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Project Instructions: EX-22-08, EXPRESS: West Coast Mapping

Date Submitted: October 5, 2022

Platform: NOAA Ship *Okeanos Explorer*

Project Number: EX-22-08

Project Title: EXPRESS: West Coast Mapping

Project Dates: October 16-November 6, 2022

Prepared by: _____ **Dated:** 10/5/2022

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Expedition Coordinator
NOAA Office of Ocean Exploration and Research

Approved by: Kasey Cantwell **Dated:** 10/5/2022

Kasey Cantwell
Operations Chief
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Approved by: Rachel Medley **Dated:** 10/6/2022

Rachel Medley
Chief, Expeditions and Exploration Division
NOAA Office of Ocean Exploration and Research

Approved by: GOELLER.AMANDA.LYNNE.1267671644 Digitally signed by GOELLER.AMANDA.LYNNE.1267671644 Date: 2022.10.25 16:28:05 -04'00' **Dated:** _____

Commander Amanda Goeller
Commanding Officer
NOAA Marine Operations Center — Atlantic

I. Overview

A. Brief Summary and Project Period

October 16-November 6, 2022
San Diego, California - Newport, Oregon
EX-22-08, EXPRESS: West Coast Mapping

This document contains project instructions specific to EX-22-08. For the annual, cross-expedition details, see the "NOAA Ship *Okeanos Explorer* FY2022 Field Season Instructions." This expedition will commence on October 16, 2022, in San Diego, California, and conclude on November 6 in Newport, Oregon. It will include 24-hour-a-day acoustic exploration mapping operations focused on areas generally deeper than 200 m off the coast of California and Oregon. See Appendix B for the expedition's Data Management Plan.

B. Days at Sea

Of the 22 days at sea (DAS) scheduled for this expedition, 22 DAS are funded by a NOAA Office of Oceanic and Atmospheric Research allocation. Operations will be conducted 24 hours per day and consist of mapping operations, 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, and a high-bandwidth satellite connection for continuous ship-to-shore communications.

C. Operating Area

EX-22-08 will focus operations on expanding mapping coverage in unexplored regions off the coast of California and Oregon. Priority mapping areas are indicated in **Figure 1**. (The waypoints for the general working area and proposed cruise track are in Appendix A.)

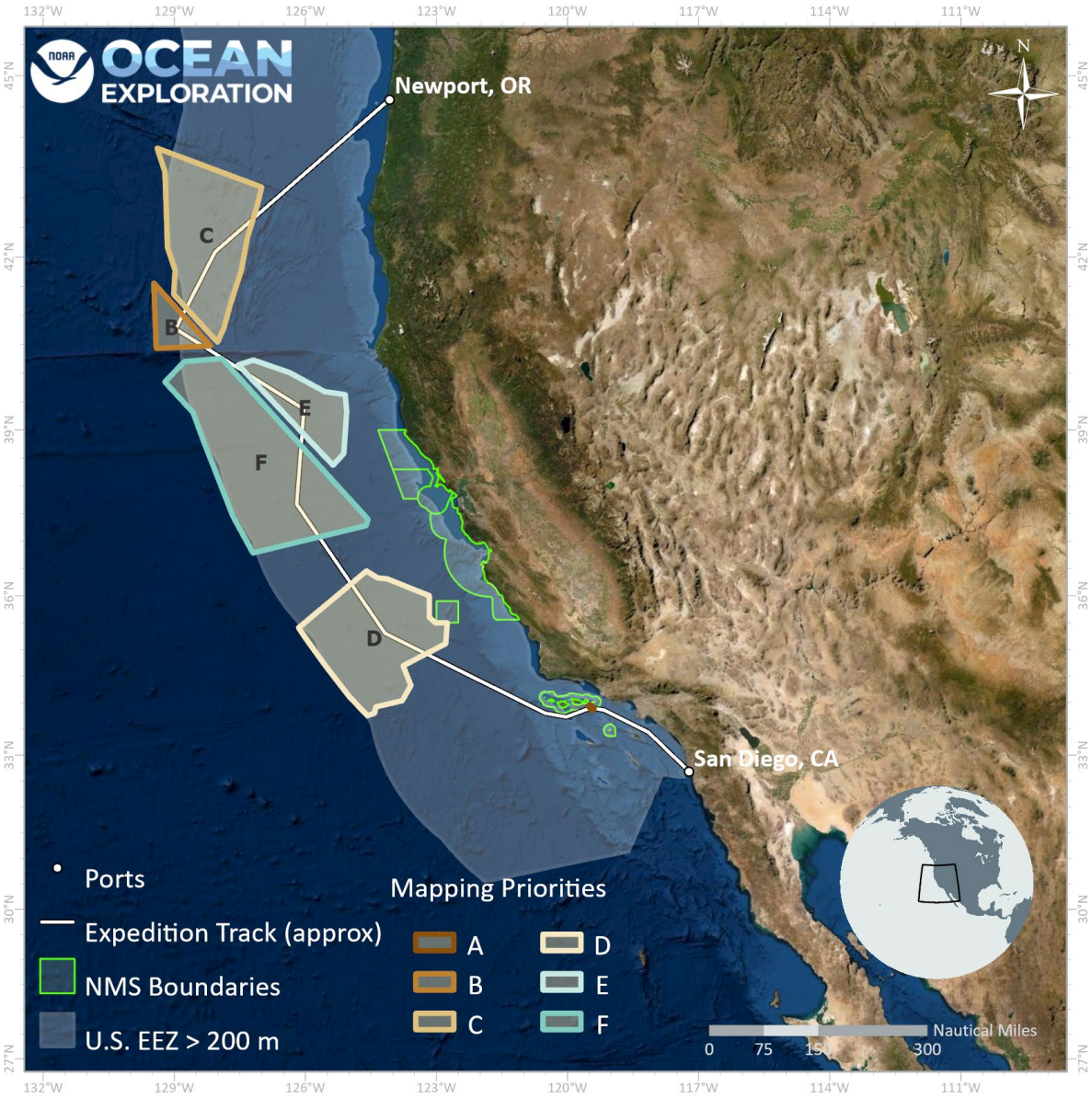

Figure 1. Map showing the general operating areas for EX-22-08. Note that the cruise track is subject to change based on survey results, field conditions, and the discretion of the commanding officer. Priority regions (A-F) have been identified from community input.

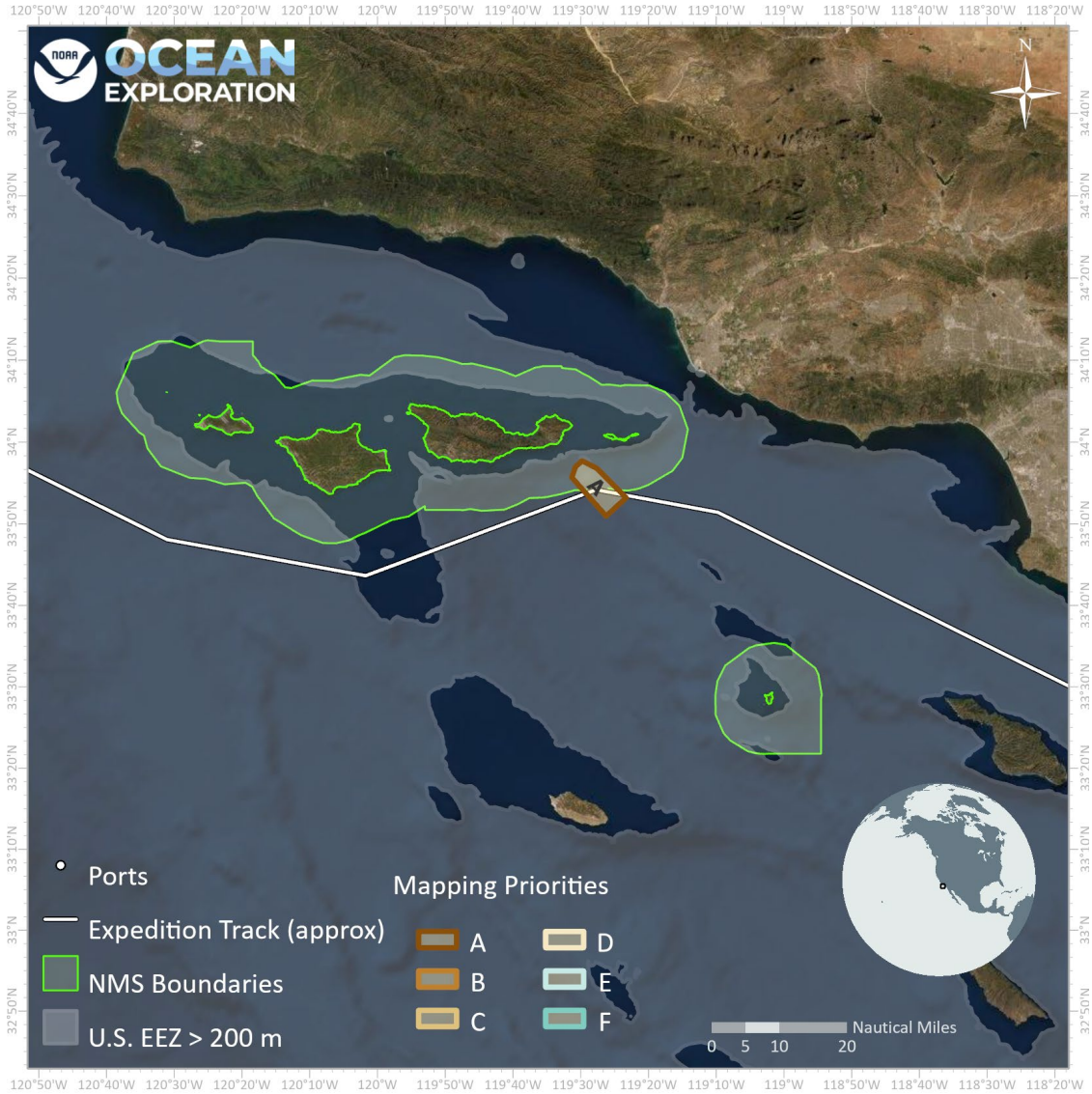

Figure 2. Map showing the operating areas around Channel Islands for EX-22-08. Note that the cruise track is subject to change based on survey results, field conditions, and the discretion of the commanding officer.

D. Summary of Objectives

EX-22-08 operations will involve a transit northwest from San Diego followed by focused ocean mapping operations that will occur in a small region south of the Channel Islands and off the west coast of Oregon and California (Figures 1 and 2), mostly in deep water (>200 m). The expedition will include 24-hour-a-day exploratory mapping operations to fill mapping gaps and a detailed sub-bottom survey of a sponge reef south of the Channel

Islands. See the NOAA Ship *Okeanos Explorer* FY23 Field Season Instructions for more information.

1. Science Objectives

Strategic Transit

- Transit data will aim to address bathymetric gaps, or prioritize areas with poor bathymetric or seabed backscatter data quality. Transit speeds requested will be best possible speed up to 10 kn.

Acoustic Sonar Objectives

- Conduct 24-hour-per-day mapping operations for the entirety of the cruise. 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.
- Collect high-resolution mapping data in priority areas, as shown in Figs. 1 and 2, with areas numbered according to priority A through F. Focused surveys may also be completed in the contingency areas (areas D,E, F) as time and transit allows, or in order to adapt to adverse weather conditions.
- 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 utilized during mapping operations.
- Transit speeds of 10 kn may be requested in certain areas as feasible.
- Conduct field review of bathymetry data.
- Review water column data for anomalies.
- Produce jpg images and navigation lines of sub-bottom data.
- Generate final cruise map displaying seabed coverage obtained.
- EK60/80 Split-beam Sonar Objectives
  - Ensure all licenses, software, and firmware are up to date.
  - Confirm functionality and integration of all frequencies (18, 38, 70, 120, 200 kHz) with ancillary systems.
  - Calibrate each sonar via the automated calibration gear.

Science

- Acquire data on deepwater habitats to support science and management needs.
- Identify, map and explore the diversity and distribution of benthic habitats, including potential deep-sea coral and sponge communities, fish habitats, and chemosynthetic communities.

- Map geologic features to better understand the geological context of the region and improve knowledge of past and potential geohazards.
- Acquire acoustic and oceanographic data as a foundation to better understand the characteristics of the water column and the pelagic fauna that inhabit it.
- Engage a broad spectrum of the scientific and management community, as well the public in telepresence-based exploration.
- Conduct operations in conjunction with shore-based exploration command centers and remote science team participants.
- 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.
- Collect high-resolution bathymetry in areas with no (or low quality) sonar data.

Positioning and Inertial Motion Data

- POS/MV data will be monitored in real time and collected to ensure data quality and watch for potential periodic dropouts that have been reported throughout the fleet.
- Seapath data from the newly installed system will be monitored and utilized as necessary.

Sound Speed Profiling

- Collect expendable bathythermograph casts as data quality requires but not more than 6 hours apart.
- Maintain CTD capabilities as a backup sound velocity profiling method for mapping data requirements.

Education

- Train the next generation of ocean explorers by hosting up to three Explorers-in-Training on the ship. Training will include standing 8 hour watches of sonar data acquisition, processing, and documentation according to standard NOAA Ocean Exploration procedures. Ancillary projects may be assigned as necessary.

Data Processing/Throughput Testing

- 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

Miscellaneous

- Collect sun photometer measurements as part of an Exploration Project of Opportunity (EPO).

2. Video Engineering Objectives

- Provide onboard support for 24 hour mapping and telepresence mapping objectives.
- Verify Global Foundation for Ocean Exploration (GFOE) managed telepresence systems perform as expected.

3. Network/Onboard Data Objectives

- Ensure Global Foundation for Ocean Exploration (GFOE) managed VSAT, network and computing infrastructure operate as required to meet mission objectives.
- Ensure shipboard instruments / teams are producing expected data products at the expected rates according to established conventions.
- Ensure data management processes organize, backup and transmit data to shore as expected.
- Support shore-based personnel to remotely access shipboard resources to better meet mission objectives.
- Cross-train network, system administration and data management personnel.
- Improve system documentation.

E. Participating Institutions

- National Oceanic and Atmospheric Administration (NOAA), Office of Ocean Exploration and Research (OER) — 1315 East-West Highway, Silver Spring, MD 20910 USA
- University Corporation for Atmospheric Research (UCAR) Community Programs for Advancement of Earth System Science — P.O. Box 3000, Boulder, CO 80307 USA
- Global Foundation for Ocean Exploration (GFOE) — P.O. Box 417, Mystic, CT 06355 USA
- University of New Hampshire Center for Coastal and Ocean Mapping, 24 Colovos Rd, Durham NH, USA
- University of Rhode Island Inner Space Center, 215 South Ferry Road, Narragansett, RI 02882 USA.

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

F. Personnel (Mission Party)

Table 1 describes the currently planned arrival times for personnel in advance of EX-22-08. Expedition mobilization is scheduled for October 15. All personnel are planning to move aboard by October 15 and we will work with OPS to schedule times of arrival to organize COVID-19 testing.

Table 1. Seagoing mission personnel: This list is tentative until travel is booked. Any deviations will be communicated to the operations officer.

#	Name (Last, First)	Title	Date Aboard	Date Disembark	Gender	Affiliation	Nationality
1	Morrow, Thomas	Expedition Coordinator, Mapping Lead	10/14	11/8	M	OER	USA
2	Cuellar, Sam	Watch Lead/Expedition Coordinator in training	10/14	11/8	M	UCAR	USA
3	Peliks, Marcel	Watch Lead	10/15	11/7	M	UCAR	USA
4	Coulson, Anna	Watch Lead	10/15	11/7	F	UCAR	USA
5	Clifton, Jennifer	Explorer-in-Training	10/15	11/7	F	UCAR	USA
6	Stablow, Benjamin	Explorer-in-Training	10/15	11/7	M	UCAR	USA
7	Wright, Chris	Data Manager	10/15	11/7	M	GFOE	USA
8	Brian, Roland	Videographer	10/15	11/7	M	GFOE	USA

* Not confirmed.

[1] Science and Technology Corporation

1. Foreign National Guests 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 3. Points of contact

Operations	Name, Title	Office	Address	Phone/Fax	Email
Marine Operations Center, Atlantic	CDR Amanda Goeller, Commanding Officer	Marine Operations Center, Atlantic	439 West York Street Norfolk, VA 23510-1145	(757) 441-6776/ (757) 441-6495	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/ (757) 441-6776	Chiefops.MOA@noaa.gov
NOAA Ship Okeanos Explorer (primary)	CDR 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
Mission (primary)	Kasey Cantwell, Operations Chief	NOAA Ocean Exploration	1315 East-West Highway, Silver Spring, MD 20910	(301)-717-7776	Kasey.cantwell@noaa.gov
Mission (other)	Rachel Medley, Chief, Expeditions and Exploration Division	NOAA Ocean Exploration	1315 East-West Highway, Silver Spring, MD 20910	(301) 789-3075	rachel.medley@noaa.gov
Mission (other)	Jeremy Weirich, Director	NOAA Ocean Exploration	1315 East-West Highway, Silver Spring, MD 20910	(617) 875-4658	jeremy.weirich@noaa.gov

2. Diplomatic Clearances

None required.

3. Licenses and Permits

See Appendix C.

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 San Diego, California, at the start of the expedition, **shipments should arrive no later than October 7th, 2022,** 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 Newport Oregon, after the expedition, **shipments should arrive no later than October 31st, 2022,** and should be shipped to the following address:

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

5. COVID-19 Plan for Mission Personnel

In accordance with the "OMAO Marine Operations COVID-19 Protocols" effective April 16, 2022, shelter-in-place is not required for sailing. All mission personnel shall follow the guidelines written within the documentation, subject to change pending new guidance released. All sailing personnel are required to be fully vaccinated, which means they must have completed the initial vaccination series and all applicable boosters.

Current protocol requires that mission personnel will be tested via rapid antigen tests the day of or night before sailing and potentially before being cleared to move onboard the ship for berthing. Any mission personnel who test positive will have their test confirmed by a molecular test. If COVID-positive 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 any required testing as dictated by OMAO:

- 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 5 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
Operations Support Team Lead, Expeditions and Exploration Division
NOAA Office of Ocean Exploration and Research
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 prevailing conditions and the discretion of the commanding officer. This is an approximate itinerary and is subject to change based on objective completion.

Table 4. Expedition itinerary

Date	Activities
10/14	Members of the mission team join the ship. Pre-cruise familiarization brief to be conducted during the afternoon hours.
10/15	Expedition mobilization day. Remaining members of the mission team join the ship Dockside sonar pinging may be requested. Mission personnel orientation meeting. Vessel familiarization meeting with operations officer, executive officer, and safety officer for any new mission personnel. Mapping watch schedule posted. Pre-cruise familiarization brief to be conducted if not completed on 10/14.
10/16	First day underway. Depart San Diego, CA in the morning. Transit mapping as ship heads to focused mapping site A. Detailed mapping of site A near CINMS.
10/17 -11/4	Transit to focused mapping sites offshore. Focused mapping operations west of California and Oregon in US and International waters. Priorities will depend on weather conditions and subject to Commanding Officer's description.
11/5	Transit mapping to Newport, Oregon.
11/6	Arrive in Newport, Oregon
11/7	Demobilization, mission personnel depart the vessel.

B. Staging and Destaging

Minimal staging and destaging are anticipated for this mapping expedition. Expendable bathythermograph (XBT) probes may need to be loaded on board prior to departure from San Diego, California. This work will be coordinated with the ship's senior survey technician.

C. Operations To Be Conducted

1.1. Telepresence/Outreach Events

- Three live video feeds will be used throughout the expedition to provide situational awareness for onshore personnel.

2. Port Events and Ship Tours

No public port events or ship tours are planned for this expedition.

3. Special/Unusual Operations or Requests

There are no special or unusual operations or requests for this expedition.

D. SCUBA Dive Plans

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 science dives are planned during EX-22-08, but the ship may plan training, safety drills, or maintenance dives.

E. Applicable Restrictions

Mapping operations will be carried out in National Marine Sanctuaries waters. A permit has been requested, detailing targets and operations in the region. See appendix C for additional details.

III. Equipment

A detailed list of equipment provided by the ship and NOAA Ocean Exploration is in the NOAA Ship *Okeanos Explorer* FY23 Field Season Instructions. There are no specific changes relative to this expedition.

IV. Hazardous Materials

A. Policy and Compliance

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

B. Inventory

Table 5. Inventory of hazardous materials that will be aboard for EX-22-08

Item	Use	Approximate Locations
95% denatured ethanol (30 gal)	Sample preservation	Wetlab, under the chemical hood
Formaldehyde (2 gal) to be buffered into 10% buffered formalin	Sample preservation	Wetlab, under the chemical hood
Chaos buffer (325 mL) (4 M guanidine thiocyanate, 0.5% N-laurosylsarcosine, 25 mMTris pH 8.0, 0.1 M beta-mercaptoethanol)	Sample preservation	Wetlab, under the chemical 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)	Hangar, pit, vehicles
Tap Magic cutting fluid	Cutting/machining lubricant	ROV workshop fire cabinet
Tap Magic heavyweight cutting fluid	Cutting/machining lubricant	ROV workshop fire cabinet
Tuff Coat M	Marine lubricant	Winch room
Dow Corning Molykote 111	Valve lubricant and sealant	ROV workshop fire cabinet, pit
WD40	Lubricant	ROV workshop fire cabinet
Loktite	Bolt adhesive	ROV workshop fire cabinet
Shell Diala S2	Vitrea	Hangar, vehicles
Por-15	Paint kit	ROV workshop fire cabinet
Aeroshell 41	Hydraulic fluid	Hangar, ROV *Deep Discoverer*
Ultratane	Butane fuel	ROV workshop fire cabinet

Item	Use	Approximate Locations
Rust-oleum	Protective enamel	ROV workshop fire cabinet
Flux-Off	Soldering flux remover	ROV workshop fire cabinet
Propane	Torch fuel	ROV workshop fire cabinet
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
Bleach (1 qt)	Sterilization and sample preservation	Cabinet under sink

Appendix A. Waypoints

Figure A1. Map showing the general operating area for EX-22-08

Table A1. Waypoints for general working area (white dashed line)

Latitude (DD)	Longitude (DD)
32.5969	-116.6664
29.8474	-123.6183
42.7185	-131.0366
45.036	-124.0848

Table A2. Waypoints for proposed cruise track (white line)

Latitude (DD)	Longitude (DD)
32.70444349	-117.2389192
33.44037954	-118.1505057
33.85682076	-119.1621444
33.90296749	-119.462301
33.72747725	-120.0292633
33.80141176	-120.5184073
35.30291193	-124.1758703
37.67110301	-126.1991476
39.367049	-126.032394
40.77069355	-128.9672579
42.08757734	-128.0667883
44.61717546	-124.0758181

Appendix B. Data Management Plan

Okeanos Explorer Mission EX2208 Data Management Plan

Report Date: 2022-09-23

1. General Description of Data to be Managed

1.1 Name and Purpose of the Data Collection Project:
EX-22-08, EXPRESS: West Coast Mapping
This expedition will commence on October 16, 2022 in San Diego, CA, and conclude on November 6, 2022 in Newport, Oregon. Operations will be conducted 24 hours per day acoustic exploration mapping operations focused on U.S. waters off the coast of California and Oregon in areas generally deeper than 200m.

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 sonar, EK60/EK80 split-beam sonars, Knudsen 3260 Chirp sub-bottom profiler, and Teledyne acoustic Doppler current profiler), expendable bathythermograph (XBTs) in support of multibeam sonar mapping operations, conductivity, temperature, depth profiler (CTD) casts, 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:

National Marine Sanctuaries, deep-sea coral communities, deep-sea sponge communities, deep-sea hydrothermal communities, water column habitat characterization, vulnerable marine habitats, seafloor composition, island formation, plate tectonics, hydrothermal vents, critical minerals, submarine geohazards, biogeographic patterns, deep-sea ecosystems, extinct polymetallic sulfide systems, fracture zones, rift zones

Place Keywords:

Coastal California, Channel Islands, Monterey Bay, Southern California Borderlands, West Coast of California, Pacific Basin

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: 2022-10-16 and End Date: 2022-11-6

1.6 Actual or Planned Geographic Coverage of the data:
Northernmost Boundary: 47 and Southernmost Boundary: 30
Westernmost Boundary: -131 and Easternmost Boundary: -116

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

Bottom Backscatter, Cruise Plan, Cruise Summary, EK60 Split Beam Data, EK80 Split Beam Data, Multibeam (image), Multibeam (processed), Multibeam (product), Multibeam (raw), Navigational Data, SCS Output (compressed), SCS Output (native), Sound Velocity Profile, Sub-Bottom Profile data, Temperature data, Water Column Backscatter, XBT (raw)

1.8 What platforms will be employed?
NOAA Ship Okeanos Explorer

2 Points of Contact for this Data Producing Project

Overall POC: Thomas Morrow, thomas.morrow@noaa.gov
Title: Expedition Coordinator
Affiliation: NOAA Office of Ocean Exploration and Research
Phone: (202) 650-7319

3 Points of Contact for Managing the Data

Data POC: Megan Cromwell
Data POC Title: Stewardship Data Management
Data POC Email: megan.cromwell@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).

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 the National Historic Preservation Act of 1966.

8 Data Preservation and Protection

8.1 Actual or planned long-term data archive location:

Data from this mission will be preserved and stewarded through the NOAA National Centers for Environmental Information. Refer to the Okeanos Explorer 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. 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 226-6A describes the agency's specific procedures for NEPA compliance.

An environmental review memorandum was completed for NOAA Ocean Exploration expeditions on *Okeanos Explorer* in 2022 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. NOAA Ocean Exploration is preparing a programmatic environmental assessment to cover future expeditions.

As required under Section 7 of the Endangered Species Act (ESA), NOAA Ocean Exploration conducted an informal consultation with NOAA's National Marine Fisheries Service (NMFS) Office of Protected Resources to request their concurrence with NOAA Ocean Exploration's biological evaluation determining that NOAA Ocean Exploration's operations on *Okeanos Explorer* conducted from October 16-November 6 may affect, but are not likely to adversely affect, ESA-listed marine species. In a letter dated March 14, 2022, the chief of the ESA Interagency Cooperation Division in the NMFS Office of Protected Resources wrote that NMFS concurs with NOAA Ocean Exploration's determination.

In addition, NOAA Ocean Exploration consulted with the NMFS West Coast Region on potential impacts of operations to essential fish habitat (EFH) in the Pacific Ocean between October 16-November 6 under the Magnuson-Stevens Fishery Conservation and Management Act. NOAA Ocean Exploration received a letter of acknowledgement from NMFS on August 3, 2022, that covers expedition activities from October 16-November 6.

Permits have been requested for the proposed work inside Channel Islands National Marine Sanctuary, but have not been received at the time of publication. If received, they will be added to this document. If permits are not granted, the project will not include operations inside Channel Islands National Marine Sanctuary.

Appendix D. Emergency Contact Data Sheet

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.