



# Project Instructions: EX-22-02, Caribbean Mapping (Mapping)

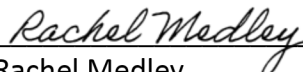
Date Submitted: February 7, 2022  
Platform: NOAA Ship *Okeanos Explorer*  
Project Number: EX-22-02  
Project Title: Caribbean Mapping  
Project Dates: March 5-25, 2022

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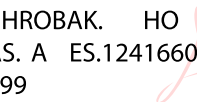
Dated: 2/7/2022

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Dated: 2/8/2022

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NOAA Ocean Exploration

Dated: 2/9/2022

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

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# I. Overview

## A. Brief Summary and Project Period

March 5-25 2022

Key West, Florida — San Juan, Puerto Rico

EX-22-02 Caribbean Mapping

This document contains project instructions specific to EX-22-02. For the annual cross-expedition details, see the [“NOAA Ship \*Okeanos Explorer\* FY22 Field Season Instructions.”](#) This expedition will commence on March 5, 2022 in Key West, Florida, and conclude on March 25, 2022 in San Juan, Puerto Rico. 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. Operations will focus on exploring deep waters (greater than 200 m) in U.S. waters south of Puerto Rico, in partnership with the MesoAmerican-Caribbean Sea Hydrographic Commission (MACHC).

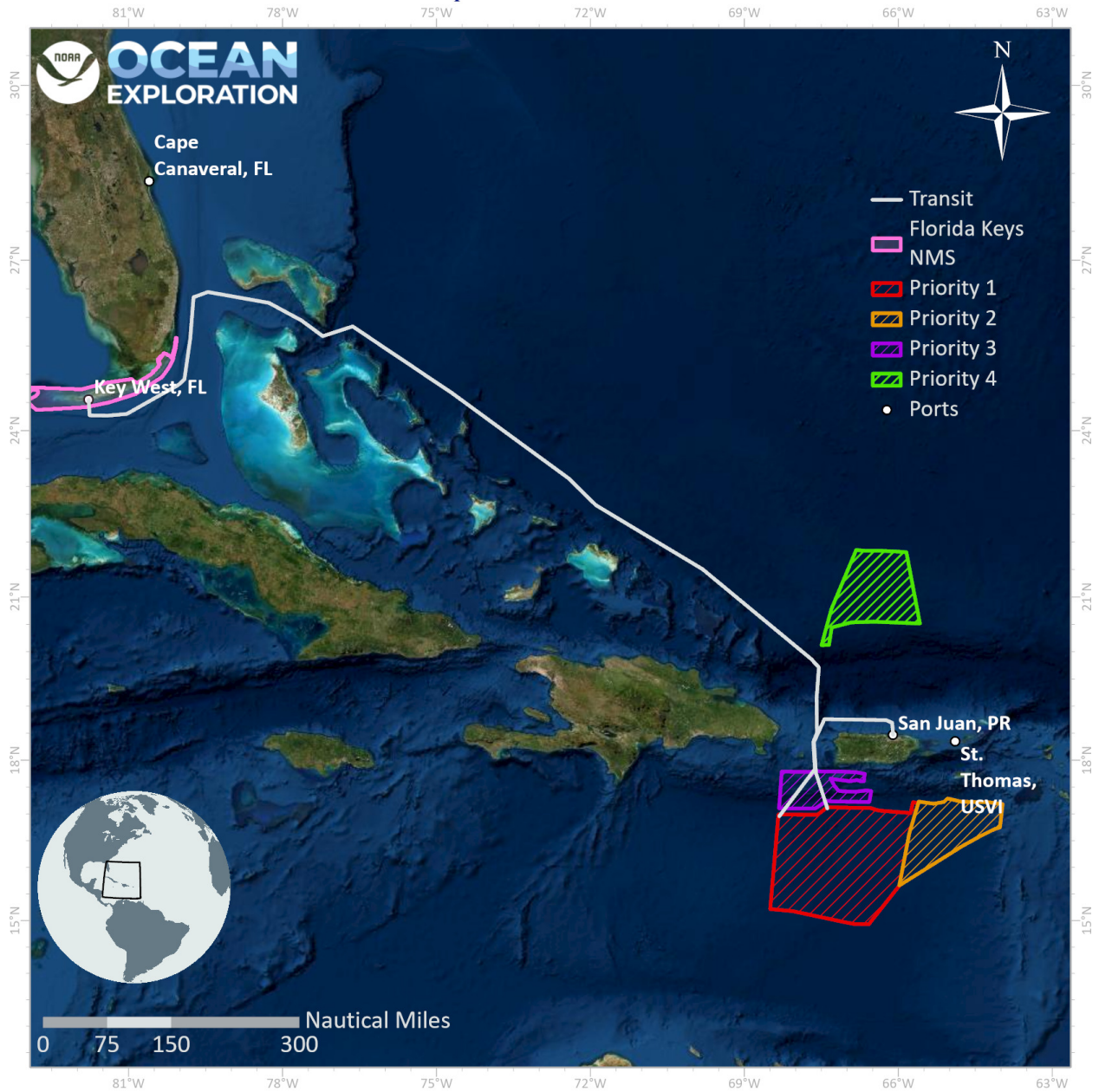
## B. Days at Sea

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. Mapping operations are planned 24 hours a day, with a medium operational tempo.

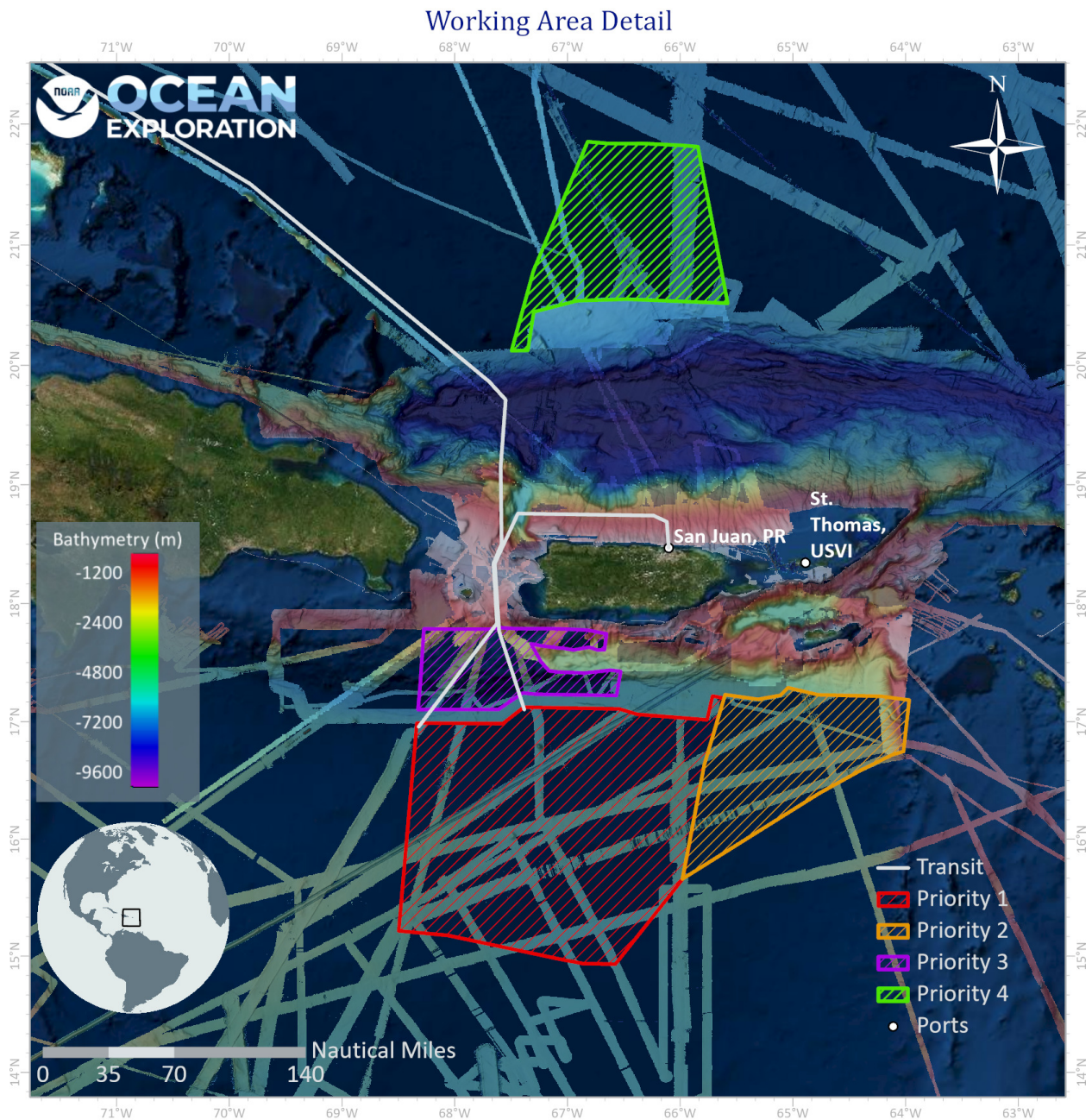
## C. Operating Area

EX-22-02 will focus operations on U.S. waters south of Puerto Rico. **Figure 1** shows the general operating area for the expedition. Waypoints for the working area and proposed cruise track are included in Appendix A.

# Expedition Overview



**Figure 1.** Map showing the general operating area for EX-22-02. Note that the expedition track is subject to change based on survey results, field conditions, and discretion of the commanding officer.



**Figure 2.** Map detail showing operating areas for EX-22-02 and existing bathymetric coverage. Note that the expedition track is subject to change based on survey results, field conditions, and discretion of the commanding officer.

## D. Summary of Objectives

EX-22-02 operations will involve a transit eastward followed by focused ocean mapping operations that will occur in U.S. waters south of Puerto Rico, mostly in deep water (>200 m). The expedition will include 24-hour-a-day exploratory mapping operations to fill mapping gaps.

See Appendix A for an elaboration of procedures/objectives and the [“NOAA Ship Okeanos Explorer FY22 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 1 through 4. Focused surveys may also be completed in the contingency areas (areas 3,4) as time 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 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\* FY22 Field Season Instructions](#)” for institutions that consistently participate throughout the field season.

## F. Personnel (Mission Party)

Mission personnel (see **Table 1**) will join the ship on March 3, 2022, after a RAPID negative COVID-19 test (as stated in the most current OMAO guidance on COVID protocols - see Section 4; protocols are subject to change). Mission personnel will then be aboard for the duration of the expedition (March 5-25, 2022). Some personnel will depart on March 26, 2022, and others will stay aboard for the expedition that follows (EX-22-03).

**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	Aboard from EX2201	03/26	M	OER (FW <sup>1</sup> )	USA
2	Candio, Sam	Mapping Lead / Watch Lead	Aboard from EX2201	03/26	M	OER (STC <sup>2</sup> )	USA
3	Bittinger, Amanda	Watch Lead	03/04	03/26	F	UCAR	USA
4	Gillespie, Treyson	Watch Lead	03/04	03/26	M	UCAR	USA
5	Arndt, Henry	Explorer-in-Training	03/04	03/26	M	OER	USA
6	Medley, Daryin	Explorer-in-Training	03/04	03/26	M	OER	USA
7	TBD*	Explorer-in-Training	03/04	03/26	[Insert gender]	[Insert affiliation]	USA
8	Wright, Chris	Data Manager	Aboard from EX2201	Staying aboard for EX2203	M	GFOE	USA
9	Lister, Andy	Data Manager	Aboard from EX2201	03/26	M	GFOE	USA
10	Brian, Roland	Video Engineer	Aboard from EX2201	Staying aboard for EX2203	M	GFOE	USA
11	Knott, Bob	Video Engineer	03/04	03/26	M	GFOE	USA
12	Sagatov, Anna	Training	03/04	03/26	F	GFOE	USA



13	Bailey, Caitlin	Training	03/04	03/26	F	GFOE	USA
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\* Not confirmed.

<sup>1</sup> FedWriters

<sup>2</sup> Science and Technology Corporation

## 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 3.** Points of contact

Operations	Name, Title	Office	Address	Phone/Fax	Email
Marine Operations Center, Atlantic	CAPT Nicholas Chrobak, Commanding Officer	Marine Operations Center, Atlantic	439 West York Street Norfolk, VA 23510-1145	(757) 441-6776/ (757) 441-6495	<a href="mailto:co.moc.atlantic@noaa.gov">co.moc.atlantic@noaa.gov</a>
Marine Operations Center, Atlantic	LCDR Steven Barry, Chief of Operations	Marine Operations Center, Atlantic	439 West York Street Norfolk, VA 23510-1145	(757) 441-6842/ (757) 441-6776	<a href="mailto:Chiefops.MOA@noaa.gov">Chiefops.MOA@noaa.gov</a>
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	<a href="mailto:CO.Explorer@noaa.gov">CO.Explorer@noaa.gov</a>
NOAA Ship Okeanos Explorer (primary)	LTJG Hunter Brendel, NOAA Operations Officer	NOAA Ship Okeanos Explorer	NOAA Ship Okeanos Explorer 47 Chandler Street Newport, RI 02841	(808) 659-9179 x221	<a href="mailto:ops.explorer@noaa.gov">ops.explorer@noaa.gov</a>
Mission (primary)	Thomas Morrow Expedition Coordinator	NOAA Ocean Exploration	24 Colovos Road Durham, NH 03824	(904) 673-0627	<a href="mailto:thomas.morrow@noaa.gov">thomas.morrow@noaa.gov</a>
Mission (other)	Kasey Cantwell, Operations Chief	NOAA Ocean Exploration	1315 East-West Highway, Silver Spring, MD 20910	(301) 717-7776	<a href="mailto:kasey.cantwell@noaa.gov">kasey.cantwell@noaa.gov</a>
Mission (other)	Rachel Medley, Chief, Expeditions	NOAA Ocean Exploration	1315 East-West Highway, Silver	(301) 789-3075	<a href="mailto:rachel.medley@noaa.gov">rachel.medley@noaa.gov</a>

	and Exploration Division		Spring, MD 20910		
Mission (other)	Genevieve Fisher, Director (Acting)	NOAA Ocean Exploration	1315 East-West Highway, Silver Spring, MD 20910	(301) 452-7366	<a href="mailto:genevieve.fisher@noaa.gov">genevieve.fisher@noaa.gov</a>

## 2. Diplomatic Clearances

This expedition will involve marine scientific research (MSR) in waters under the jurisdiction of the Dominican Republic, Venezuela, U.S. Virgin Islands, Puerto Rico. A request to conduct MSR in the waters of Dominican Republic, Venezuela, U.S. Virgin Islands, Puerto Rico was submitted to the U.S. Department of State on December 28, 2021, and is currently pending approval. Consent has not been requested from the Bahamas and Turks and Caicos, though transit through territorial waters is anticipated.

## 3. 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](mailto:OPS.Explorer@noaa.gov).

For shipments to arrive while in port in Key West, Florida, at the start of the expedition, **shipments should arrive no later than Thursday, March 3rd, 2022**, and be shipped to the following address:

NOAA Ship OKEANOS EXPLORER  
ATT: Name/Dept  
33 E. Quay Road  
Key West, FL 33040

For shipments to arrive while in port in San Juan, Puerto Rico, after the expedition from March 25-April 2, 2022, **shipments should arrive no later than Thursday, March 31st, 2022**, and should be shipped to the following address:

[Insert Name or port recipient's organization]  
c/o [insert Name of recipient]  
ATTN: NOAA Ship *Okeanos Explorer* [insert street address]  
[Insert City, State postal abbreviation zip code]

During the port call in Key West, Florida and San Juan, Puerto Rico, deliveries will be conducted contact-free in compliance with OMAO's COVID-19 protocols to maintain the bubble between

expeditions.

## 4. COVID-19 Contingency Plan for Scientific Party

In accordance with the “[OMAO COVID-19 Protocols](#)” effective November 24, 2021, shelter-in-place is no longer required for sailing. All sailing personnel are required to follow guidelines written within the documentation. Section 3.3 of the OMAO Protocols requires all sailing personnel to be COVID-19 cleared for sailing using a Rapid Molecular Test (a copy of section 3.3 is below).

3.3 Testing Strategy. To be cleared for sailing an individual must be tested prior to sailing, as follows:

- The same day of sailing or the night before using 1 Rapid Molecular Test.
- In the event of unanticipated delays, repeat testing may be necessary depending on how long the delay will be. (Additional molecular tests would need to be sent asap). To be reviewed on a case by case basis if timing exceeds 24-48 hours from the original test. All personnel are required to be at the ship for the scheduled testing event.

Any mission personnel who test positive 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.
- 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:

LT Christopher "J" Dunn, NOAA

Expeditions Operations Leader, Expeditions and Exploration Division  
 NOAA Office of Ocean Exploration and Research  
 215 South Ferry Road  
 Narragansett, RI 02882  
 Desk: (401) 874-6478  
 Cell: (262) 995-3410

## 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. Project Itinerary

**Table 4** summarizes the expedition itinerary. All times and dates are subject to prevailing conditions and the discretion of the commanding officer. Locations are approximate. Final ROV dive sites will be delivered to the bridge at night for the next day’s ROV dive.

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

**Table 4. Expedition itinerary:** This is an approximate itinerary and is subject to change based on objective completion, weather, and logistical needs.

Date	Activities
03/03	Members of the mission team join the ship. Pre-cruise familiarization brief to be conducted during the afternoon hours.
03/04	Expedition mobilization day. Dockside sonar pinging may be requested. Mission personnel orientation meeting. Alternative time for the vessel familiarization meeting with operations officer, and safety officer for any new mission personnel. Mapping watch schedule posted.
03/05-03/9	First day underway. Depart Key West, FL in the morning. EK calibration. Transit mapping as the ship heads east to primary survey grounds south of Puerto Rico. Secure data collection for transit through Bahamas and Turks and Caicos Islands territorial waters (collection not permitted). Safety drills, including donning of survival suits
03/09-03/23	Focused mapping operations south of Puerto Rico in US waters. Priorities will depend on weather conditions and are at the Commanding Officer’s discretion.
03/24	Transit mapping to San Juan, Puerto Rico, including one UCH site
03/25	Arrive in San Juan, Puerto Rico

## B. Staging and Destaging

Minimal staging and destaging are anticipated for this mapping expedition.

## C. Operations to Be Conducted

### 1. Telepresence/Outreach Events

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

### 2. In-Port Events

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

### 3. Special/Unusual Operations or Requests

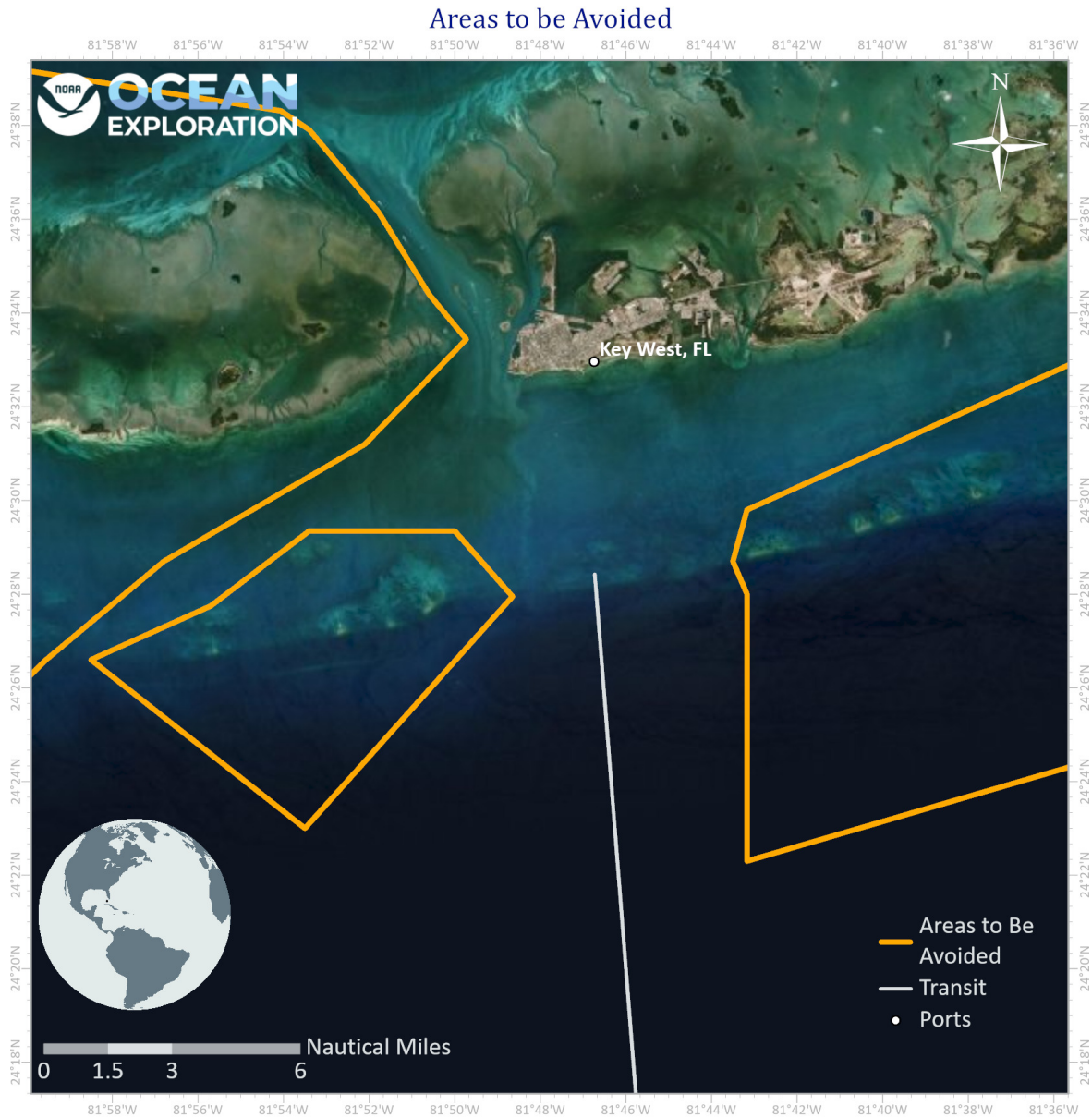
There are no special or unusual operations or requests for this expedition.

## D. SCUBA Dive 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 EX-22-02, but the ship may plan training, safety drills, or maintenance dives.

## E. Applicable Restrictions

Operational areas include the port of Key West, located within the Florida Keys National Marine Sanctuary. Areas to be avoided are indicated (see Figure 3). Data collection will be restricted in the EEZs for Bahamas and Turks and Caicos Islands, only innocent passage transit is permitted in these waters.



**Figure 3.** Map detail showing Areas to be Avoided within the Florida Keys National Marine Sanctuary.

### III. Hazardous Materials

#### A. Policy and Compliance

See the [“NOAA Ship \*Okeanos Explorer\* FY22 Field Season Instructions.”](#)

## B. Inventory

**Table 7.** Inventory of hazardous materials that will be aboard for EX-22-02

Item	Use	Approximate Locations
95% UPS denatured ethanol (248 gal)	Sample preservation	02 Deck, port side ethanol storage container
Formaldehyde (20L) to be buffered into 10% buffered formalin	Sample preservation	Wet lab, under the chemical hood
Bleach	Sterilization and sample preservation	Wet lab cabinet under sink
Magnesium chloride	Sample preservation	Wet lab under hood
Sodium phosphate	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
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

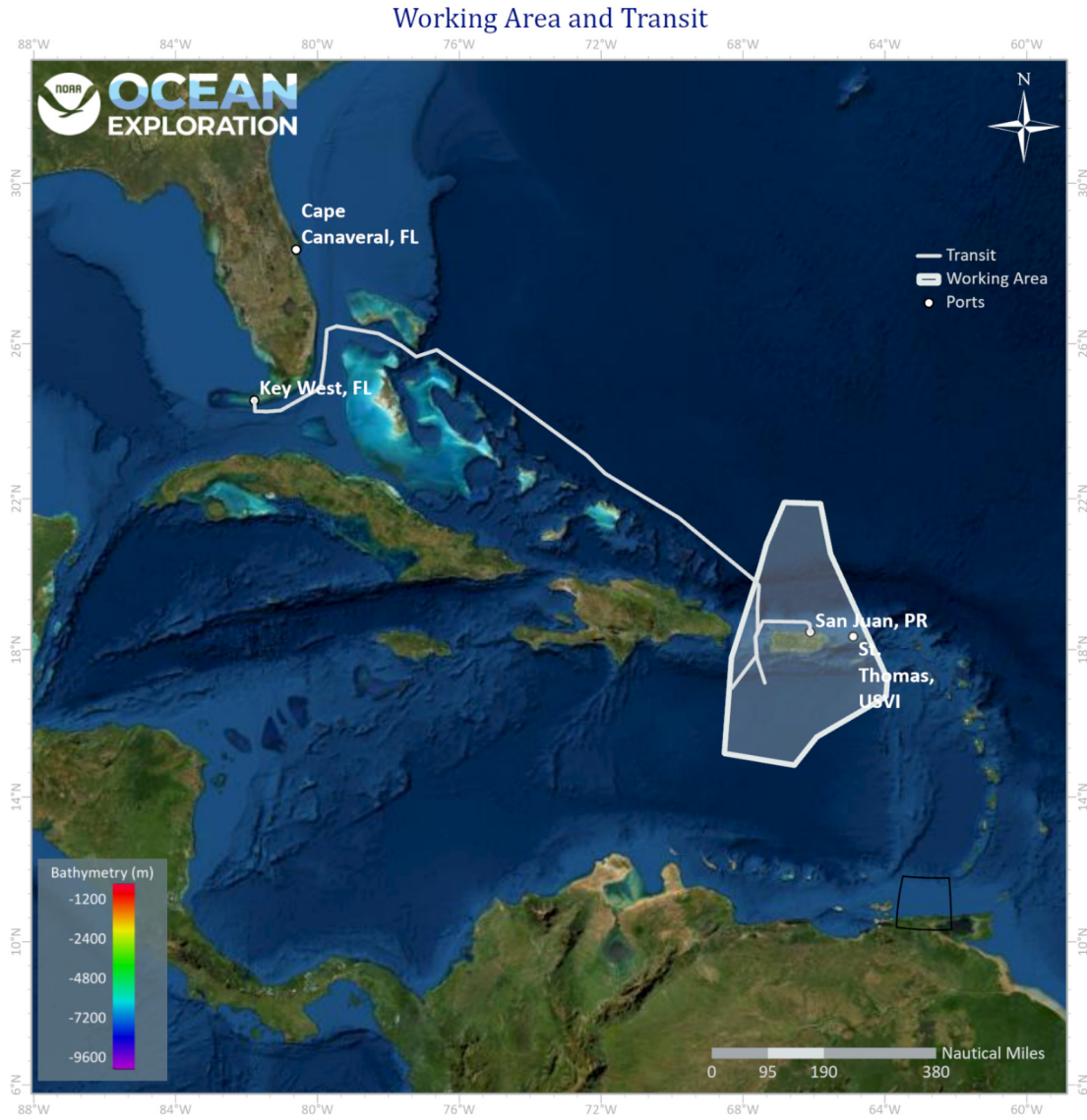
## IV. Equipment

A detailed list of equipment provided by the ship and NOAA Ocean Exploration can be found in the [“NOAA Ship \*Okeanos Explorer\* FY22 Field Season Instructions.”](#) There are no specific changes relative to this expedition.



# Appendix A. Waypoints

## EX-22-02, Caribbean Mapping (MACHC partnership)



Map created by NOAA Ocean Exploration, Service Layer Credits/Source: Earthstar Geographics

**Figure A1** (for reference). Map showing the general operating area for EX-22-02.

**Table A1.** Waypoints for general working area (white polygon)

Latitude (D DM)	Longitude (D DM)
068° 31.564' W	15° 11.380' N
068° 19.398' W	17° 47.365' N
067° 32.430' W	20° 07.041' N
067° 20.263' W	20° 48.526' N
066° 50.130' W	21° 54.534' N
065° 48.873' W	21° 52.302' N
065° 31.896' W	20° 33.173' N
063° 55.696' W	17° 12.960' N
063° 58.101' W	16° 43.869' N
065° 55.239' W	15° 38.247' N
066° 33.153' W	14° 52.252' N
068° 31.564' W	15° 11.380' N

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

Latitude (D DM)	Longitude (D DM)
081° 46.729' W	24° 28.425' N
081° 45.675' W	24° 16.231' N
081° 24.765' W	24° 15.948' N
081° 02.108' W	24° 17.810' N
080° 24.407' W	24° 37.251' N
080° 02.154' W	24° 48.496' N
079° 54.813' W	24° 54.417' N
079° 48.006' W	25° 37.448' N
079° 44.106' W	26° 21.270' N
079° 27.357' W	26° 26.767' N

078° 16.031' W	26° 15.385' N
077° 37.996' W	25° 56.920' N
077° 13.035' W	25° 40.334' N
076° 38.090' W	25° 50.611' N
074° 41.756' W	24° 39.952' N
072° 25.068' W	23° 08.439' N
071° 53.681' W	22° 39.870' N
069° 48.878' W	21° 30.346' N
067° 41.661' W	19° 51.836' N
067° 32.880' W	19° 42.735' N
067° 35.538' W	19° 08.846' N
067° 35.039' W	18° 30.252' N
067° 39.361' W	18° 20.251' N
067° 37.503' W	17° 49.952' N
068° 19.164' W	16° 57.419' N
067° 22.945' W	17° 06.128' N
067° 36.296' W	17° 45.668' N
067° 38.660' W	18° 20.193' N
067° 26.377' W	18° 45.507' N
066° 14.126' W	18° 44.477' N
066° 07.119' W	18° 41.375' N
066° 06.100' W	18° 28.139' N

# Appendix B. Data Management Plan

## Okeanos Explorer Mission EX2202 Data Management Plan

Report Date: 2022-01-13

### 1. General Description of Data to be Managed

#### 1.1 Name and Purpose of the Data Collection Project:

EX-22-02, Caribbean Mapping (Mapping)

EX-22-02 operations will involve a transit eastward followed by focused ocean mapping operations that will occur in U.S. waters south of Puerto Rico, mostly in deep water (>200 m). The expedition will include 24-hour-a-day exploratory mapping operations to fill mapping gaps.

#### 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, 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:

bathymetric gaps, benthic habitats, chemosynthetic communities, CTD, deep-sea coral and sponge communities, deep-water habitats, EM304, essential fish habitats, EFH, expedition, exploration, explorer, fish habitats, habitat areas of particular concern, HAPC, Key West, mapping survey, marine education, MesoAmerican-Caribbean Sea Hydrographic Commission, MACHC, 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, Puerto Rico, R337, Rhode Island, San Juan, science, scientific computing system, scientific mission, scientific research, SCS, sea, Seabed 2030, single beam sonar, singlebeam sonar, single-beam sonar, site characterization, sonar anomalies, split beam sonar, stewardship, sub-bottom profile, systematic exploration, technology, undersea, underwater, water column backscatter

#### 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: 2022-03-05 and End Date: 2022-03-25

### **1.6 Actual or Planned Geographic Coverage of the data:**

Northernmost Boundary: 27 and Southernmost Boundary: 14  
Westernmost Boundary: -83 and Easternmost Boundary: -63

### **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), Seafloor Imagery, 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](mailto:thomas.morrow@noaa.gov)

Title: Expedition Coordinator

Affiliation: NOAA Office of Ocean Exploration and Research

Phone: 904-673-0627

### **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](mailto: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-existent or non-compliant, please explain:**

Not Applicable

### **6.2 Where will the metadata be hosted?**

Organization: An ISO format collection-level metadata record will be generated during pre-cruise planning and published in 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's EDMC DMP 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 .kml 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 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 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. This document is on file with NOAA Ocean Exploration and can be provided upon request. NOAA Ocean Exploration is preparing a programmatic environmental assessment to cover future expeditions.

See the "[NOAA Ship \*Okeanos Explorer\* FY22 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).



## 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.

## Appendix E. OER Ethanol Testing


To ensure the quality of the ethanol stored aboard NOAA Ship *Okeanos Explorer*, NOAA Ocean Exploration has developed an [OER 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.




UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
OCEANIC AND ATMOSPHERIC RESEARCH  
Office of Ocean Exploration and Research  
Silver Spring, MD 20910

March 3, 2022

MEMORANDUM FOR: CAPT Nicholas Chrobak, NOAA  
Commanding Officer, Marine Operations Atlantic

FROM: CDR Colin Little  Digitally signed by  
LITTLE, COLIN.D.1271718981  
Date: 2022.03.07 07:30:00  
-0600  
Commanding Officer, NOAA Ship *Okeanos Explorer*

Kasey Cantwell   
Operations Chief, Expeditions and Exploration  
NOAA Ocean Exploration

SUBJECT: EX-22-02 Project Instruction Amendment: Scheduling  
revision

Due to operational delays preceding expedition EX-22-02, scheduled departure has been delayed to March 10, 2022. Planned operations will be carried out for 19 days, departing from Key West, FL and arriving on March 28, 2022, in San Juan, Puerto Rico. This represents a loss of 2 Days at Sea from the original Project Instructions and ship schedule.

