UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NOAA Marine and Aviation Operations
Marine Operations Center
439 W. York Street
Norfolk, VA 23510-1114

AUG 1 9 2016

MEMORANDUM FOR: Lieutenant Commander Jeffrey Shoup, NOAA
Commanding Officer, NOAA Ship *Nancy Foster*

FROM: Captain Scott M. Sirois, NOAA
Commanding Officer, NOAA Marine Operations Center-Atlantic

SUBJECT: Project Instruction for NF-16-07
Habitat Mapping Southeast

Attached is the final Project Instruction for NF-16-07 Habitat Mapping Southeast Project, which is scheduled aboard NOAA Ship *Nancy Foster* during the period of August 30, – September 27, 2016. Of the 29 DAS scheduled for this project, 29 days are funded by a Line Office Allocation. This project is estimated to exhibit a Medium Operational Tempo. Acknowledge receipt of these instructions via e-mail to **OpsMgr.MOA@noaa.gov** at Marine Operations Center-Atlantic.

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
NATIONAL CENTERS FOR COASTAL OCEAN SCIENCE
1305 East West Highway N/SCI1, 9th Floor
Silver Spring, MD 20910

Project Instructions

Date Submitted: August 9, 2016

Platform: NOAA Ship *Nancy Foster*

Project Number: NF-16-07 (National Centers for Coastal Ocean Science).

Project Title: Habitat Mapping Southeast

Project Dates: August 30 – September 27, 2016

Prepared by: TAYLOR.JAMES.CHRISTOPHER.1366275122 Digitally signed by TAYLOR.JAMES.CHRISTOPHER.1366275122 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=OTHER, cn=TAYLOR.JAMES.CHRISTOPHER.1366275122 Date: 2016.08.19 14:49:14 -04'00' Dated:

J. Christopher Taylor, PhD
Ecologist and Chief Scientist
National Centers for Coastal Ocean Science – Beaufort Laboratory

Approved by: GOTTHOLM.BERNARD.W.1365817061 Digitally signed by GOTTHOLM.BERNARD.W.1365817061 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=OTHER, cn=GOTTHOLM.BERNARD.W.1365817061 Date: 2016.08.19 15:13:10 -04'00' Dated:

Bernard William Gottholm
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Approved by: for Dated: 8/22/2016

Mary C. Erickson
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Approved by: Dated: 8/18/16

Captain Scott M. Sirois, NOAA
Commanding Officer
Marine Operations Center - Atlantic

Template Date: 03JUN2016

I. Overview

A. Brief Summary and Project Period

The National Centers for Coastal Ocean Sciences (NCCOS) will continue its mission to conduct ecological characterizations of hardbottom and rocky reef essential fish habitats in the Southeast US Atlantic waters to guide ecosystem management and ocean planning. The purpose of the cruise will be to collect multibeam and fishery echosounder data and diver visual observations to describe the distribution of benthic habitats and biological hotspots, particularly around Ocean Dredge Material Disposal Sites (ODMDS) and natural hardbottom/rocky reefs.

B. Days at Sea (DAS)

Of the 29 DAS scheduled for this project, 0 DAS are funded by an OMAO allocation, 29 DAS are funded by a Line Office Allocation, 0 DAS are Program Funded, and 0 DAS are Other Agency funded. This project is estimated to exhibit a Medium Operational Tempo.

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

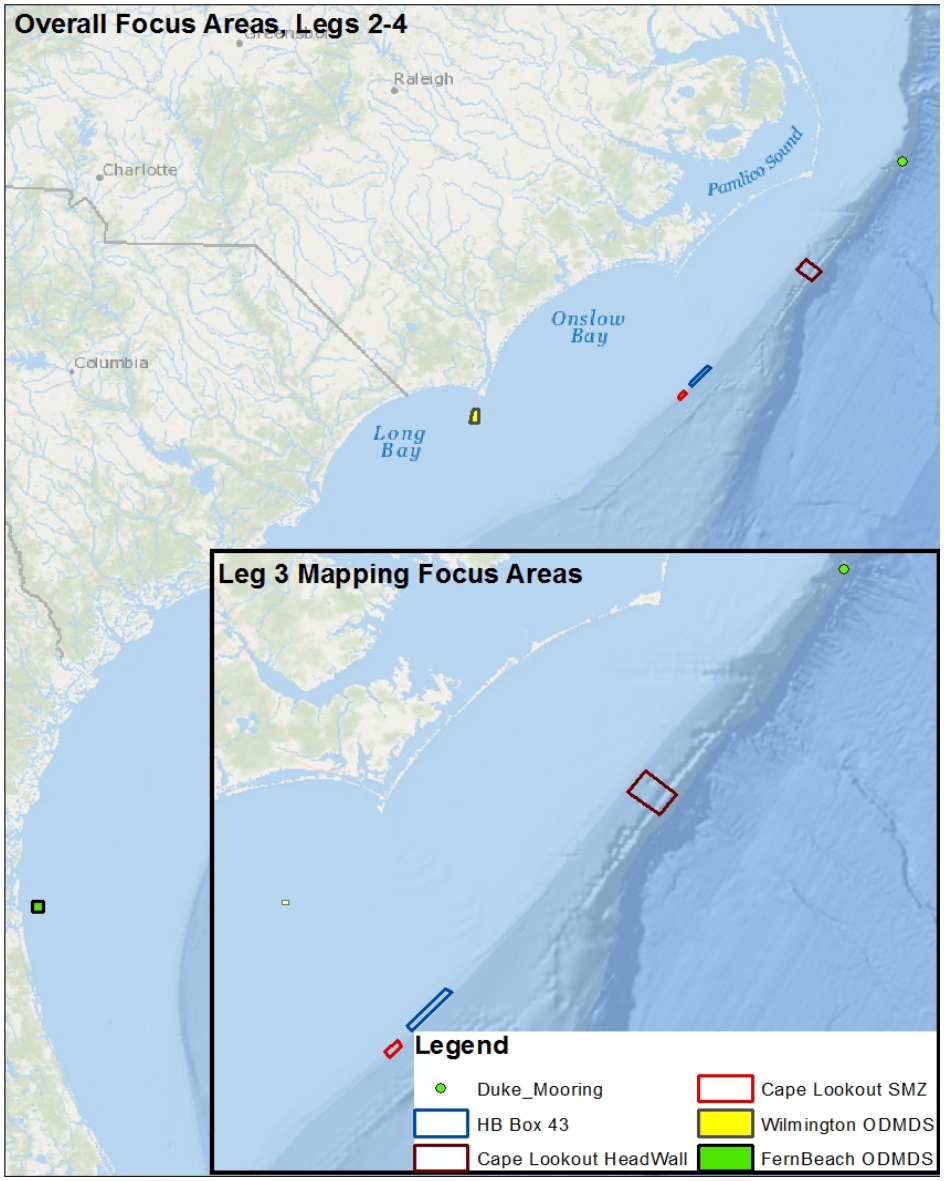


Figure 1. Overall Operating Areas for NF-16-07

The cruise will be in four (4) Legs with 3 science operations Legs.

Leg 1: Transit from Charleston to Jacksonville – Multibeam survey during transit on continental shelf

Leg 2: Fernandina Beach, Florida: Dive assessment Ocean Dredge Material Disposal Site

Leg 3: Seafloor Habitat Mapping on Continental Shelf, South Carolina and North Carolina

Leg 4: Wilmington, NC Dive assessment Ocean Dredge Material Disposal Site

D. Summary of Objectives

The objectives of this project are to 1) collect high resolution multibeam and fisheries acoustic data in depths *approximately* 10 to 1000 meters so as to continue to characterize seafloor habitats and fish biomass hotpots in priority areas in the SE US Atlantic Waters (Outer Continental Shelf) including hardbottom seafloor habitats, sand shoals and ridges, and Ocean Dredge Material Disposal Sites (ODMDS, US Environmental Protection Agency), 2) validate seafloor habitat types using drop cameras from small boats, and 3) conduct ecological assessments of ODMDS and adjacent hardbottom habitats to determine habitat value. In addition, this project will include piggy-back objective: 1) evaluate a new unmanned surface vehicle (USV) for use in extending capabilities for seafloor mapping by NOAA survey, researchers and partners.

E. Participating Institutions

NOAA (NCCOS, NMFS, OCS), US Environmental Protection Agency, University of North Carolina, Geodynamics Group, LLC, ASV Global, Student Interns from academic institutions

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

Name (Last, First)	Title	Date Aboard	Date Disembark	Gender	Affiliation	Nationality
Taylor, Chris	Chief Scientist	8/31/16	9/18/16	M	NCCOS	US
Vander Pluym, Jenny	Science Diver	8/31/16 9/20/16	9/7/16 9/28/16	F	NCCOS	US
Ebert , Erik	Science Diver	8/31/16	9/28/16	M	NCCOS	US
Degan, Brian	Science Diver	8/31/16 9/20/16	9/7/16 9/28/16	M	NCCOS	US
Parsons, Mel	Science Diver	8/31/16 9/20/16	9/7/16 9/28/16	M	EPA	US
McArthur, Chris	Science Diver	8/31/16 9/20/16	9/7/16 9/28/16	M	EPA	US
Lehman, Wade	Science Diver	8/31/16 9/20/16	9/7/16 9/28/16	M	EPA	US
Weiss, Lena	Science Diver	8/31/16 9/20/16	9/7/16 9/28/16	F	EPA	US
Hall, Rosemary	Science Diver	8/31/16	9/7/16	F	EPA	US
Blackburn, Steve	Scientist	8/31/16	9/7/16	M	EPA	US
Rosemond, Claire	Science Diver	8/31/16 9/20/16	9/7/16 9/28/16	F	UNC	US
Haley, Lemoine	Science Diver	8/31/16 9/20/16	9/7/16 9/28/16	F	UNC	US
Freshwater, Wilson	Science Diver	8/31/16	9/7/16	M	UNCW	US
Sumners, Ben	Hydrographer	9/8/16	9/18/16	M	Geodynamics	US
Groves, Sarah	Scientist	9/8/16	9/28/16	F	NCCOS	US
Le, Duc	Student Intern	9/8/16	9/18/16	M	FL A&M	US
Heir, Homer	Student Intern	9/8/16	9/18/16	M	C of Chas	US
Brissette, Nathan	Student Intern	9/8/16	9/18/16	M	Cape Fear Tech	US
Downs, Rob	Hydrographer	9/8/16	9/18/16	M	OCS	US
Chance, Stuart	USV contractor	9/8/16	9/18/16	M	ASV Global	US
Jurisich, Joel	USV contractor	9/8/16	9/18/16	M	ASV Global	US
Weed, Greg	USV contractor	9/8/16	9/18/16	M	ASV Global	US
Ruiz, John	Science Diver	9/20/16	9/28/16	M	EPA	US
White, Greg	Science Diver	9/20/16	9/28/16	M	EPA	US
Houda, Tara	Science Diver	9/20/16	9/28/16	F	EPA	US
Kellison, Todd	Science Diver	9/20/16	9/28/16	M	NMFS	US

G. Administrative

1. Points of Contacts:

Chief Scientist: Chris Taylor, NOAA/NOS/NCCOS, 101 Pivers Island Road, Beaufort, NC 28516, 252-838-0833, Chris.Taylor@noaa.gov

Field party Chief (Leg 3): Erik Ebert, NOAA/NOS/NCCOS, 101 Pivers Island Road, Beaufort, NC 28516, 252-728-8751, Erik.Ebert@noaa.gov

Field party Chief (Leg 4): Jenny Vander Pluym, NOAA/NOS/NCCOS, 101 Pivers Island Road, Beaufort, NC 28516, 252-728-8777, Jenny.VanderPluym@noaa.gov

Nancy Foster Operations Officer: LT Linh Nguyen, 1050 Register St., North Charleston, SC 29405, 843-991-6326, ops.nancy.foster@noaa.gov

Unmanned Surface Vehicle Operations: LCDR Samuel Greenaway, NOAA/NOS/OCS/HSTB, 1315 East West Hwy, SSMC3, Silver Spring, MD 20910, 301-713-2653, Samuel.Greenaway@noaa.gov

2. Diplomatic Clearances

None Required.

3. Licenses and Permits

None Required.

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.

Exact operating areas, stations and mapping polygons will be conveyed to Ship Operations prior to developing Daily Plans for the cruise.

A. Project Itinerary:

LEG 1

30-31 August: NOAA Ship Nancy Foster transit from Charleston, SC to Jacksonville, FL

LEG 2

31 August: Jacksonville, FL. Science party boards, crane requested for loading dive tanks and gear. Science party become familiar with small boat arrangement on deck, prepares scuba tank racks and fill station.

1 September: 1000 Ship departs Jacksonville

1-5 September: Operations off Fernandina Beach, Ocean Dredge Material Disposal Site

0000 Begin/continue multibeam survey of target areas

0700 Ship completes night multibeam survey. Scientist will direct ship to conduct fishery acoustic at select dive stations prior to day dive operations. Divers load gear on small

boats (NF2 2 divers and 2 tanks each; NF3 2-4 divers and 2 tanks each; NF4 2-6 divers 2 tanks each)

0745 Daily safety meeting

0800 Deploy small boats for dive operations

0830 NF Stand by to support dive operations.

1100 Small boats return to NF, boats recovered

1130 Lunch

1230 Divers reload small boats as in morning evolution

1245 Small boats deployed for dive operations (NF2 2 divers and 2 tanks each; NF3 2-4 divers and 2 tanks each; NF4 2-6 divers 2 tanks each)

1300 NF Stand by to support dive operations.

1600 Small boats return to ship.

1630 Recover small boats

1700 Secure from dive operations, refill tanks

1730 Commence night operations: Scientist enter next day's dive coordinates in small boat GPS. Night fishery acoustic and hydrographic survey: multibeam with fishery sonar to complete seafloor habitat mapping of operating area.

6 September: Ship returns to Jacksonville, FL Port

1000. Touch and Go Scientists disembark Jacksonville, ship transits to Charleston

ETA: Ship return to Charleston

7 September: Ship in port Charleston. Rest Day

LEG 3

8 September: Scientist mobilize load and prepare equipment for Leg 3. Ship to remove one of three small boats to be replaced by USV in cradle. Ship's crane required to load USV and other equipment.

1500 Scientists board ship in Charleston

9 September:

1000 Ship departure for seafloor mapping (ship and unmanned surface vessel) and groundtruthing in priority areas off SC and NC

TBD Ship and USV conduct patch test and system readiness tests offshore Charleston, SC

TBD Ship transits to operating areas in Onslow Bay (east of Cape Fear). Survey polygons will be provided to the ship each evening for daily plans

10-17 September:

0000 Ship and USV resumes multibeam seafloor mapping and fishery acoustic surveys in priority areas

0700 Ship suspends multibeam seafloor mapping and fishery acoustic surveys in priority areas. USV continues survey operations

0730 Small boats conduct drop camera operations at stations provided after interpretation of seafloor mapping products from previous night. Ship and unmanned surface vehicle

(USV) continue shadowing seafloor mapping operations in priority areas while small boats are conducting drop camera operations, where safety and conditions allow.

1100 Small boats return to ship for lunch

1300 Small boat redeployed for drop camera operations

1600 Ship resumes multibeam seafloor mapping and fishery acoustic surveys in priority areas.

18 September: TBD. Ship returns to Charleston. Science party disembarks. Crane required to unload USV.

19 September: Ship in port, Charleston, SC. Rest Day

LEG 4

20 September: 1000. Science party boards in Charleston. Crane requested to load equipment.

21-27 September: Seafloor mapping and diver surveys near Wilmington, NC Ocean Dredge Material Disposal Site

0000 Begin/continue multibeam survey of target areas

0700 Ship completes night multibeam survey. Scientist will direct ship to conduct fishery acoustic at select dive stations prior to day dive operations. Divers load gear on small boats (NF2 2 divers and 2 tanks each; NF3 2-4 divers and 2 tanks each; NF4 2-6 divers 2 tanks each)

0745 Daily safety meeting

0800 Deploy small boats for dive operations

0830 NF Stand by to support dive operations.

1100 Small boats return to NF, boats recovered

1130 Lunch

1230 Divers reload small boats as in morning evolution

1245 Small boats deployed for dive operations (NF2 2 divers and 2 tanks each; NF3 2-4 divers and 2 tanks each; NF4 2-6 divers 2 tanks each)

1300 NF Stand by to support dive operations.

1600 Small boats return to ship.

1630 Recover small boats

1700 Secure from dive operations, refill tanks

1730 Commence night operations: Scientist enter next day's dive coordinates in small boat GPS. Night fishery acoustic and hydrographic survey: multibeam with fishery sonar to complete seafloor habitat mapping of operating area.

28 September: Ship transits to Charleston, SC

B. Staging and Destaging:

Leg 2: Equipment will be loaded 31 August in Jacksonville, FL. Destaging will occur in Jacksonville, FL on 6 September as a touch-and-go.

Leg 3: USV and large equipment will be loaded by crane on 7 September in Charleston, SC.Remaining smaller equipment and personnel will board on 8 September. Destaging will occur on 18 September in Charleston, SC. Ship's crane required for unloading USV and equipment.

Leg 4: Equipment will be loaded on 20 September in Charleston, SC. Destaging will occur on 27 September in Charleston, SC

C. Operations to be Conducted:

Seafloor mapping: Multibeam sonar and fishery acoustic surveys (Legs 2-4)

Seafloor mapping will be conducted during night operations, during the daytime small boat operations where safety permits on Leg 3, and when sea conditions do not permit safe small boat operations on all legs. Survey locations will be determined by the Chief Scientist and provided to the Ship's Survey Department prior to departure and refined during each daily plan. Ship's Survey Department will lead hydrographic multibeam surveys during transits and during Legs 2 & 4. Contract Lead Hydrographers will work with Ship's Survey Department during Leg 3. All surveys will use the ship's multibeam sonar (Reson 7125 or Kongsberg EM710) will be used to log bathymetry and backscatter and will be operated by the survey department with assistance from science party. Multibeam will be used to develop specific habitat locations and possible targets to be validated using drop camera (Leg 3) or divers (Legs 2 & 4). Survey lines will be developed to ensure greater than 110% bottom coverage and cross lines. Multibeam data will be processed as collected to produce preliminary bathymetry products to select habitat validation stations the following day. Survey lines will be transmitted to survey department and bridge using Hypack. A CTD cast will be used at beginning of each night. Underway CTD system will be used for sound velocity profiles every 4 hours throughout MBES survey operations. Fishery acoustics will be acquired using EK60 simultaneous to multibeam sonar.

Dive Operations: Fish and benthic community survey (Legs 2&4)

Divers will conduct biological assessments of selected stations on hardbottom habitats identified from the sidescan, multibeam and splitbeam fishery sonar mapping. Dive teams will vary between 2 and 4 divers depending on the objective. One or more divers will assess the benthic invertebrate community and the remaining diver will census the fish community and sizes. Photographs and videos will accompany the data records. In some cases, organisms will be brought to the surface for identification and verification. No chemicals will be needed, but freezers may be used. Some stations will be selected from shipwreck or other artificial objects on the seafloor identified from the sidescan and multibeam sonar imagery. Archaeological surveys will be coordinated with biological assessments of the biological and benthic cover on these sites. Stations will be located using GPS and confirming expected depths on small boats. Upon arrival, lead diver will deploy weighted line with polyball float. This line will be used as a reference mark for divers to descend to station. Divers will deploy from and be retrieved by small boats; Nancy Foster will stand by near dive operations area to support as needed. The anticipated bottom

time will be 25-40 minutes. Divers will use the following methods while maintaining buddy contact:

1) Fish community: Diver will trail a field tape along prescribed heading and document large fishes along a 50 m transect. Returning to station, for the first 25m of tape the same diver will record presence of small fish species.

2) Habitat point diver: Diver will record benthic organism occurrence at points distributed every 30 cm for 20 m of the fish transect tape. Returning to the start point, diver will record physical height of relief or ledges.

3) Habitat demographics/topographic diver: diver will record occurrence and height of benthic organisms within a 10m x 1m box on the one side of the transect. This sampling will only be conducted at select stations.

At all stations a fish diver + habitat point diver team will conduct a transect survey. At select stations the additional habitat diver will also survey the station. Buddy pairs can call dive if visibility hinders ability to collect scientific data OR is perceived by any diver to be a safety issue. Divers will always be "connected" to one another by transect tape but will be required to maintain visual contact with buddy.

At the conclusion of the dive, divers will attach a lift bag to the anchor allowing it to be retrieved by topside personnel in the small boats using a controlled ascent. Each buddy team will have at least one NOAA diver that is trained in deploying small Carter lift bags (<100lbs). Divers are trained to inflate lift bag with back gas. Back gas is also used to inflate SMB (Surface Marker Buoys) that each diver will have on person in cases of free assent after anchor is deployed to surface or in cases of buddy separation/emergencies. Divers will free drift off the bottom releasing a surface marker buoy (lift bag or other highly visible marker) that can be seen from the surface. Small boats will follow divers and upon surfacing retrieve all divers and equipment into the small boats. Where multiple dives are occurring at the same site, divers will descend and ascend the marker buoy line until the last dive team, which will conduct a free ascent. This approach minimizes diver fatigue and ensures anchor retrieval.

If at any time divers breathe their cylinders down to 2/3's of the starting volume the data collection will be terminated and safety ascent procedures will be initiated. This is also known as the rule of thirds, where the first 1/3 of the cylinder is allotted for use by the diver during the bottom phase of the dive, 1/3 of the cylinder is allotted for use by the diver during ascent, and 1/3 of the cylinder is reserved for his/her dive partner in cases of an out of air situation or other emergency contingency. All divers will surface with a minimum of 500 PSI.

Dives will be planned using nitrox computers or appropriate nitrox tables to allow for pre-dive planning and gas management. Maximum depth and bottom time will be planned according to the buddy with the most conservative profile. All divers will dive with computers set to atm 1.4 mode.

Drop camera on small boats ground validation (LEG 3)

Drop camera surveys will be used to validate seafloor habitat types at stations dictated by outcomes from seafloor habitat mapping surveys. Small boats will carry two scientists and coxswain. Small boat will maneuver to drop camera station preloaded into boat GPS. Scientist with assistance from helper will lower small drop camera using down rigger affixed to gunwale of boat. Coxwain will maintain boat in drift while drop camera is lowered to collect imagery of seafloor. Drifts may last 5-10 minutes at each station. Two small boats are required, each with a team to operate drop cameras.

The ship's J-frame may be used to deploy a drop camera to collect images of the seafloor when conditions do not permit small boat operations or when safe conditions permit use of j-frame while small boat operations are underway. The ship will maneuver to station and establish station keeping using dynamic positioning. The small sea-view camera in a small frame will have a 15 lb. heavy weight attached (total weight about 25 lbs). The drop camera operator will note depth at station and instruct the winch operator to lower the camera frame to just above seafloor. The camera operator may instruct the ship to make small movements using z-drives. After 5 minutes, the camera will be retrieved.

Multibeam seafloor mapping: Unmanned surface vessel (LEG 3)

The Unmanned Surface Vessel (USV) will be an ASV Global C-Worker 5 (18 feet LOA) will be launched from the ship to conduct hydrographic seafloor mapping surveys to complement the shipboard sonar data collection. As one of the objectives for deploying the USV on this cruise is to evaluate the system's capabilities, several operational concepts may be employed, including:

1. Autonomous Survey: The USV will be pre-programmed to complete a hydrographic survey within given geographic boundaries and require only monitoring or minimal operator intervention to complete the survey. Operator intervention should only be necessary to address faults, override onboard navigation safety and collision avoidance if necessary, and modify mission parameters if desired.

2. Survey Formation: The USV would be programmed to maintain a standoff distance and direction from the ship, while the USV and the ship simultaneously conduct hydrographic surveys. In this scenario, the USV would respond to ship's behavior to manage survey coverage and respond to vessel traffic.

3. Additional operations may include contact development, where the USV is programmed to conduct a survey over a single or multiple points of interest, and survey gap coverage, where the USV is programmed to survey gaps (holidays) in previously acquired coverage.

At all times the USV will be monitored by an USV operator with the capability to take control of the system for safety or operational needs.

The USV is diesel powered and has an endurance of 3-5 days at survey speed. It is the intention to maximize the time that USV is deployed to both obtain the greatest survey coverage and minimize the launch and recovery operations required by the ship. However, certain

circumstances may require more frequent launch and recovery, including weather, long ship transits beyond the safe monitoring range for the USV, or USV equipment issues. See Appendices for further details and photograph of the USV.

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. The Dive Plans encompassing Legs 2 and 4 of NF-16-07 are presented in Appendix C.

E. Applicable Restrictions

Conditions which preclude normal operations:

Equipment failure (sonars): Mitigation – at sea repair.

Poor weather: Mitigation – switch from small boats (suspend diving and drop camera) to ship based operations (conduct multibeam operations).

Safety concerns: Mitigation – discuss and review daily operations during safety briefings with ships command each day.

III. Equipment

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

1) Hand held radios for communication between bridge, deck and small boats.
2) CTD's 1000m depth rating.
3) Underway CTD system
4) Kongsberg EM 710 and Reson Seabat 7125 multibeam sonars, and Simrad split-beam EK-60 sonars.
5) Simrad EK60 splitbeam calibration downriggers and calibration sphere (calibration of EK60 will be determined during cruise based on weather and operations)
6) Applanix Pos/MV v.4
7) 2-3 cubic foot freezer space (<32 F)
8) Internet connection and connection to ship's data server for MBES and EK60 processing computers
9) Oxygen kits and recall systems for small boats.
10) Dynamic Positioning System
11) 15 80 cf and 8 AL 100 cf NITROX scuba tanks and compressor system, initially filled with 36%
12) Three small boats for Legs 2 and 4: 2 small boats for 2-4 divers (NF2, NF3), 1 small boat capable of carrying 2-6 divers and tanks (NF4) with GPS and depth sounder to locate stations and confirm depth at station. Two small boats for Leg 3.
13) Crane for loading USV and mooring
14) Ship's diesel fuel for use by USV

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

1) Three high end laptops / workstations and 4 flat screen monitors, internet connection required
2) 6 Tb Data Server
3) 16 120 cf NITROX scuba tanks, 10 100 cf NITROX scuba tanks with tank racks
4) Tank fill whip array
5) Nitrox gas analyzers
6) Emergency Oxygen kits for small boats
7) RASS bottles and regulators for all dives greater than 100 FSW
8) Dive benches or racks to store 120 cf nitrox tanks for refill.
9) Dive tapes, weights, clipboards, data sheets, dive gear (SEP or alternative serviced within 12 months)
10) Laptops for data entry and data management
11) USV system including USV (20' LOA, 4800 Lbs in Air), Deck Container (4'x8'x7'), Communication Antennas (temporary mount), Operator Console (6' desk space required)

IV. Hazardous Materials

A. Policy and Compliance

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

V. Additional Projects

A. Supplementary ("Piggyback") Projects

Piggy-back projects are described above and include evaluation of the Unmanned Surface Vehicle.

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.

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 short comings 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. 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 make-up 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. The Chief Scientist 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 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/noaaforms/eforms/nf57-10-01.pdf.

All NHSQs submitted after March 1, 2014 must be accompanied by NOAA Form (NF) 57-10-02 - Tuberculosis Screening Document in compliance with OMAO Policy 1008 (Tuberculosis Protection Program).

The completed forms should be sent to the Regional Director of 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 email process approved by NOAA is Accellion Secure File Transfer which requires the sender to setup an account. Accellion's Web Users Guide is a valuable aid in using this service, however to reduce cost the DOC contract doesn't provide for automatically issuing full functioning accounts. To receive access to a "Send Tab", after your Accellion account has been established send an email from the associated email account to accellionAlerts@doc.gov requesting access to the "Send Tab" function. They will notify you via email usually within 1 business day of your approval. The 'Send Tab" function will be accessible for 30 days.

Contact information:

Regional Director of 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

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 at 128kbs is shared by all vessels staff and the science team at no charge. Increased bandwidth in 30 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

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:

(1) Installation of the latest virus definition (.DAT) file on all systems and performance of a virus scan on each system.
(2) Installation of the latest critical operating system security patches.
(3) No external public Internet Service Provider (ISP) connections.

Completion of the above requirements prior to boarding the ship is required.

Non-NOAA personnel using the ship's computers or connecting their own computers to the ship's network must complete NOAA's IT Security Awareness Course within 3 days of embarking.

F. Foreign National Guests Access to OMAO Facilities and Platforms

All foreign national access to the vessel shall be in accordance with NAO 207-12 and RADM De Bow's March 16, 2006 memo (http://deemedexports.noaa.gov). National Marine Fisheries Service personnel will use the Foreign National Registration System (FNRS) to submit requests for access to NOAA facilities and ships. The Departmental Sponsor/NOAA (DSN) is responsible for obtaining clearances and export licenses and for providing escorts required by the NAO. DSNs should consult with their designated Line Office Deemed Export point of contact to assist with the process.

Full compliance with NAO 207-12 is required.

Responsibilities of the Chief Scientist:

1. Provide the Commanding Officer with the email generated by the Servicing Security Office granting approval for the foreign national guest's visit. (For NMFS-sponsored guests, this email will be transmitted by FNRS.) This email will identify the guest's DSN and will serve as evidence that the requirements of NAO 207-12 have been complied with.
2. Escorts – The Chief Scientist is responsible to provide escorts to comply with NAO 207-12 Section 5.10, or as required by the vessel's DOC/OSY Regional Security Officer.
3. Ensure all non-foreign national members of the scientific party receive the briefing on Espionage Indicators (NAO 207-12 Appendix A) at least annually or as required by the Servicing Security Office.

4. Export Control - Ensure that approved controls are in place for any technologies that are subject to Export Administration Regulations (EAR).

The Commanding Officer and the Chief Scientist will work together to implement any access controls necessary to ensure no unlicensed export occurs of any controlled technology onboard regardless of ownership.

Responsibilities of the Commanding Officer:

1. Ensure only those foreign nationals with DOC/OSY clearance are granted access.
2. Deny access to OMAO platforms and facilities by foreign nationals from countries controlled for anti-terrorism (AT) reasons and individuals from Cuba or Iran without written approval from the Director of the Office of Marine and Aviation Operations and compliance with export and sanction regulations.
3. Ensure foreign national access is permitted only if unlicensed deemed export is not likely to occur.
4. Ensure receipt from the Chief Scientist or the DSN of the FNRS or Servicing Security Office email granting approval for the foreign national guest's visit.
5. Ensure Foreign Port Officials, e.g., Pilots, immigration officials, receive escorted access in accordance with maritime custom to facilitate the vessel's visit to foreign ports.
6. Export Control - 8 weeks in advance of the project, provide the Chief Scientist with a current inventory of OMAO controlled technology onboard the vessel and a copy of the vessel Technology Access Control Plan (TACP). Also notify the Chief Scientist of any OMAO-sponsored foreign nationals that will be onboard while program equipment is aboard so that the Chief Scientist can take steps to prevent unlicensed export of Program controlled technology. The Commanding Officer and the Chief Scientist will work together to implement any access controls necessary to ensure no unlicensed export occurs of any controlled technology onboard regardless of ownership.
7. Ensure all OMAO personnel onboard receive the briefing on Espionage Indicators (NAO 207-12 Appendix A) at least annually or as required by the Servicing Security Office.

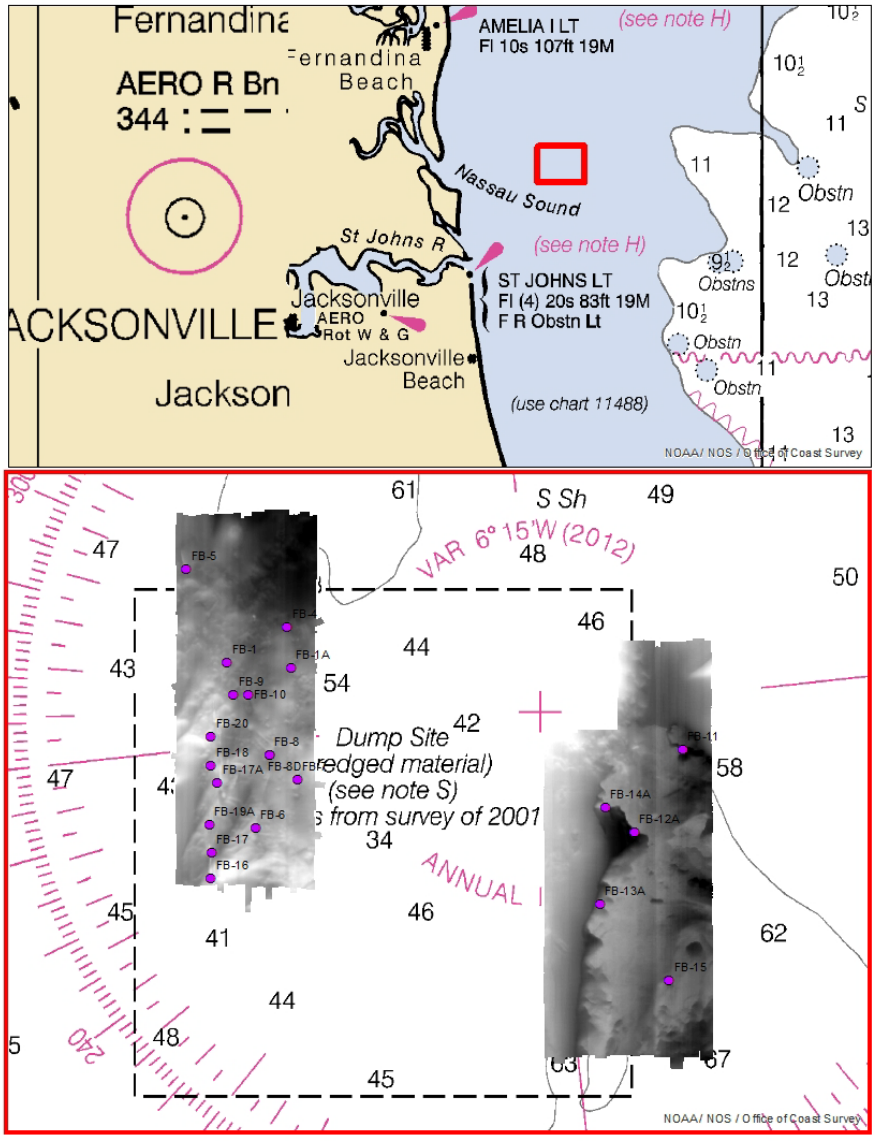
Responsibilities of the Foreign National Sponsor:

1. Export Control - The foreign national's sponsor is responsible for obtaining any required export licenses and complying with any conditions of those licenses prior to the foreign national being provided access to the controlled technology onboard regardless of the technology's ownership.
2. The DSN of the foreign national shall assign an on-board Program individual, who will be responsible for the foreign national while on board. The identified individual must be a U.S. citizen and a NOAA or DOC employee. According to DOC/OSY, this requirement cannot be altered.
3. Ensure completion and submission of Appendix C (Certification of Conditions and Responsibilities for a Foreign National

VIII. Appendices

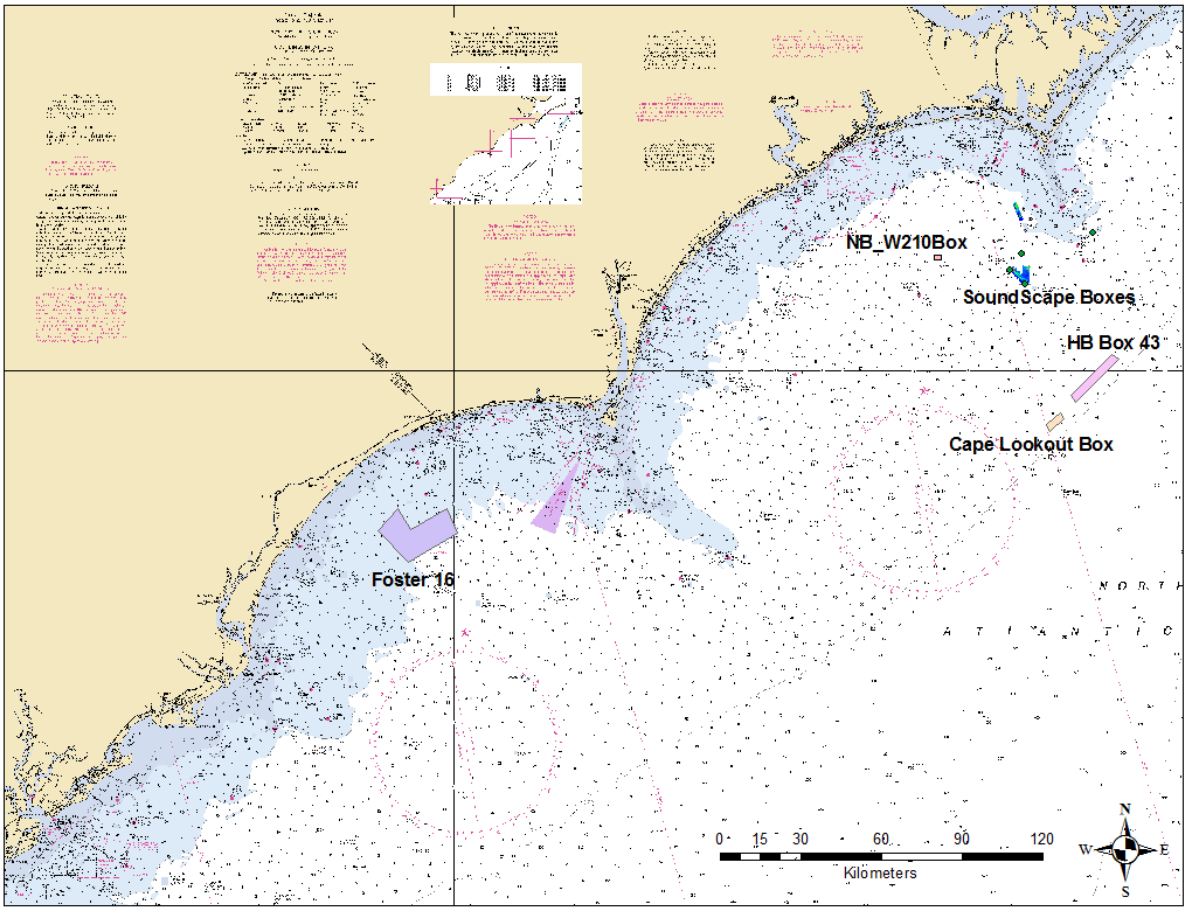
A. Detailed Maps and Transits for operating areas.

a. Leg2 – Fernandina Beach, FL ODMDS, including sample stations

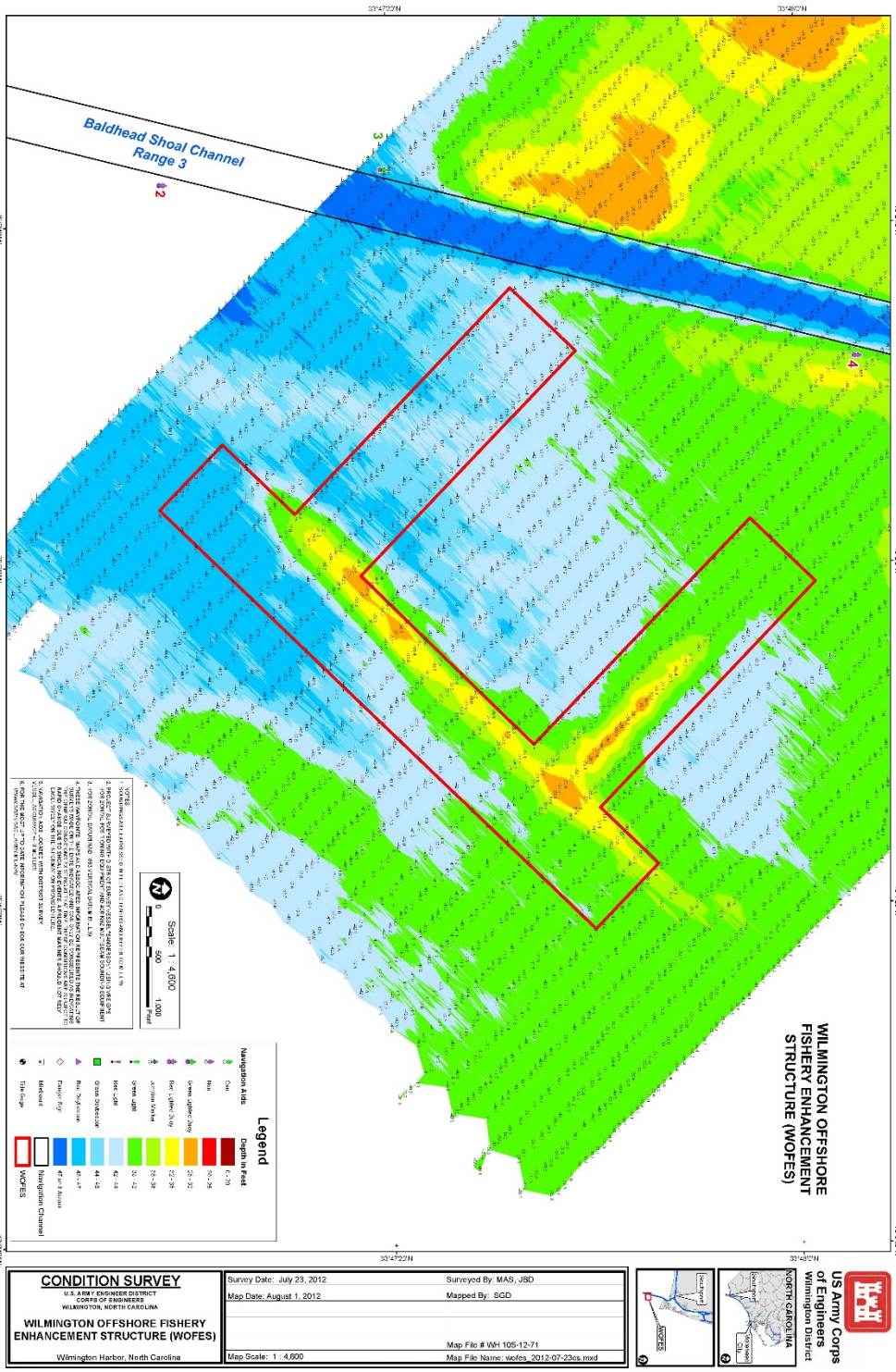


Station	Depth_ft	Latitude	Longitude
FB-1	52	30.54175167	81.311705
FB-1A	57	30.5414	81.30694167
FB-4	58	30.54401167	81.30721
FB-5	56	30.547745	81.31472667
FB-6	52	30.53112833	81.30956
FB-7	52	30.53425667	81.30644667
FB-8	50	30.53581333	81.30853333
FB-8D	55	30.53581333	81.30853333
FB-9	53	30.53968333	81.31121667
FB-10	56	30.53971167	81.31010667
FB-11	68	30.536145	81.27772
FB-12A	60	30.53086667	81.28133333
FB-13A	65	30.52628333	81.28388333
FB-14A	65	30.53246667	81.28351667
FB-15	66	30.52133333	81.27876667
FB-16	50	30.52792833	81.31286833
FB-17	57	30.52954167	81.31284833
FB-17A	53	30.53404333	81.31238667
FB-18	51	30.53516167	81.31289167
FB-19A	54	30.53132833	81.31298167
FB-20	51	30.53697	81.31289833

b. Leg3 – Seafloor mapping priority areas and preferred order of operations



c. Leg4 – Wilmington, NC ODMDS (sampling stations will be within red outlined area and natural hardbottom reefs adjacent to ODMDS that will be mapped during Leg 4)



B. Photo and protocol for deployment/recovery

ASV Standard Operating Procedure for Launch and Recovery of CW5 Single Point Lift

Document Number:	**ASV-**
Issue:	**A**
Date:	**14-01-16**

	Name	**Date**
Originator	Stuart Chance	28-06-16
Authorised Project Manager	Tim Marzolf	08-01-16

DISTRIBUTION		
Name	**Establishment**	**Copy Number**
Originator	ASV	1

ASV Standard Operating Procedure for Launch and Recovery of CW5

Table of Contents

1 Introduction

This SOP covers the operation of the single point lift launch and recovery system to deploy and retrieve CW5.

1.1 Related Documents

- SOP on Launch and Recovery of C-Worker

2 Safety Considerations

This procedure requires working around automated equipment.

This procedure requires working around suspended loads and cranes.

This procedure requires good communication with ASV Operator, riggers, deckhands, crane operators, and deck bosses.

Steel-toes, hardhats, and lifejackets are required while commencing LARS Operations.

Keep clear between the ASV and obstructions.

Always have an escape route if a load is to shift unexpectedly.

3 Process

3.1 Manpower Requirements

Three people at a minimum are required to operate the LARS system, and a fourth person is required to drive the CW5. See section 4 for further requirements.

3.2 Important Notes

All LARS operations should be done with the mothership into or quartered into the seas to lessen wave action.

Some of the steps outlined in this procedure may require slight modification based on specific vessel requirements. Best judgement and agreed solutions by ASV party, boat captain, and crew should be used if necessary.

Always inspect all attachment points and lifting rope visually for wear/defects before use.

3.3 Launching

Pre-Checks

-Run through all pre-checks and loop checks while on deck prior to commencing launch and recovery operations. Keep CW5 in manual control with Helm.

1. Hold toolbox talk with everyone who will be participating in the launch (ASV launch team, the captain (or whoever will be operating the mothership during launch), and any third-party personnel who will be assisting).

   -Discuss the launch procedure from start to finish making sure that everyone understands their specific roles and responsibilities throughout the launch process.

   -Have a discussion with the captain to go over the launching procedure. Leading up to the launch, the mothership should remain in gear traveling as slow as possible. When the launching process begins, the mothership should be put in neutral and remain so until the CW5 is launched. This ensures the boat is not drifting into a rough side-sea condition while also keeping the speed as slow as possible during the launch.

   -Ensure that there is a direct line of communication between the deck, the bridge, and the ASV helm operator.

2. Perform the necessary visual inspections and pre-start checks on the CW5 and davit system.

3. Start CW5 engine and perform pre-launch loop checks to ensure all systems are functioning properly. (CW5 engine is to be left running throughout launch).

4. Secure quick-release hooks to davit ropes.

   -Each quick-release hook has a rope that must be maintained by a member of the ASV launch team. Ensure that the line connected to the quick-release hook remains slack until the CW5 is ready to be launched.

   -Place quick-release hook so both release hooks are towards the mothership.

   -Connect bow painter line to the CW5 and mothership, making sure the line is connected to CW5 in a way that allows the line tender to quickly remove it upon launch. (Note that if sea state or other conditions are such that the connection of a painter line may be unsafe or could cause damage to the boats, the painter line may be left out of the launch procedure. This is up to the ASV crew chief's discretion).

5. Deploy the appropriate fenders to help prevent CW5 from contacting the mothership during launch.

6. Remove the securing ratchet straps and shore power from CW5.

7. Attach "endless" taglines to bowline and stern lifting beam stand. These will be pulled inboard of mothership to prevent excessive swinging of CW5.

   - An endless tagline is a single line which is "basketed" at the load. The person using the tagline must hold both ends at once. To remove, he releases one end and pulls the line until it is removed from the load and out of the way.

8. Once all launch team members are in their designated positions, inform the captain that the CW5 is ready to be launched and wait for his approval before proceeding.

9. Inform all personnel in the area that you are preparing to launch and to remain clear of the area if they are not directly involved in the launching process.

10. Pick up and move CW5 outboard of mothership with crane.

11. Once CW5 is in the water, have boat operator check payload sensors as required.

    - If possible, this step should occur before any launching takes place.

12. Remove both “endless” taglines, making sure not to leave too much excess line going into the water.

13. Release the aft lifting hook using the quick release and raise aft davit line until it is clear of the CW5 antennas. (Note that aft davit line must always be released first)

14. Disconnect the forward lifting hook with quick release and raise the winch line until it is clear of the CW5 antennas.

15. Once free, have ASV helm operator place the CW5 engine into reverse gear and back away from mothership slowly.

    -At the same time the mothership should clutch into forward.

    -This step may need to change based on the orientation of the davits/crane and surrounding equipment.

3.4 Recovering

Mothership needs to face into/quarter seas to mitigate wave action. Mothership should be in clutch forward with one prop at dead slow. CW5 has an idle speed of approximately 3 knots.

During rough weather, recovering in a following sea has worked well.

1. Hold toolbox talk with everyone who will be participating in the recovery (ASV recovery team, the captain (or whoever will be operating the mothership during recovery), and any third-party personnel who will be assisting).

    -Discuss the recovery procedure from start to finish making sure that everyone understands their specific roles and responsibilities throughout the recovery process.

-Have a discussion with the captain to go over the recovery process. During recovery, the mothership should only have one prop in gear and be moving as slowly as possible while maintaining a constant heading.

-Ensure that there is a direct line of communication between the deck, the bridge and the ASV helm operator.

2. Before moving CW5 into position, do the necessary pre-recovery checks on the lifting apparatuses.

3. Prepare a boat hook with a loop of the bow painter line lightly taped to the hook end. Make sure the other end of the line is properly secured to the mothership.

4. Once the recovery poles are prepared, the necessary fenders have been deployed, and all required personnel are in position, notify the captain that you are ready to begin the recovery process.

5. After receiving approval from the captain, have any nonessential personnel clear the area until the recover process is complete.

6. Begin the recovery process by having the helm operator manoeuvre the CW5 to approach from the stern quarter alongside the mothership. During approach, CW5 should remain at idle speed so as not to overshoot the recovery position.

7. Once alongside the mothership, secure the bow line onto the forward cleat of the CW5 using the prepared boat hook. When the bow line is secure, have the CW5 operator immediately put the engine in neutral and allow the crew members to manoeuvre the CW5 into the recovery position in line of the davit. (Note that if additional launch and recoveries will be performed, it is advised to mark the bow line where it first hits the attachment point on the mothership. This provides a reference for the crew during future recoveries of the CW5.)

8. Attach a second tagline to the rear lifting bracket to prevent excessive swing when lifting.

9. Basket main lifting sling with boat hook to the crane hook.

10. Loosen bowline from cleat on mothership to use as a tag line for crane recovery.

-Utilize bow and aft taglines to prevent CW5 from excessive swinging

11. Just prior to moving the CW5 over the deck, have the operator shut down the engines and engage the emergency stop to prevent propeller from being engaged during recovery.

12. Slowly bring both davits inboard simultaneously until CW5 is resting against the bumpers of the aft cradle base.

13. Once on the davit base, secure CW5 with pre-setup ratchet straps before releasing tension from the davit winches (Always keep ratchet straps on CW5 while on deck).

14. Ensure all recovery equipment is stowed and that CW5 is reconnected to shore power.

4 Manpower

On launching, it is recommended to have 1 release-hook operator, 2 tagline operators, 1 crane operator, and 1 ASV CW5 vessel operator.

On recovering, it is recommended to have 1 mainline rigger, 2 tagline operators, 1 crane operator, and 1 ASV CW5 vessel operator.

C. Dive Plans and Dive Emergency Action Plans for Legs 2 and 4 (Following Pages)

NOAA Form 57-03-20
(02-15)

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

DIVE OPERATIONS PLAN

DIVE OPERATIONS

DATE(S) of DIVE OPERATIONS	09/01/16-09/06/16	DIVE OPS START TIME	0800	DIVE OPS STOP TIME	1700
LOCATION of DIVE OPERATIONS	Fernandina Beach, FL	DISTANCE FROM SHORE	9	EVAC TIME to CHAMBER	3 hr
PLATFORM or FACILITY	NOAA Ship Nancy Foster	DEPTH RANGE	40-90 fsw	NUMBER of DIVERS	12
PLANNED NUMBER of DIVE EVOLUTIONS PER DAY	16	MAXIMUM NUMBER of DIVES to be LOGGED PER DAY	32	NUMBER of CONSECUTIVE DIVE DAYS	6

SAFE SHIP CHECKLIST REQUIRED	YES ☐ NO ☑	DIVE MODE	OPEN CIRCUIT SCUBA ☑ REBREATHER ☐	DIVE PURPOSE	SCIENTIFIC DIVE ☑ WORKING DIVE ☐
FLOAT PLAN REQUIRED	YES ☑ NO ☐	DECOMPRESSION CALCULATION	DIVE COMPUTER ☑ DECOMPRESSION TABLES ☐	DIVE DUTY	ON-DUTY DIVE ☑ OFF-DUTY DIVE w/SEP GEAR ☐

DIVERS (Attach additional sheets if more than 12 divers participate in the dive)

DIVEMASTER / LEAD DIVER Brian Degan (NOAA)	DIVER Erik Ebert (NOAA)	DIVER Chris Taylor (NOAA)
DIVER Jenny Vander Pluynm (NOAA)	DIVER Wilson Freshwater (UNCW)	DIVER Hayley Lemoine (UNC-IMS)
DIVER Claire Rosemond (UNC-IMS)	DIVER Rosemary Hall (EPA)	DIVER Lena Weiss (EPA)
DIVER Wade Lehmann (EPA)	DIVER Chris McArthur (EPA)	DIVER Mel Parsons (EPA)

DESCRIPTION

PURPOSE of DIVES and TASKS to be PERFORMED

Benthic and fish visual surveys along a 50 m transect tape to characterize the hardbottom habitats on artificial and natural bottoms. Take site photographs, in water measurements of bottom features and benthic organisms.

PRINCIPAL DIVER WORN EQIUPMENT and BREATHING MEDIA

NOAA SEP or LOR approved SCUBA equipment for non NOAA Divers.
All Divers will use NX 32% as main breathing gas with computers set to 1.4 ata.
All divers will bring SMB and reels in case of buddy separation.

TOOLS and SPECIALIZED EQUIPMENT to be USED — Tethered comms dive? YES ☐ NO ☑

Clipboards, pencils, pvc meter stick, plastic meter tape, camera.

POTENTIAL HAZARDS and MITIGATIONS (Certain hazards are present on all dives (AGE, DCS, drowning, etc.). The hazards listed below are unique to this operation.)

The dives conducted on Ocean Dredge Material Disposal sites have a high probability of being in low visibility conditions. There is also the possibility of current and surface boat traffic. Advise divers to maintain buddy contact during dives with low visibility or higher than normal current. Advise divers to surface cautiously during their ascent. Rely on topside support (NOAA ship) to monitor boat traffic.

PRIMARY MEANS of EVACUATION for EMERGENCIES

USCG - Jacksonville, FL

AUTHORIZATION

SUBMITTED BY (DIVEMASTER/LEAD DIVER) Jenny Vander Pluym	SIGNATURE	DATE
APPROVED BY (UNIT DIVING SUPERVISOR/DESIGNEE) Brian P Degan	SIGNATURE	DATE

RESET

NOAA Form 57-03-20
(02-15)

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

DIVE OPERATIONS PLAN

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SAFE SHIP CHECKLIST REQUIRED	YES ☐ NO ☐	DIVE MODE	OPEN CIRCUIT SCUBA ☐ REBREATHER ☐	DIVE PURPOSE	SCIENTIFIC DIVE ☐ WORKING DIVE ☐
FLOAT PLAN REQUIRED	YES ☐ NO ☐	DECOMPRESSION CALCULATION	DIVE COMPUTER ☐ DECOMPRESSION TABLES ☐	DIVE DUTY	ON-DUTY DIVE ☐ OFF-DUTY DIVE w/SEP GEAR ☐

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DIVER Jenny Vander Pluynm (NOAA)	DIVER Wilson Freshwater (UNCW)	DIVER Hayley Lemoine (UNC-IMS)
DIVER Claire Rosemond (UNC-IMS)	DIVER Rosemary Hall (EPA)	DIVER Lena Weiss (EPA)
DIVER Wade Lehmann (EPA)	DIVER Chris McArthur (EPA)	DIVER Mel Parsons (EPA)

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All divers will bring SMB and reels in case of buddy separation.

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APPROVED BY (UNIT DIVING SUPERVISOR/DESIGNEE) Brian P Degan	SIGNATURE	DATE

RESET