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

MEMORANDUM FOR: CDR Lindsay Kurelja, NOAA
Commanding Officer, NOAA Ship *Gordon Gunter*

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

SUBJECT: Project Instruction for GU-17-06
Fall Ecosystem Monitoring

Attached is the final Project Instruction for GU-17-06, Fall Ecosystem Monitoring, which is scheduled aboard NOAA Ship *Gordon Gunter* during the period of October 30 – November 11, 2017. Of the 13 DAS scheduled for this project, 13 DAS are Program 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 **Deputyops.MOA@noaa.gov** at Marine Operations Center-Atlantic.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAi MARINE FISHERIES SERVICE
Northeast Fisheries Center
166 Water Street
Woods Hole, MA 025431026

Final Project Instructions

Date Submitted: 29 September2017

Platform: NOAA Ship *Gordon Gunter*

Project Number: GU 17-06

Project Title: Fall Ecosystem Monitoring Survey Leg 1
(Leg 2 Potential HB 1707)

Project Dates: 30 October- 11 November 2017

Prepared by: Jerome Prezioso
Fisheries Oceanography Branch
N01iheast Fisheries Science Center
Nan-agansett Laboratory
Date: September 18, 2017

Approved by: _____
Jonathan Hare, Ph.D.
Sci e and Research Director
Northeast Fisheries Science Center
Date: 29 Sept 2017

Approved by: _____
Captain Scott Sirois, NOAA
Commanding Officer
Marine Operations Center - Atlantic
Date: 10/3/17

I. Overview

A. Brief Summary and Project Period

The principal objective of the survey is to assess the hydrographic, planktonic and pelagic components of the Northeast U.S. Continental Shelf Ecosystem. Specifically we will quantify the spatial distribution of the following parameters: water currents, water properties, phytoplankton, microzooplankton, mesozooplankton, sea turtles and marine mammals. We will use traditional and novel techniques and instruments. A broad array of measurements of the pelagic ecosystem will be made during the 30 October to 11 November cruise period.

B. Days at Sea (DAS)

Of the_13_DAS scheduled for this project,_13_DAS are funded by a Line Office Allocation. This project is estimated to exhibit a Medium Operational Tempo.

C. Operating Area

The continental shelf from Georges Bank (including stations in Canada's Exclusive Economic Zone), to the waters of the Southern New England Area and Middle Atlantic Bight north of Cape Hatteras, NC. Stations will be occupied in waters with depths ranging between 15 and 500 meters. *Gordon Gunter* will sail from Naval Station Newport and end at the Marine Operations Center - Atlantic in Norfolk, VA.

D. Summary of Objectives

Operational objectives are to: (1) collect underway data using TSG, SCS, and ADCP; 2) complete CTD and bongo operations at stations throughout area, (2) collect biological data with bongo plankton nets, (3) collect marine mammal and seabird observations, (4) collect online data and imagery of phytoplankton and ciliates using Imaging FlowCytobot units, and (5) collect radiometry measurements for satellite validation.

The Ecosystem Monitoring surveys contribute to stock assessments, protected species assessments, ecosystem assessments, and climate assessments. As such, the surveys are multi-objective. Ichthyoplankton and hydrographic data are collected for stock assessments. A range of ecosystem observations are made, from nutrients and ocean acidification to marine mammals, and a number of the measurements are used in NEFSC ecosystem assessment products. The ocean acidification and hydrographic measurements are incorporated into the region’s climate assessments.

This survey is multidisciplinary and as such will integrate all these operations. The cruise plan will evolve with input from scientists as well as the officers and crew of *Gordon Gunter*. A post-cruise meeting will focus on lessons learned and improvements to make for subsequent surveys of this type. Note that this cruise is Leg 1 of the Fall Ecosystem Monitoring Survey. Leg 2 will be carried out by *Henry Bigelow* if it is ready for duty after its emergency shipyard work. *Henry Bigelow* will survey the Gulf of Maine area that was not visited by *Gordon Gunter*.

E. Participating Institutions

NMFS-Northeast Fisheries Science Center
NOAA-NESDIS Center for Satellite Applications and Research
Woods Hole Oceanographic Institute
University of Maine, Orono
University of New Hampshire
State University of New York
University of Massachusetts, Boston
Rutgers University, New Jersey
Environmental Protection Agency, Narragansett
Graduate School of Oceanography, URI, Narragansett

F. Personnel/Science Party

Name (Last, First)	**Title**	**Date Aboard**	**Date Disembark**	**Gender**	**Affiliation**	**Nationality**
Walsh, Harvey	Chief Scientist	10/30/2017	11/11/2017	M	NMFS	US
Holzwarth-Davis, Tamara	Lead CTD Specialist	10/30/2017	11/11/2017	F	NMFS	US
Kovach, Charles	Lead Radiometry Collection	10/30/2017	11/11/2017	M	NOAA	US

Metheny, Nicholas	Seabird Observer	10/30/2017	11/11/2017	M	Integrated Statistics	US
Loch, John	Seabird Observer	10/30/2017	11/11/2017	M	Integrated Statistics	Canada
Taylor, Chris	Fisheries Biologist	10/30/2017	11/11/2017	M	NMFS	US
Hodkin, Cara Ewell	Volunteer	10/30/2017	11/11/2017	F	SUNY	US
King, Brianna	Volunteer	10/30/2017	11/11/2017	F	University of Maine	US
Thomas, Maura	Guest Researcher	10/30/2017	11/11/2017	F	University of Maine	Canada (US permanent resident card)
Baskin-Aberdola, Chloe	Volunteer	10/30/2017	11/11/2017	F	Rutgers	US
TBD	Volunteer	10/30/2017	11/11/2017	TBD	University of Mass, Boston	US
TBD	Volunteer	10/30/2017	11/11/2017	TBD	NOAA Teacher-at-Sea Program	US

G. Administrative

1. Points of Contact:
Chief Scientists – Harvey Walsh NOAA Fisheries 28 Tarzwell Drive, Narragansett, RI 02882 harvey.walsh@noaa.gov, 401-782-3313
Jerry Prezioso NOAA Fisheries 28 Tarzwell Drive, Narragansett, RI 02882 jerry.prezioso@noaa.gov, 401-782-3277
Project Operations Leads-Tamara Holzwarth-Davis-NOAA Fisheries 166 Water Street, Woods Hole, MA 02543 Christopher Taylor – NOAA Fisheries 28 Tarzwell Drive, Narragansett, RI 02882
chris.1.taylor@noaa.gov, 401-782-3200
Ops Officer- LT Jamie Park - richard.j.park@noaa.gov
Agent- Nathan Keith, Vessel Coordinator

2. Diplomatic Clearances
This project involves Marine Scientific Research in waters under the jurisdiction of Canada. Diplomatic clearance has been requested.

3. Licenses and Permits
Canada's Foreign Fishing Vessel License has been requested. Pursuant to 50 CFR 600.745 a Scientific Research Permit exempts this vessel from federal fishing regulations. Active marine mammal and endangered species incidental take permits can be found at: http://www.nmfs.noaa.gov/pr/permits/incidental/research.htm#nefsc. Dead sea birds can be salvaged under US Fish and Wildlife permit # MB043513-0.

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:

30 October: Depart Naval Station Newport, RI and depart Narragansett Bay to commence Leg 1 of the Fall Ecosystem Monitoring Survey.

11 November: Complete cruise operations for Leg 1 of survey outside of Chesapeake Bay.

B. Staging and Destaging:

27 October: Begin cruise staging at Naval Station Newport. Load and set up scientific equipment and complete CTD and SCS installations.

11 November: Dock at MOC – A Norfolk, VA. Disembark scientific personnel, and off-load scientific equipment and samples.

C. Operations to be conducted:

This first leg of the Fall Ecosystem Monitoring Survey consists of about 117 random-stratified and fixed Oceanography stations in the Middle Atlantic Bight, Southern New England, and Georges Bank areas (Table 1, Figure 1.) The Gulf of Maine will not be visited since the cruise is scheduled to end in Norfolk, Virginia. Because of this, the plan is for the *Gunter* to work its way from north to south, starting on Georges Bank, weather permitting. If not, Southern New England, Georges Bank and finally the Mid-Atlantic Bight areas will be surveyed in that order. The stations are randomly distributed at varying distances, and as such there is no fixed expectation of number to be covered each day. Rather, the progress of the survey will depend on transit time, sea state, and water depth of the stations, with deeper stations requiring more time to complete operations. Some stations will also have more complex operations scheduled, such as a water cast and a bongo tow, which will increase the amount of time spent on-station. Water taken from the Niskin bottles on water casts will be analyzed for Dissolved Inorganic Carbon (DIC) and carbon stable isotopes (Figure 5).

Several of the ship's systems will be running and continuously logging: ADCP, TSG, and EK-60 data from the entire track-line. Personnel from Woods Hole Oceanographic Institution will be using water from the scientific seawater flow-through system to capture images of phytoplankton with an Imaging FlowCytobot Unit on a dedicated computer. Marine mammal and seabird observers will be stationed on the bridge or flying bridge making continual observations during daylight hours.

Oceanographic station locations and a cruise track will be provided to the vessel prior to sailing to allow the navigation officer ample time to load this information into the navigation systems. The Commanding Officer and Chief Scientist will jointly modify the track during the cruise as weather conditions and time constraints vary to best achieve the cruise objectives. **Highest reasonable cruising speeds should be employed to improve the potential to complete the cruise missions within the 13 allotted days for this cruise.**

Random Plankton Stations: A Seabird CTD profiler attached to an array of two bongo nets (61 and 20 cm diameters) will be deployed at approximately 120 stations (Figure 2). In addition, a Seabird CTD 19+ profiler will be deployed alone to collected seawater for salinity calibrations, at deep stations (>200 m).

Oceanographic Stations: A Seabird 911+ CTD will be deployed on a rosette frame with a carousel water sampling system (SBE32) and 11 10-liter Niskin bottles at approximately 35 fixed stations (Figure 3). This package will collect profiles of water temperature, salinity, chlorophyll-a and oxygen levels to within 5 meters of the bottom, or **to a maximum depth of 500 meters.** Water samples collected by the Niskin sampling bottles at multiple depths along the upcast will be processed for nutrients, dissolved inorganic carbon (DIC) analysis.

The deployments of the Seabird 19+ (with and without bongos) and 911+ CTD units will use the two oceanographic winches and a primary CTD computer located in the dry lab that will be provided by the Oceans and Climate Branch. Shipboard computers will be available as a backup for the CTD operations should there be a failure of the Oceans and Climate Branch CTD computer.

Radiometer Measurements: Above water and in-water radiometer measurements will be collected for satellite validation during the day, from 10-am to 5-pm. There will be a minimum of one reading per day. The above water instrument can make measurements on the ship's deck during daylight hours, and will be conducted such that it will not impact other ship operations. In water measurements will be collected using a Satlantic Hyperpro profiling radiometer. The Hyperpro will be deployed at oceanographic stations. If possible, it will be deployed by hand off the stern while the ship is on station and drifting (Figure 6). Most of the time the profiles can be conducted while the CTD cast is being deployed. If conditions are not right, (sun and current), then we may need 20 minutes for a station where he may need a bump from the ship or have the sun facing aft. Additional, non-random stations may be added during transits on sunny days to collect radiometer measurements

Acoustic Survey Operations: EK-60 operations will be conducted continuously throughout the cruise track at the highest safe transit speed possible, and during scientific gear deployments.

Scientific Computer System (SCS): *Gordon Gunter's* SCS system is a PC-based server, which continuously collects and distributes scientific data from various navigational, oceanographic, meteorological, and sampling sensors throughout the cruise. The SCS EventLog program has also been configured for NEFSC Fisheries Acoustic Survey operations, and will be used by the scientists to document all operational events (*e.g.*, beginning and end of gear deployments). Date and time for data collections from computers, instrumentation, and logsheets recording will be synchronized using the vessel's GPS master clock and Dimension IV software. The NEFSC and *Gordon Gunter's* ET are responsible for ensuring data collection and logging.

1. Continuous Underway Sampling:

1.1. SCS

1.1.1. Navigational, meteorological, and environmental data will be archived throughout the cruise using *Gordon Gunter's* Scientific Computer System (SCS).

1.1.2. **Ship Requirements**

1.1.2.1. SCS system should be running for duration of cruise

1.2. ADCP

1.2.1. Current speed and direction

1.2.2. Backscatter at 150 kHz

1.2.3. **Ship Requirements**

1.2.3.1. ADCP running during cruise and logging data

1.3. Flow-through system

1.3.1. TSG - salinity, temperature, density

1.3.2. pCO2 system surface water and atmospheric CO2

1.3.3. Discrete samples – drawn from flow-through by scientists

1.3.3.1. DIC – dissolved inorganic carbon

1.3.3.2. salt – for salinity calibrations

1.3.4. **Ship Requirements**

1.3.4.1. Flowthrough system cleaned prior to cruise (freshwater flush)

1.3.4.2. Flowthrough system running during cruise and logging data

1.3.4.3. Ability to draw small amount of water from system for Imaging FlowCytoBot unit (Figure 4).

1.4. Fisheries acoustics

1.4.1. EK-60

1.4.2. Ship Requirements

1.4.2.1. Acoustics running during cruise at all frequencies and logging data

NOTE: Extraneous echo sounders should be turned off to eliminate or at least minimize acoustic interference with the EK60.

1.5. Fisheries acoustics

1.5.1. EK-60

1.5.2. Ship Requirements

1.5.2.1. Both acoustics running during cruise at all frequencies and logging data

NOTE: Extraneous echo sounders should be turned off to eliminate or at least minimize acoustic interference with the EK60.

1.6 Surface observations

1.6.1 Seabird and marine mammal observations made during daylight hours by two observers rotating on a 4 hour schedule, either on the bridge or flying bridge.

1.6.2 **Ship Requirements**

1.6.2.1 110 VAC available either on the flying bridge or bridge for the observers' laptops.

1.7 Water Bottle Cast – deployed at subset of stations surface to **500 m maximum depth** or 5 m from bottom

1.7.2 SBE19 – Temperature, conductivity, depth

1.7.3 Water bottles – tripped manually with a messenger for salinity calibrations.

1.7.4 **Ship Requirements**

1.7.4.1 None

Data: At the end of the cruise the ship will provide the chief scientist with three copies of the data from the EK60 transducer, the ADCP unit and the SCS system. The chief scientist will provide a 1 terabyte drive for this. A copy of the SCS data should also be FTP'd to DMS personnel in Woods Hole.

D. Dive Plan

Dives are not planned for this project.

E. Applicable Restrictions

Conditions which would preclude normal operations may include the following:

Adverse weather – Marginal conditions such as high seas and winds that make deploying gear over the side hazardous to personnel, and secondarily to the equipment, warrant having operations suspended until the command deems conditions safe again. One way to mitigate such interruptions would involve coordination between the chief scientist and the command to adjust the cruise track to avoid the worst weather and continue operations in a more sheltered area where they can be conducted safely.

Equipment failures - if scientific, may involve the adjustment of sampling strategies to permit survey operations to continue with functional equipment. Vessel equipment failures will be worked out on an ad hoc basis between the scientists and command to permit survey operations to continue with the understanding that the safety of the vessel is always the top priority.

Protected Resource Requirements:

The NEFSC is fully permitted under the MMPA and ESA to conduct research data collection activities. Active permits are effective September 12, 2016 through September 9, 2021. Permits and applicable information are available online at: http://www.nmfs.noaa.gov/pr/permits/incidental/research.htm#nefsc

North Atlantic right whale protection: The vessel is requested to adhere to right whale protection regulations. Information on Seasonal Management Area (SMA) and Dynamic Management Area (DMA) regulations and information for protecting right whales from collisions with vessels are provided through the NOAA Protected Resources website (http://www.nmfs.noaa.gov/pr/shipstrike/), Right Whale Sighting Advisory System (SAS) website (http://www.nefsc.noaa.gov/psb/surveys/), the U.S. Coast Guard's "Notices To Mariners" and NOAA weather radio.Mariners are urged to use caution and proceed at safe speeds in areas where right whales occur. U.S. Law (50 CFR 224.105) prohibits operating vessels 65 feet (19.8 meters) or greater in excess of 10 knots in Seasonal Management Areas (SMAs) along the U.S. east coast. Mariners are also requested to route around voluntary speed restriction zones, Dynamic Management Areas (DMAs) or transit through them at 10 knots or less. Approaching within 500 yards of right whales is prohibited, unless the Chief Scientist is in possession of an ESA/MMPA permit allowing such approaches.

Whale sightings: Sightings of right whales, or dead or entangled whales of any species, are extremely valuable and reports are urgently requested. Please report all right whale sightings north of the Virginia-North Carolina border to 866-755-6622; right whale sightings south of that border should be reported to 877-WHALE HELP. Right whale sightings in any location may be reported to the U.S. Coast Guard via VHF channel 16. Protocols for reporting sightings are described in the Guide to Reporting Whale Sightings placard. The placard is available online (http://www.nefsc.noaa.gov/psb/surveys/documents/20120919_Report_a_Right_Whale.pdf) and laminated copies will be provided by the Protected Species Branch upon request. It is requested that this placard be kept on the bridge for quick reference and to facilitate rapid reporting (via satellite phone if necessary). Opportunistic sightings of other marine mammal species that are live and well may be reported using the Platforms of Opportunity (POP) forms and protocols. To information regarding the WhaleALERT application http://stellwagen.noaa.gov/protect/whalealert.html. For information on reporting a dead whale http://www.nefsc.noaa.gov/psb/surveys/documents/20120919_Report_a_Dead_Whale.pdf

III. Equipment

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

Ship Requirements for Acoustics

Simrad EK60 Scientific Sounder: The Simrad EK60 Scientific Sounder will be the primary sampling gear used during fisheries acoustic surveys for providing species-specific abundance estimates. The EK60 operates four transducers mounted on the retractable keel (18, 38, 120, and 200 kHz split-beam transducers). EK60 data are logged to the EK60 data server, which is on the ship's and scientific networks. RS232 connections are used for navigational (Differential GPS) input. The SCS Event Logger will be used to record all operational events (e.g., begin and end points of transects, stations, gear deployments, and other events that affect the track cruise and vessel speed) during the cruise.

The EK60 will be synchronized to the ADCP and ship's EK60 echo sounders. All extraneous echo sounders need to be turned off to eliminate or at least minimize acoustic interference with the EK60. At the beginning of the cruise, it may be necessary to turn off sounders to determine sources of interference. The ADCP is set with an external trigger to be a slave with the EK60. There still is some minor interference at 120kHz on the EK60 and thus, the ADCP may need to be turned off at times during the cruise.

Acoustics are running during cruise at all frequencies and logging data.

Ship Requirements for Side Sampling Station and Oceanographic Operations

SBE911+ provided by the Oceans and Climate Branch will be connected to conducting cable on
forward winch.

A primary CTD computer located in the dry lab that will be provided by the Oceans and Climate
Branch. Shipboard computers will be available as a backup for the CTD operations should there be a failure of the Oceans and Climate Branch CTD computer.

Slip rings are to be checked prior to cruise and redone if necessary.

New terminations will be done prior to the start of this cruise for both oceanographic winches.

SBE19+ provided by the Oceans and Climate Branch will be connected to conducting cable on aft winch for bongo deployments.

NEMA Data String for CTD Computer.

Disposal of waste water cannot happen before, during, or right after CTD rosette operations.

Smoking is not allowed on Oceanography deck due to nutrient and carbonate chemistry sampling.

NEMA Data String to Computer Lab.

Ultra-cold (-80^{o}C) freezer (tested prior to embarkation) for storage of samples.

Ship Requirements for Continuous Underway Sampling

SCS - Navigational, meteorological, and environmental data will be archived throughout the cruise using *Gordon Gunter's* Scientific Computer System (SCS). SCS system should be running for duration of cruise.

ADCP - Running during cruise and logging data.

Flow-through system - TSG - salinity, temperature, density.
Fluorometer – chlorophyll-a concentration.
Imaging FlowCytobot – small amount of seawater drawn from the system to obtain phytoplankton images.
PCO2 system – operational during the entire cruise period
Discrete samples – drawn from flow-through by scientists.
DIC – dissolved inorganic carbon.
salt – for salinity calibrations.

Flowthrough system cleaned prior to cruise (freshwater flush).

Flowthrough system running during cruise and logging data.
Ability to draw water samples from system and to plumb in Imaging FlowCytobot instrument from WHOI.

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

CTD Rosette Operations :

A CTD Rosette will be deployed at subset of stations surface to **500 m MAX DEPTH** or 5 m from bottom; at approximately 20-50 locations during the course of the cruise. Data from this array will be relayed in real time to an onboard primary CTD computer located in the dry lab provided by the

Oceans and Climate Branch. Shipboard computers will be available as a backup for the CTD operations should there be a failure of the Oceans and Climate Branch CTD computer.

SBE911+ – salinity, temperature, density.
Fluorometer – chlorophyll a concentration.
PAR – for light measurement.
Water bottles – tripped automatically from computer in CTD Lab.
Salt - for salinity calibrations.
Nutrients – N, P, Si, others.
Ocean Carbon – DIC, Total alkalinity.
Phytoplankton species composition.
Microzooplankton species composition.
Chlorophyll-a – measured directly.
Carbon stable isotope ratio determination
Figure 5 shows seawater from the Niskin bottle array being filtered for chlorophyll-a
and carbon stable isotope ratio analysis.

Oceanography Stations:

CTD/Bongo – deployed at most stations surface to **200 m max depth** or 5 m from bottom.
SBE19+ Temperature, conductivity, depth deployed with rosette having 10 ten-liter bottles,
and radiometer.
61 cm, 333 micron mesh– zooplankton and ichthyoplankton.
20 cm, 165 micron mesh – microzooplankton and zooplankton (20 stations).
20 cm , 333 micron mesh – zooplankton and ichthyoplankton (100 stations).
45 kg depressor weight for bongo net deployments.

Continuous Underway Sampling:

Imaging FlowCytoBot: An Imaging Flow Cytobot unit will be plumbed into the scientific flow-through system and used throughout the cruise. The unit will require a very small amount of seawater from the flow-through system and 110 VAC (Figure 4). This unit will be brought to the ship as early as possible during staging to ensure optimal installation and functionality.

IV. Hazardous Materials

A. Policy and Compliance

The Chief Scientists are responsible for complying with FEC 07 Hazardous Materials and Hazardous Waste Management Requirements for Visiting Scientific Parties (or the OMAO procedure that supersedes it). By Federal regulations and NOAA Marine and Aviation Operations policy, the ship may not sail without a complete inventory of all hazardous materials by name and quantity, MSDS, appropriate spill cleanup materials (neutralizing agents, buffers, or absorbents) in amounts adequate to address spills of a size equal to the amount of chemical brought aboard, and chemical safety and spill response procedures. Documentation regarding those requirements will be provided by the Chief of Operations, Marine Operations Center, upon request.

Per OMAO procedure, the scientific party will include with their project instructions and provide to the CO of the respective ship 30 days before departure:

- List of chemicals by name with anticipated quantity
- List of spill response materials, including neutralizing agents, buffers, and absorbents
- Chemical safety and spill response procedures, such as excerpts of the program's Chemical Hygiene Plan or SOPs relevant for shipboard laboratories
- For bulk quantities of chemicals in excess of 50 gallons total or in containers larger than 10 gallons each, notify ship's Operations Officer regarding quantity, packaging and chemical to verify safe stowage is available as soon as chemical quantities are known.

Upon embarkation and prior to loading hazardous materials aboard the vessel, the scientific party will provide to the CO or their designee:

- An inventory list showing actual amount of hazardous material brought aboard
- An MSDS for each material
- Confirmation that neutralizing agents and spill equipment were brought aboard sufficient to contain and cleanup all of the hazardous material brought aboard by the program
- Confirmation that chemical safety and spill response procedures were brought aboard

Upon departure from the ship, scientific parties will provide the CO or their designee an inventory showing that all chemicals were removed from the vessel. The CO's designee will maintain a log to track scientific party hazardous materials. MSDS will be made available to the ship's complement, in compliance with Hazard Communication Laws.

Scientific parties are expected to manage and respond to spills of scientific hazardous materials. Overboard discharge of hazardous materials is not permitted aboard NOAA ships.

B. Inventory

Common Name of Material	**Qty**	**Notes**	**Trained Individual**	**Spill control**
Acetone (90%)	2 x 500 ml.	Alkalinity,Located in chem lab.	Tamara Holzwarth-	E

			Davis, Harvey Walsh	
Formaldehyde solution (37%)	2 x 20 liters	Alkalinity, Stored in ship chem. locker. 10 liters will be in dispensing carboy in Preservation Alcove hood.	Tamara Holzwarth-Davis, Harvey Walsh	F
Ethanol (95%)	4 to 10 x 20 liters	Flammability, Stored in ship chem. locker.	Tamara Holzwarth-Davis, Harvey Walsh	E
Mercuric Chloride	1 x 50 ml.	Located in ship chem. locker.	Chris Taylor	M

C. Chemical safety and spill response procedures

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Formalin/Formaldehyde

- Ventilate area of leak or spill. Remove all sources of ignition.
- Wear appropriate personal protective equipment.
- Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible.
- Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container.
- Do not use combustible materials, such as saw dust.

Neutralizer and Absorbent Materials
Spill-X-FP, Formaldehyde Eater and Spilfyter (Trade Marks) will be brought in sufficient quantities – (two 5-gallon buckets and several 2 lb. containers) to neutralize 40 liters of 37% Formaldehyde solution.

Absorbent ground clay containment material will be brought along to absorb spilled chemicals – (three 14 lb. containers).

D. Radioactive Materials

No Radioactive Isotopes are planned for this project.

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.

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 hours 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. The form is available at http://www.omao.noaa.gov/fleeteval.html and provides a "Submit" button at the end of the form. 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 ship, 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. 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 Operations 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.

Foreign National access must be sought not only for access to the ship involved in the project but also for any Federal Facility access (NOAA Marine Operations Centers, NOAA port offices, USCG Bases) that foreign nationals might have to traverse to gain access to and from the ship. The following are basic requirements.

Full compliance with NAO 207-12 is required.

Responsibilities of the Chief Scientists:

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 (all that apply)

Appendix 1.

Figures, maps, tables, images, etc.

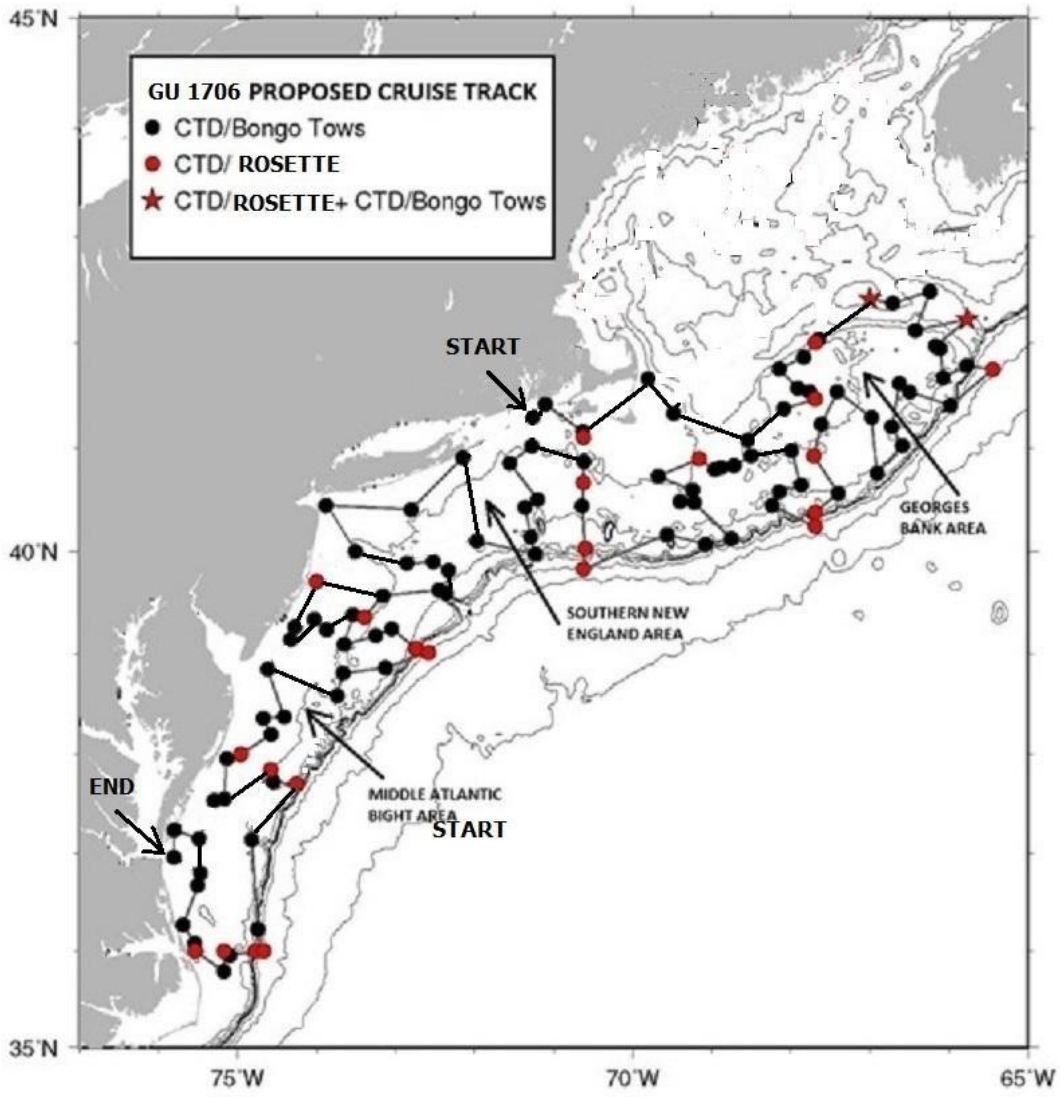

Figure 1. Typical station locations and a proposed cruise track for GU 17-06 Fall Ecosystem Monitoring Survey 30 October – 11 November 2017. Note that black station points are approximations of the actual positions of the CTD/Bongo Tows.

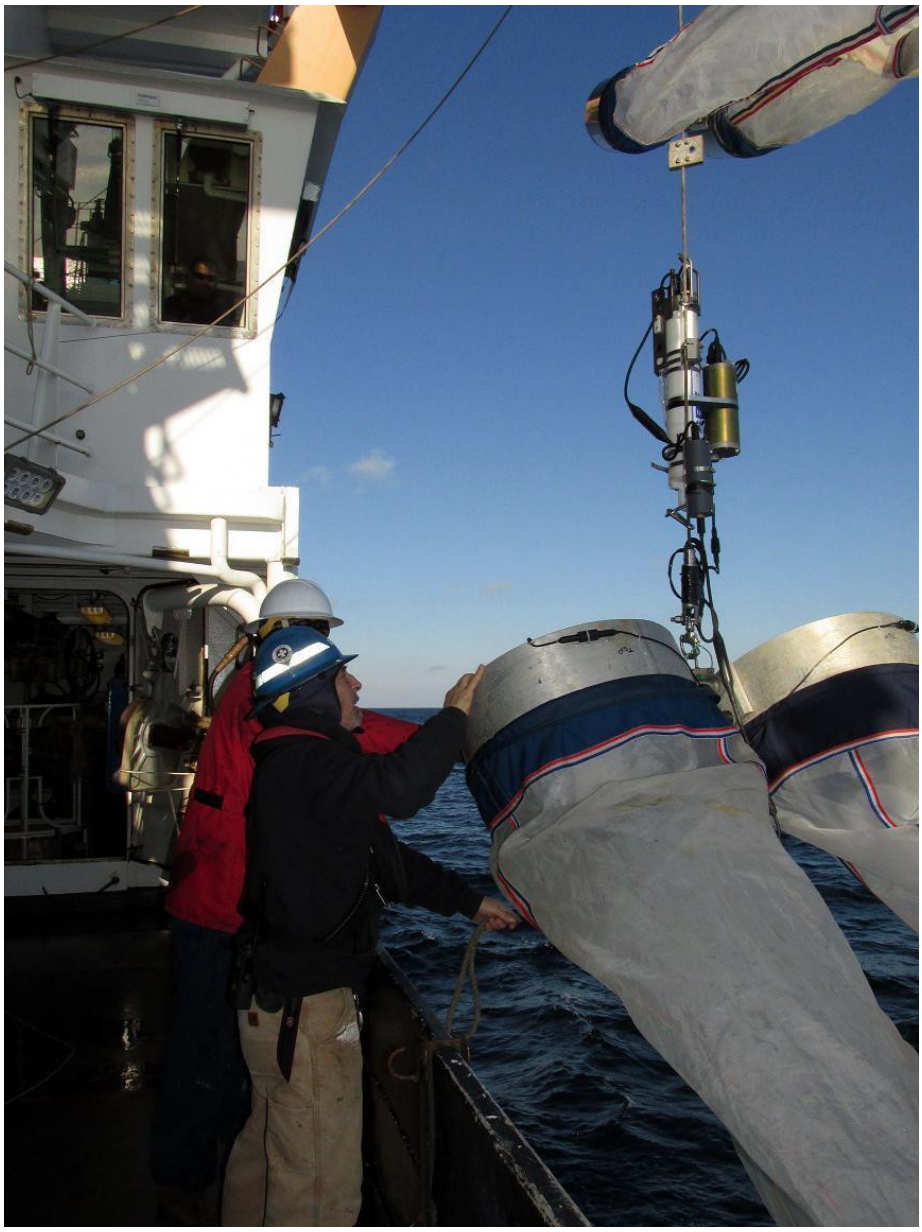

Figure 2. Plankton net sampling array, showing 61 and 20 cm bongo frames, and CTD unit.

Figure 3. A Niskin bottle rosette sampler equipped with 10 liter Niskin bottles.

Figure 4. The cylindrical Imaging FlowCytobot unit.

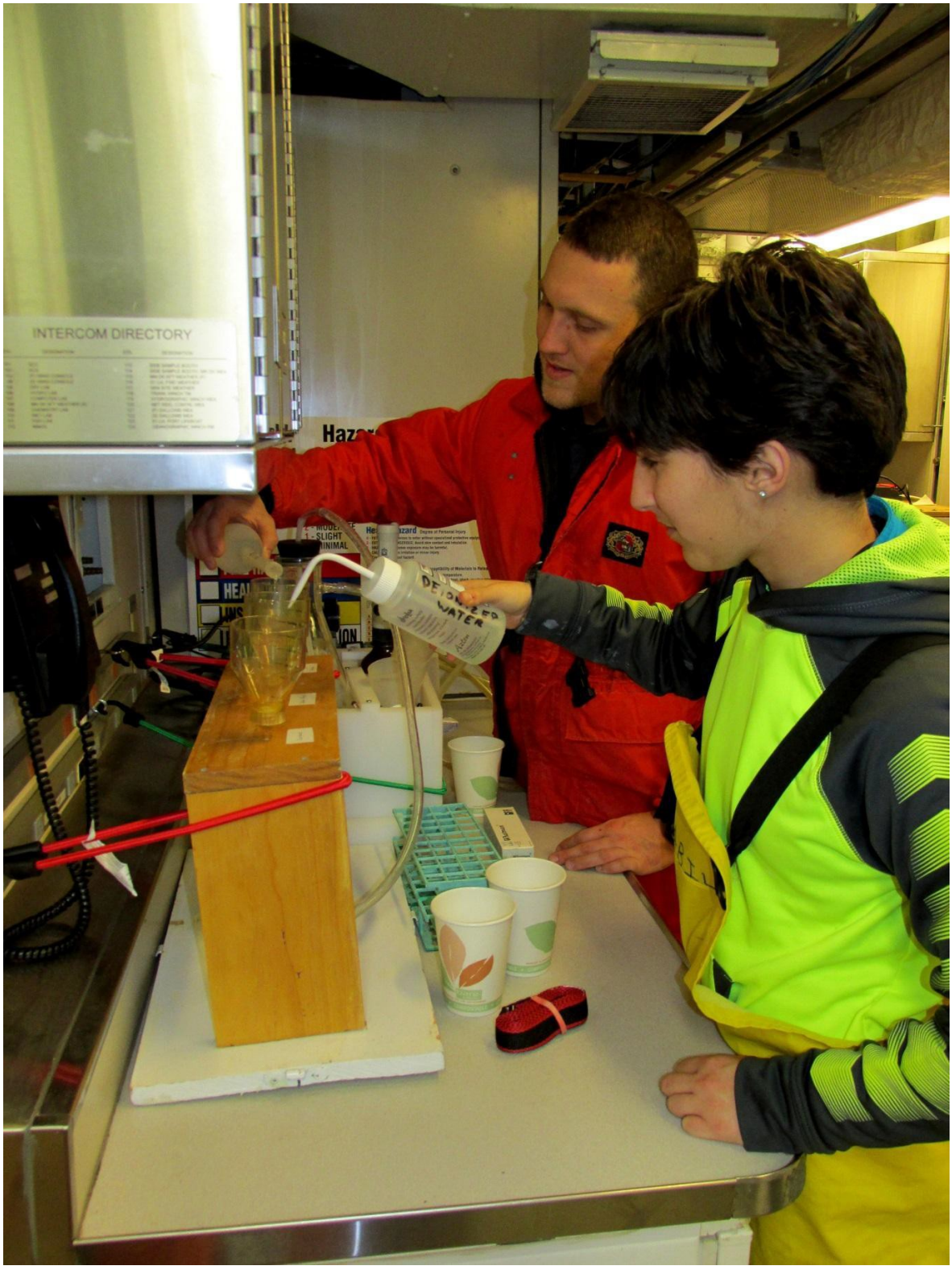
INTERCOM DIRECTORY

Figure 5. Seawater from the Niskin bottle array being filtered for chlorophyll-a and carbon stable
isotope analysis.

Figure 6. Submersible radiometer being hand-deployed .

Table 1. Station/Waypoint List (coordinates in Latitude, Longitude: degree-minutes)

Name	Region	Strata	Deployment	Protocol	Latitude		Longitude	
					Degrees	Minutes	Degrees	Minutes
1-MAB-1	MAB	1	Bongo Oblique	STD	35	59.976	74	45.030
2-MAB-1	MAB	2	Bongo Oblique	STD	35	59.976	75	20.016
2-MAB-2	MAB	2	Bongo Oblique	STD	35	44.982	75	10.020

3-MAB-1	MAB	3	Bongo Oblique	STD	35	34.986	75	25.014
3-MAB-2	MAB	3	Bongo Oblique	STD	35	34.986	75	15.018
4-MAB-1	MAB	4	Bongo Oblique	STD	37	4.950	74	50.028
5-MAB-1	MAB	5	Bongo Oblique	STD	37	49.932	75	5.022
5-MAB-2	MAB	5	Bongo Oblique	STD	37	34.938	75	15.018
5-MAB-3	MAB	5	Bongo Oblique	STD	37	24.942	75	20.016
5-MAB-4	MAB	5	Bongo Oblique	STD	36	44.958	75	5.022
5-MAB-5	MAB	5	Bongo Oblique	STD	36	44.958	75	10.020
6-MAB-1	MAB	6	Bongo Oblique	STD	36	44.958	75	45.006
6-MAB-2	MAB	6	Bongo Oblique	STD	37	9.948	75	40.008
7-MAB-1	MAB	7	Bongo Oblique	STD	38	9.924	73	45.054
7-MAB-2	MAB	7	Bongo Oblique	STD	38	9.924	74	0.048
8-MAB-1	MAB	8	Bongo Oblique	STD	37	49.932	74	45.030
8-MAB-2	MAB	8	Bongo Oblique	STD	37	59.928	74	35.034
8-MAB-3	MAB	8	Bongo Oblique	STD	38	19.920	74	40.032
8-MAB-4	MAB	8	Bongo Oblique	STD	38	29.916	74	10.044
9-MAB-1	MAB	9	Bongo Oblique	STD	38	24.918	74	50.028
10-MAB-1	MAB	10	Bongo Oblique	STD	38	49.908	73	15.066
10-MAB-2	MAB	10	Bongo Oblique	STD	38	59.904	73	5.070
10-MAB-3	MAB	10	Bongo Oblique	STD	38	34.914	73	20.064
11-MAB-1	MAB	11	Bongo Oblique	STD	38	59.904	74	10.044
11-MAB-2	MAB	11	Bongo Oblique	STD	39	14.898	73	35.058
11-MAB-3	MAB	11	Bongo Oblique	STD	39	24.894	73	50.052
11-MAB-4	MAB	11	Bongo Oblique	STD	38	44.910	73	45.054
12-MAB-1	MAB	12	Bongo Oblique	STD	38	39.912	74	50.028
13-MAB-1	MAB	13	Bongo Oblique	STD	39	19.896	74	15.042
13-MAB-2	MAB	13	Bongo Oblique	STD	39	34.890	73	55.050
14-SNE-1	SNE	14	Bongo Oblique	STD	39	49.884	71	55.098
15-SNE-1	SNE	15	Bongo Oblique	STD	39	49.884	72	25.086
15-SNE-2	SNE	15	Bongo Oblique	STD	39	24.894	72	50.076
15-SNE-3	SNE	15	Bongo Oblique	STD	39	29.892	73	0.072
15-SNE-4	SNE	15	Bongo Oblique	STD	40	9.876	72	25.086
16-SNE-1	SNE	16	Bongo Oblique	STD	40	14.874	72	45.078
16-SNE-2	SNE	16	Bongo Oblique	STD	40	14.874	73	20.064
16-SNE-3	SNE	16	Bongo Oblique	STD	40	19.872	72	45.078
16-SNE-4	SNE	16	Bongo Oblique	STD	40	34.866	72	25.086
17-SNE-1	SNE	17	Bongo Oblique	STD	40	39.864	72	50.076
18-SNE-1	SNE	18	Bongo Oblique	STD	40	4.878	71	10.116
19-SNE-1	SNE	19	Bongo Oblique	STD	40	49.860	70	55.122
19-SNE-2	SNE	19	Bongo Oblique	STD	40	4.878	71	35.106
19-SNE-3	SNE	19	Bongo Oblique	STD	40	14.874	71	20.112
19-SNE-4	SNE	19	Bongo Oblique	STD	40	39.864	70	45.126
19-SNE-5	SNE	19	Bongo Oblique	STD	40	14.874	71	40.104

20-SNE-1	SNE	20	Bongo Oblique	STD	40	54.858	71	50.100
20-SNE-2	SNE	20	Bongo Oblique	STD	41	9.852	70	55.122
20-SNE-3	SNE	20	Bongo Oblique	STD	40	39.864	72	0.096
21-SNE-1	SNE	21	Bongo Oblique	STD	40	59.856	71	50.100
22-SNE-1	SNE	22	Bongo Oblique	STD	39	59.880	70	20.136
23-SNE-1	SNE	23	Bongo Oblique	STD	40	29.868	70	0.144
23-SNE-2	SNE	23	Bongo Oblique	STD	40	29.868	69	5.166
23-SNE-3	SNE	23	Bongo Oblique	STD	40	34.866	70	10.140
23-SNE-4	SNE	23	Bongo Oblique	STD	40	29.868	69	50.148
23-SNE-5	SNE	23	Bongo Oblique	STD	40	34.866	69	15.162
24-SNE-1	SNE	24	Bongo Oblique	STD	40	59.856	70	15.138
24-SNE-2	SNE	24	Bongo Oblique	STD	40	49.860	70	20.136
24-SNE-3	SNE	24	Bongo Oblique	STD	41	4.854	70	20.136
25-SNE-1	SNE	25	Bongo Oblique	STD	40	54.858	69	30.156
26-GB-1	GB	26	Bongo Oblique	STD	40	29.868	67	15.210
26-GB-2	GB	26	Bongo Oblique	STD	40	24.870	67	50.196
27-GB-1	GB	27	Bongo Oblique	STD	40	34.866	68	0.192
27-GB-2	GB	27	Bongo Oblique	STD	40	49.860	66	55.218
27-GB-3	GB	27	Bongo Oblique	STD	40	44.862	67	45.198
27-GB-4	GB	27	Bongo Oblique	STD	40	59.856	67	10.212
27-GB-5	GB	27	Bongo Oblique	STD	40	59.856	67	5.214
27-GB-6	GB	27	Bongo Oblique	STD	41	9.852	67	20.208
28-GB-1	GB	28	Bongo Oblique	STD	41	39.840	65	50.244
28-GB-2	GB	28	Bongo Oblique	STD	40	49.860	66	40.224
29-GB-1	GB	29	Bongo Oblique	STD	41	44.838	66	35.226
29-GB-2	GB	29	Bongo Oblique	STD	41	4.854	67	10.212
29-GB-3	GB	29	Bongo Oblique	STD	41	14.850	66	35.226
29-GB-4	GB	29	Bongo Oblique	STD	41	19.848	67	5.214
29-GB-5	GB	29	Bongo Oblique	STD	41	29.844	66	10.236
29-GB-6	GB	29	Bongo Oblique	STD	41	59.832	66	5.238
29-GB-7	GB	29	Bongo Oblique	STD	41	44.838	66	0.240
29-GB-8	GB	29	Bongo Oblique	STD	41	49.836	66	10.236
30-GB-1	GB	30	Bongo Oblique	STD	41	39.840	67	35.202
30-GB-2	GB	30	Bongo Oblique	STD	40	54.858	68	15.186
30-GB-3	GB	30	Bongo Oblique	STD	41	19.848	67	20.208
30-GB-4	GB	30	Bongo Oblique	STD	41	44.838	67	5.214
30-GB-5	GB	30	Bongo Oblique	STD	41	14.850	68	5.190
30-GB-6	GB	30	Bongo Oblique	STD	40	59.856	68	25.182
30-GB-7	GB	30	Bongo Oblique	STD	41	44.838	67	15.210
31-GB-1	GB	31	Bongo Oblique	STD	41	24.846	68	20.184
31-GB-2	GB	31	Bongo Oblique	STD	41	54.834	67	25.206
31-GB-3	GB	31	Bongo Oblique	STD	41	24.846	68	15.186
32-GB-1	GB	32	Bongo Oblique	STD	42	4.830	66	40.224

32-GB-2	GB	32	Bongo Oblique	STD	41	54.834	68	0.192
33-GOM-1	GOM	33	Bongo Oblique	STD	41	4.854	69	5.166
34-GOM-1	GOM	34	Bongo Oblique	STD	41	49.836	68	30.180
34-GOM-2	GOM	34	Bongo Oblique	STD	41	44.838	69	35.154
34-GOM-3	GOM	34	Bongo Oblique	STD	41	29.844	69	15.162
35-GOM-1	GOM	35	Bongo Oblique	STD	41	49.836	70	20.136
36-GOM-1	GOM	36	Bongo Oblique	STD	42	24.822	70	10.140
36-GOM-2	GOM	36	Bongo Oblique	STD	42	54.810	70	5.142
37-GOM-1	GOM	37	Bongo Oblique	STD	43	4.806	69	55.146
37-GOM-2	GOM	37	Bongo Oblique	STD	42	34.818	69	15.162
38-GOM-1	GOM	38	Bongo Oblique	STD	42	39.816	68	25.182
38-GOM-2	GOM	38	Bongo Oblique	STD	42	19.824	66	30.228
38-GOM-3	GOM	38	Bongo Oblique	STD	42	24.822	68	20.184
39-GOM-1	GOM	39	Bongo Oblique	STD	42	34.818	67	0.216
40-GOM-1	GOM	40	Bongo Oblique	STD	42	49.812	70	30.132
41-GOM-1	GOM	41	Bongo Oblique	STD	42	44.814	68	50.172
41-GOM-2	GOM	41	Bongo Oblique	STD	43	14.802	69	25.158
41-GOM-3	GOM	41	Bongo Oblique	STD	43	9.804	69	50.148
41-GOM-4	GOM	41	Bongo Oblique	STD	43	19.800	69	10.164
42-GOM-1	GOM	42	Bongo Oblique	STD	43	29.796	68	0.192
42-GOM-2	GOM	42	Bongo Oblique	STD	42	59.808	67	35.202
42-GOM-3	GOM	42	Bongo Oblique	STD	43	4.806	68	15.186
42-GOM-4	GOM	42	Bongo Oblique	STD	43	44.790	68	0.192
43-GOM-1	GOM	43	Bongo Oblique	STD	43	39.792	66	55.218
43-GOM-2	GOM	43	Bongo Oblique	STD	43	39.792	66	45.222
44-GOM-3	GOM	44	Bongo Oblique	STD	43	14.802	66	30.228
45-GOM-1	GOM	45	Bongo Oblique	STD	43	39.792	68	55.170
46-GOM-1	GOM	46	Bongo Oblique	STD	44	19.776	66	40.224
47-GOM-1	GOM	47	Bongo Oblique	STD	42	39.816	66	35.226
47-GOM-2	GOM	47	Bongo Oblique	STD	43	4.806	65	40.248
47-GOM-3	GOM	47	Bongo Oblique	STD	42	44.814	65	50.244
LNG (Acid 1)	GOM	36	CTD Profile 911+, Bongo Oblique	STD	42	25.008	70	36.797
Wilkinson Basin(Acid 3)	GOM	37	CTD Profile 911+, Bongo Oblique	STD	42	30.000	69	40.002
NE Ch (Acid 2)	GOM	38	CTD Profile 911+, Bongo Oblique	STD	42	13.500	65	46.002
Georges Basin (Acid 4)	GOM	39	CTD Profile 911+, Bongo Oblique	STD	42	22.420	67	2.675
Jordon Basin (Acid 5)	GOM	42	CTD Profile 911+, Bongo Oblique	STD	43	23.999	67	42.000
Acid 8 MAB	MAB	1	CTD Profile 911+	FXD	36	0.018	74	46.631
Acid 7 MAB	MAB	2	CTD Profile 911+	FXD	36	0.018	75	10.370
Acid 6 MAB	MAB	3	CTD Profile 911+	FXD	36	0.018	75	28.315
Acid 12 MAB	MAB	7	CTD Profile 911+	FXD	37	42.072	74	15.336

Acid 10 MAB	MAB	8	CTD Profile 911+	FXD	37	59.967	74	57.418
Acid 11 MAB	MAB	8	CTD Profile 911+	FXD	37	50.604	74	34.758
Acid 14 MAB	MAB	11	CTD Profile 911+	FXD	39	21.684	73	23.532
Acid 13 MAB	MAB	13	CTD Profile 911+	FXD	39	42.489	74	0.224
Acid 19 SNE	SNE	18	CTD Profile 911+	FXD	40	2.226	70	36.068
Acid 18 SNE	SNE	23	CTD Profile 911+	FXD	40	40.200	70	37.334
Great South Ch (Acid 28)	GOM	23	CTD Profile 911+	FXD	40	54.000	69	9.444
Acid 17 SNE	SNE	24	CTD Profile 911+	FXD	41	6.306	70	37.334
Acid 24 GB	GB	26	CTD Profile 911+	FXD	40	22.970	67	41.430
Acid 23 GB	GB	27	CTD Profile 911+	FXD	40	55.718	67	42.510
Acid 22 GB	GB	30	CTD Profile 911+	FXD	41	28.196	67	41.430
Acid 21 GB	GB	32	CTD Profile 911+	FXD	42	0.404	67	41.430
Acid 32 GOM	GOM	36	CTD Profile 911+	FXD	42	18.936	70	16.762
Acid 33 GOM	GOM	36	CTD Profile 911+	FXD	42	21.402	70	27.924
Jordan Basin S (Acid 35)	GOM	38	CTD Profile 911+	FXD	42	42.060	67	42.000
PF01 (Acid 26)	GOM	40	CTD Profile 911+	FXD	42	59.920	70	25.300
Jordan Basin N (Acid 34)	GOM	41	CTD Profile 911+	FXD	44	12.000	67	42.000
Buoy M – Jordan Basin	GOM		CTD Profile 911+	SUP	43	29.4	67	52.2
JT04 (Acid 30)	GOM	41	CTD Profile 911+	FXD	43	46.300	68	40.200
Acid 27 GOM	GOM	47	CTD Profile 911+	FXD	43	1.652	66	20.486
BI01 (Acid 29)	GOM	48	CTD Profile 911+	FXD	44	29.130	67	13.660
Acid 9 MAB	MAB	50	CTD Profile 911+	FXD	36	0.018	74	40.158
Acid 15 MAB	MAB	56	CTD Profile 911+	FXD	39	3.228	72	44.679
Acid 16 MAB	MAB	56	CTD Profile 911+	FXD	39	0.764	72	34.968
Acid 20 SNE	SNE	60	CTD Profile 911+	FXD	39	49.950	70	37.333
Acid 25 GB	GB	62	CTD Profile 911+	FXD	40	14.738	67	41.430
Acid 26 GB	GB	68	CTD Profile 911+	FXD	41	45.144	65	26.528