

Project Instructions


Date Submitted: July 22, 2021

Platform: NOAA Ship *Nancy Foster*

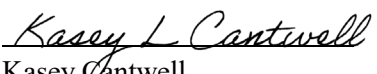
Project Number: NF-21-06 (OMAO)

Project Title: Exploration Mapping - Blake Plateau

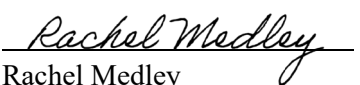
Project Dates: July 27, 2021 to August 5, 2021

Prepared by:  Dated: 7/22/21

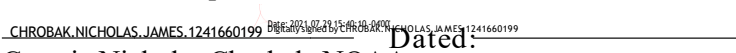
Meme Lobecker
Chief Scientist
NOAA Office of Ocean Exploration and Research

Approved by:  Dated: 7/23/2021

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NOAA Ocean Exploration

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Captain Nicholas Chrobak, NOAA
Commanding Officer
Marine Operations Center – Atlantic

I. Overview

A. Brief Summary and Project Period

July 27 - August 5, 2021

Charleston, South Carolina (SC) - Charleston, SC

NF-21-06, Exploration Mapping - Blake Plateau

This document contains project instructions specific to NF-21-06. This expedition will commence on July 27, 2021 in Charleston, SC and will conclude on August 5, 2021 in Charleston, SC. It will include 24-hour-per-day acoustic exploration mapping operations focused on areas generally deeper than 200 m in U.S. waters off the U.S. East Coast with a focus on the Blake Plateau. See the Appendices for the expedition's Data Management Plan.

B. Days at Sea (DAS)

Of the 10 DAS scheduled for this project, 10 DAS are funded by a Line Office Allocation. This project will require mapping operations 24 hrs/day. The operational tempo will be medium.

C. Operating Area (include map/figure showing op area)

NF-21-06 will focus operations on the Blake Plateau within U.S. waters off the East Coast. An overview of the cruise is indicated in **Figure 1**. The waypoints for the priority areas are provided in Appendix 1.

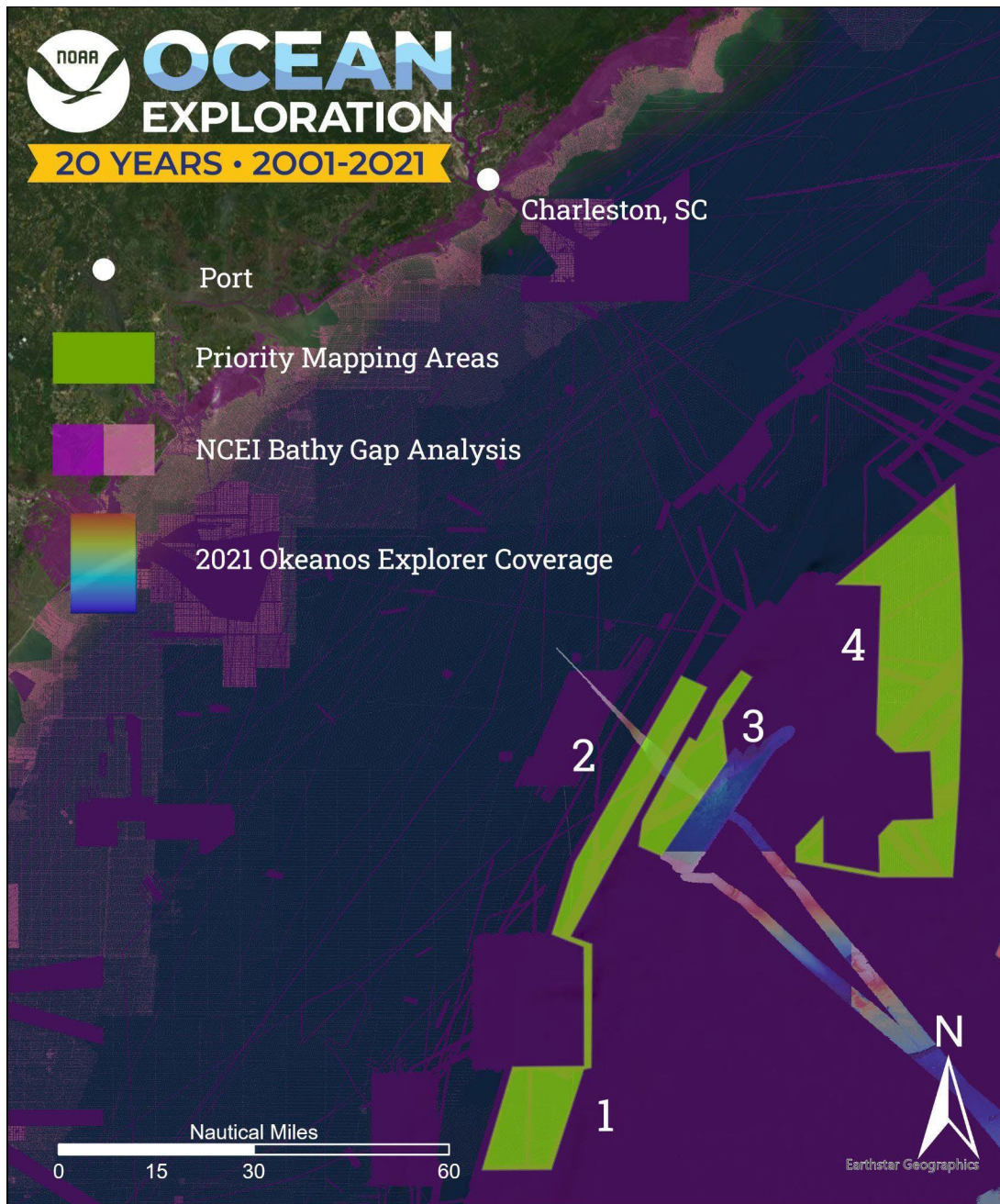


Figure 1. Map showing the general operating area and priority mapping areas for NF-21-06.

D. Summary of Objectives

NF-21-06 operations will begin with transit mapping data collection en route to the priority mapping areas. Data collection is requested to begin as soon as feasible after the sea buoy, following the ‘always exploring’ tenet and standard practice employed during mapping cruises executed by NOAA Ocean Exploration. The expedition will include 24-hour-per-day mapping operations using the ship’s EM 710 multibeam echosounder and EK 60 sonars (38, 120, 200 kHz). Mapping priority areas will fill bathymetric and bottom backscatter mapping gaps in support of the National Ocean Mapping,

Exploration, and Characterization strategy goal of mapping U.S. waters deeper than 40 m by 2030.

The EK sonars will be operated at maximum power and pulse length of 1024 ms (preferred) or 512 ms depending on calibration status.

E. Participating Institutions

- National Oceanic and Atmospheric Administration (NOAA), Office of Ocean Exploration and Research (NOAA Ocean Exploration) — 1315 East-West Highway, Silver Spring, MD 20910 USA
- University Corporation for Atmospheric Research (UCAR) Programs for Advancement of Earth System Science — P.O. Box 3000, Boulder, CO 80307 USA
- University of New Hampshire Center for Coastal and Ocean Mapping, 24 Colovos Rd, Durham NH, USA

F. Personnel/Science Party: name, title, gender, affiliation, and nationality

Table 1. Sailing personnel.

Name (Last, First)	Title	Date Aboard	Date Disembark	Gender	Affiliation	Nationality
Gillespie, Treyson	Mapping Data Manager / Processor	July 25, 2021	August 5, 2021	Male	NOAA Ocean Exploration / University Corporation for Atmospheric Research (UCAR)	U.S.

G. Administrative

1. Points of Contact:

*Meme Lobecker, NOAA Ocean Exploration
Chief Scientist (onshore)
mobile: (240) 429-7023
elizabeth.lobecker@noaa.gov
26 Mendum Ave.,
Kittery, ME 03904*

*Trey Gillespie, NOAA Ocean Exploration / UCAR
Project Operation Lead (offshore)*

*72 America Street,
Apartment B*

*Charleston, South
Carolina, 29403*

gillespieta@g.cofc.edu

mobile: (803)493-3238

gillespieta@g.cofc.edu

LT Peter Gleichauf

Operations Officer | NOAA Ship Nancy Foster

1050 Register Street

N. Charleston, SC 29405

ship: 541-867-8915

mobile: 410-241-3210f

ops.nancy.foster@noaa.gov

2. Diplomatic Clearances

None required.

3. Licenses and Permits

The NEPA Categorical Exclusion and ESA Letter of Compliance are provided in the Appendix section of this document.

II. Operations

The Chief Scientist is responsible for ensuring the scientific staff are trained in planned operations and are knowledgeable of project 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 2 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 2. Expedition itinerary.

Date	Activities
7/19-7/25	Mission personnel shelter in place at home.
7/22	PCR test at crew hotel in Mount Pleasant including mission personnel.
7/26	Mission personnel arrive to ship and start lodging onboard.
7/26 or 7/27	Vessel familiarization/orientation for mission personnel.
7/27	First day underway. Depart Charleston, SC in the morning. Transit mapping en route to operations areas after passing sea buoy. Arrive to first survey area in the evening. Safety drills, including donning of survival suits.
7/28-8/4	Focused mapping operations on the Blake Plateau.
8/5	Transit mapping to Charleston, SC. Arrive Charleston, SC sea buoy in the morning. Final data package assembled and two copies carried off ship on separate hard drives. Mission personnel depart ship.

B. Staging and Destaging:

Not applicable to this cruise.

C. Operations to be Conducted:

Seafloor mapping operations including operation of multibeam sonar, EK 60 sonars, and sound velocity profiling.

D. Dive Plan

All dives are to be conducted in accordance with the requirements and regulations of the NOAA Diving Program (<http://www.ndc.noaa.gov/dr.html>) and require the approval of the ship's Commanding Officer. (This statement must remain in all project instructions)

Dives are not planned for this project.

E. Applicable Restrictions

Conditions which preclude normal operations:

It is understood that at the time of writing these project instructions, several ships in the NOAA

fleet, including *Nancy Foster*, are experiencing periodic POS-MV dropouts which require breaking survey line and standing by for up to an hour before the system comes online again. The survey team will ensure there are no gaps in bathymetric coverage and will recommence lines where they are broken off.

If survey conditions are poor, for example weather, bathymetric data quality takes precedence over all else. For example, the EKs can be shut down if their data quality is poor and/or if it helps with bathymetric data quality. It is understood that bottom backscatter data quality can degrade with poor weather, and this is not a reason to cease operations as long as bathymetric data quality is acceptable.

III. Equipment

A. Equipment and Capabilities provided by the ship (itemized)

- EM 710 Multibeam Echosounder, recently patch tested
- Sound Velocity Profiling - underway methods preferred, system integrity proven with recent comparison cast. SV Manager for transits.
- EK 60 split beam echosounders (38, 120, 200 kHz), recently calibrated
- Sonar acquisition log keeping

B. Equipment and Capabilities provided by the scientists (itemized)

- Hard drives large enough to transport duplicate copies of all raw and processed acoustic and ancillary data.
- QPS single seat software license to run Qimera, FMMW, FMGT, Fledermaus
- Installation files for QPS Product Suite (in advance of cruise)
- Bathymetric, bottom backscatter, and water column backscatter data processing and data management

IV. Hazardous Materials

A. Policy and Compliance

No Hazardous Materials are being brought aboard the ship for this project.

B. Inventory

Not applicable.

C. Chemical safety and spill response procedures

Not applicable.

D. Radioactive Materials

No Radioactive Isotopes are planned for this project.

E. Inventory (itemized) of Radioactive Materials

Not applicable.

F. Lithium batteries (beyond everyday household items)

Not applicable.

V. Additional Projects

A. Supplementary (“Piggyback”) Projects

No Supplementary Projects are planned.

B. NOAA Fleet Ancillary Projects

No NOAA Fleet Ancillary Projects are planned.

VI. Disposition of Data and Reports

Disposition of data gathered aboard NOAA ships will conform to NAO 216-101 *Ocean Data Acquisitions* and NAO 212-15 *Management of Environmental Data and Information*. To guide the implementation of these NAOs, NOAA’s Environmental Data Management Committee (EDMC) provides the *NOAA Data Documentation Procedural Directive* (data documentation) and *NOAA Data Management Planning Procedural Directive* (preparation of Data Management Plans). OMAO is developing procedures and allocating resources to manage OMAO data and Programs are encouraged to do the same for their Project data.

The Data Management Plan for NF-21-06 was developed by NOAA Ocean Exploration in partnership with NCEI and is provided as an appendix in this document.

A. Data Classifications: *Under Development*

a. OMAO Data

b. Program Data

B. Responsibilities: *Under Development*

VII. Meetings, Vessel Familiarization, and Project Evaluations

A. Pre-Project Meeting: The Chief Scientist and Commanding Officer will conduct a meeting of pertinent members of the scientific party and ship’s crew to discuss required equipment, planned operations, concerns, and establish mitigation strategies for all concerns. This meeting shall be conducted before the beginning of the project with sufficient time to allow for preparation of the ship and project personnel. The ship’s

Operations Officer usually is delegated to assist the Chief Scientist in arranging this meeting.

- B. Vessel Familiarization Meeting: The Commanding Officer is responsible for ensuring scientific personnel are familiarized with applicable sections of the standing orders and vessel protocols, e.g., meals, watches, etiquette, drills, etc. A vessel familiarization meeting shall be conducted in the first 24 hours of the project's start and is normally presented by the ship's Operations Officer.

- C. Post-Project Meeting: The Commanding Officer is responsible for conducted a meeting no earlier than 24 hrs before or 7 days after the completion of a project to discuss the overall success and shortcomings of the project. Concerns regarding safety, efficiency, and suggestions for future improvements shall be discussed and mitigations for future projects will be documented for future use. This meeting shall be attended by the ship's officers, applicable crew, the Chief Scientist, and members of the scientific party and is normally arranged by the Operations Officer and Chief Scientist.

- D. Project Evaluation Report: Within seven days of the completion of the project, a Customer Satisfaction Survey is to be completed by the Chief Scientist or Principal Investigator, as appropriate. The form is available at <https://sites.google.com/a/noaa.gov/omao-intranet-dev/operations/marine/customer-satisfaction-survey> and provides a "Submit" button at the end of the form. It is also located at https://docs.google.com/a/noaa.gov/forms/d/1a5hCCkgIwaSII4DmrHPudAehQ9HqhRqY3J_FXqbJp9g/viewform. Submitted form data is deposited into a spreadsheet used by OMAO management to analyze the information. Though the complete form is not shared with the ships, specific concerns and praises are followed up on while not divulging the identity of the evaluator.

VIII. Miscellaneous

A. Meals and Berthing

The ship will provide meals for the scientists listed above. Meals will be served 3 times daily beginning one hour before scheduled departure, extending throughout the project, and ending two hours after the termination of the project. Since the watch schedule is split between day and night, the night watch may often miss daytime meals and will require adequate food and beverages (for example a variety of sandwich items, cheeses, fruit, milk, juices) during what are not typically meal hours. Special dietary requirements for scientific participants will be made available to the ship's command at least seven days prior to the project.

Berthing requirements, including number and gender of the scientific party, will be provided to the ship by the Chief Scientist. The Chief Scientist and Commanding Officer will work together on a detailed berthing plan to accommodate the gender mix of the scientific party taking into consideration the current makeup of the ship's complement. The Chief Scientist is responsible for

ensuring the scientific berthing spaces are left in the condition in which they were received; for stripping bedding and linen return; and for the return of any room keys which were issued. Unless prior arrangements are made, the science party may move aboard the night before scheduled departure and must move off the ship the day after scheduled arrival (at the end of project). The Chief Scientist/Principal Investigator is also responsible for the cleanliness of the laboratory spaces and the storage areas utilized by the scientific party, both during the project and at its conclusion prior to departing the ship.

All NOAA scientists will have proper travel orders when assigned to any NOAA ship. The Chief Scientist will ensure that all non-NOAA or non-Federal scientists aboard also have proper orders. It is the responsibility of the Chief Scientist or Principal Investigator to ensure that the entire scientific party has a mechanism in place to provide lodging and food and to be reimbursed for these costs in the event that the ship becomes uninhabitable and/or the galley is closed during any part of the scheduled project.

All persons boarding NOAA vessels give implied consent to comply with all safety and security policies and regulations which are administered by the Commanding Officer. All spaces and equipment on the vessel are subject to inspection or search at any time. All personnel must comply with OMAO's Drug and Alcohol Policy dated May 17, 2000, which forbids the possession and/or use of illegal drugs and alcohol aboard NOAA Vessels.

B. Medical Forms and Emergency Contacts

The NOAA Health Services Questionnaire (NHSQ, NF 57-10-01 (3-14)) must be completed in advance by each participating scientist. The NHSQ can be obtained from the Chief Scientist or the NOAA website <http://www.corporateservices.noaa.gov/noaforms/eforms/nf57-10-01.pdf>.

NHSQs must be submitted every 2 years for individuals under the age of 50 and every 1 year for ages 50 and above. NHSQs must be accompanied by [NOAA Form \(NF\) 57-10-02](#) - Tuberculosis Screening Document in compliance with [OMAO Policy 1008](#) (Tuberculosis Protection Program, which requires a yearly PPD or TB exam).

The completed forms should be sent to Marine Health Services at the applicable Marine Operations Center. The NHSQ and Tuberculosis Screening Document should reach the Health Services Office no later than 4 weeks prior to the start of the project to allow time for the participant to obtain and submit additional information should health services require it, before clearance to sail can be granted. Please contact MOC Health Services with any questions regarding eligibility or completion of either form. Ensure to fully complete each form and indicate the ship or ships the participant will be sailing on. The participant will receive an email notice when medically cleared to sail if a legible email address is provided on the NHSQ.

The participant can mail, fax, or email the forms to the contact information below. Participants should take precautions to protect their Personally Identifiable Information (PII) and medical information and ensure all correspondence adheres to DOC guidance (http://ocio.os.doc.gov/ITPolicyandPrograms/IT_Privacy/PROD01_008240).

The only secure submission process approved by NOAA is [kiteworks](#) by Accellion Secure File

Transfer, which requires the sender to set up an account using a valid NOAA email address and password. User accounts may expire after 30 days of inactivity. Simply re-register to send and receive files.

Persons without a NOAA email account must fax or mail their forms.

Contact information:

Marine Health Services
Marine Operations Center – Atlantic
439 W. York Street
Norfolk, VA 23510
Telephone 757-441-6320
Fax 757-441-3760
Email MOA.Health.Services@noaa.gov

Prior to departure, the Chief Scientist must provide an electronic listing of emergency contacts to the Executive Officer for all members of the scientific party, with the following information: contact name, address, relationship to member, and telephone number.

C. Shipboard Safety

All personnel who embark are to fully support and comply with NOAA Administrative Order 202-1106: NOAA Sexual Assault and Sexual Harassment Prevention and Response Policy. The at-sea working/living environment is particularly sensitive and it is incumbent upon all personnel to uphold a positive and professional workplace dynamic in order to successfully accomplish cruise objectives.

Surge protectors, power strips and Uninterrupted Power Sources (UPS) must be approved for marine/shipboard use, removed from service if hot to the touch, regularly inspected for damage or wear, limited to one surge protector per duplex receptacle (i.e., “outlet”), and never daisy chained. The equipment must meet MIL Performance Specification MIL-PZRF-32167A, which incorporates ASTM F1507 (Standard Specifications for Surge Suppressors for Shipboard Use) and UL 1449 (Safety Standards for Surge Protective Devices).

Hard hats are required when working with suspended loads. Work vests are required when working near open railings and during small boat launch and recovery operations. Hard hats and work vests will be provided by the ship when required.

Wearing open-toed footwear or shoes that do not completely enclose the foot (such as sandals or clogs) outside of private berthing areas is not permitted. At the discretion of the ship CO, safety shoes (i.e. steel or composite toe protection) may be required to participate in any work dealing with suspended loads, including CTD deployment and recovery. The ship does not provide safety-toed shoes/boots. The ship’s Operations Officer should be consulted by the Chief Scientist to ensure members of the scientific party report aboard with the proper attire.

D. Communications

A progress report on operations prepared by the Chief Scientist may be relayed to the program office. Sometimes it is necessary for the Chief Scientist to communicate with another vessel, aircraft, or shore facility. Through various means of communications, the ship can usually accommodate the Chief Scientist. Special radio voice communications requirements should be listed in the project instructions. The ship's primary means of communication with the Marine Operations Center is via email and the Very Small Aperture Terminal (VSAT) link. Standard VSAT bandwidth has increased, on average per ship, to 768 kbs and is shared by all vessel's staff and the science team at no charge to sailing personnel. Increased bandwidth in 7 day increments is available on the VSAT systems at increased cost to the scientific party. If increased bandwidth is being considered, program accounting is required and it must be arranged through the ship's Commanding Officer at least 30 days in advance.

E. IT Security

The applicable sections below are required prior to boarding the ship.

a. Guest Scientist Access to Ship Science Systems

1. IT Security Awareness Training:
 - a. It is recommended that guests complete the course 3 days before embarking, but must be completed prior to use of or accessing any NOAA ship science computer or network resources guest scientists must complete NOAA's IT Security Awareness Course.
2. Guest scientists must review and sign the Rules of Behaviour (ROB)
3. For Foreign Nationals see section 8.F.

b. Connecting Guest Scientist Computer Systems to NOAA Ships Science Network

1. Any computer that will be hooked into the ship's network must comply with the *OMAO Fleet IT Security Policy* 1.1 (November 4, 2005) prior to establishing a direct connection to the NOAA WAN. Requirements include, but are not limited to:
2. Installation of the latest virus definition (.DAT) file on all systems and performance of a virus scan on each system.
3. Installation of the latest critical operating system security patches.
4. No external public Internet Service Provider (ISP) connections.
5. No Kaspersky products are allowed
6. Computer Operating Systems that the support vendor has identified as reaching "End of Life" for support will not be allowed on the shipboard network. Examples include Microsoft Windows XP and Vista as well as Windows Server 2003, Windows 7, Server 2003, and Server 2008.

c. Guest Personal Devices, use of Public WiFi

At any time, NOAA OMAO may monitor and/or audit user activity and/or network traffic. In addition, NOAA OMAO may access your system and disclose information obtained through audits to third parties, including law enforcement authorities.

1. Guests must review and sign the Rules of Behaviour
2. No Kaspersky products are allowed

References: *OMAO Fleet IT Security Policy* 1.1 (November 4, 2005), NOAA220 Rules of Behaviour for Public Wifi, NOAA220 Rules of Behaviour for LAN.

F. Foreign National Guests Access to OMAO Facilities and Platforms

Foreign National access to the NOAA ship or Federal Facilities is not required for this project.

IX. COVID-19 Contingency Plan for Scientific Party (DRAFT**)**

In the event of a non-negative test result for any member of the scientific party, or the identification of recent close contact with a positive COVID-19 case through contact tracing:

- the member will not be cleared to board the ship, and lodging will be provided at their home in Charleston, SC.
- The Chief Scientist will be notified of any mission personnel who are not cleared to sail.
- The Chief Scientist will determine, in consultation with the ship's command and appropriate parties, whether the mission will continue without the uncleared personnel.
- Subsequent testing will be sought using Ocean Exploration's IDIQ contract

In the event a member of the scientific party develops symptoms of possible COVID-19 while underway, [OMAO protocols](#) will be followed.

- Once ashore, all logistics and support for the affected scientist(s) will be coordinated through shore side Point of Contact:

LCDR Carl Noblitt
Operations Deputy, Expedition and Exploration Div. OER
Personal Cell 508.527.4606
carl.noblitt@noaa.gov Email
US East Coast time zone

Elizabeth "Meme" Lobecker
Chief Scientist
Mobile: 240-429-7023
elizabeth.lobecker@noaa.gov
US East Coast time zone

- Duties of the shore side support person/team include coordination of:
 - further testing
 - daily well-being check-in & symptom screening
 - travel
 - lodging

- medical support
- on site support as needed
- **notify LCDR Carl Noblitt, Operations Deputy, Expedition and Exploration Div. OER, Personal Cell 508.527.4606, email carl.noblitt@noaa.gov**

If the affected scientist is in a foreign port, the shore side POC shall contact **the U.S. Embassy (or consulate, or appropriate Dept. of State entity)** to request help and if necessary, translation support.

DOS contact information by port for this expedition:

X. Appendices

Appendix 1. Mapping area waypoints (Lat/long, DM)

Mapping Priority 1		
Waypoint ID	Latitude	Longitude
1	30 50.654 N	79 48.839 W
2	30 50.536N	79 37.712 W
3	30 37.193 N	79 42.794 W
4	30 37.045 N	79 53.475 W

Mapping Priority 2		
Waypoint ID	Latitude	Longitude
1	31 42.656 N	79 12.380 W
2	31 41.742 N	79 11.917 W
3	31 35.849 N	79 16.478 W
4	31 30.819 N	79 15.727 W
5	31 18.224 N	79 25.923 W

6	31 19.554 N	79 29.465 W
7	31 22.853 N	79 28.821 W
8	31 30.729 N	79 23.776 W
9	31 33.884 N	79 21.683 W
10	31 33.335 N	79 20.556 W
11	31 38.736 N	79 17.193 W

Mapping Priority 3		
Waypoint ID	Latitude	Longitude
1	31 41.925 N	79 22.918 W
2	31 40.373 N	79 18.732 W
3	31 7.301 N	79 40.358 W
4	31 7.990 N	79 42.773 W
5	31 17.49 N	79 39.231 W

Mapping Priority 4		
Waypoint ID	Latitude	Longitude
1	31 19.603 N	79 5.323 W
2	31 23.526 N	79 1.032 W
3	31 16.926 N	79 1.169 W
4	31 17.483 N	79 5.290 W

Appendix 2. Data Management Plan

At the end of the cruise, mission personnel will walk off the ship with the following:

1. *Two hard drives each containing the following*
 - a. *MBES data*
 - i. *.all, .wcd raw files*
 - ii. *MBES patch test line files and SV files used*
 - iii. *QPS processing project(s)*
 - iv. *Ancillary files*
 1. *Data processing Logs*
 2. *Weather Logs if available*
 3. *A copy of Processor Unit Parameters exported from SIS*
 4. *Any available calibration info for SVP profiling methods - when were probes used last calibrated and is documentation available*
 - b. *EK data*
 - i. *Raw EK data: .raw/.idx/.bot*
 - ii. *Cal files (.xml, .raw/.idx/.bot)*
 - c. *A copy of the Foster annual readiness report if one is available*
 - d. *A copy of the cruise operations log the survey technicians create during acquisition*
 - e. *Draft mapping data report*

Nancy Foster Mission NF2106 Data Management Plan

Report Date: 2021-07-18

1. General Description of Data to be Managed

1.1 Name and Purpose of the Data Collection Project:

NF-21-06, Exploration Mapping Blake Plateau

NF-21-06 will include 24-hour-per-day acoustic exploration mapping operations focused on areas generally deeper than 200 m in U.S. waters off the U.S. East Coast with a focus on the Blake Plateau. Mapping priority areas will fill bathymetric and bottom backscatter mapping gaps in support of the National Ocean Mapping, Exploration, and Characterization (NOMECE) strategy goal of mapping U.S. waters deeper than 40 m by 2030.

1.2 Summary Description of the data to be collected:

Operations for this cruise will be conducted 24 hours per day and consist of mapping operations for 24 hours per day using the ship's multibeam echosounders (EM 710 or EM2040 as depth appropriate) and EK 60 sonars at 38, 120, and 200 kHz.

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

Blake Plateau, Charleston, CTD, EM710, EM2040, expedition, exploration, explorer, mapping survey, marine education, Mid-Atlantic, Mid-Atlantic Canyons, multibeam, multibeam backscatter, multibeam sonar, multi-beam sonar, Nancy Foster, National Ocean Mapping Exploration and Characterization, NOMECE, noaa, noaa fleet, NOAA Ocean Exploration, NOMECE, ocean, ocean discovery, ocean education, ocean exploration, ocean exploration and research, ocean literacy, ocean research, oceans, OER, 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?

n/a

1.5 Planned or Actual Temporal Coverage of the data:

Start Date: 2021-07-27 and End Date: 2021-08-05

1.6 Actual or Planned Geographic Coverage of the data:

Northernmost Boundary: 32.7 and Southernmost Boundary: 30.6

Westernmost Boundary: -79.9 and Easternmost Boundary: -78.6

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), EK60 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 Nancy Foster

2 Points of Contact for this Data Producing Project

Overall POC: Elizabeth "Meme" Lobecker, Elizabeth.lobecker@noaa.gov

Title: Expedition Coordinator

Affiliation: NOAA Ocean Exploration

Phone: (240) 429-7023

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 as well as an archive-ready, documented, and compressed NetCDF3 format to NCEI-MD; water column profile data and navigation data will be delivered in ASCII format to NCEI-MD; multibeam and splitbeam output data and metadata along with water column profiles used for calibration will be compressed and delivered in a bagit format to NCEI-CO.

5.2 What quality control procedures will be employed?

Quality control procedures for the data from the Kongsberg multibeam sensors are handled at UNH CCOM/JHC. Raw (level-0) bathymetry files are cleaned/edited into new data files (level-1) and converted to a variety of products (level-2). Data from sensors monitored through the SCS are archived in their native format and are not quality controlled. Data from CTD casts and XBT firings are archived in their native format. CTDs are post-processed by the data management team as a quality control measure

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 at NCEI-MS for public discovery and access.

URL: https://data.noaa.gov/waf/NOAA/NESDIS/ncei/oer/iso_u/xml/

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.

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.

All 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 Nancy Foster 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 3. Environmental Permitting / Compliance Documentation

Categorical Exclusion

Categorical Exclusion (CE) Evaluation Worksheet

Project Identifier: NF2106BlakeMap

Date Review Completed: 7/9/2021

Completed by: Elizabeth Lobecker, Mapping Expedition Coordinator for NOAA's Office of Exploration and Research

OAR Functional Area: OER

Worksheet File Name: 2021-07-OER-G3-NF2106BlakeMap

Step 1. CE applicability

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

no

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

The proposed action is the NOAA's Office of Exploration and Research (OER) to complete a mapping expedition using the NOAA Ship Nancy Foster's scientific sonar systems of multibeam echosounders EM710 and EK60 sonars 38, 120, 200 kHz. During NF-21-06, the proposed actions will include 24-per-day acoustic exploration mapping operations focused on areas generally deeper than 200 meters in the U.S. EEZ offshore the U.S. East Coast with a focus on the Blake Plateau. Mapping properties chosen for this cruise will fill in bathymetry mapping gaps in support of the National Ocean, Mapping, Exploration, and Characterization strategy goal of mapping U.S. waters deeper than 40 meters by 2030. The expedition will start on July 27, 2021 in Charleston, South Carolina and will conclude on August 5, 2021 in Charleston, South Carolina. The exact start and end dates may vary by a few days or weeks depending on weather and other logistical considerations.

All mission personnel are either on contract with OER or are funded through OER's grant. The actions demonstrate independent utility and are not connected actions.

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

- a. G3: Topographic, bathymetric, land use and land cover, geological, hydrologic mapping, charting, and surveying services that do not involve major surface or subsurface land disturbance and involve no permanent physical, chemical, or biological change to the environment.
- b. The topical scope for this action is consistent with the CE number G3 in Appendix E of the Companion Manual to NOAA Administrative Order (NAO) 216-6A: Topographic, bathymetric, land use and land cover, geological, hydrologic mapping, charting, and surveying services that do not involve major surface or subsurface land disturbance and involve no permanent physical, chemical, or biological change to the environment. These expeditions will conduct calibrations of sonars which will involve no permanent physical, chemical, or biological changes to the environment in areas deeper than 200 meters in depth. Bathymetric mapping applies to this CE, as the work will be seafloor mapping. There will be no surface or subsurface land disturbance and there will be no permanent physical, chemical, or biological change to the environment. Operations are short in duration due to the equipment used onboard the vessel during mapping operations and the transit of the vessel within the Blake Plateau.

Step 2. Extraordinary Circumstances Consideration

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

The action will not result in adverse affects on human health or safety. The actions will take place offshore on a NOAA ship Nancy Foster which practices safe seamanship at all times. The action is short term in nature, specifically 10 days. The Nancy Foster will be operating in remote deep-sea (>200m) areas located off the U.S. East Coast with a focus on the Blake Plateau. All operations are underwater and, therefore, have no human presence. The vessel will transit through different depths as it moves from the ports of call to the areas of operations in deeper waters. These actions do not involve any procedures or outcomes known to result in impacts on human health and safety.

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

Data collection will primarily focus offshore in deep waters (greater than 200 meters), including areas offshore the U.S. East Coast with a focus on the Blake Plateau the effects will be negligible, as acoustic mapping are transient and will not cause any permanent impact on the seabed or water column due to the short duration time in the area mapped. Operations taken will follow the vessels Best Management Practices when operating during the cruise. The action is to occur

in the offshore environment approximately 100 nautical miles from shore in waters deeper than 200 meters.

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

The action will not result in adverse effects on protected species or habitats protected by the ESA, MMPA, MSA or NMSA meet the definition of negligible. This determination was made based on consultation with NOAA experts on ESA and MMPA. MSA, NMSA, and MBTA do apply. Given the offshore focus of most of our proposed work, it is improbable that we will encounter marine mammals protected under the MMPA, or sea birds protected under the MBTA. If we did encounter any such protected animals, our impacts would be negligible because of the best management practices to which we adhere to avoid or minimize environmental impacts.

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

The operations of the expedition will be in compliance with FEC 07 Hazardous Materials and Hazardous Waste Management Requirements for Visiting Scientific Parties (or the OMAO procedure that supersedes it) to ensure generation, use, storage, transport, and disposal of such substances will not result in significant impacts.

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

The proposed action will not result in adverse effects that cannot be resolved through applicable regulatory processes since we will not be operating within listed or eligible properties, lands, resources or sites coming under the umbrella of protection referenced above. The proposed action area is within the U.S. EEZ but there are no such areas and resources within the action that would result in an adverse effect on properties listed or eligible for listing on the National Register of Historic Places authorized by the National Historic Preservation Act of 1966, National Historic Landmarks designated by the Secretary of the Interior, or National Monuments designated through the Antiquities Act of 1906; Federally recognized Tribal and Native Alaskan

lands, cultural or natural resources, or religious or cultural sites that cannot be resolved through applicable regulatory processes.

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

The action is to occur 100 nautical miles from shore and therefore these types of communities will not be affected. There are no communities within or near the geographic scope of the expedition, and the mission does not involve actions known or likely to result in adverse impacts on human health.

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

The ship will follow all USCG regulations for safe ballasting (if ballasting is necessary) to mitigate against invasive species spread. The mission team will comply with all applicable local and federal regulations regarding the prevention or spread of invasive species. At the completion of every ROV dive or CTD cast, the equipment will be thoroughly rinsed with fresh water and completely dried to prevent spreading organisms from one site to another.

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

The proposed actions will not result in any potential violation of federal, state, or local law or requirements imposed for the protection of the environment while taking place on the NOAA ship.

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

The actions will not result in highly controversial environmental effects. Exploration techniques and processes are well known, and have shown no notable or lasting effects to the environment even as the vessel travels within the U.S. EEZ. Given the project's scope and breath, no notable or lasting changes or highly controversial effects to the environment will result.

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

While each cruise contributes to the overarching goal of exploring, mapping, and sampling the ocean, every cruise is independently beneficial, not connected to subsequent cruises, and will not be setting any new precedents.

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

No, the action would not result in any such effects that are uncertain, unique, or unknown. The techniques and equipment used for this type of field activity and the effects are reasonably well known and minimal.

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

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

CE Determination

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

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

Signature:

Signed by:

LYNCH.TERENCE.L. Digitally signed by
DR.1377202895 LYNCH.TERENCE.L.DR.1377202895
Date: 2021.07.15 08:47:33 -04'00'

Date Signed:

ESA Biological Assessment



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

July 20, 2021

NOAA Fisheries
Office of Protected Resources
ESA Interagency Cooperation Division
1315 East-West Hwy
Silver Spring, MD 20910

Attn: Ms. Cathy Tortorici

Re: Request for Initiation of Expedited Informal Consultation under section 7(a)(2) of the Endangered Species Act for Marine Operation Activities on the NOAA Ship *Nancy Foster* for Exploration Mapping of the Blake Plateau /Project Number: NF-21-06 (OMAO))

Dear Ms. Tortorici,

The NOAA Office of Ocean Exploration and Research (OER) proposes to fund the proposed project as described below. We request initiation of informal consultation under section 7(a)(2) of the Endangered Species Act (ESA) for the marine operation activities on the NOAA Ship *Nancy Foster* for exploration mapping of the Blake Plateau (Project Number: NF-21-06 (OMAO)). We have determined that the proposed activity may affect, but is not likely to adversely affect, the ESA-listed species and critical habitat included in the table(s) below. Our supporting analysis is provided below. We request your written concurrence with our determinations.

Pursuant to our request for expedited informal consultation, we are providing, enclosing, or otherwise identifying the following information:

- A description of the action to be considered;
- A description of the action area;
- A description of any listed species or critical habitat that may be affected by the action; and
- An analysis of the potential routes of effect on any listed species or critical habitat.

Proposed Action

NOAA's Office of Ocean Exploration and Research (OER) is filling in the gaps in basic understanding of deep ocean and seafloor areas, providing deep-ocean data and



information to improve our overall awareness of resources and habitats in the U.S. EEZ and international waters. OER is conducting this work alongside participating institutions of the University Corporation for Atmospheric Research (UCAR) and the University of New Hampshire Center for Coastal and Ocean Mapping. Mapping priority areas will fill bathymetric and bottom backscatter mapping gaps in support of the National Ocean Mapping, Exploration, and Characterization (NOMECC) strategy goal (e.g., Seabed 2030 Initiative) of mapping U.S. waters deeper than 40 meters by 2030.

- Proposed cruise dates: July 27, 2021 to August 5, 2021
- Of the 10 Days at Sea (DAS) scheduled for this project, 10 DAS are funded by a Line Office Allocation. This project will require mapping operations 24 hours/day. The operational tempo will be medium.

This expedition will commence on July 27, 2021 in Charleston, SC and will conclude on August 5, 2021 in Charleston, South Carolina. It will include 24 hour/day acoustic exploration mapping operations focused on areas generally deeper than 200 meters in U.S. waters off the U.S. East Coast with a focus on the Blake Plateau. The exact start and end dates may vary by a few days or weeks depending on weather and other logistical considerations.

Overview of Activity

OER conducts deep-ocean expeditions using advanced technologies on the NOAA Ship *Nancy Foster* and on similar vessels supporting marine science and technology pursuits. Exploratory expeditions are proposed collaboratively, with input from marine science and technology communities, OER stakeholders, and education and outreach partners. Expeditions provide real-time or near real time, open access deep water oceanographic data that benefits NOAA, research and educational institutions, and the general public.

This cruise's operations will begin with a transit mapping data collection en-route to the priority mapping area as seen in **Figure 1**. Map survey cruises for the majority conduct seafloor mapping and conductivity-temperature-density (CTD) casts. Data collection is requested to begin as soon as feasible after reaching the sea buoy en route out of the harbor, following the "always Exploration" tenet and standard practice employed during mapping cruises executed by NOAA OER. The operations will include 24 hour/day mapping operations using the ship's multibeam echosounders EM710 and EK 60 sonars (38, 120, 200 kilohertz (kHz)). Mapping priority areas will fill in bathymetric and bottom backscatter mapping gaps.

The entire survey will take place in the U.S EEZ but may deviate in track lines, locations, and timing for reasons such as the health and safety of those aboard, science drivers, poor data quality, inclement weather, or mechanical issues with the research vessel and/or equipment. All research cruises will focus on collecting critical baseline information in unknown and poorly known areas 200 meters and deeper to meet NOAA science and management goals as a part of the NOMECC Strategy. The proposed expedition will consist of acquiring high resolution seafloor mapping data essential for making significant biological, geological, archaeological and oceanographic discoveries; collecting seafloor data; supplementing previous work where possible to form the template for selecting ROV dive targets; and contribute to global datasets of modern seafloor mapping data, currently is estimated at 5-10 percent of the global seafloor (NOAA, 2020).

Information generated by NOAA OER will directly contribute to a better understanding of deepwater habitats, ecosystems, and geologic history of the ocean by providing basic information about the biological resources and habitats of these regions ensuring that marine resource managers make informed decisions.

Mapping Operations

NOAA Ship *Nancy Foster* has a suite of scientific ocean mapping sonars, each with a unique exploration application. All of these systems are routinely used by the ocean science community and have provided invaluable scientific data for oceanographers, marine researchers, and managers within many Federal agencies, including NOAA's Office of National Marine Sanctuaries (ONMS), the Bureau of Ocean Energy Management (BOEM) and the U.S. Geological Survey (USGS). All of the mapping sonars used on the ship have hull-mounted transducers that are downward facing looking through the water column directly underneath the ship. These sonars include EM710 Multibeam Echosounder, Sound Velocity Profiling, and EK 60 split beam echosounders (38, 120, 200 kHz).

The multibeam sonar maps broad sweeps along the seafloor for bathymetry/backscatter and water column feature detection (e.g. gaseous seeps). The split-beam sonars gather calibrated target strength measurements of biologic and gaseous targets in the water column. All of the sonars may not be able to be run concurrently with the multibeam due to inter-sonar acoustic interference.

Multibeam Sonar:

Multibeam sonar mapping will be conducted with a Kongsberg EM710 echosounder within the specific action area and during the transits to and from the sites where other operations will be conducted, and are planned to continue to build upon previous mapping surveys as much as feasible. Multibeam sonar data will produce high-resolution bathymetry and acoustic backscatter maps. These maps will provide critical baseline information to scientists and resource managers interested in identifying and expanding our understanding of the geology and important biological habitats and ecological connections. Additionally, the data collected will help scientists better understand the size and character of seafloor habitats in the area, allowing for improved targeting of future exploration and research, including the selection of sites for further investigation with a ROV.

Single Beam/Split Beam Sonars:

Kongsberg Simrad EK60 are specifically designed to provide calibrated quantitative acoustic data useful for interpreting marine life in the water column of the ocean. Additionally, they are now used to map gaseous seep plumes and hydrothermal venting emitting from the seafloor. In many cases the ability to observe and measure the acoustic backscatter response of different types of marine life (fish, squid, plankton, etc.) is dependent upon the frequency of the sonar. Therefore, the more frequencies that are used for these acoustic surveys, the more complete the picture that can be gained about the marine environment.

Recent research results demonstrate that the simultaneous use of multiple echo sounder transducer frequencies is useful for improving estimates of fish stocks, aiding in the discrimination of biological scattering layers or different species (Stanton et al., 2010), and mapping the location, density, and relative size of fish aggregations relative to benthic habitat features (Costa et al., 2014). Simrad EK60 sonars can be referred to as “split-beam” sonars since each of the four quadrants of the main lobe of the beam pattern is calibrated to measure the target strength of objects within that portion of the beam.

The *Nancy Foster* is equipped with EK60 split-beam sonar transducers operated at the following frequencies: 38 kHz, 120 kHz, and 200 kHz. When the EK60 pings it sends a narrowband signal at a particular frequency band.

CTD Casts

CTD casts may be conducted two ways: 1) with a Castaway CTD to gather conductivity/temperature/depth measurements or sound velocity measurements to calibrate sonar data, and 2) using a CTD rosette to collect additional information about the physical and chemical properties of the water column, including at sites of interest identified from mapping and ROV investigation.

Source Vessel Specifications

The NOAA (OMAO) Ship *Nancy Foster* is a 187 foot federal government vessel with an 11.2 foot draft and a transit cruise speed of 10.5 knots. The *Nancy Foster* is outfitted with a suite of single and multibeam echo sounders for seafloor mapping, an echo sounder for fish stock assessments, and a vast array of additional oceanographic and atmospheric sensors needed to collect data about the ocean environment. Additionally, the *Nancy Foster* is equipped to service oceanographic and atmospheric surface and subsurface buoys and employs state-of-the-art navigation and propulsion systems needed for high-quality and efficient data collection..

- Nancy Foster Specifications:
 - Vessel: *Nancy Foster*
 - Approximate length: 187 feet
 - Approximate breadth: 40 feet
 - Draft: 11.2
 - Hull description: Welded steel
 - Displacement: 1,190 long tons
 - Type of vessel (i.e., deep draft, cargo, barge etc.): NOAA Ship
 - Cruising speed: 10.5 knots
 - Range: 3500 nm
 - Endurance: 15 days
 - Travel routes: 1
 - Number of trips: 1
 - Presence of lookout: 3

Since being transferred to NOAA by the Navy in 2001, the NOAA Ship *Nancy Foster* ship supports fish habitat and population studies, seafloor mapping surveys, physical and chemical oceanographic studies, and maritime heritage surveys. The *Nancy Foster*'s

homeport is in Charleston, South Carolina and focuses on operating in the U.S. Atlantic and Gulf coasts, and the Caribbean Sea. Future research onboard the *Nancy Foster* funded by NOAA OER, may include oceanographic research and seafloor mapping in areas 200 m and deeper utilizing the same or similar scientific instruments to the NOAA Ship *Okeanos Explorer* or similar research vessels. Active acoustic sources being used during the *Nancy Foster*'s proposed survey offshore of the U.S. East Coast within the Blake Plateau are provided in **Table 5**.

Conservation Measures and BMPs

Research and expedition activities conducted by the NOAA Ship *Nancy Foster* will follow the conservation measures and Best Management Practices (BMPs) methodology developed and used on the NOAA Ship *Okeanos Explorer*. All BMPs will be communicated to the science leads, boat operators, and field staff, and as necessary between the ship's crew (Commanding Officer/Master or designee(s), as appropriate) and scientific party in order to explain responsibilities, communication procedures, marine mammal monitoring protocol, and operational procedures. Mitigation measures and BMPs include:

1. Minimize Exposure to Elevated Noise Levels
 - a. Maintain watch for the presence of marine protected species. Immediately notify the survey department of the proximity of cetaceans and sea turtles. When marine mammals are able to be identified by Bridge Officers or Watch Standers, these observations are noted in the NOAA fleet marine mammal observation log as part of standard practice.
 - i. If ESA-listed cetaceans are present within 400 meters of the ship (460 m/500 yards for North Atlantic right whales), the vessel would stop and the sonars will be secured and the ship will slowly move away from the area if feasible.
 - ii. If ESA-listed cetaceans are within 400 meters (460 meters/500 yards for North Atlantic right whales) and are not in danger of collision, reduce speed and seek to avoid the animal as much as possible.
 - iii. The Survey Department will respond by switching the multibeam sonar into "mammal protection" mode (keeps it pinging but at a source level reduced by 20 decibels) if a marine mammal is spotted at any distance. No change will occur to the EK60s. Note: the Acoustic Doppler Current Profiler (ADCPs) are never run simultaneously with the multibeam, so they would already be off. The ADCPs are mostly run when the ship is stationary at a dive site and risk to marine mammals is minimal.
 - b. Minimize turning all sonar sound sources on and off as a precautionary measure to avoid possible startling of animals.
 - c. When the systems have been shut down for any reason, the multibeam mammal protection mode would be used to turn the multibeam back on first.

Only after the multibeam has been brought from mammal protection mode to full power would the EK60 sonars then be turned back on.

d. If the multibeam sonar is not being used, but other sonar systems are being turned on, they will be started in lower power settings and will gradually (over a 15 minute time period) be adjusted to higher power settings as appropriate for the water depths to essentially mimic the approach of the “mammal protection” mode of the multibeam.

2. Minimize Temporary Disturbance from Human Activity

a. All in-water work will be postponed, when whales are within 100 meters, or other protected species are within 50 meters;

b. Should a marine protected species enter the area while in-water work is already in progress, the activity may continue only when that activity has no reasonable expectation to adversely affect the animal(s); and

c. No attempt will be made to feed, touch, ride, or otherwise intentionally interact with any marine protected species.

3. Minimize Entanglement

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

b. All in-water work will be postponed when whales are within 100 meters, or other protected species are within 50 meters of the vessel;

c. Should a marine protected species enter the area while in-water work is already in progress, the activity may continue only when that activity has no reasonable expectation to adversely affect the animal(s); and

d. Individuals participating in the activity will closely monitor the instrument cables at all times while they are deployed.

4. Minimize Collisions with Vessels

a. Vessel Strike Avoidance

- I. Vessel operators and crew must maintain a vigilant watch for all marine mammals and sea turtles and slow down or stop the vessel or alter course, as appropriate, to avoid striking any marine mammal. These requirements apply when the vessel is in transit and do not apply in any case where compliance will create an imminent and serious threat to a person or vessel or to the extent that a vessel is restricted in its ability to maneuver and, because of the restriction, cannot comply. A visual observer aboard the

vessel must monitor a vessel strike avoidance zone around the vessel according to the parameters stated below. Visual observers monitoring the vessel strike avoidance zone can be either third-party visual protected species observers or crew members, but crew members responsible for these duties must be provided sufficient training to distinguish marine mammals from other phenomena. Vessel strike avoidance measures shall be followed during sonar surveys and while in transit.

- II. Vessel personnel should do the following in order to avoid causing injury or death to marine mammals and sea turtles:
 - i. Maintain a vigilant watch for marine mammals and sea turtles and slow down or stop their vessel to avoid striking protected species.
 - ii. When whales are sighted, maintain a distance of 400 yards (91 meters) or greater from the whale. If the whale is believed to be a North Atlantic right whale, vessel personnel should maintain a minimum distance of 500 yards (460 meters) from the animal.
 - iii. When sea turtles or small cetaceans are sighted, attempt to maintain a distance of 50 yards (45 meters) or greater whenever possible.
 - iv. When cetaceans are sighted while a vessel is underway, attempt to remain parallel to the animal's course. Avoid excessive speed or abrupt changes in direction until the cetacean has left the area.
 - v. Reduce vessel speed to 10 knots or less when mother/calf pairs, pods, or large assemblages of cetaceans are observed near an underway vessel when safety permits. A single cetacean at the surface may indicate the presence of submerged animals in the vicinity of the vessel; therefore, precautionary measures should always be exercised.
 - vi. Whales may surface in unpredictable locations or approach slowly moving vessels. When vessel personnel sight animals in the vessel's path or in close proximity to a moving vessel, reduce speed and shift the engine to neutral. Do not engage the engines until the animals are clear of the area.
- III. The vessel must maintain a minimum separation distance of 400 meters from large whales (i.e. sperm and baleen whales). The

following avoidance measures must be taken if a large whale is within 400 m of the vessel.

i. The vessel must reduce speed and shift the engine to neutral, and must not engage the engines until the whale has moved outside of the vessel's path and the minimum separation distance has been established.

ii. If the vessel is stationary, the vessel must not engage engines until the whale(s) has moved out of the vessel's path and beyond 400 m.

b. Additional Requirements for the North Atlantic Right Whale

i. If a sighted whale is believed to be a North Atlantic right whale, federal regulation requires a minimum distance of 500 yards (457 m) be maintained from the animal.

ii. Vessels entering North Atlantic right whale critical habitat are required to report into the Mandatory Ship Reporting System.

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

iv. Injured, dead, or entangled right whales should be immediately reported to the U.S. Coast Guard via VHF Channel 16.

v. Adherence to seasonal vessel speed restrictions of 10 knots or less as designated locations along the U.S. east coast.

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

5. Minimize Vessel Waste and Discharge & Prevent Invasive Species

- a. All vessels operating in areas where ESA-listed species are present will continue to follow the International Convention for the Prevention of Pollution from Ships (MARPOL) discharge protocols, but will postpone any authorized discharge if any protected species are within 100 yards of the vessel.
 - b. Meet all Environmental Protection Agency (EPA) Vessel General Permits and Coast Guard requirements.
 - c. Avoid discharge of ballast water in designated critical habitat.
 - d. Use anti-fouling coatings.
 - e. Clean hull regularly to remove aquatic nuisance species.
 - f. Avoid cleaning of hull in critical habitat.
 - g. Avoid cleaners with nonylphenols.
6. Avoid or Minimize Impacts to Essential Fish Habitat
- a. Instruments deployed to collect water samples and current data (except for expendable instruments) would not be allowed to contact the seafloor;
 - b. The use detergents and other pollutants which may be washed into the marine environment will be avoided or held to a minimum;
 - c. The vessel will adhere to MARPOL discharge regulations at all times during the proposed cruises;
 - d. Except in an emergency, the vessel will not anchor while at sea.

Description of the Action Area

The *action area* is all areas to be affected by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). *Effects of the action* are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action. The action area is distinct from and can be larger than the project footprint because some elements of the project may affect listed species or critical habitat some distance from the project footprint. The action area, therefore, extends out to a point where no effects from the project are expected to occur.

For this project, the action area includes areas of the Blake Plateau within U.S. waters off the East Coast. An overview of the cruise is indicated in **Figure 1**. The waypoints for the priority areas are provided in **Table 1** through **Table 4**.

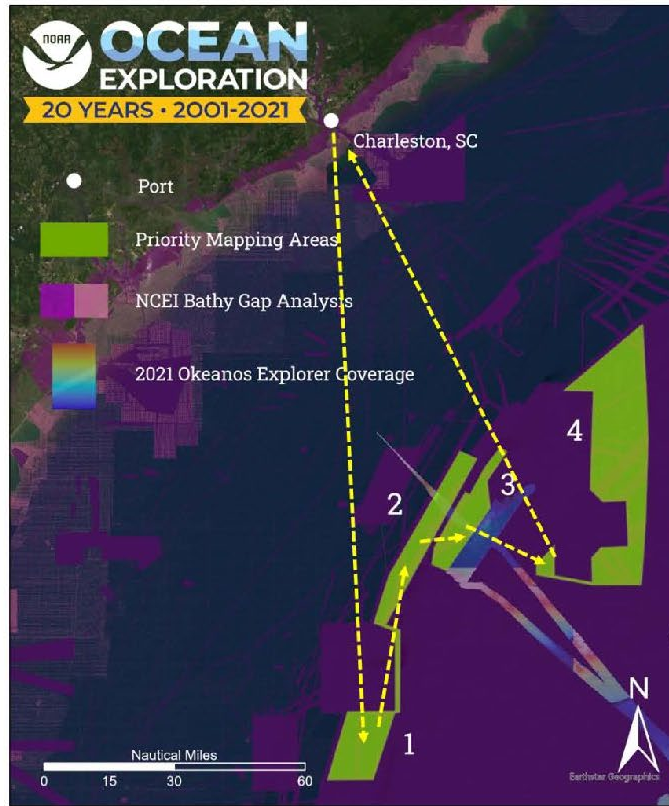


Figure 1. Map showing the general operating area and priority mapping areas for NF-21-06.

Table 1. Mapping Priority Area # 1

Waypoint ID	Latitude	Longitude
1	30 50.654 N	79 48.839 W
2	30 50.536N	79 37.712 W
3	30 37.193 N	79 42.794 W
4	30 37.045 N	79 53.475 W

Table 2. Mapping Priority Area # 2

Waypoint ID	Latitude	Longitude
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1	31 42.656 N	79 12.380 W
2	31 41.742 N	79 11.917 W
3	31 35.849 N	79 16.478 W
4	31 30.819 N	79 15.727 W
5	31 18.224 N	79 25.923 W
6	31 19.554 N	79 29.465 W
7	31 22.853 N	79 28.821 W
8	31 30.729 N	79 23.776 W
9	31 33.884 N	79 21.683 W
10	31 33.335 N	79 20.556 W
11	31 38.736 N	79 17.193 W

Table 3. Mapping Priority Area # 3

Waypoint ID	Latitude	Longitude
1	31 41.925 N	79 22.918 W
2	31 40.373 N	79 18.732 W
3	31 7.301 N	79 40.358 W
4	31 7.990 N	79 42.773 W
5	31 17.49 N	79 39.231 W

Table 4. Mapping Priority Area # 4

Waypoint ID	Latitude	Longitude
1	31 19.603 N	79 5.323 W
2	31 23.526 N	79 1.032 W
3	31 16.926 N	79 1.169 W
4	31 17.483 N	79 5.290 W

A summary of all active acoustic sources to be used by the *Nancy Foster* for its proposed survey is provided in **Table 5** below.

Table 5. Active acoustic sources being used during Nancy Foster’s proposed survey.

Source	SEL _{sp1} (dB re 1 μPa-m)	SPL _{rms2} (dB re 1 μPa-m)	SPL _{pk3} (dB re 1 μPa-m)	Frequency (kHz)	Pulse length (ms)	Beam width or swath angle (o)	Ping rate (Hz)
Kongsberg EM710 multibeam	NA	232	NA	70-100	2	150	0.6
Kongsberg Simrad EK60 split-beam sonar 18-kHz	198	219	225	18	0.008192	11	10
Kongsberg Simrad EK60 split-beam sonar 38-kHz	199	223	229	38	0.004096	7	10
Kongsberg Simrad EK60 split-beam sonar 70-kHz	194	221	227	70	0.002048	7	10
Kongsberg Simrad EK60 split-beam sonar 120-kHz	186	216	222	120	0.001024	7	10
Kongsberg Simrad EK60 split-beam sonar 200-kHz	184	214	220	200	0.001024	7	10
Kongsberg Simrad EK60 split-beam sonar 333-kHz	NA	206	212	333	NA	7	10

¹ SEL_{sp}: single ping sound exposure level (SEL).
² SPL_{rms}: root-mean-square (rms) sound pressure level (SPL).
³ SPL_{pk}: peak SPL.

The analyses on environmental effects take into consideration of sound source characteristics (sound level, frequency, and duty cycle, etc.), sound propagation in the marine environment, and hearing capabilities and sensitivities of marine organisms to assess the likely impacts. Several models are used to calculate the ensonified areas based on source characteristics of the active acoustic devices that are used by the *Nancy Foster* for oceanographic research and seafloor mapping. Hearing capabilities and thresholds of noise impacts of various marine organisms are based on technical guidance and memos from NOAA Fisheries (e.g., NMFS, 2016; 2018). Impact distances to permanent threshold shift (PTS) and temporary threshold shift (TTS)/behavioral harassment are presented in **Table 6**.

Table 6. PTS and TTS/Behavioral Harassment distance (meters) of marine mammal hearing groups from different active sources onboard NOAA Ship Nancy Foster

Source	PTS		TTS/Behavioral Harassment
	LF	MF	

Kongsberg EM710 multibeam	1	2	571
Kongsberg Simrad EK60 split-beam sonar 18-kHz	1	1	68
Kongsberg Simrad EK60 split-beam sonar 38-kHz	1	1	40
Kongsberg Simrad EK60 split-beam sonar 70-kHz	1	1	24
Kongsberg Simrad EK60 split-beam sonar 120-kHz	1	1	14
Kongsberg Simrad EK60 split-beam sonar 200-kHz	NA	NA	NA
Kongsberg Simrad EK60 split-beam sonar 333-kHz	NA	NA	NA

¹LF: low-frequency

cetacean;

²MF: mid-frequency

cetacean;

³NA: No effects due to frequency beyond marine mammal hearing range.

Action Area Habitat

The action area for the proposed mapping survey by the NOAA Ship *Nancy Foster* is offshore the U.S. Southeast coast as the vessel transits to and from the Blake Plateau area. The fauna and flora of the Blake Plateau is poorly known, as the depths, seafloor topography, and Gulf Stream currents have made it difficult to conduct operations.

The continental margin is composed of three regions extending from the shoreline reaching depths around 5,000 meters. As the vessel transits from Charleston, South Carolina, the continental margin flattens before reaching the Charleston Bump, a rugged bottom topography upper slope before reaching the Blake Plateau. The Blake Plateau region is an area of interest for mapping and ROV operations by OER and partners for the past several years. Explorations have documented the most extensive continuous cold-water coral mound reef ecosystem. Transit track lines for operations conducted by the *Nancy Foster* during this cruise are indicated in **Figure 1**.

The priority area during this cruise range in depths ranging from 200 to 500 meters. The areas of interest are within the Deepwater Coral Habitat Areas of Particular Concern (HAPC) Stetson-Miami Terrace in the South Atlantic Region. This HAPC encompasses hundreds of pinnacles along the eastern Blake Plateau, coral mounds, numerous lithohierms at depths of 500 meters in the Savannah and East Florida Lithohierms, and Miami Terrace and Escarpment which a Miocene-age terrace off southwest Florida with rugged hardbottom habitats filled with rich communities of bottom-dwelling species ranging from 200-600 meters in depth. The Blake Plateau is relatively flat, gradually descending until it reaches the Blake Escarpment slope allowing for unique physical and biological features in the region. The cruise priority areas will improve mapping coverage for the Blake Plateau, allowing for a better understanding of the habitat and its marine communities.

Potentially Affected NMFS ESA-Listed Species and Critical Habitat

We have assessed the listed species that may be present in the action area and our determination of the project’s potential effects to them as shown in **Table 7** below.

Please note abbreviations used in **Table 7**: E = endangered; T = threatened; NLAA = may affect, not likely to adversely affect; NE = no effect; N/A = not applicable; DPS = Distinct Population Segment

Table 7. ESA-listed Species in the Action Area and Effect Determination(s)

Species	ESA Status	Critical Habitat	Recovery Plan	Effect Determination (Species)
Marine Mammals – Cetaceans				
Blue Whale (<i>Balaenoptera musculus</i>)	E – 35 FR 18319	---	07/1998 11/2020	NLAA
Fin Whale (<i>Balaenoptera physalus</i>)	E – 35 FR 18319	---	75 FR 47538 07/2010	NLAA
North Atlantic Right Whale (<i>Eubalaena glacialis</i>)	E – 73 FR 12024	81 FR 4837	70 FR 32293 08/2004	NLAA
Sei Whale (<i>Balaenoptera borealis</i>)	E – 35 FR 18319	---	12/2011	NLAA
Sperm Whale (<i>Physeter macrocephalus</i>)	E – 35 FR 18319	---	75 FR 81584 12/2010	NLAA
Marine Reptiles				
Green Turtle (<i>Chelonia mydas</i>) – North Atlantic DPS	T – 81 FR 20057	63 FR 46693	FR Not Available 10/1991 – U.S. Atlantic	NLAA
Hawksbill Turtle (<i>Eretmochelys imbricate</i>)	E – 35 FR 8491	63 FR 46693	57 FR 38818 08/1992 – U.S. Caribbean, Atlantic, and Gulf of Mexico 63 FR 28359 05/1998 – U.S. Pacific	NLAA
Kemp’s Ridley Turtle (<i>Lepidochelys kempi</i>)	E – 35 FR 18319	---	03/2010 – U.S. Caribbean,	NLAA

			Atlantic, and Gulf of Mexico 09/2011	
Leatherback Turtle (<i>Dermochelys coriacea</i>)	E – 35 FR 8491	44 FR 17710 and 77 FR 4170	10/1991 – U.S. Caribbean, Atlantic, and Gulf of Mexico 63 FR 26359 05/1998 – U.S. Pacific	NLAA
Loggerhead Turtle (<i>Caretta caretta</i>) – Northwest Atlantic Ocean DPS	T – 76 FR 58868	79 FR 39855	74 FR 2995 10/1991 – U.S. Caribbean, Atlantic, and Gulf of Mexico 05/1998 – U.S. Pacific 01/2009 – Northwest Atlantic	NLAA
Fishes				
Atlantic Sturgeon (<i>Acipenser oxyrinchus oxyrinchus</i>) – Carolina DPS	E – 77 FR 5913	82 FR 39160	-- --	NLAA
Atlantic Sturgeon (<i>Acipenser oxyrinchus oxyrinchus</i>) – Chesapeake DPS	E – 77 FR 5879	82 FR 39160	-- --	NLAA
Atlantic Sturgeon (<i>Acipenser oxyrinchus oxyrinchus</i>) – Gulf of Maine DPS	T – 77 FR 5879	82 FR 39160	-- --	NLAA
Atlantic Sturgeon (<i>Acipenser oxyrinchus oxyrinchus</i>) – New York Bight DPS	E – 77 FR 5879	82 FR 39160	-- --	NLAA
Atlantic Sturgeon (<i>Acipenser oxyrinchus oxyrinchus</i>) – South Atlantic DPS	E – 77 FR 5913	82 FR 39160	-- --	NLAA
Giant Manta Ray (<i>Manta birostris</i>)	T – 83 FR 2916	-- --	-- --	NLAA

Oceanic Whitetip Shark (<i>Carcharhinus longimanus</i>)	T – 83 FR 4153	---	9/2018- Outline	NLAA
Shortnose Sturgeon (<i>Acipenser brevirostrum</i>)	E – 32 FR 4001	---	63 FR 69613 12/1998	NLAA

We have assessed the critical habitats that overlap with the action area and our determination of the project’s potential effects to them as shown in **Table 8** below.

Table 8. Critical Habitat(s) in the Action Area and Effect Determination(s)

Critical Habitat	Federal Register Notice	Units/Areas	Effect Determination (Critical Habitat)
Marine Mammals – Cetaceans			
North Atlantic Right Whale (<i>Eubalaena glacialis</i>) Critical Habitat	81 FR 4837	Units 1 to 2	NLAA
Marine Reptiles			
Loggerhead Turtle (<i>Caretta caretta</i>) – Northwest Atlantic Ocean DPS Critical Habitat	79 FR 39856	LOGG-N-01 to LOGG-N-36, LOGG-S-1 to LOGG-S-1	NLAA

Effects Determination

Endangered Species Act (ESA) Section 7 (a)(2) requires that each federal agency, in consultation with NMFS and the U.S. Fish and Wildlife Service (USFWS), ensure that any action authorized, funded, or carried out by the agency is not likely to jeopardize the continued existence of endangered or threatened species, or result in the destruction or adverse modification of designated critical habitat. No cruise activities would be in areas with resources only under USFWS jurisdiction, so no consultations with USFWS will be sought.

Our analysis considers potential impacts or stressors to identified marine species in and around the U.S. Southeast Atlantic and the vessel transit areas between Charleston, South Carolina and the Blake Plateau on the North Atlantic DPS of green sea turtles (*Chelonia mydas*), hawksbill sea turtles (*Eretmochelys imbricata*), Northwest Atlantic DPS of loggerhead sea turtles (*Caretta caretta*), leatherback sea turtles (*Dermochelys coriacea*), kemp’s ridley turtle (*Lepidochelys kempii*), sperm whales (*Physeter macrocephalus*), fin

whales (*Balaenoptera physalus*), blue whales (*Balaenoptera musculus*), sei whales (*Balaenoptera borealis*), North Atlantic right whale (*Libalaena glacialis*), oceanic whitetip shark (*Carcharinus longimanus*), giant manta ray (*Manta birostris*), shortnose sturgeon (*Acipenser brevirostrum*), the South Atlantic, Carolina, Chesapeake Bay, New York Bight and Gulf of Maine DPSs of atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*); and on critical habitats for the North Atlantic right whale (southeastern US calving area) and Northwest Atlantic DPS of loggerhead turtle. All mapping operations are expected to be in waters at depths of 200 meters and greater. Transit mapping operations are planned between all areas mentioned.

We believe that the most likely potential impacts or stressors are:

1. Exposure to elevated noise levels;
2. Temporary disturbance from human activity;
3. Collisions with vessels; and
4. Exposure to waste and discharge.

The above stressors are evaluated in the subsequent sections.

1. Exposure to elevated noise levels

The additional noise from vessel operation will be brief and not add significantly to the local noise environment. When the vessel transits to and from survey areas, potential effects on marine mammals, sea turtles and fishes include acoustic disturbance. However this disturbance will be brief and are not likely to be significant in impacting the individual's ability to feed, reproduce or avoid predators. "Brief interruptions in communication via masking are possible, but unlikely given the habits of whales to move away from the vessels, either as a result of engine noise, the physical presence of the vessel, or both" (NMFS OPR 2017). Combined vessel noise and presence could cause slight response or behavioral interruptions, but they would be minor and insignificant as the vessel moves away. The distance between the vessel and observed marine mammals and sea turtles, per avoidance protocols described above (See Conservation Measures and BMPs), ensure the vessel will maintain an appropriate distance from observed ESA-listed species and therefore minimize the potential for acoustic disturbance from engine noise. Because the potential acoustic interference from engine noise will be undetectable or so minor that it could not meaningfully be evaluated, we find that the risk from vessel noise is insignificant and not likely to adversely affect ESA-listed marine mammals, sea turtles, and fishes.

The proposed action would include the operation of the NOAA Ship *Nancy Foster's* mapping sonar systems presented in **Table 5**. The effects on marine life from exposure to high intensity noise vary with the frequency, intensity, duration of the sound source, and the physiology and hearing characteristics of the exposed animal. Exposure to very high levels of sound can cause soft tissue injuries that could directly result in fatality.

Exposure to lower levels at frequencies within the animal's range of hearing may cause injury in the form of permanent hearing damage, also referred to as permanent threshold shift (PTS). Exposure to even lower levels may cause behavioral effects that include temporary threshold shifts (TTS), temporarily masked communications and/or acoustic environmental cues, alteration of ongoing behaviors, and areal avoidance.

NOAA National Marine Fisheries Service (NMFS) Thresholds

According to the NOAA Technical Guidance for Assessing the Effects of Anthropogenic Sounds on Marine Mammal Hearing (NOAA 2018), the current defined threshold for the onset of TTS varies by the hearing group:

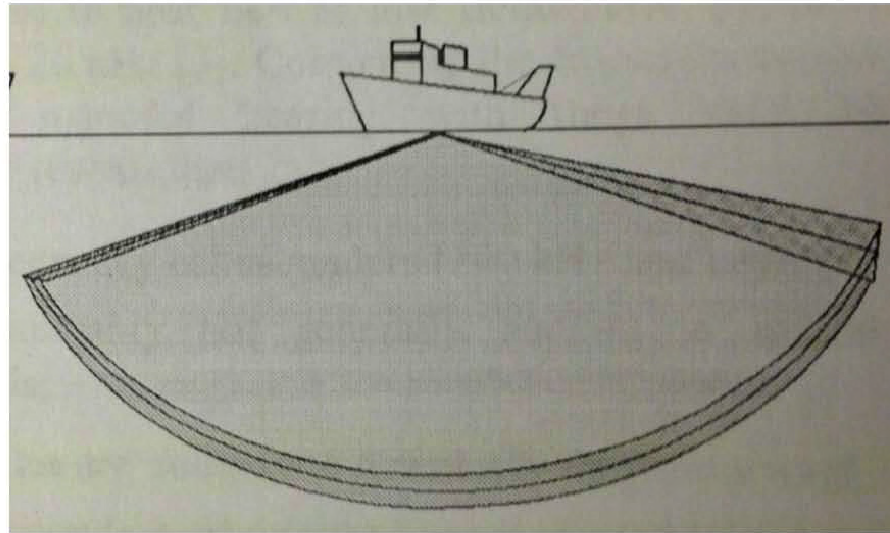
- for low-frequency cetaceans (blue, fin, sei, and right whales) the exposure to in-water sounds is 179 dB re 1 microPa,
- for mid-frequency cetaceans (sperm whales) is 178 dB re 1 μ Pa,
- and is 175 dB re 1 μ Pa for sea turtles (McCauley et al. 2000).

The single pulse threshold for the onset of PTS also varies by hearing group:

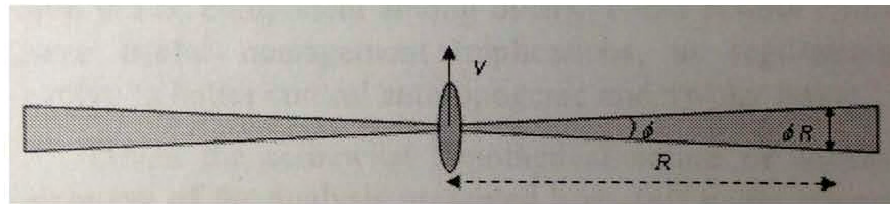
- for low-frequency cetaceans 219 dB re 1 μ Pa,
- for mid-frequency cetaceans is 230 dB re 1 μ Pa,
- and is 204 dB re 1 μ Pa for sea turtles (U.S. Navy 2017).

Threshold values for cetaceans were evaluated against each mapping sonar on the NOAA Ship *Nancy Foster* using the methodology applied in the draft Programmatic Environmental Assessment for the NOAA Ship *Okeanos Explorer's* marine operation activities (See Section 4.1.2 of NOAA OER 2020). Distances to these thresholds are noted in **Table 6**. This methodology accounts for beam width and absorption as multibeam and splitbeam systems are not simple omni-directional point sources but rather are focused sonar arrays that use “selective angular directivity” and furthermore transmit “very short pulses at limited ping rates” (Lurton & DeRuiter 2011). These two characteristics of this type of sonar decrease the potential sound exposure level as well as decrease the probability of animals being subjected to PTS and TTS threshold intensity levels. **Figure 2** provides diagrams excerpted from Lurton & DeRuiter (2011) showing the generalized ensonification volume of a generic multibeam sonar system from both horizontal (**Figure 2a**) and overhead (**Figure 2b**) perspectives. **Figure 2b** also provides the variables used to estimate the exposure time of a stationary animal as the ship passes on its survey track. The exposure time can be estimated by $\Theta R/V$ where Θ is the longitudinal transmitting lobe aperture in radians, R is the range from the source to the animal, and V is the speed of the ship.

The aperture of the EM710 on the *Nancy Foster* is 0.5 degrees but since it would operate in single swath mode in shallow water it will be conservatively treated as 1 degree, yielding a Θ value of 0.02 radians. The ship will be mapping at 8 knots (4.116 meters per second). At a 200 meter distance, the exposure times for a stationary animal caught in the ensonification plane of the EM710 are therefore calculated to be 1 second. This exposure time increases linearly with R so that at 1000 m distance, the exposure time increases to 5 seconds.



2a)



2b)

Figure 2. Diagrams showing a typical multibeam ensonification volume from a) the horizontal and b) the overhead prospective (From Lurton & DeRuiter 2011).

Transmit pulse forms and rates are two other differences that distinguish multibeam and splitbeam sonar from other types of sonar and acoustic sources and further reduce their potential threat to ESA-listed species. Sound is not transmitted continuously from these systems but rather in extremely short pulses (i.e., pings). Ping durations obtained from the EM710 manual are very brief --0.2 to 2.0 milliseconds. The ping rate or in other words, how frequently pings are emitted, is depth dependent and is provided for different depths with the longest pulse length expected for 1000m of water is 2 milliseconds. A discussion on how these sources affect ESA-listed marine mammals, sea turtles, and fishes is presented below.

Marine Mammals

During the proposed action, potential acoustic effects to marine mammals would be limited to sound exposures from active acoustic sources aboard the *Nancy Foster*. A comprehensive analysis of the *Nancy Foster's* onboard sonars and transducers show that different active sound sources will have varied TTS and PTS isopleths

for marine mammal hearing groups (See **Table 6**). The acoustic footprint of the *Nancy Foster's* oceanographic research and seafloor mapping is small relative to the overall distribution of the animals in the area and their use of the area. Feeding behavior is not likely to be impacted. Prey species are mobile and are broadly distributed throughout the study area; therefore, marine mammals are expected to be able to resume foraging once they have moved away from areas with disturbing levels of underwater noise. Because of the temporary nature of the disturbance and the availability of similar habitat and resources in the surrounding area, the impacts to marine mammals and the food sources that they utilize are not expected to have significant impacts on individual ESA-listed marine mammals or their populations.

Furthermore, the *Nancy Foster* will be required to implement a suite of monitoring and mitigation measures (See Conservation Measures and BMPs above page 5 through 9) to minimize the potential impacts to marine protected species. These measures include shutting down and/or powering down all active sonars when an ESA-listed marine mammal is approaching the research vessel. If an ESA-listed marine mammal is spotted at any distance from the vessel, the operations crew aboard the *Nancy Foster* will decrease active sonar sources by 20 decibels and maintain a 400 meter (460 meters for North Atlantic right whales) distance from ESA-listed marine mammals during vessel transit. As shown in **Table 6**, all distances to PTS, TTS, and behavioral harassment are smaller than 400 meters except for the EM710. However, by implementing a power down of the EM710 by 20 decibels, the EM710 sonar would not surpass the threshold for TTS and behavioral harassment past 400 meters. As a result, it is highly unlikely that ESA-listed marine mammals will be exposed to sound levels that will result in harm or harassment.

In summary, the proposed oceanographic research and seafloor mapping activities by the NOAA Ship *Nancy Foster* would have a minimal, temporary, and localized effect on marine mammal species. Furthermore, due to the mitigation and monitoring measures implemented during the proposed survey, it is unlikely that acoustic effects from the action would result in harm or harassment to ESA-listed marine mammals. As a result, effects to marine mammals from active sonar sources used during OER's proposed survey are insignificant and are not likely to adversely affect ESA-listed blue, sei, fin, North Atlantic right, and sperm whales.

Sea Turtles

Available data indicate that sea turtles hear in the low frequency range, with a functional hearing range of about 100 Hertz (Hz) to 1 kHz, with an upper frequency limit of 2 kHz (Finneran 2012). Response to underwater and aerial stimuli down to 50 Hz and vibrational stimuli down to 30 Hz has also been recorded (Pinniaak 2016). The operating frequencies of all proposed sonar devices are much higher frequencies and outside the functional hearing range of ESA-listed sea turtles (See **Table 5**). Therefore sea turtles are not expected to detect or respond to sounds emitted by any of our sonar systems. As a result, effects to ESA-listed sea turtles from active sonar sources used during OER's proposed survey are insignificant and are not likely to adversely affect the North Atlantic DPS of green, hawksbill, Northwest Atlantic DPS of loggerhead, leatherback or kemp's ridley sea turtle.

Marine Fish

The functional hearing ranges of ESA-listed Atlantic and shortnose sturgeon are not well understood. Lake sturgeon are responsive to sounds ranging in frequency from 50 to 500 Hz. Information on the hearing ranges of shortnose and Atlantic sturgeon is unknown, but available information on lake sturgeon indicates that lake sturgeon can hear sounds from 100 to 800 Hz (Meyer et al., 2010). The vast majority of fish species studied cannot hear sounds above 0.5-1.5 kHz (BOEM 2014).

Data for elasmobranch fishes suggest they are capable of detecting sounds from approximately 20 Hertz to 1 kiloHertz with the highest sensitivity to sounds at lower ranges (Casper et al. 2012; Casper and Mann 2009; Casper 2006; Ladich and Fay 2013; Myrberg Jr. 2001; Yan 2003).

As previously described, the NOAA Ship *Nancy Foster*'s scientific sonars operate at high frequency ranges of 70 kHz (the multibeam sonar) and 38 kHz, 120 kHz, and 200 kHz for the EK60 split-beam sonar transducer. When the EK60 pings it sends a narrowband signal at a particular frequency band. All of these frequency ranges are well above the hearing sensitivity ranges for elasmobranchs and sturgeon based on the research that has been done to date. As a result, effects to ESA-listed fishes from active sonar sources used during OER's proposed survey are insignificant and are not likely to adversely affect ESA-listed oceanic whitetip shark, giant manta ray, shortnose sturgeon, the South Atlantic, Carolina, Chesapeake Bay, New York Bight and Gulf of Maine DPSs of Atlantic sturgeon.

2. Temporary disturbance from human activity

The activities associated with the mapping and vessel operations offshore of the U.S. Southeast and vessel transit areas between Charleston, South Carolina and the Blake Plateau involve work in the marine environment where ESA-listed species are known to occur. Marine species may experience a startle reaction and resulting stress should they encounter human activities in the water. The reaction could range from one extreme where an animal calmly approaches and investigates the person or gear, to a panicked response in which the animal flees, which could result in injury or reduce vitality.

Following the Best Management Practices associated with the Marine Wildlife Viewing Guidelines and Boat Operations and Diving Activities methods from the NOAA Ship *Nancy Foster* will reduce the likelihood of interactions with ESA-listed species. These BMPs were developed for the *Okeanos Explorer*'s cruises operating in the Papahānaumokuākea Marine National Monument, which will be used in the project area, include:

- All in-water work will be postponed when whales are within 100 yards, or other protected species are within 50 yards;
- Should a marine protected species enter the area while in-water work is already in progress, the activity may continue only when that activity has no reasonable expectation to adversely affect the animal(s); and

- No attempts will be made to feed, touch, ride, or otherwise intentionally interact with any marine protected species.

It is expected that ESA-listed marine mammals, sea turtles, and fishes will avoid human activity. The most likely effect on this interaction will be a moderate to high energy avoidance behavior resulting in the animal temporarily leaving the immediate area unharmed. Considering this avoidance behavior, in combination with the nature of the activities, and implementation of the above mentioned guidelines, we have determined that disturbances related to vessel operations will be infrequent, temporary in nature, and never reach the scale where it would affect the individual's health. As a result, effects to ESA-listed marine mammals, sea turtles, and fishes from human activity during OER's proposed survey are insignificant and are not likely to adversely affect ESA-listed sperm, fin, blue, sei, and North Atlantic right whale; North Atlantic DPS of green, hawksbill, Northwest Atlantic DPS of loggerhead, leatherback, and kemp's ridley sea turtle; oceanic whitetip shark, giant manta ray, shortnose sturgeon, the South Atlantic, Carolina, Chesapeake Bay, New York Bight and Gulf of Maine DPSs of atlantic sturgeon.

3. Collisions with vessels

Marine Mammals and Sea Turtles

Marine mammals and sea turtles must surface to breathe, and they are known to rest or bask at the surface. Therefore, when at or near the surface, these animals are at risk of being struck by the vessel or its propellers during small boat operations and vessel transits to and from project operating areas. Potential injuries and their severity will depend on the speed of the vessel, the part of the vessel that strikes the animal, and the body part impacted. Injuries may include bruising, broken bones or carapaces, and lacerations that can often result in death.

Existing information about sea turtle sensory biology suggests that sea turtles rely more heavily on visual cues, rather than auditory, to initiate threat avoidance. Research also suggests that sea turtles cannot be expected to consistently notice and avoid vessels that are traveling faster than two knots (Hazel et al., 2007). Vanderlaan and Taggart (2007) report that the severity of injury to large whales is directly related to vessel speed. They found that the probability of lethal injury increased from 21 percent, for vessels traveling at 8.6 knots, to over 79 percent for vessels moving at 15 knots or more. Additionally, since collisions with whales have been reported for both slow and fast moving craft, it appears that, in at least some situations, whales may either be unaware of a vessel's presence or unable to resolve the vessel's proximity and/or vector of approach based on available acoustic cues. Consequently, vessel operators must be responsible to actively watch for and avoid sea turtles and marine mammals, and to adjust their speed based on expected animal density and on lighting and turbidity conditions to allow adequate reaction time to avoid marine animals.

During the proposed OER survey on the *Nancy Foster*, vessel operators and crew will maintain a vigilant watch for all marine mammals and sea turtles and slow down or stop the vessel or alter course, as appropriate, to avoid striking any ESA-listed marine mammal or sea turtle (See Conservation Measures and BMPs above page 5). As a result, effects to ESA-listed marine mammals and sea turtles from vessel collision during OER's proposed survey are discountable and are not likely to adversely affect ESA-listed sperm, fin, blue,

sci, and North Atlantic right whale; and the North Atlantic DPS of green, hawksbill, Northwest Atlantic DPS of loggerhead, leatherback, and kemp's ridley sea turtle.

Fishes

The Oceanic whitetip shark is present in much of the subtropical waters around the globe, in the Northwest Atlantic Ocean, they are classified as Critically Endangered by the IUCN Red List of Threatened Species (Bonfil et al., 2008). Individuals of the species may be found alone, in pairs, or in schools. Oceanic whitetip sharks can be found at the ocean surface, but most frequently stay between 25.5 and 50 meters deep (Carlson and Gulak 2012; Young 2016). The Caribbean supports the few known dense aggregations sites for this species at Cat Island, Bahamas (Gallagher and Hammerschlag, 2011) every year from April to early June. Project activities do not currently include operations in the vicinity of Cat Island. Based on the short duration of the project, expected adherence to established BMPs, the expectation that protected marine species would be widely scattered throughout the proposed area of operation, the limited populations of the protected species in these areas, and the expectation that the species will, for the most part, be at depths where there will be minimal risk of vessel strike; we have determined that the risk of a vessel collision with an Oceanic Whitetip Shark would be discountable.

The Giant Manta ray occurs in tropical, subtropical and temperate waters of the Atlantic, Pacific and Indian Oceans. It is a migratory species, and seasonal visitor along productive coastlines with regular upwelling, in oceanic island groups, and near offshore pinnacles and seamounts (NMFS 2018). The timing of these visits varies by region and seems to correspond with the movement of zooplankton, current circulation and tidal patterns, seasonal upwelling, seawater temperature, and possibly mating behavior. Although the giant manta ray tends to be solitary, they aggregate at cleaning sites and to feed and mate. Giant manta rays are found at depths less than ten meters during the day (Miller 2016). They are commonly encountered on shallow reefs while being cleaned or are sighted feeding at the surface inshore and offshore. It is also occasionally observed in sandy bottom areas and seagrass beds. Giant manta rays appear to exhibit a high degree of plasticity in terms of their use of depths within their habitat. During feeding, giant manta rays may be found aggregating in shallow waters at depths less than 10 meters. However, tagging studies have also shown that the species conducts dives of up to 200 to 450 meters and is capable of diving to depths exceeding 1,000 meters. Given the project activity focus on deeper water than where Giant Manta rays are often found, expected adherence to established BMPs, the expectation that the protected marine species would be widely scattered throughout the proposed area of operation, and the expectation that the species will, for the most part, be at depths where there will be minimal risk of vessel strike; we have determined that the risk of a vessel collision with a Giant Manta ray would be discountable.

The distribution and habitat of shortnose sturgeon and Atlantic sturgeon are all well above the planned minimum operating depth (200 meters) of project activities. Vessel strike is a significant threat to Atlantic sturgeon, particularly on the Delaware, James and Cape Fear Rivers. A study from 2005 to 2008 documented 28 Atlantic sturgeon mortalities in the Delaware Estuary; 50% of the deaths appeared to be from vessel strikes and the cause of the other half unknown due to decompositions but believed to be due to vessel strike (Brown 2011). A 2007-2010 study of the tidal Freshwater portion of the James River, VA documented 31 carcasses of adult Atlantic sturgeon; 26 had gashes from vessel propellers

and the cause of death of the remaining five is unknown (Balazik 2012). These mortalities are suggested to be caused by deep-draft ocean cargo ships. The NOAA NMFS 2010 “Biological Assessment of Shortnose Sturgeon (*Acipenser brevirostrum*)” reports that the majority of ship strikes on sturgeon are believed to be from large, ocean-going vessels. NOAA Ship Nancy Foster is an ocean-going but not a large ocean-going vessel. The vessel is approximately 187 foot long, has a draft of 11.2 inches, less than 2,000 long tons displacement. Based on the known distribution and the preferred habitat types in comparison to the proposed minimum operational limit for the Nancy Foster, the short duration of the proposed action, expected adherence to marked channels and shallower draft of the *Nancy Foster* relative to deeper-draft cargo ships and large ocean-going vessels, we have concluded that the risk of a vessel collision with Gulf sturgeon, shortnose sturgeon and the South Atlantic, Carolina, Chesapeake Bay, New York Bight and Gulf of Maine DPSs of Atlantic sturgeon would be discountable.

4. *Vessel waste and discharge*

NOAA vessels adhere to MARPOL regulations and discharge protocols unless operating in biologically important areas (e.g. a marine protected area) which prompt additional guidance and regulations. NOAA guidance for vessel operations in the presence of a marine protected species and other marine wildlife provided includes:

- All vessels operating in areas where ESA-listed species are present will continue to follow MARPOL discharge protocols, but will postpone any authorized discharge if any protected species are within 100 yards of the vessel.
- Meet all EPA Vessel General Permits and Coast Guard requirements.
- Avoid discharge of ballast water in designated critical habitat.
- Avoid cleaners with nonylphenols.
- Use anti-fouling coatings.
- Clean hull regularly to remove aquatic nuisance species.
- Avoid cleaning of hull in critical habitat.

While an accidental release of waste or discharge may occur which might put protected species at risk to exposure, based on the short duration of the project activities; the excellent safety record of NOAA vessels around the world; the strict adherence to the MARPOL protocols; expected adherence to above mentioned discharge regulations during all project operations; the expectation that protected marine species are widely scattered throughout the project area and the limited populations of ESA-listed species in these areas; we have determined that the risk of protected species being exposed to vessel waste and discharge would be insignificant. As a result, effects to ESA-listed marine mammals, sea turtles, and fishes from human activity during OER’s proposed survey are insignificant and are not likely to adversely affect ESA-listed sperm, fin, blue, sei, and North Atlantic right whale; North Atlantic DPS of green, hawksbill, Northwest Atlantic DPS of loggerhead, leatherback, and kemp’s ridley sea turtle; oceanic whitetip shark, giant manta ray, shortnose sturgeon, the South Atlantic, Carolina, Chesapeake Bay, New York Bight and Gulf of Maine DPSs of Atlantic sturgeon.

5. *Effects to designated critical habitats for the north Atlantic right whale (southeastern US calving area) and northwest Atlantic DPS of loggerhead turtle*

Critical habitat for the Northwest Atlantic Ocean DPS of loggerhead sea turtle is designated in several locations within the potential action area for this project. In the southeast Atlantic there is Sargassum (LOGG-S-02). There is also critical habitat designated as migratory, breeding and near shore reproductive habitat. However, only the Sargassum critical habitat overlaps with the potential action areas of this project. The other designated critical habitat are generally too shallow or close to shore and thus do not overlap with the proposed project action area. The essential features identified for each of these critical habitat units is shown in **Table 9**.

Table 9. Essential features of loggerhead sea turtle.

Loggerhead Critical Habitat Unit	Essential Features
Nearshore Reproductive Habitat	<ul style="list-style-type: none"> ● Waters off of the highest density nesting beaches; ● Waters sufficiently free of obstructions or artificial lighting; and ● Waters with minimal man made structures.
Constricted Migratory Habitat	<ul style="list-style-type: none"> ● Constricted Continental Shelf area relative to nearby Continental Shelf waters; and ● Passage conditions to allow for migration to and from nesting, breeding, and foraging areas.
Breeding Habitat	<ul style="list-style-type: none"> ● High densities of reproductive males and females; ● Proximity to primary Florida migratory corridor; and ● Proximity to Florida nesting grounds.
Winter Habitat	<ul style="list-style-type: none"> ● Water temperatures above 10 degrees Celsius from November to April; ● Continental Shelf waters in proximity to the western boundary of the Gulf Stream; and ● Water depths between 20 and 100 meters.
Foraging Habitat	<ul style="list-style-type: none"> ● Sufficient prey availability and quality, such as benthic invertebrates; and ● Water temperatures to support loggerhead inhabitation, generally above 10°C.

Due to the proposed Conservation and BMPs, the proposed action would not entail activities that affect the essential features of designated critical habitat, because the activities would not affect oceanographic conditions, water depth or temperature, prey availability, passage conditions, densities of reproductive loggerheads, or any other identified essential feature. Therefore, the effects from the proposed action are insignificant and are not likely to adversely effect the Northwest Atlantic Ocean DPS of loggerhead critical habitat.

North Atlantic Right Whale Critical Habitat

Two areas have been designated as critical habitat for North Atlantic right whales: 1) the southeastern U.S. calving area from Cape Fear, NC south to approximately 27nm below Cape Canaveral, FL at 28° N, and 2) northeastern U.S. foraging area in the Gulf of Maine and Georges Bank region. Only the Southeastern U.S. calving area would overlap with the

proposed action. The southeastern U.S. calving habitat areas are in shallow, coastal waters that are shallower waters than the 200 meter minimum operating depths of the *Nancy Foster's* mapping operations; therefore project activities will avoid these critical habitats. However, vessel transits to and from the port of Charleston, SC to the Blake Plateau will be made through this area.

50 CFR Part 226 designated critical habitat for the Northern right whale. Key habitat features discussed include: appropriate foraging habitat, in particular dense aggregations of older, caloric-rich copepods, dominated by *C. finmarchicus*, *P. minutus*, *C. spp.* and by cirripede (barnacle) larvae; and, physical and seasonal oceanographic characteristics of foraging areas conducive to the dense growth of zooplankton. A wide range of human activities that may impact critical habitat or disrupt essential life functions that occur there is also discussed and includes, but is not limited to:

1. Mortality due to collisions with large vessels;
2. Entanglement and mortality due to commercial fishing activities;
3. Possible habitat degradation through pollution, seabed mining and oil and gas exploration;
4. Pollutants may also affect phytoplankton and zooplankton populations in a way that decreases the density and abundance of specific zooplankton patches on which northern right whales feed;
5. Possible harassment due to whale-watching and other vessel activities; and
6. Possible harassment due to research activities (on permitted sites and during specified times throughout the year).

Potential impacts for North Atlantic Right whale collisions with vessels, exposure to waste and discharge, entanglement, and disturbance from human activities including exposure to elevated noise levels were addressed previously in this Biological Evaluation. Project activities will have no effect on currents and circulation patterns, bathymetric features (basins, banks, and channels), oceanic fronts, density gradients, and temperature regimes in any part of the designation within the southeastern U.S. calving area. Activities will also not result in an increase in temperature in the action area; will not directly or indirectly affect the abundance, distribution, quality or availability of copepod patches; and will not directly or indirectly remove copepods.

Based on the short duration of the project; adherence to seasonal vessel speed restrictions of 10 knots or less within the southeastern U.S. calving area; adherence to the NOAA Compliance Guide for Right Whale Ship Strike Reduction Rule; the excellent safety record of NOAA vessels around the world; the strict adherence to the MARPOL protocols; and adherence to best practices described above, any effects to the physical or biological features of North Atlantic Right Whale critical habitats due to vessel operation in this area would be discountable.

Conclusion

NOAA OER has reviewed the proposed project for its effects to ESA-listed species and their critical habitat. Based on the analysis above, we have determined that the proposed activities on the NOAA Ship Nancy Foster for exploration mapping of the Blake Plateau (Project Number: NF21-06 (OMAO)) is not likely to adversely affect any listed species or critical habitat under NMFS's jurisdiction. We have used the best scientific and

commercial data available to complete this analysis. We request your concurrence with this determination.

Sincerely,

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Terence Lynch
Acting Deputy Director
NOAA Ocean Exploration & Research

cc: Amanda Maxon
Environmental Compliance Contractor
NOAA Ocean Exploration & Research

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ESA Letter of Concurrence



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

July 21, 2021

Refer to NMFS No: OPR-2021-01739

Dr. Terence Lynch
Acting Deputy Director
National Oceanic and Atmospheric Administration
Office of Ocean Exploration and Research
1315 East-West Highway
Silver Spring, Maryland

RE: Concurrence Letter for Marine Operation Activities on the NOAA Ship *Nancy Foster* for
Exploration Mapping of the Blake Plateau/Project Number: NF-21-06

Dear Dr. Lynch,

On July 20, 2021, the National Marine Fisheries Service (NMFS) received your request for a written concurrence under the Endangered Species Act of 1973, as amended (ESA; 16 U.S.C. 1531 et seq.) that the National Oceanic and Atmospheric Administration (NOAA) Office of Ocean Exploration and Research's (OER) marine operation activities on the NOAA Ship *Nancy Foster* for exploration mapping of the Blake Plateau (Project Number: NF-21-06) may affect, but is not likely to adversely affect ESA-listed species or designated critical habitat. This response to your request was prepared by NMFS pursuant to section 7(a)(2) of the ESA, implementing regulations at (50 CFR §402), and agency guidance for preparation of letters of concurrence.

We reviewed the consultation request document and related materials submitted by your agency. Based on our knowledge, expertise, and the materials submitted in your request for informal consultation, we concur with NOAA OER's conclusions that the proposed action may affect, but is not likely to adversely affect ESA-listed species and designated critical habitat.

This concludes consultation under the ESA for species and designated critical habitat under NMFS's purview on marine operation activities on the NOAA Ship *Nancy Foster* for exploration mapping of the Blake Plateau.

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

We look forward to further cooperation with you on other projects to ensure the conservation of our threatened and endangered marine species and designated critical habitat. If you have questions regarding this consultation, please contact Jonathan Molineaux, Consultation Biologist,



at (301) 427-8440 or by email at jonathan.molineaux@noaa.gov, or me at (301) 427-8495, or by email at cathy.tortorici@noaa.gov.

Sincerely,

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for

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

cc: NOAA OER – Amanda Maxon