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Project Instructions: EX2302, Seascape Alaska: Aleutians Explorations 1

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Platform: NOAA Ship *Okeanos Explorer*

Project Number: EX2302

Project Title: Seascape Alaska: Aleutians Explorations 1

Project Dates: May 05-27, 2023

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I. Overview

A. Brief Summary and Project Period

This document contains project instructions specific to EX2302. For the annual cross-expedition details, see the "NOAA Ship *Okeanos Explorer* FY23 Field Season Instructions." This expedition will commence on May 5th, 2023, in Seattle, Washington, and conclude on May 27th, 2023, in Dutch Harbor, Unalaska, Alaska. Operations will be conducted 24 hours a day, and may consist of autonomous underwater vehicle (AUV) dives, mapping operations, conductivity, temperature, and depth (CTD) operations, EK60/EK80 sonar calibration, and full shore-based participation via telepresence.

Operations will include the use of the ship's deepwater mapping systems (Kongsberg EM 304 multibeam, EK60/EK80 split-beam sonars, Knudsen 3260 Chirp sub-bottom profiler, and Teledyne acoustic Doppler current profilers), expendable bathythermograph (XBTs) in support of multibeam sonar mapping operations, conductivity, temperature, depth profiler (CTD) casts, a man-portable Iver AUV operated by Orca Maritime launched and recovered from *Okeanos Explorer's* small boats or crane, EK60/80 calibrations, and a high-bandwidth satellite connection for continuous ship-to-shore communications. Operations will focus on exploring deep waters (greater than 200 m for mapping operations and between 40 and 130 m for AUV operations) in U.S. waters off Alaska and the Aleutian Islands.

B. Days at Sea

Of the 23 days at sea (DAS) scheduled for this expedition, 23 DAS are provided by the OAR line office base allocation. The total number of DAS and allocation distribution was reduced from an original count of 24 DAS due to delays resulting in March 2023 dry dock work to *Okeanos Explorer*. The information here reflects the most recent working information and schedule between the ship's Command and the program and will be finalized as new information is available.

While mapping operations are planned 24 hours a day for the majority of this expedition, a high operational tempo due to extended operations, which may include AUV dives and small boat operations, CTD casts, ADCP survey, and EK60/EK80 calibrations, is expected for a portion of several days and will require 12 hours a day of support from the ship's deck and engineering department. Additional support beyond 12 hours may be required to include launch and recovery operations of the AUV.

C. Operating Area

EX2302 will focus operations on U.S. and international waters of the west coast of Washington, the Gulf of Alaska, and the Aleutian Islands. Mapping, AUV, and CTD operations will be conducted at depths between 40 and 6,000 meters. **Figure 1** shows the general operating area for the expedition. The polygon and waypoints for the general working area and proposed expedition track are in **Appendix A**.

As this expedition is operating in remote locations and/or far from a suitable port to treat medical emergencies, a medical officer is requested to be aboard for the entirety of the expedition.

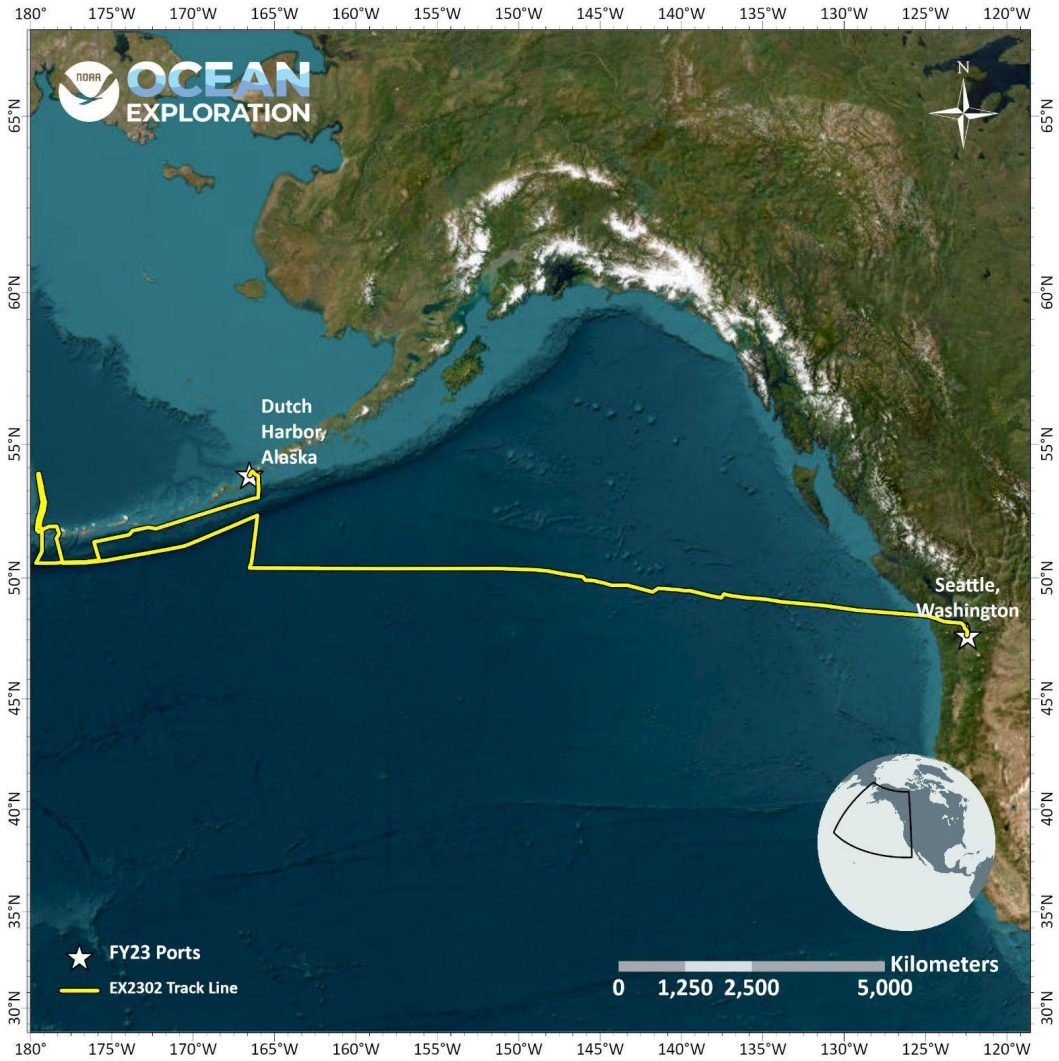

Figure 1. Map showing the proposed expedition for EX2302. This track is subject to change based on survey results, field conditions, and the discretion of the commanding officer.

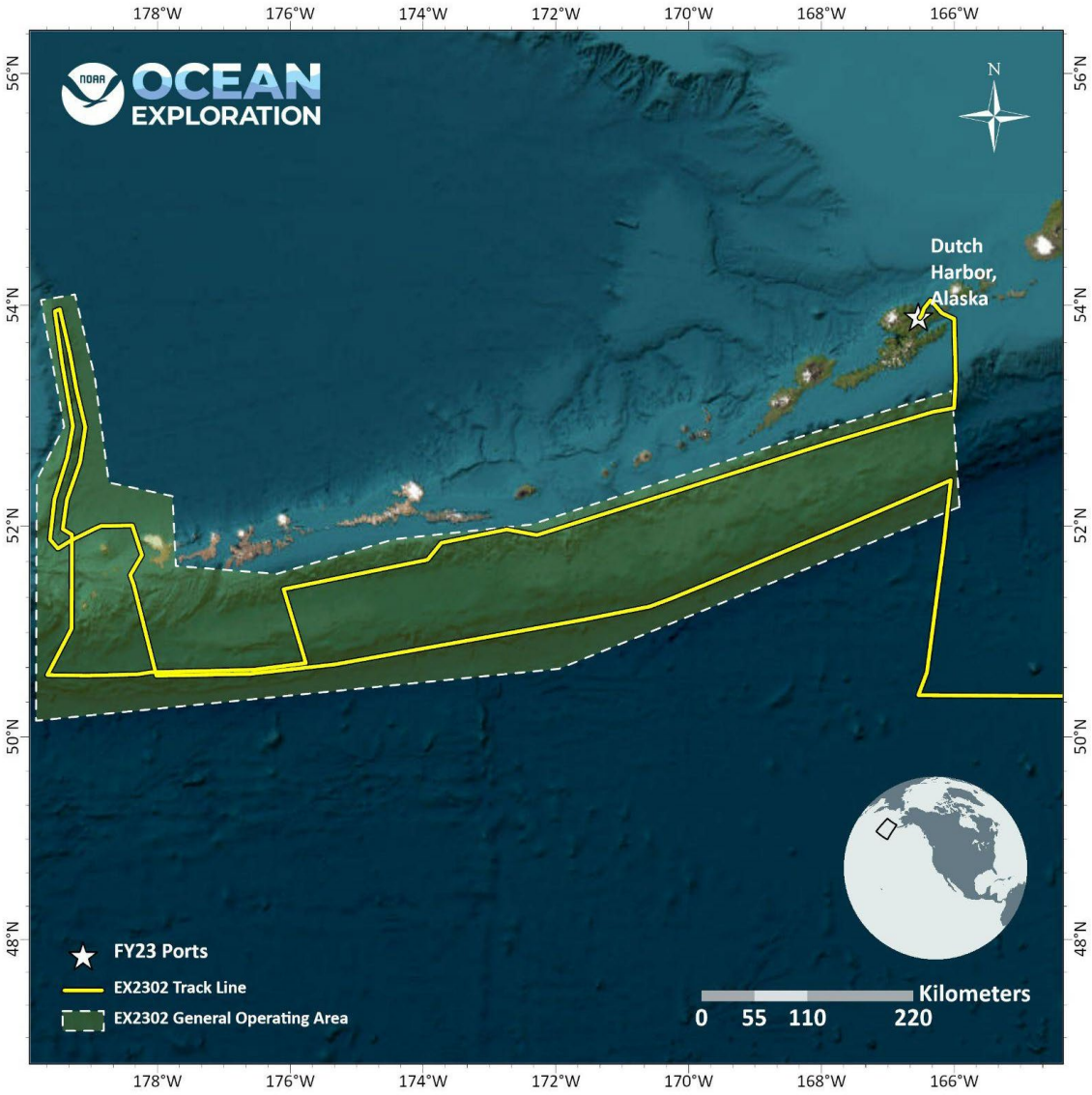

Figure 2. Map showing the general operating area for EX2302. The expedition track is subject to change based on survey results, field conditions, and the discretion of the commanding officer.

D. Summary of Objectives

EX2302 operations will involve a transit west followed by focused ocean mapping operations in U.S. and international waters of the west coast of Washington, the Gulf of Alaska, and the Aleutian Islands, primarily in deep water (>200 m). AUV operations will take place in waters between 40 - 130 meters in the Aleutian Islands, collecting sidescan sonar, magnetometer, and bathymetry data. This expedition will collect critical baseline information to support priority NOAA science and management needs, as well as needs identified by the Seascape Alaska campaign and the Defense POW/MIA Accounting Agency (DPAA).

Mission objectives for EX2302 include a variety of objectives focused on science, mapping, education, outreach, and data management. Overarching objectives that span the entire Fiscal Year 2023 (FY23) field season are covered in the "NOAA Ship *Okeanos Explorer* FY23 Field Season Instructions." See **Appendix B** for the expedition data management plan. Additional objectives specific to EX2302 follow:

1. Science Objectives

a. Map geologic features to better understand the geological context of the region and improve knowledge of past and potential geohazards.
b. Acquire acoustic and oceanographic data as a foundation to better understand the characteristics of the water column and the pelagic fauna that inhabit it.
c. Engage a broad spectrum of the scientific and management community, as well as the public, in telepresence-based exploration.
d. Create and provide input into standard science products to provide a foundation of publicly accessible data and information products to spur further exploration, research, and management activities.
e. Conduct stationary CTD casts as required to support high-priority requests from the science community (e.g., to help identify potential hydrothermal vents).
f. Use the onboard laboratory to preserve and catalog all biological and geological samples and ready them for shipping to their respective public archives.
g. Collect water samples using the ROV- and CTD-mounted Niskin bottles and filter samples in the onboard laboratory to obtain eDNA samples for shoreside processing.
h. Collect sun photometer measurements as part of surveys of opportunity in partnership with NASA.

2. Acoustic Mapping Objectives

a. Collect transit data that addresses bathymetric gaps or prioritizes areas with poor bathymetric or seabed backscatter data quality. Requested transit speeds will be the best possible speed up to 10 kts.

b. Conduct 24-hour mapping operations for the entirety of the expedition. Mapping operations will consist of concurrent data acquisition from the EM 304 multibeam echosounder, EK60/80 split-beam echosounder suite, and Knudsen 3260 sub-bottom profiler.
c. Collect high-resolution bathymetry in areas with no (or low quality) sonar data.
d. Execute mapping line plans as defined by onboard personnel, with real-time adjustments made to obtain complete seabed coverage as necessary. An average survey speed of 8-9 kn will be used during mapping operations.
e. Conduct XBT casts as data quality requires, but not more than six hours apart.
f. Maintain CTD capabilities as a backup sound velocity profiling method for mapping data requirements.
g. Collect acoustic, bathymetric, and magnetic data from a man-portable AUV in the Aleutian Islands in partnership with the Defense POW/MIA Accounting Agency (DPAA).

3. ROV Exploration Objectives

a. Use a small boat deployable ROV to ground-truth any targets of interest discovered through AUV survey in the Aleutian Islands.

4. Video Engineering Objectives

a. Provide onboard support for 24-hour exploration operations.
b. Verify Global Foundation for Ocean Exploration (GFOE) managed telepresence systems perform as expected.

5. Network/Onboard Data Objectives

a. Ensure integrity of all data processing pipelines and automated transfer to shore for all raw sonar data and daily bathymetry and bottom backscatter mosaic products.
b. EnsureGFOE managed VSAT, network, and computing infrastructure operate as required to meet mission objectives.
c. Ensure shipboard instruments/teams are producing expected data products at the expected rates according to established conventions.
d. Ensure data management processes organize, backup, and transmit data to shore as expected.
e. Support shore-based personnel with remote access to shipboard resources to better meet mission objectives.
f. Cross-train network, system administration, and data management personnel.

g. Improve system documentation.
h. Conduct at-sea testing and evaluation of Starlink low earth orbiting satellite systems and applicability to operations.

6. Outreach and Education Objectives

a. Train the next generation of ocean explorers by hosting up to three explorers-in-training and one Knauss Fellow on the ship. Training will include standing eight-hour watches of sonar data acquisition, processing, and documentation according to standard NOAA Ocean Exploration procedures. Ancillary projects may be assigned as necessary.
b. Host limited scheduled ship tours while in port (exact schedule TBD)
c. Engage the general public in ocean exploration through social media and live video and timely content (dive summaries, web features, highlight videos, video clips, still imagery, and mapping products) on the NOAA Ocean Exploration website.

7. Ship Objectives

a. Conduct stationary CTD operations as requested and able.
b. Review ROV emergency procedures.
c. Conduct wardroom and deck department refresher training of ROV deployment and recovery with a discussion of emergency procedures.
d. Conduct wardroom Aft Conn familiarity refresher training.
e. Practice and discuss man-overboard scenarios during ROV recovery, depending on weather and operations.
f. Conduct testing and evaluation of new stern thrusters installed in March of 2023.
g. Conduct small boat operations in support of launch and recovery of small, man-portable AUVs.

8. Ethanol Testing

a. Test the quality of the ethanol stored in the ejectable 02 Deck container before and after each ROV expedition.
b. Use NOAA Ocean Exploration's Ethanol Test Guide (**Appendix C**), which provides detailed instructions on how to test the ethanol, calculate the measurements, and record the results.
c. Update NOAA Ocean Exploration's internal Ethanol Test Guide as procedures are refined.

E. Participating Institutions

- Defense POW/MIA Accounting Agency (DPAA)

See "NOAA Ship *Okeanos Explorer* FY23 Field Season Instructions" for institutions that consistently participate throughout the field season.

F. Personnel (Mission Party)

Mission personnel (see **Table 1**) will arrive in Seattle, Washington, on May 1st - 2nd, 2023. Mission personnel will then be aboard for the duration of the expedition (May 5th - 27th, 2023). Some personnel will depart on May 28th, 2023, and others will stay aboard for the expedition that follows (EX2304). The expedition will also be supported by shoreside personnel (see **Table 2**).

Mission personnel sailing aboard NOAA Ship *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.

Table 1. Seagoing mission personnel: This list is tentative until travel is booked. Arrival dates are dependent upon downstream impacts related to the scheduling of the March 2023 dry dock and will be confirmed once expedition dates are finalized. Any deviations will be communicated to the operations officer.

#	Name (Last, First)	Title	Date Aboard	Date Disembark	Gender	Affiliation	Nationality
1	Cuellar, Sam	Expedition Coordinator	05/02	05/29	M	NOAA Ocean Exploration	USA
2	Bittenger, Amanda	Mapping Watch Lead 1	05/03	05/29	F	UCAR	USA
3	Gillespie, Trey	Mapping Watch Lead 2	05/03	05/29	M	UCAR	USA
4	Ferrante, Cassie	Mapping Watchstander	05/03	05/29	F	UCAR	USA
5	Carris, Dana	Explorer-in-Training	05/04	[05/28]	M	UCAR	USA
6	Kuhle, Cameron	Explorer-in-Training	05/04	[05/28]	M	UCAR	USA
7	Woodworth, Brett	Explorer-in-Training	05/04	[05/28]	M	UCAR	USA
8	Wright, Chris	GFOE Team Lead	05/03	[05/29]	M	GFOE	USA
9	Kline, Logan	Knauss Fellow	05/04	[05/28]	F	NOAA Ocean Exploration	USA

#	Name (Last, First)	Title	Date Aboard	Date Disembark	Gender	Affiliation	Nationality
11	Brian, Roland	Video Engineer	05/03	[05/29]	M	GFOE	USA
12	Aragon, Fernando	Data Manager	05/03	[05/29]	M	GFOE	
13	Nelson, Chad	AUV Operator	05/03	[05/29]	M	Orca Maritime	USA
14	Lamendola, Christen	AUV Operator	05/03	[05/29]	F	Orca Maritime	USA

1. Foreign National Guests (FNGs) Access to OMAO Facilities and Platforms

Foreign national access to *Okeanos Explorer* or other federal facilities will not be required for this expedition.

G. Administrative

1. Points of Contact

Table 2. Points of contact.

Operations	Name, Title	Office	Address	Phone	Email
Marine Operations Center, Atlantic	CPT Amanda Goeller, Commanding Officer	Marine Operations Center, Atlantic	439 West York Street Norfolk, VA 23510-1145	(757) 441-6778	co.moc.atlantic@noaa.gov
Marine Operations Center, Atlantic	CDR Steven Barry, Chief of Operations	Marine Operations Center, Atlantic	439 West York Street Norfolk, VA 23510-1145	(757) 441-6842	Chiefops.MOA@noaa.gov
NOAA Ship Okeanos Explorer (primary)	CPT Colin Little, Commanding Officer	NOAA Ship Okeanos Explorer	NOAA Ship Okeanos Explorer 47 Chandler Street Newport, RI 02841	(401) 439-7848	CO.Explorer@noaa.gov
NOAA Ship Okeanos Explorer (primary)	LT Hunter Brendel, NOAA Operations Officer	NOAA Ship Okeanos Explorer	NOAA Ship Okeanos Explorer 47 Chandler Street Newport, RI 02841	(808) 659-9179 x221	ops.explorer@noaa.gov

Operations	Name, Title	Office	Address	Phone	Email
Mission (primary)	Sam Cuellar, Expedition Coordinator	NOAA Ocean Exploration	1315 East-West Highway, Silver Spring, MD, 20910	(202) 302-9474	samuel.cuellar@noaa.gov
Mission (other)	Kasey Cantwell, Operations Chief	NOAA Ocean Exploration	1315 East-West Highway, Silver Spring, MD 20910	(301) 717-7776	kasey.cantwell@noaa.gov
Mission (other)	CDR Sam Greenaway, Chief (acting), Expeditions and Exploration Division	NOAA Ocean Exploration	1315 East-West Highway, Silver Spring, MD 20910	(206)-427-9554	samuel.greenaway@noaa.gov
Mission (other)	Jeremy Weirich, Director	NOAA Ocean Exploration	1315 East-West Highway, Silver Spring, MD 20910	(301) 452-7366	jeremy.weirich@noaa.gov

2. Diplomatic Clearances

None required.

3. Licenses and Permits

This project will have elements conducted in part within Alaska state waters, potentially involving Underwater Cultural Heritage exploration. This work will be done under a State Cultural Resource Investigation Permit (SCRIP) provided by the Alaskan Department of Natural Resources, Office of History and Archaeology. The expedition coordinator is responsible for obtaining and listing all permits as well as any identification numbers they contain. See **Appendix D** for the applicable documents. Final documents will be archived with the associated expedition report.

4. Shipments

The *Okeanos Explorer* operations officer should be notified of any shipments to the ship. Send an email describing the shipment (including size and number of items) to OPS.Explorer@noaa.gov.

For shipments to arrive while in port in Seattle, Washington at the start of the expedition, **shipments should arrive no later than April 28th, 2023**, and be shipped to the following address:

NOAA Ship *Okeanos Explorer*
Attn: Name/Dept

47 Chandler Street
Newport, RI 02841

For shipments to arrive while in port in Dutch Harbor, Alaska after the expedition from May 27th-June 1st, 2023, **shipments should arrive no later than May 17th, 2023**, and should be shipped to the following address:

NOAA Ship *Okeanos Explorer*
Attn: Name/Dept
47 Chandler Street
Newport, RI 02841

5. COVID-19 Contingency Plan for Scientific Party

In accordance with the "OMAO Marine Operations COVID-19 Protocols" effective June 24, 2022, shelter-in-place is not required for sailing. All mission personnel shall follow the guidelines written within the documentation, subject to change, pending the release of new guidance. All sailing personnel are required to be fully vaccinated, which means they must have completed the initial vaccination series and all applicable boosters.

The current protocol requires that mission personnel will be tested via a rapid antigen test the day of or night before sailing and possibly before being cleared to move aboard the ship for berthing. Any mission personnel who test positive will have their test confirmed by a molecular test. If an individual tests positive for COVID-19 on the molecular confirmation test, they will be disqualified from sailing, and backup personnel will be activated as mission objectives and priorities dictate.

If any mission personnel test positive for COVID-19 during OMAO required testing:

- NOAA Marine Health Services will notify the individuals who test positive that they are not cleared to board the ship. NOAA Ocean Exploration will reimburse the individual for five days of shelter-in-place lodging to complete their isolation and for a COVID-19 test to confirm they are negative prior to returning home or returning to work to sail if the expedition has not already departed.
- The expedition coordinator will be notified of any mission personnel who are not cleared to sail.
- The expedition coordinator will notify the NOAA Ocean Exploration operations chief.
- The expedition coordinator will determine, in consultation with the ship's commanding officer, NOAA Ocean Exploration's operations chief, and appropriate parties, whether the mission will continue without the uncleared personnel.

If any mission personnel develop COVID-19-like symptoms while underway, OMAO protocols will be strictly followed. The expedition coordinator (or designee if they are unable to fulfill this role) will remain the primary point of contact for all mission personnel. Additional support with onshore logistics for impacted mission personnel will be provided by:

Abby Letts
Technical Operations Team Lead, Expeditions and Exploration Division
NOAA Ocean Exploration
Joint Hydrographic Center
24 Colovos Road
Durham, NH 03824

II. Operations

The expedition coordinator is responsible for ensuring mission personnel are trained in planned operations and are knowledgeable about expedition objectives and priorities. The commanding officer is responsible for ensuring all operations conform to the ship's accepted practices and procedures.

A. Expedition Itinerary

Table 4 summarizes the expedition itinerary. All times and dates are subject to conditions and the discretion of the commanding officer. Locations are approximate.

Additional items may be added to the itinerary as expedition plans are further developed.

Table 3. Expedition itinerary: This is an approximate itinerary and is subject to change based on objective completion, weather, and logistical needs.

Date	Activities
05/02	Mission personnel begin to arrive on ship. Underway preparations and training. Mobilization. Mission personnel will need laptop computers added to the wireless network.
05/03	Mobilization. Remaining mission personnel arrive. More mission personnel will need laptop computers added to the wireless network. Crane operations may be needed to load identified stores for transport to Alaska in coordination with other NOAA Partners. Begin mobilization of AUVs from Orca Maritime and installation of computer station and iridium antenna outside skin of ship.

Date	Activities
05/04	Mobilization. Mission personnel will need laptop computers added to the wireless network. Crane operations may be needed to load identified stores for transport to Alaska in coordination with other NOAA Partners. Begin mobilization of AUVs from Orca Maritime and installation of computer station and iridium antenna outside skin of ship.
05/05	Vessel familiarization meeting (~45 min) with mission personnel that have not sailed on *Okeanos Explorer* within the last year. Depart Seattle, Washington in the morning. Pre-project meeting to be held with ship at 14:30 in combination with daily operations meeting. Welcome aboard briefings, drills, and underway mapping.
05/06	Transit Mapping
05/07	Transit Mapping
05/08	Transit Mapping
05/09	Transit Mapping
05/10	Transit Mapping
05/11	Transit Mapping
05/12	Transit Mapping
05/13	Transit Mapping
05/14	Transit Mapping
05/15	Transit Mapping
05/16	AUV and CTD Operations, overnight mapping (extended hours possible)
05/17	AUV and CTD Operations, overnight mapping (extended hours possible)
05/18	AUV and CTD Operations, overnight mapping (extended hours possible)
05/19	Mapping Operations
05/20	Mapping Operations
05/21	Mapping Operations
05/22	Mapping Operations
05/23	Mapping Operations
05/24	Mapping Operations

Date	Activities
05/25	Mapping Operations - begin transit to Dutch Harbor, AK overnight
05/26	Mapping Operations
05/27	Arrive in Dutch Harbor, AK
05/28	Demobilization
05/29	Demobilization

B. Staging and Destaging

Pre-staging is anticipated for this mapping expedition. Crane operations may be needed to facilitate the loading of NOAA-related equipment for transit to Alaska and for the loading of AUV vehicles and associated equipment.

Crane operations for demobilization are anticipated to offload AUV vehicles and equipment.

C. Operations to Be Conducted

1. CTD Casts

CTD cast locations are to be determined based on further coordination with the science community, but will likely occur during AUV operations when the AUV is deployed away from the ship. CTD casts will be scoped with the operations officer and senior survey technician in advance.

2. Extended Operations

This expedition includes planned extended over-the-side and small-boat operations. Current expedition plans include conducting extended over-the-side (e.g., CTD operations) and AUV operations up to four times per week during the expedition. The exact locations AUV and CTD operations are to be finalized but will take place in the vicinity of the Aleutian Islands. A final plan for extended operations will be included in the final project instructions and will be circulated prior to the start of the expedition. Best attempts will be made to stick to this schedule pending weather, mechanical issues, or other operational constraints. Extended dive operations may also be requested by the mission team in the case of unexpected late AUV deployments and/or exceptional discoveries.

Approval of extended dive and over-the-side operations is at the commanding officer's discretion, and every effort shall be taken to minimize undue hardship on the crew and disruptions to work schedules.

3. Telepresence/Outreach Events

a. Three live video feeds will be used throughout the expedition to provide situational awareness for onshore personnel.
b. Llive interactions are not planned for this expedition.

4. In-Port Events

a. No in port public events are planned for this expedition.

5. Special/Unusual Operations or Requests

a. Crane and deck support may be needed during mobilization and demobilization to onload and offload NOAA-partner and AUV equipment.

b. Small boat operations support will be needed for the deployment and recovery of small, man-portable AUVs during the expedition with 1-2 AUV operators on board. These dates are anticipated to be May 16-18 but may shift due to weather and other unforeseen delays.

D. SCUBA Dive Plan

All SCUBA dives are to be conducted in accordance with the requirements and regulations of the NOAA Diving Program and require the approval of the ship's commanding officer. No SCUBA science dives are planned during EX2302, but the ship may plan training, safety drills, or maintenance dives.

E. Applicable Restrictions

Conditions that preclude normal operations include AUV dives, CTD and mapping operations within the state waters of Alaska. Permits have been requested for these activities and are expected prior to departure. Permits and operational restrictions will be reviewed with the ship during the pre-cruise meeting prior to departure (additional information in **Appendix D**).

III. Equipment

A detailed list of equipment provided by the ship and NOAA Ocean Exploration can be found in the "NOAA Ship *Okeanos Explorer* FY23 Field Season Instructions." Orca Maritime's Iver AUV system and associated components will be under the control and management of Orca

Maritime, but any hazardous materials, which are not expected, will be stored in accordance with best practices and official guidelines.

IV. Hazardous Materials

A. Policy and Compliance

See the "NOAA Ship *Okeanos Explorer* FY23 Field Season Instructions."

B. Inventory

Table 4. Inventory of hazardous materials that will be aboard for EX2302.

Item	Use	Approximate Locations
95% UPS denatured ethanol (275 gal)	Sample preservation	02 Deck, port side ethanol storage container
Formaldehyde (2 gal) to be buffered into 10% buffered formalin	Sample preservation	Wet lab, under the chemical hood
Bleach (1 qt)	Sterilization and sample preservation	Wet lab cabinet under sink
Magnesium chloride (500 g)	Sample preservation	Wet lab under hood
Sodium phosphate (1 kg)	Sample preservation	Wet lab under hood
AquaShield	Underwater lubricant	ROV workshop fire cabinet, pit
Dow Corning 4	Electrical insulating compound	ROV workshop fire cabinet, pit
Fluid film spray	Silicone lubricant	ROV workshop fire cabinet
Isopropanol alcohol (2 gal)	Solvent	ROV workshop fire cabinet
Scotchkote	Electrical insulating compound	ROV workshop fire cabinet
3M silicone spray	Silicone lubricant	ROV workshop fire cabinet
Synthetic AW hydraulic oil, ISO-22	Amsoil (AWG-05)	Hanger, pit, vehicles
Tap Magic cutting fluid	Cutting/machining lubricant	ROV workshop fire cabinet
Tap Magic heavyweight cutting fluid	Cutting/machining lubricant	ROV workshop fire cabinet
Tuff Coat M	Marine lubricant	Winch room
Dow Corning Molykote 111	Valve lubricant and sealant	ROV workshop Fire cabinet, pit

Item	Use	Approximate Locations
WD40	Lubricant	ROV workshop fire cabinet
Loktite	Bolt adhesive	ROV workshop fire cabinet
Shell Diala S2	Vitrea	Hanger, vehicles
Por-15	Paint kit	ROV workshop fire cabinet
Aeroshell 41	Hydraulic fluid	Hanger, ROV Deep Discoverer
Ultratane	Butane fuel	ROV workshop fire cabinet
Rust-oleum	Protective enamel	ROV workshop fire cabinet
Flux-Off	Soldering flux remover	ROV workshop fire cabinet
Propane	Torch fuel	ROV workshop fire cabinet
Adhesive Pliobond 25	General adhesive	Tool room
AP 120 Metal Prep	Degreaser/cleaner for metal surfaces	Pit
Butane fuel	Torch refill	Tool room
PVC cement	Adhesive for PFV plastic piping	Tool room
Phosphoric acid	Ferrous metal rust removal	Tool room
Pipetite paste	Plumbing sealant	Tool room/pit
Spindle oil 10, ROS PT	Lubricant/compensation oil	Tool room
DC557	Silicon grease	Tool room/pit
Tether potting catalyst	Two part epoxy catalyst	Pit
Tether potting compound	Two part epoxy ingredient	Pit
ThermaPlex bearing grease	Lubricant	Pit
Tritech Seaking	Compensator oil for sonar head	Pit

Appendix A. Waypoints

Table A1. Waypoints for the general working area (white square).

Latitude (D DM)	Longitude (D DM)
165° 55.28' W	52° 10.54' N
166° 02.06' W	53° 14.03' N
171° 57.13' W	50° 39.35' N
179° 49.74' W	50° 09.42' N
179° 49.69' W	52° 25.97' N
179° 24.32' W	52° 54.51' N
179° 45.65' W	54° 02.53' N
179° 14.52 W	54° 05.70' N
178° 43.97' W	52° 24.53' N
177° 46.04' W	52° 17.32' N
177° 42.87' W	51° 38.13' N
176° 12.08' W	51° 33.80' N

Appendix B. Data Management Plan

1. General Description of Data to be Managed

1.1 Name and Purpose of the Data Collection Project:

EX-23-03, Seascape Alaska: Aleutians Exploration I

Operations will focus on exploring deep waters (greater than 200 m for mapping operations

and between 40 and 130 m for AUV operations) in U.S. waters off Alaska and the Aleutian Islands.

1.2 Summary Description of the data to be collected:

Operations will include the use of the ship's deepwater mapping systems (Kongsberg EM 304 multibeam, EK60/EK80 split-beam sonars, Knudsen 3260 Chirp sub-bottom profiler, and Teledyne acoustic Doppler current profilers), expendable bathythermograph (XBTs) in support of multibeam sonar mapping operations, conductivity, temperature, depth profiler (CTD) casts, a man-portable Iver 3 AUV operated by Orca Maritime launched and recovered from *Okeanos Explorer's* small boats or crane, EK60/80 calibrations, and a high-bandwidth satellite connection for continuous ship-to-shore communications.

1.3 Keywords or phrases that could be used to discover the data:

Theme Keywords:

bathymetric gaps, benthic habitats, CTD, deep-sea coral and sponge communities, Deep Discoverer, deep-water habitats, chemosynthetic communities, EM304, essential fish habitats, EFH, expedition, exploration, explorer, fish habitats, habitat areas of particular concern, HAPC, mapping survey, marine education, multibeam, multibeam backscatter, multibeam sonar, multi-beam sonar, noaa, noaa fleet, ocean, ocean discovery, ocean education, ocean exploration, ocean exploration and research, ocean literacy, ocean research, oceans, OER, okeanos, okeanos explorer, R337, science, sun photometer, scientific computing system, scientific mission, scientific research, SCS, sea, Seirios, Seabed 2030, shakedown, single beam sonar, singlebeam sonar, single-beam sonar, site characterization, sonar anomalies, split beam sonar, stewardship, sub-bottom profile, pelagic infauna, systematic exploration, eDNA, technology, undersea, underwater, water column backscatter, EXPRESS, EXpanding Pacific Research and Exploration of Submerged Systems,

Place Keywords:

Alaska, Aleutian Islands, U.S. West Coast, Pacific Northwest, Seattle, Washington, Dutch Harbor, Unalaska, Gulf of Alaska

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

Okeanos Mapping Cruises

1.5 Planned or Actual Temporal Coverage of the data:

Start Date: 2023-05-05 and End Date: 2023-05-27

1.6 Actual or Planned Geographic Coverage of the data:

Northernmost Boundary: 55 and Southernmost Boundary: 47
Westernmost Boundary: -180 and Easternmost Boundary: -122

1.7 What data types will be created or captured and submitted for archive?

Bottom Backscatter, Cruise Plan, Cruise Summary, CTD (processed), CTD (product), CTD (raw),Digital Video, Digital Still Images, EK60 Split Beam Data, EK80 Split Beam Data, Multibeam (image), Multibeam (processed), Multibeam (product), Multibeam (raw),

Navigational Data, SCS Output (compressed), SCS Output (native), Seafloor Imagery, Sound Velocity Profile, Sub-Bottom Profile data, Temperature data, Water Column Backscatter, XBT (raw), AUV Multibeam (image), AUV Multibeam (processed), AUV Multibeam (product), AUV Multibeam (raw), SCS Output (compressed), SCS Output (native)

1.8 What platforms will be employed?
NOAA Ship Okeanos Explorer, Deep Discoverer ROV, Seirios Camera Platform, Iver 3 AUV

2 Points of Contact for this Data Producing Project

Overall POC: Samuel Cuellar, samuel.cuellar@noaa.gov
Title: Expedition Coordinator
Affiliation: NOAA Office of Ocean Exploration and Research
Phone: (202) 302-9474 (Samuel Cuellar)

3 Points of Contact for Managing the Data

Data POC: Caitlin Ruby
Data POC Title: Stewardship Data Management
Data POC Email: caitlin.ruby@noaa.gov

4 Resources

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

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

5 Data Lineage and Quality

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

SCS data shall be delivered in its native format to NCEI-MD (oceanographic archive); the data are then converted to an archive-ready, documented, and compressed NetCDF3 format which is made available for download through the Ocean Exploration Digital Atlas; water column profile data and navigation data will be delivered in ASCII format to NCEI-MD; EM304 and EK60/80 output data and metadata along with water column profiles used for calibration will be delivered to NCEI-CO (geophysical archive). AUV seafloor imagery, water column profile data and navigation data will be delivered in ASCII format to NCEI-MD on a separate drive.

5.2 What quality control procedures will be employed?

Quality control procedures for the data from the Kongsberg EM304 is handled at UNH CCOM/JHC. Raw (level-0) bathymetry files are cleaned/edited into new data files (level-1) and converted to a variety of products (level-2). Data from sensors monitored through the

SCS are archived in their native format and are not quality controlled. Data from CTD casts and XBT firings are archived in their native format.

6 Data Documentation

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

6.1.1 If metadata are non-existant or non-compliant, please explain:
Not Applicable

6.2 Where will the metadata be hosted?
Organization: An ISO format collection-level metadata record will be generated during pre-cruise planning and published in the NOAA OneStop catalog and an OER Web Accessible Folder (WAF) hosted for public discovery and access at:
URL: https://data.noaa.gov/waf/NOAA/NESDIS/ncei/oer/iso/
Metadata Standard: ISO 19115-2 Geographic Information with Extensions for Imagery and Gridded Data will be the metadata standard employed.

6.3 Process for producing and maintaining metadata:
Metadata will be generated via xml editors or metadata generation tools.

7 Data Access

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

7.1.1 If the data will not be available to the public, or with limitations, provide a valid reason.
Not Applicable

7.1.2 If there are limitations, describe how data are protected from unauthorized access.
Account access to mission systems are maintained and controlled by the Program. Data access prior to public accessibility is documented through the use of Data Request forms and standard operating procedures.

7.2 Name and URL of organization or facility providing data access.
Organization: NOAA National Centers for Environmental Information (NCEI)
URL: https://www.ncei.noaa.gov

7.3 Approximate delay between data collection and dissemination. By what authority?
Hold time: Data are considered immediately publicly accessible as soon as possible after the mission, unless there are documented restrictions.
Hold authority: not applicable

7.4 Prepare a Data Access Statement
No data access constraints, unless data are protected under Section 304 of the National Historic Preservation Act of 1966. Data collected and derivative data products produced by

the *Okeanos Explorer* will be archived in a location where it can be withheld from public disclosure.

8 Data Preservation and Protection

8.1 Actual or planned long-term data archive location:

Data from this mission will be preserved and stewarded through the NOAA National Centers for Environmental Information. Refer to the Okeanos Explorer Data Management Plan at NOAA Central Library Institutional Repository for detailed descriptions of the processes, procedures, and partners involved in this collaborative effort.

8.2 If no archive planned, why?

Not Applicable

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

The EM304 output data is a new format not currently read by NCEI archive systems. The new file format is being added to the system capability. There will be an unknown delay for the archive of these .kmall files. All other data will be archived within 60-90 days of receipt.

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

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

8.5 Prepare a Data Use Statement

Data use shall be credited to NOAA Office of Ocean Exploration and Research.

Appendix C. NOAA Ocean Exploration Ethanol Testing

To ensure the quality of the ethanol stored aboard NOAA Ship *Okeanos Explorer,* NOAA Ocean Exploration has developed an Ethanol Test Guide. This guide provides step-by-step instructions on how to test the ethanol stored in the ejectable ethanol storage barrel on the 02 Deck. This guide also provides a built in calculator to plug in the measurements and get a definitive result. Finally, this guide is a log of the current and previous results of the ethanol testing.

Appendix D. Licenses, Permits, and Environmental Compliance

Pursuant to the National Environmental Policy Act (NEPA), NOAA Ocean Exploration is required to include in its planning and decision-making processes appropriate and careful consideration of the potential environmental consequences of actions it proposes to fund, authorize, and/or conduct. The companion manual for NOAA Administrative Order 216-6A describes the agency's specific procedures for NEPA compliance.

An environmental review memorandum was completed for NOAA Ocean Exploration expeditions on NOAA Ship *Okeanos Explorer* in 2023 in accordance with Section 4 of the companion manual in the form of a categorical exclusion worksheet. Based on this review, a categorical exclusion was determined to be the appropriate level of NEPA analysis necessary, as no extraordinary circumstances exist that require the preparation of an environmental assessment or environmental impact statement. This document is on file with NOAA Ocean Exploration and can be provided upon request.

See the "NOAA Ship *Okeanos Explorer FY23 Field Season Instructions*" for additional information regarding environmental compliance that applies to the entire field season (e.g., Endangered Species Act Section 7 consultation and potential impacts to essential fish habitat). An ESA memo is currently under review for this project.

A State Cultural Resources Investigation Permit (SCRIP) has been requested from the Alaska Department of Natural Resources, Office of History and Archaeology for work within 3nm of the coast for AUV operations. This permit is expected before departure on EX2302.

Final licenses, permits, or compliance documents will be appended to the associated expedition report.