The types of sensors needed and data to be generated
- ROV dives will not disturb or touch a shipwreck or other cultural features. Exceptions to this rule require the necessary permits, approvals, and notifications based on the location of the dive.
- Prior to the expedition, any permitting requirements should be identified and if required, permits must be procured.
- NOAA requires that the AIS feed that broadcasts information about the ship, including position, course, and speed, must remain on at all times for collision avoidance and other safety reasons. Although the International Maritime Organization's (IMO) Maritime Safety Committee condemns the internet publication of AIS data, it is easily available for viewing. During the expedition planning phase, the Expedition Coordinator will provide the AIS broadcast range on the ship to the chief scientist and science team.

The science team, chief scientist, and other parties involved in a UCH mapping expedition should be made aware of this and decide whether the value of the operation merits acceptance of the potential issues/outcomes imposed. A go/no-go decision will be made based on this information.

## Field Operations

Exploration dives by ROV should be planned to collect optical and acoustic images without causing physical disturbance to the UCH. Representatives and leads from operational groups, including the ROV, data, video, and telepresence teams and ship operations should meet to discuss ROV operations and data collection. The guidelines for mapping operations should be followed to ensure site locations are not disclosed during field operations. SOPs with full operational details are available on the ship. A 3-nm buffer zone will be created around the UCH target or isolated survey box. The times at which the ship enters and departs the 3-nm buffer zone needs to be recorded and provided to the Data Management Team Lead for data post-processing. Following work at the site, the ship will return to the site where it first entered the 3-nm buffer zone to continue operations.

The following actions will be taken just prior to entering the 3-nm buffer zone in order to stop broadcasting the ship's location while the survey is conducted:

- NOAA email events: Disable/stop email events (OMAO/ET)
- NOAA Shiptracker: Disable/stop the email updates from the ship going to OMAO/Shiptracker
- SAMOS: Disable/stop the email update to FSU containing METOC and flow- through data, etc.
- GFOE will pause the User Datagram Protocol (UDP) to NOAA Ocean Exploration and Seatube
- Telepresence video feeds (NOAA Ocean Exploration Telepresence Lead):
  - Do not stream any feeds that include the ship's location, including, but not limited to, the SCS data screen, any active mapping data acquisition screens, and video feeds that show the ship's location. It is acceptable to stream video feeds that do not include the ship's location.
  - If highly sensitive features (human remains, evidence of human remains such as shoes or other accouterments, highly valuable items, etc.) are going to be investigated or are unexpectedly encountered during the course of the seafloor investigation, the Lead Marine Archaeologist, GFOE Team Lead, Expedition Coordinator, and Commanding Officer have the authority to immediately switch the live feed from the ROVs to another camera on the ship.

Daily updates on the NOAA Ocean Exploration Digital Atlas are normally linked to the location of the ship at the time the update is posted. If daily updates are made during UCH surveys, no position will be provided. If a position is required, a nearby position outside of the buffer zone can be reported. Normal transmissions from the ship will resume after finishing UCH survey operations and exiting the 3-nm buffer zone. The point of exit should be as near to the point of entry as feasible to minimize location data gaps pointing to the location of the UCH. No informal information about the UCH should be released to the general public by ship or mission personnel. This includes posting information and images on social networking sites like Facebook, Twitter, or personal blogs. Images, video, and information on the UCH will be released to the public following the normal process, and announcement of discoveries will be made through the appropriate offices and public affairs officials.

In addition to the items listed, the ship sends out automated weather observations every hour and manual weather observations every six hours with positions. These observations are pulled onto public sites by several different websites and Google Map apps. One example is sailwx.info. This is only accurate to the nearest decimal degree (6 nm). This level of accuracy is not of concern.

## Post-Expedition Data Management

Following completion of the expedition, the Expedition Coordinator should have a follow-up call with the data management team and NOAA Ocean Exploration Marine Archaeologist to review the datasets collected, confirm those that need to be withheld from the public archive, and provide information to the data management team for associated metadata records.

## Post-Expedition Follow-Up

### Information Release

- No informal information about the UCH should be released to the general public by ship or mission personnel. This includes posting information and images on social networking sites like Facebook or personal blogs. Images, video, and mapping data will be released to the public following the normal process and announcement of discoveries will be made through the appropriate offices and public affairs officials.
- Determination of whether the UCH is potentially eligible for nomination to the National Register of Historic Places (NRHP), or eligible for protection under other legislation such as the Sunken Military Craft Act or National Marine Sanctuary Act, will take some time following completion of the expedition. Sensitive or potentially sensitive information about the UCH is to remain restricted until determination is complete. Following completion of the expedition, the designated Lead Marine Archaeologist will work with

others to analyze the UCH data and conduct historical research to determine whether the UCH is eligible for nomination to the NRHP.

- If the UCH is determined to be eligible, the Lead Marine Archaeologist will prepare the nomination for the NRHP process.
- If the UCH is determined to NOT be eligible, and protection of the site does not fall under other legislation, the Lead Marine Archaeologist will notify the data management team that site information can be made publicly available.

### UCH Targeted Expedition Follow-Up

- The Expedition Coordinator, NOAA Ocean Exploration's Marine Archaeologist, a representative from the ONMS Maritime Heritage Program, archaeologists involved in the survey, and any parties with jurisdiction, management, or other legal ties to the resource will meet to discuss the potential historical significance of the UCH and the sensitivities of releasing data to the public that can be protected under Section 304 of the NHPA. The outcome of this meeting will determine if it is necessary to protect site location information from public release.
  - If the findings determine that releasing information and data on the UCH is not a threat, development of products and data management should follow the guidelines for a standard ROV expedition.
  - If it is determined that a site is or has potential to be historically significant and eligible for nomination to the National Register of Historic Places, the location and data containing the location should not be released to the public.
  - Data products that contain position information will be forwarded to the expedition's data management team, and data and products will be stored in an archive with restricted access.
  - Expedition plans, cruise reports, situation reports, mapping summary reports, and other documents that are publically available outside NOAA or freely accessible within NOAA will not provide location information for the UCH or survey areas. In certain circumstances, the Lead Marine Archaeologist for the expedition may request that certain UCH sites not be mentioned in the public reports.

## C. Post-Expedition Data Management

Data collected by NOAA Ocean Exploration that is considered sensitive will be protected from direct public release until such time as a final determination can be made as to permanent protection. Data in this state will be:

- Fully documented so as to be independently understandable to users,
- Visible through publication of metadata records by NOAA Ocean Exploration,

- Accessible upon request to NOAA Ocean Exploration (controlled access by permission), and
- Preserved in NOAA archives as “restricted” (not available for direct public access).

These data will not be available for direct public access unless and until the UCH with which they are associated is eliminated from consideration for nomination to the NRHP (NHPA Section 304) or for protection under other legislation such as the Sunken Military Craft Act or National Marine Sanctuary Act. If the UCH is nominated and accepted for any official protection, then the exceptional status will be made permanent, and all documentation updated and finalized as such.

Data generated by expeditions on *Okeanos Explorer* are archived under a data management agreement with NCEI. Only data that have the potential to reveal the nature and location of the UCH will be restricted from public access. In accordance with the data management agreement, sensitive data from the expedition will have restricted access at NCEI. To help researchers discover sensitive data, NCEI will publish a metadata record (but not the data) that identifies a point of contact for access. Requests to access the data should be made to the Director of NOAA Ocean Exploration, who may delegate responsibility to the NOAA Ocean Exploration Marine Archaeologist. In lieu of the NOAA Ocean Exploration Marine Archaeologist, the NOAA Ocean Exploration Director may delegate to the Director of the ONMS Maritime Heritage Program.

If data are found to be sensitive because they reveal the location of a historically significant cultural resource, Section 304 of the NHPA provides that the head of a federal agency or other public official shall withhold from public disclosure information about the location, character, or ownership of a historic property when disclosure may cause a significant invasion of privacy, risk harm to the historic property, or impede the use of a traditional religious site by practitioners. Data collected by the expedition that are considered sensitive will be archived in a location where they can be withheld from public disclosure.

Data sets and associated products are housed at NCEI and the NOAA Central Library.

- NCEI will develop appropriate metadata records to post on the NOAA Ocean Exploration Digital Atlas.
- CTD and XBT data collected during mapping operations conducted within the buffer zone will not be repressed from the NOAA Ocean Exploration Digital Atlas and will be held in a public archive.
- Cruise reports, expedition plans, mapping summary reports, and other documents that are publicly available outside NOAA or freely accessible within NOAA should not provide location information for the UCH or survey areas.

Start and end times for the 3-nm buffer zone surrounding the UCH site need to be provided to the data management team. Datasets containing sensitive location information will be restricted in their entirety unless other parsing arrangements have been made. The following datasets may contain sensitive UCH location information and need to be reviewed, post-processed as appropriate, and made restricted, and pertinent metadata records need to be created and made available:

- Multibeam, sub-bottom, and single beam sonar data
- SCS data logs
- All ROV dive products (including associated sensor data)
- CTD rosette and in situ sensor datasets collected in relation to the UCH and within the 3-nm buffer zone
- Imagery with geospatial information (all imagery should be reviewed and geospatial imagery removed before being made public)
- Ship track and other datasets within the buffer zone

## D. Non-Disclosure Agreement References

Ship, mission, and NOAA Ocean Exploration personnel have a legal responsibility to protect sensitive archaeological information (primarily location information) from untimely release. The following summarizes the types of personnel who might be engaged in an expedition on *Okeanos Explorer*, where their responsibility to protect sensitive location information about UCH lies, and whether this responsibility has already been addressed or their signature on a non-disclosure agreement (NDA) is required in order for them to participate in the expedition with planned UCH operations.

- Federally employed scientists agreed not to disclose sensitive information and to adhere to federal laws as part of the terms of their employment with the federal government.
- The crew aboard the ship (ship personnel) are under the Commanding Officer's purview. On *Okeanos Explorer*, all crew are federal employees, and thus agreed not to disclose sensitive information and to adhere to federal laws as part of the terms of their employment with the federal government. This can also include personnel from partner organizations like maritime academies or U.S. Coast Guard personnel.
- Mission personnel (aboard and shoreside) who are not federal employees (including technicians, vehicle operators, students, etc.) are required to sign a non-disclosure agreement to protect sensitive cultural heritage information as part of their contract agreement.
- Other NOAA Ocean Exploration personnel who have access to data and information on the FTP site are either federal employees or contractors and need to be similarly

reminded of their responsibilities. NOAA Ocean Exploration contractors signed an NDA as a condition of employment with the federal government (this should be confirmed annually).

At the beginning of the expedition, all personnel need to be notified of their responsibilities as described in Tables 3 and 4.:

**Table 3.** Mission personnel NDA responsibilities (notified by Expedition Coordinator)

Employee Type	Accountability Mechanism for Withholding Sensitive Data	Action
NOAA Federal Employees	NOAA and Federal Contract	Send reminder of contract and provide archaeology background document
Other Mission Contractors (UCAR, ERT Inc., 2020 Company LLC, etc.)	Non-Disclosure Agreement	Confirm all contractors signed NDA, send reminder of contract, and provide archaeology background document
NOAA/Federal Scientists	NOAA and Federal Contract	Send reminder of contract and provide archaeology background document
Other Federal Scientists (BOEM, Navy, NPS, etc.)	Federal Contract	Send reminder of contract and provide archaeology background document
Other Mission Personnel and Scientists	Non-Disclosure Agreement	Get NDA signed



**Table 4.** *Okeanos Explorer* crew (ship personnel) NDA responsibilities (notified by Commanding Officer or designee)

Employee Type	Accountability Mechanism for Withholding Sensitive Data	Action
NOAA Federal Employees	Subject to NOAA and the ship's communications plans and protocols for sensitive data	Send reminder of contract to ship via all hands, and provide archaeology background document
Other Federal Employees (e.g., Public Health Service)	Subject to NOAA and the ship's communications plans and protocols for sensitive data	Sends reminder of contract to ship via all hands and provide archaeology background document
Wage Mariners	Subject to NOAA and the ship's communications plans and protocols for sensitive data	Sends reminder of contract to ship via all hands and provide archaeology background document

# Appendix E: Summary of Mitigation Measures and Best Management Practices

**NOAA Ship *Okeanos Explorer*: SOPs for Environmental Compliance  
Summary of Mitigation Measures and Best Management Practices  
Focused on EX FY23+ Pacific Operations  
Atlantic-Specific Content is UNDERLINED**

This document summarizes all protective measures and Best Management Practices (BMPs) that OER expeditions and projects are required to incorporate into their activities in order to be legally compliant with federal environmental compliance including NEPA, MMPA, ESA Section 7, and MSA. These BMPs are required to be incorporated within project instructions, cruise plans and NEPA documentation including financial assistance awards and environmental review memoranda. All applicable BMPs must be communicated to the science leads, boat operators and field staff, and as necessary between ship's crew (Commanding Officer/Master or designee(s), as appropriate) and scientific party in order to explain responsibilities, communication procedures, marine mammal monitoring protocol, and operational procedures. Bridge Watchstanders on the *Okeanos Explorer's* bridge will carefully monitor for the presence of marine protected species, and permitted personnel would follow established best management practices (BMPs) to minimize disturbance:

## **1. Minimize Exposure to Elevated Noise Levels**

- a. Maintain watch for the presence of marine protected species. Immediately notify the survey department of the proximity of cetaceans and sea turtles. When marine mammals are able to be identified by Bridge Officers or Watch Standers, these observations are noted in the NOAA fleet marine mammal observation log as part of standard practice.
  - i. If a sea turtle is present within 400 m of the ship, the survey department will respond by stopping the pinging of the sub-bottom sonar. The sub-bottom shall remain off until the sea turtle has departed the 400 m safety zone.
  - ii. If cetaceans are present within 400 m of the ship (460 m/500 yards for North Atlantic and Pacific Right Whales), the vessel would stop if the animal is in danger of colliding with the ship but the mapping sonars would continue transmitting to avoid startle responses. If an observed animal is unable or unwilling to depart the immediate area, sonars will be secured and the ship will slowly move away from the area if feasible.

- iii. If the cetacean is within 400 m (460 m/500 yards for North Atlantic and Pacific Right Whales) and is not in danger of collision, reduce speed and seek to avoid the animal as much as possible.
  - iv. The Survey Department will respond by stopping the pinging of the sub-bottom sonar and switching the multibeam sonar into “mammal protection” mode (keeps it pinging but at a source level reduced by 20 decibels). No change will occur to the EK 60s. Note: the ADCPs are never run simultaneously with the multibeam and sub-bottom, so they would already be off. The ADCPs are mostly run when the ship is stationary at a dive site and risk to marine mammals is minimal.
- b. Minimize turning all sonar sound sources on and off as a precautionary measure to avoid possible startling of animals.
  - c. When the systems have been shut down for any reason, the multibeam mammal protection mode would be used to turn the multibeam back on first. Only after the multibeam has been brought from mammal protection mode to full power would the sub-bottom profiler and EK 60 sonars then be turned back on.
  - d. If the multibeam sonar is not being used, but other sonar systems are being turned on, they will be started in lower power settings and will gradually (over a 15 minute time period) be adjusted to higher power settings as appropriate for the water depths to essentially mimic the approach of the “mammal protection” mode of the multibeam.
  - e. We will postpone start-up and operation of the USBL, if porpoises, dolphins or Koiga are sighted within 1000 meters of the ship.

## **2. Minimize Temporary Disturbance from Human Activity**

- 1) All in-water work will be postponed when North Atlantic and Pacific right whales are detected within 457.2 meters (500 yards), other ESA-listed cetaceans are detected within 91.44 meters (100 yards), or other ESA-listed species are detected within 45.72 meters (50 yards);
  - i. This includes postponing start-up of the USBL, in preparation for an ROV dive.
  - ii. We will postpone start-up and operation of the USBL, if porpoises, dolphins or Koiga are sighted within 1000 meters of the ship
- 2) No attempt will be made to feed, touch, ride, or otherwise intentionally interact with any marine ESA-listed species.

## **3. Minimize Entanglement**

- a. Maintain watch for and avoid the presence of marine protected species. Notify the department heads of the proximity of animals;

- b. OER will postpone in-water work when ESA-listed species are within the distances noted in Section 2.1
- c. Should a marine protected species enter the area while in-water work is already in progress, the activity may continue only when that activity has no reasonable expectation to adversely affect the animal(s); and
- d. Individuals participating in the activity will closely monitor the instrument cables at all times while they are deployed.

#### **4. Minimize Collisions with Vessels**

The following guidelines for vessel operation in the presence of marine protected species and other marine wildlife are provided by the Bureau of Ocean Energy Management in a Notice to Lessees and Operators, NOAA Fisheries as part of a Biological Opinion:

If Protected Species Observers (PSOs) (or on NOAA vessels, Bridge Officers and Watchstanders) observe ESA-listed marine mammals, sea turtles, or fishes, vessel operators and crew must slow down or stop the vessel or alter course if animals are within the distances described below, to avoid striking such animals. These requirements apply when the vessel is in transit and while conducting acoustic sonar survey lines, but do not apply when compliance will create an imminent and serious threat to a person or vessel or when a vessel is restricted in its ability to maneuver.

##### **a. Vessel Strike Avoidance**

Vessel operator and crew must maintain a vigilant watch for all marine mammals and sea turtles and slow down or stop the vessel or alter course, as appropriate, to avoid striking any marine mammal. These requirements apply when the vessel is in transit and do not apply in any case where compliance will create an imminent and serious threat to a person or vessel or to the extent that a vessel is restricted in its ability to maneuver and, because of the restriction, cannot comply. A visual observer aboard the vessel must monitor a vessel strike avoidance zone around the vessel according to the parameters stated below. Visual observers monitoring the vessel strike avoidance zone can be either third-party visual PSO or crew members, but crew members responsible for these duties must be provided sufficient [training](#) to distinguish marine mammals from other phenomena. Vessel strike avoidance measures shall be followed during sonar surveys and while in transit.

When ESA-listed marine mammals, sea turtles, or fishes are sighted while a vessel is underway, the vessel shall take action as necessary to avoid violating the relevant separation distances noted below (e.g., attempt to remain parallel to the animal's

course, avoid excessive speed or abrupt changes in direction until the animal has left the area). If ESA-listed species are sighted within the relevant separation distance, the vessel must reduce speed and shift the engine to neutral. Engines will not resume until it is observed that the relevant separation distance is clear of any ESA-listed marine mammals, sea turtles, or fishes for at least 15 minutes. This does not apply to any vessel towing gear or any vessel that is navigationally constrained. Navigationally constrained means areas that are not considered open oceans such as ports, narrow passage areas, and any concerning traffic situation where halting engine operations puts the lives of those on board or the vessel's integrity in jeopardy;

B. If a large whale is identified within 457.2 meters (500 yards) of the forward path of a vessel, the vessel operator must steer a course away from the whale at 10 knots or less until the 457.2-meter (500 yards) minimum separation distance has been established. Vessel operators may also shift engines to neutral if feasible;

C. If a large whale is sighted within 91.44 meters (100 yards) of the forward path of a vessel, the vessel operator must reduce speed and shift the engine to neutral. Engines must not be engaged until the whale has moved outside of the vessel's path and beyond 457.2 meters (500 yards). If stationary, the vessel must not engage engines until the large whale has moved beyond 457.2 meters (500 yards); and

D. When ESA-listed small marine mammals (e.g. pinnipeds), sea turtles, or fishes are sighted, attempt to maintain a distance of 91.44 meters (100 yards) for in-water pinnipeds and 45.72 meters (50 yards) for sea turtles and fishes whenever possible.

E. In the event of a vessel collision, OER will follow reporting PDCs in Section 1.1.9.

## **5. Minimize Vessel Waste and Discharge & Prevent Invasive Species**

- A. All vessels operating in areas where ESA-listed species are known to be present in the region will continue to follow the International Convention for the Prevention of Pollution from Ships (MARPOL) discharge protocols, but will postpone any authorized discharge if any ESA-listed species are within 91.44 meters (100 yards) of the vessel;
- B. Vessel crews will meet all Environmental Protection Agency (EPA) Vessel General Permits and USCG requirements;
- C. Avoid discharge of ballast water in designated critical habitat;
- D. All vessels will use anti-fouling coatings;
- E. Clean hull regularly to remove aquatic nuisance species;

- F. Avoid cleaning of hull in critical habitat; and
- G. Avoid use of cleaners with nonylphenols.

#### **6. Avoid or Minimize Impacts to Habitat and Species During In-Water Work**

- a. Instruments deployed to collect water samples and current data (except for expendable instruments) would not be allowed to contact the seafloor;
- b. ROVs/AUVs will be operated in a manner to avoid seafloor disturbance, and setting the ROV/AUV on the seafloor will be held to a minimum. For those situations when the ROV/AUV does make contact with the seafloor, visual observations will be made to confirm that the area where the ROV/AUV is set down does not include corals or other fragile animals that can reasonably be avoided;
- c. ROVs/AUVs/ASV in operation will use onboard cameras and detection devices to avoid possible interactions with animals. This includes when operating all sonar sound sources.
- d. Sample collections would be limited (typically 4 - 11 total rocks and primary biological specimens per dive) that represent new species, new records, the dominant morphotype animal in a community, or species to support connectivity studies. These specimens would be collected using the ROV's manipulator arms or scoop. Whenever possible, sample collections will be made using the cutting implementation tool on the ROV, and only portions of organisms (<50 cm) will be collected to avoid mortality. Clonal biological specimens (corals, sponges) would be subsampled;
- e. When possible, rock samples will be selected in a way to minimize disturbance to the surrounding environment and to minimize the take of attached organisms.;
- f. After each ROV/AUV/ASV use, the vehicles are brought back onboard and thoroughly sprayed with freshwater and allowed to air dry before the next dive. Though marine organisms should not survive this process, the ROV/AUV/ASV is thoroughly inspected prior to every dive and checked for the presence of biological organisms to prevent the spread of invasive or non-endemic species from one location to another. In areas where Stony Coral Tissue Loss Disease (SCTLD) is present, the vehicles will be decontaminated following the procedures documented in NOAA's Office of National Marine Sanctuaries' Coral Disease Decontamination Protocol;
- g. Instruments deployed to collect water samples and current data (except for expendable instruments) would not be allowed to contact the seafloor;
- h. The use detergents and other pollutants which may be washed into the marine environment will be avoided or held to a minimum;
- i. The vessel will adhere to MARPOL discharge regulations at all times during the proposed cruises;
- j. Except in an emergency, the vessel will not anchor while at sea.

- k. In the event of an ROV/AUV/ASV collision with an ESA-listed species, OER will follow reporting PDCs in Section 1.1.9.

## **7. Avoid Live Bottom Features**

- A. All vessels in coastal waters will operate in a manner to minimize propeller wash and seafloor disturbance, and transiting vessels should follow deep water routes (e.g., marked channels and shipping lanes), as practicable;
- B. Avoid anchoring in hard-bottom and coral habitat
- C. Avoid anchoring in black abalone critical habitat; and
- D. Avoid anchoring in areas containing seagrass or eelgrass.

## **8. Minimize Risk During Buoy Deployment, Operations, and Retrieval**

- 1. Any mooring systems used during survey activities prevent any potential entanglement or entrainment of listed species, and in the unlikely event that entanglement does occur, ensure proper reporting of entanglement events according to the measures specified below.

- i. Ensure that any buoys attached to the seafloor use the best available mooring systems. Buoys, lines (chains, cables, or coated rope systems), swivels, shackles, and anchor designs must prevent any potential entanglement of listed species while ensuring the safety and integrity of the structure or device.

- ii. All mooring lines and ancillary attachment lines must use one or more of the following measures to reduce entanglement risk: shortest practicable line length, rubber sleeves, weak-links, chains, cables or similar equipment types that prevent lines from looping, wrapping, or entrapping protected species.

- iii. Any equipment must be attached by a line within a rubber sleeve for rigidity. The length of the line must be as short as necessary to meet its intended purpose.

- iv. During all buoy deployment and retrieval operations, buoys should be lowered and raised slowly to minimize risk to listed species and benthic habitat. Additionally, PSOs or trained project personnel (if PSOs are not required) should monitor for listed species in the area prior to and during deployment and retrieval and work should be stopped if listed species are observed in the area to minimize entanglement risk.

- v. If a live or dead marine protected species becomes entangled, you must immediately contact the applicable NMFS stranding coordinator using the

reporting contact details (see Reporting Requirements section) and provide any on-water assistance requested.

All buoys must be properly labeled with owner and contact information.

**9. Protected Species Observers (PSO)** - Note that these can also be Bridge Officers/ Watchstanders with sufficient [training](#).

To ensure the protection of endangered and threatened species, the following PSO guidelines are required:

- 1) During daylight hours (i.e. from 30 minutes prior to sunrise and through 30 minutes following sunset), a minimum of one PSO must be on duty observing for listed species at all times the vessel is actively transiting, conducting acoustic sonar survey lines, sub-bottom profilers are operating, and/or when-over-the-side work is being conducted;
- 2) A watch schedule showing the number of PSOs on duty required to effectively monitor the affected area for the project (e.g., surveys) and record the required data must be included (see Reporting Requirements below). PSOs must not be on watch for more than four consecutive hours, with at least a 1-hour break between watches. PSOs must not be on active duty observing for more than 12 hours in any 24-hour period;
- 3) Visual monitoring must occur from the most appropriate vantage point on the associated operational platform that allows for 360-degree visual coverage around the vessel. If 360-degree visual coverage is not possible from a single vantage point, multiple PSOs must be on watch to ensure such coverage; and
- 4) Suitable equipment must be available to each PSO to adequately observe the full extent of the minimum separation distance and shutdown zones during all vessel operations and meet all reporting requirements.
  - a) Visual observations must be conducted using binoculars and the naked eye while free from distractions and in a consistent, systematic, and diligent manner.
  - b) Rangefinders (at least one per PSO, plus backups) or reticle binoculars of appropriate quality (at least one per PSO, plus backups) to estimate distances to listed species located in proximity to the vessel and clearance and shutdown zone(s).



## 10. Minimize Collisions with Vessels

If PSOs observe ESA-listed marine mammals, sea turtles, or fishes, vessel operators and crew must slow down or stop the vessel or alter course if animals are within the distances described below, to avoid striking such animals. These requirements apply when the vessel is in transit and while conducting acoustic sonar survey lines, but do not apply when compliance will create an imminent and serious threat to a person or vessel or when a vessel is restricted in its ability to maneuver.

- 1) When ESA-listed marine mammals, sea turtles, or fishes are sighted while a vessel is underway, the vessel shall take action as necessary to avoid violating the relevant separation distances noted below (e.g., attempt to remain parallel to the animal's course, avoid excessive speed or abrupt changes in direction until the animal has left the area). If ESA-listed species are sighted within the relevant separation distance, the vessel must reduce speed and shift the engine to neutral. Engines will not resume until it is observed that the relevant separation distance is clear of any ESA-listed marine mammals, sea turtles, or fishes for at least 15 minutes. This does not apply to any vessel towing gear or any vessel that is navigationally constrained. Navigationally constrained means areas that are not considered open oceans such as ports, narrow passage areas, and any concerning traffic situation where halting engine operations puts the lives of those on board or the vessel's integrity in jeopardy;
- 2) If a large whale is identified within 457.2 meters (500 yards) of the forward path of a vessel, the vessel operator must steer a course away from the whale at 10 knots or less until the 457.2-meter (500 yards) minimum separation distance has been established. Vessel operators may also shift engines to neutral if feasible;
- 3) If a large whale is sighted within 91.44 meters (100 yards) of the forward path of a vessel, the vessel operator must reduce speed and shift the engine to neutral. Engines must not be engaged until the whale has moved outside of the vessel's path and beyond 457.2 meters (500 yards). If stationary, the vessel must not engage engines until the large whale has moved beyond 457.2 meters (500 yards); and
- 4) When ESA-listed small marine mammals (e.g. pinnipeds), sea turtles, or fishes are sighted, attempt to maintain a distance of 91.44 meters (100 yards) for in-water pinnipeds and 45.72 meters (50 yards) for sea turtles and fishes whenever possible.
- 5) In the event of a vessel collision, OER will follow reporting PDCs in Section 1.1.9.

## 11. Species' Specific PDCs <sup>1</sup>

1) Vessels entering North Atlantic right whale critical habitat are required to report into the Mandatory Ship Reporting System;

2) While conducting marine operation activities in the Atlantic, mariners shall check with various communication media for general information regarding avoiding ship strikes and specific information regarding North Atlantic right whale sighting locations. These include NOAA weather radio, U.S. Coast Guard (USCG) NAVTEX broadcasts, and Notices to Mariners; Commercial mariners calling on U.S. ports should view the most recent version of the NOAA/USCG-produced training CD entitled "A Prudent Mariner's Guide to Right Whale Protection" (contact the NMFS Southeast Region, Protected Resources Division for more information regarding the CD);

3) Injured, dead, or entangled North Atlantic right whales should be immediately reported to the USCG via VHF Channel 16. Injured, dead, or entangled North Pacific right whales should be immediately reported to NMFS' Alaska Marine Mammal Stranding Network at 877-925-7773;

4) Adherence to seasonal vessel speed restrictions of 10 knots or less as designated locations along the U.S. Coast;

5) Adherence to NOAA Compliance Guide for Right Whale Ship Strike Reduction Rule (NMFS, 2013);

6) When in Washington inland waters, all vessels (including NOAA ships, R/Vs, ROVs, AUVs, and ASVs) approaching Southern Resident killer whales within 182.9 meters (200 yards) is prohibited (76 FR 20870);

7) All vessels (including NOAA ships, R/Vs, ROVs, AUVs, and ASVs) approaching North Atlantic and Pacific right whales within 457.2 meters (500 yards) is prohibited (69 FR 69536 and 62 FR 6729);

8) Avoid transit through North Pacific right whale critical habitat (Appendix 1: Figure 6); If unavoidable, please follow the guidance in this section (11) as appropriate and modified for Right Whales and Right Whale habitats in the Pacific (Atlantic Right Whale BMPs are more advanced than in the Pacific).

---

<sup>1</sup> Underlined sections are specifically for operations in the Atlantic.

9) Vessel transit and research activities (e.g., mapping) in the Rice's [formerly Bryde's] whale core habitat distribution area is restricted. If unavoidable, maintain a vessel speed of 10 knots or less during research activities and when transiting through the area. Vessel transit and non-stationary research activities must occur during daylight hours only (no nighttime transit or other non-stationary research activities to occur overnight in this area);

10) Vessel transit and research activities are also restricted within the boundaries of the currently known distribution of Rice's whales in the western and central Gulf of Mexico, between the 100 to 400 meter (328 to 1,312 foot) isobaths. If unavoidable, maintain a vessel speed of 10 knots or less during research activities and when transiting through the distribution area. Vessel transit and non-stationary research activities must occur only during daylight hours (no nighttime transit or other research activities to occur overnight in this area);

11) Avoid the use of High-Resolution Geophysical (HRG) sound sources (e.g., echosounders and sub-bottom profilers) in all areas north of the Forelands in Cook Inlet, Alaska;

12) Avoid the use of HRG sound sources that are <24 kHz in humpback whale feeding areas for the months of March through June (Appendix: 1 Figure 1 and Figure 2). These include nearshore areas around Kodiak Island, Portlock Bank, Prince William Sound, Sitka Sound, Hoonah Sound, Tenakee Inlet, Craig, Ernest Sound, and Seymour Canal, Frederick Sound, Chatham Strait, Point Adolphus, Stephens Passage, and the Shumagin Islands;

13) Maintain a vessel separation distance 5.6 kilometers (three nautical miles) from Steller sea lion haulouts/critical habitat (Appendix 1: Figure 7, Figure 8, and Figure 9); and

14) To avoid disruption of bowhead whale foraging, while in the Beaufort and Chukchi Seas, avoid the use of HRG sound sources in areas where bowheads may be feeding (e.g., krill traps in Barrow Canyon)

## Appendix 1: Maps

Figure 1

Humpback Whale Feeding Areas in Western Alaska



Figure 2:

Humpback Whale Feeding Areas in Southeast Alaska

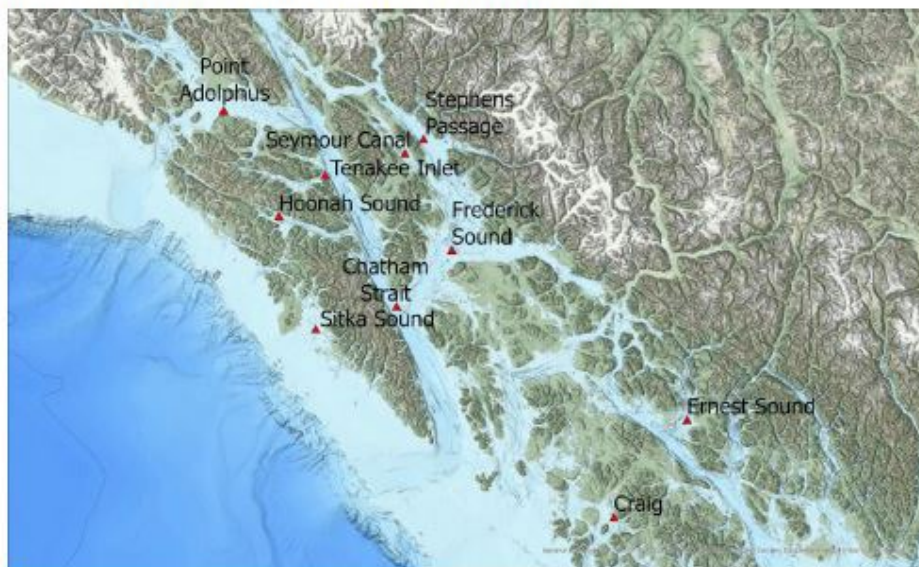


Figure 3:

Map of Barrow Canyon (bowhead whale feeding area) in the Beaufort and Chukchi Seas in Alaska

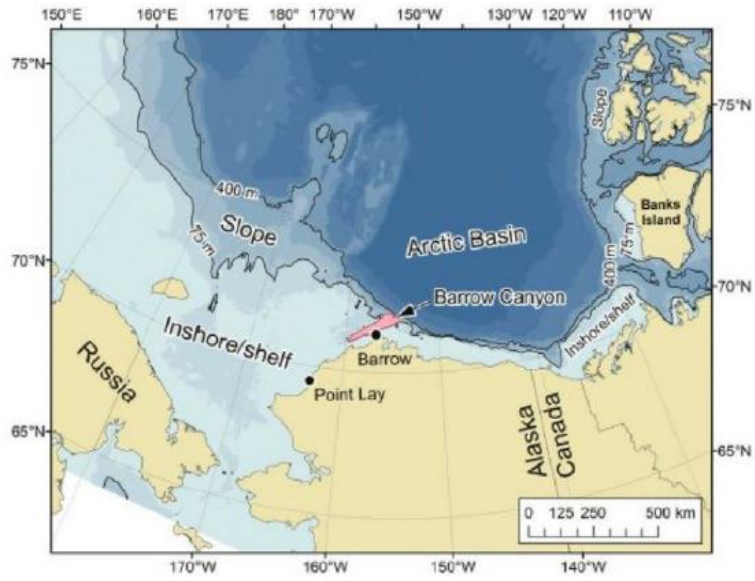


Figure 4:

Map of the Forelands in Cook Inlet, Alaska

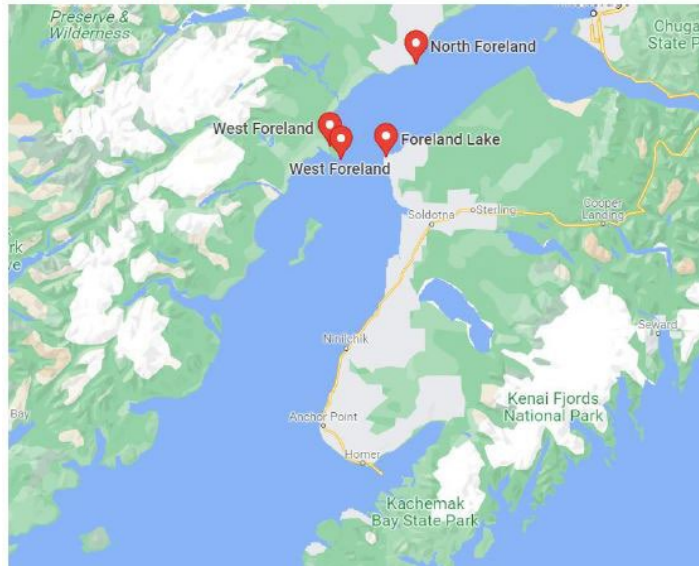


Figure 5:

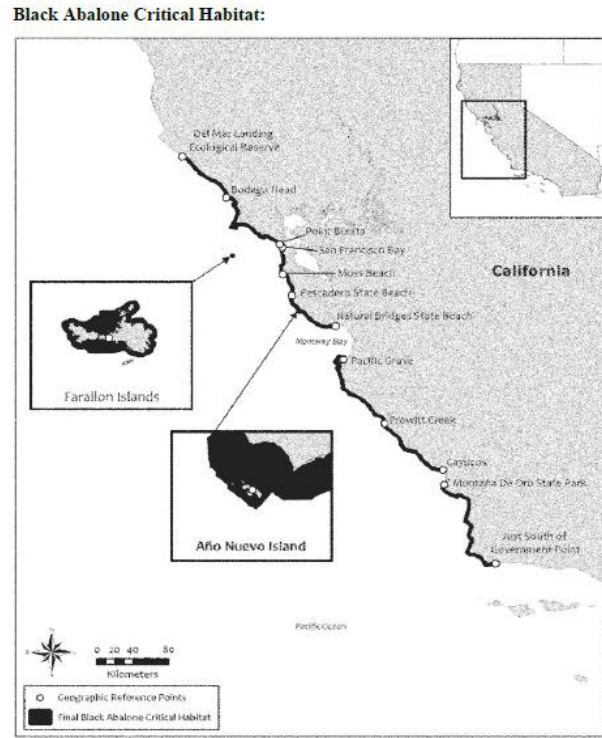


Figure 6:

North Pacific right whale critical habitat

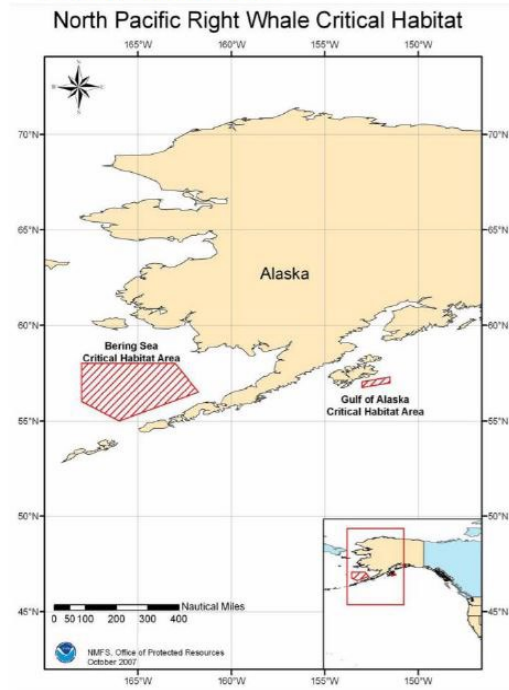


Figure 7:

Steller sea lion critical habitat in Western Alaska

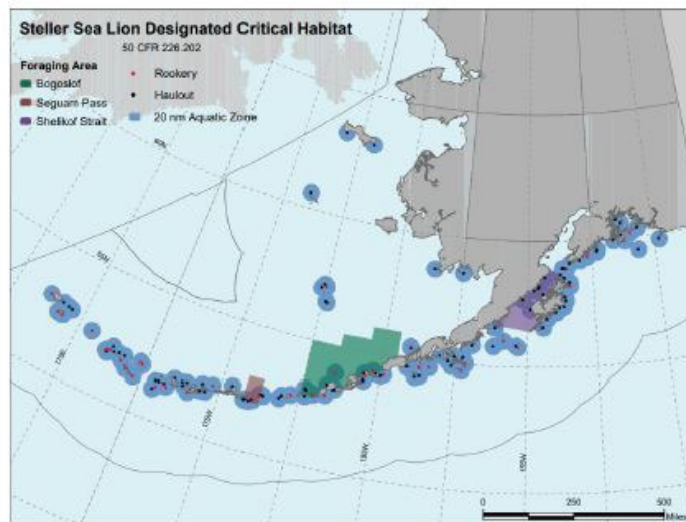


Figure 8:

### Steller sea lion critical habitat in Southeast Alaska



Figure 9:

### Steller sea lion critical habitat in Oregon and California

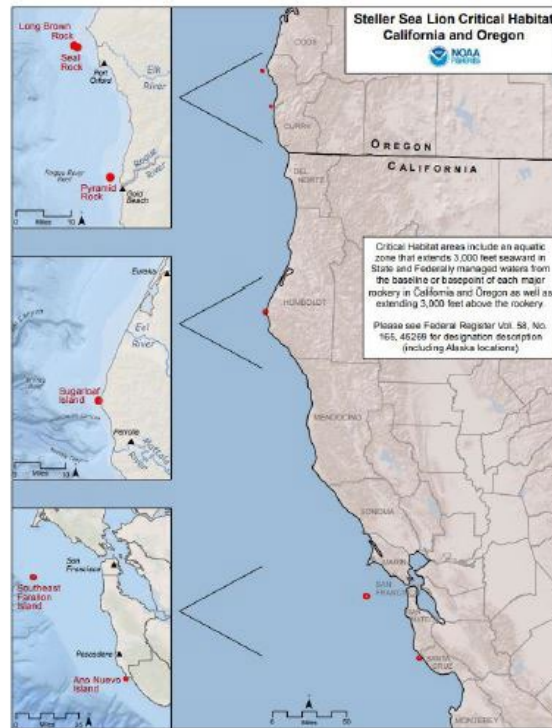




Figure 10:

Rice's Whale Core Distribution Area

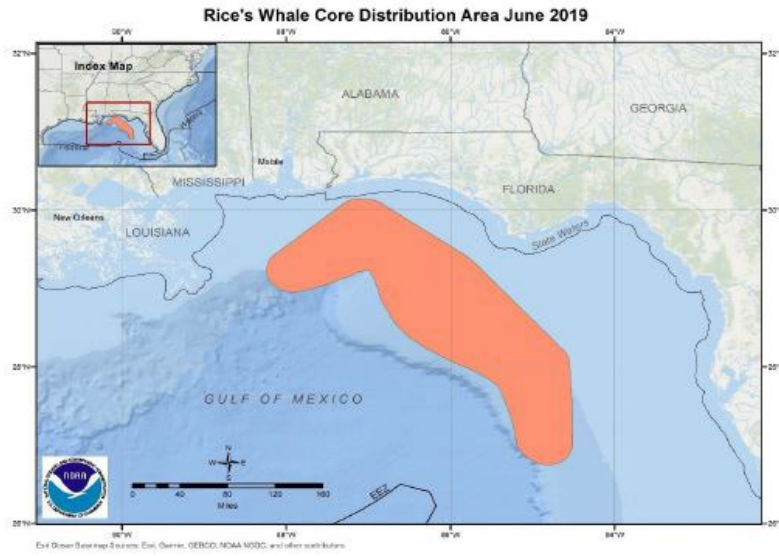


Figure 11:

Rice's Whale Suitable Habitat

