




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: Master Donn Pratt, NOAA
Commanding Officer, NOAA Ship *Gordon Gunter*

FROM:  Captain Anne K. Lynch, NOAA
Commanding Officer, NOAA Marine Operations Center-Atlantic

SUBJECT: Project Instruction for GU-14-05
SEAMAP Fall Ichthyoplankton

Attached is the final Project Instruction for GU-14-05, SEAMAP Fall Ichthyoplankton, which is scheduled aboard NOAA Ship *Gordon Gunter* during the period of August 21 to September 30, 2014. Of the 38 DAS scheduled for this project, 38 DAS are funded by an OMAO 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.

Attachment




cc:
MOA1




U. S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southeast Fisheries Science Center

3209 Frederic Street
Pascagoula, MS 39567


Project Instructions

Date Submitted: 07/15/2014 
Platform: NOAA Ship GORDON GUNTER
Cruise Number: GU-14-05
Project Title: SEAMAP Fall Ichthyoplankton
Cruise Dates: 08/21/2014  - 09/30/2014 


Prepared by: BOND.PAMELA.
J.1365874154
Field Party Chief

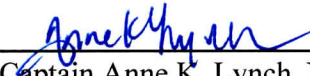
Date: 07/15/2014 


Approved by: DESFOSSE.LISA
.L.1365834519
Lab Director

Date: 07/17/2014 

Approved by: Theo R. Brainerd
Dr. Bonnie Ponwith
Director, SEFSC

Date: 07/17/2014 

Approved by: 
Captain Anne K. Lynch, NOAA
Commanding Officer
Marine Operations Center - Atlantic

Date: 7/25/2014 

I. Overview

A. Project Period

August 21 to September 30, 2014

B. Days at Sea (DAS)

Of the 38 DAS scheduled for this project, 38 DAS are funded by an OMAO allocation, 0 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

United States northern Gulf of Mexico (GOM) on the continental shelf break from 81°30' to 97°15' W and 24°43' to 30°30' N in 5 to 600 fm. A list of the station locations and a map of the area of operations are found in Table 1, Table 2, and Figure 1.

D. Summary of Objectives

1. Primary Objectives

- a. Assess the occurrence, abundance and geographical distribution of the early life stages of fall spawning fishes, especially king and Spanish mackerel, red drum, and snappers, on U.S. continental shelf waters in the GOM using a bongo frame fitted with 0.335 mm nets and a neuston frame fitted with a 0.950 mm net at selected Southeast Area Monitoring and Assessment Program (SEAMAP) stations in support of annual stock assessments.
- b. Describe the pelagic habitat of fish larvae through measurements of various physical and biological parameters:
 - i. Record profiles through the water column of temperature, salinity, fluorescence, dissolved oxygen, and turbidity using a CTD at SEAMAP stations.
 - ii. Measure chlorophyll *a* in replicate water samples taken at surface, mid or maximum chlorophyll layer and near bottom (to a maximum of 500 m) depths using bench top fluorometry.
 - iii. Detect and measure frontal features along the survey cruise track using data from the ship's Fluoro-thermosalinograph flow-through system (TSG).
- c. Map the distribution of fish eggs and invertebrate zooplankton along the cruise track using a Continuous Underway Fish Egg Sampler (CUFES).
- d. Study extrusion of smaller fish larvae through the standard SEAMAP 0.335 mm mesh bongo nets by using a secondary standard bongo frame outfitted with both 0.335 mm and 0.202 mm mesh nets. These dual-mesh tows will be done at selected stations throughout the trackline.

- e. Examine the spatial resolution of red and vermillion snapper distribution as compared with the standard 30 nm station grid by adding sampling stations at the 15 nm center points between standard stations in targeted areas. These stations will be sampled with a standard bongo, neuston, and CTD cast.
- f. Collect detailed observations of net-caught jellyfish and ctenophores.

E. Participating Institutions

National Marine Fisheries Service – Pascagoula Laboratory

F. Personnel (Science Party)

Name (Last, First)	Title	Leg	Date Aboard	Date Disembark	Gender	Affiliation	Nationality
Bond, Pam	FPC	1 and 2	Aug. 21, 2014	Sept. 30, 2014	F	NMFS	US
Drass, Denice	WL	2	Sept. 12, 2014	Sept. 30, 2014	F	NMFS	US
Fleming, Chris	WS	2	Sept. 12, 2014	Sept. 30, 2014	M	USM/GCR L ²	US
Gavins, Cindy	WS	1	Aug. 21, 2014	Sept. 8, 2014	F	Riverside ¹	US
Huddleston, David	WL	1	Aug. 21, 2014	Sept. 8, 2014	M	Riverside ¹	US
Jackson, Jonathan	WS	1	Aug. 21, 2014	Sept. 8, 2014	M	Riverside ¹	US
Knight, Carley	WS	1	Aug. 21, 2014	Sept. 8, 2014	F	Riverside ¹	US
Lyczkowski-Shultz, Joanne	WS	2	Sept. 12, 2014	Sept. 30, 2014	F	NMFS	US
Meaker, Madalyn	WS	1	Aug. 21, 2014	Sept. 8, 2014	F	Riverside ¹	US
Millett, Andrew	WL	2	Sept. 12, 2014	Sept. 30, 2014	M	Riverside ¹	US
Rosado, Becky	WS	2	Sept. 12, 2014	Sept. 30, 2014	F	Riverside ¹	US
Pollack, Adam	WL	1	Aug. 21, 2014	Sept. 8, 2014	M	Riverside ¹	US
Stepongzi, Chrissy	WS	2	Sept. 12, 2014	Sept. 30, 2014	F	Riverside ¹	US

1 – Riverside Technology, Inc.

2 – The University of Southern Mississippi/Gulf Coast Research Laboratory
FPC= Field Party Chief, WL= Watch Leader, WS= Watch Stander

G. Administrative

1. Points of Contact:

- a. Field Party Chief: Pam Bond; 3209 Frederic St. Pascagoula, MS 39567; (228) 549-1651; Pam.Bond@noaa.gov
- b. Operations Officer: Marc Weekley; NOAA Ship *Gordon Gunter*, 151 Watts Ave, Pascagoula, MS 39567; (228) 762-6422; OPS.Gordon.Gunter@noaa.gov

2. Diplomatic Clearances: None Required

3. Licenses and Permits:

This project will be conducted under the following permits:

1. Alabama Scientific Collecting Permit issued by the Alabama Department of Conservation and Natural Resources on January 27, 2014 to Pam Bond
2. Florida Special Activity License issued by the Florida Fish and Wildlife Conservation Commission on February 20, 2014 to Pam Bond (License # SAL-14-0135-SR)
3. Louisiana Saltwater Scientific Collecting Permit issued by Louisiana Department of Wildlife and Fisheries on February 10, 2014 to Pam Bond
4. Mississippi Saltwater Scientific Collecting Permit issued by Mississippi Department of Marine Resources on January 1, 2014 to Pam Bond
5. Texas Scientific Permit issued by Texas Parks and Wildlife Department on June 4, 2014 to Pam Bond (Permit # SPR-0614-096)
6. Southeast Fisheries Science Center Scientific Research Permit (SRP) and Turtle Excluder Device (TED) Exemption issued by NOAA/NMFS on January 24, 2012 to Pam Bond

II. **Operations**

The Field Party Chief (FPC) is responsible for ensuring the scientific staff are trained in planned operations and are knowledgeable of project objectives and priorities. The Commanding Officer (CO) is responsible for ensuring all operations conform to the ship's accepted practices and procedures.

A. Project Itinerary

<u>Leg</u>	<u>Date</u>	<u>Location</u>
1	August 21, 2014	Depart Pascagoula, MS
	September 8, 2014	Arrive Pascagoula, MS
<u>Leg</u>	<u>Date</u>	<u>Location</u>
2	September 12, 2014	Depart Pascagoula, MS
	September 30, 2014	Arrive Pascagoula, MS

B. Staging and Destaging

PASCAGOULA/PASCAGOULA

C. Operations to be conducted

NOAA Ship *Gordon Gunter* will depart Pascagoula, Mississippi on August 21, 2014 to conduct the fall SEAMAP Ichthyoplankton survey. The 38-day cruise will be

divided into two legs: Leg 1, 19 days; Leg 2, 19 days. Both legs of the survey will be conducted along a standard ichthyoplankton cruise. This trackline includes 143 pre-selected stations located approximately 30 n mi apart (Figure 1). Ichthyoplankton operations will be conducted throughout the day and night. Table 1 lists the 143 stations, station positions, and the plankton gear used at each station. The station order listed in Table 1 is the preferred order of sampling as developed since 1986 for the sampling of fall spawned larvae in the GOM and changes to this order may be made by the FPC during the survey, but only after consulting with the CO. The survey will require 24 h operations with two scientific watches: 12 am – 12 pm, 12 pm – 12 am.

Standard stations will follow SEAMAP sampling protocols with an oblique bongo tow to a maximum depth of 200 m, a 10 min neuston tow, and a CTD profile to a maximum depth of 200 m. A dual-mesh tow will be conducted to a maximum depth of 200 m at selected stations during both legs. In addition, egg samples will be collected in transit between stations using the CUFES in conjunction with TSG flow-through data.

Prior to arrival at the first station the SBE 9/11 plus CTD and the SEACAT SBE 19 CTD (with a weight) will be deployed in water depth greater than 100 m in order to test the functionality of the winches, hydraulics, CTD array, and SEACAT. Any problems encountered during the test can then be corrected prior to arriving on the first station. The Chief Engineer will be made aware of expected time of arrival at the first station so the salt water pumps can be turned on and ready.

Communication between the scientists and the bridge while on station will be accomplished via hand held radios. During rough weather, the watch leader and OOD with consultation from the ship's crew will determine which sampling gear can be deployed safely. The FPC should be notified of any change to station location or delays to sampling due to mechanical, medical, or weather issues as well.

PRIMARY STATION OPERATIONS – At the Bridge's 10 min warning, scientists and deck personnel will proceed to duty stations and prepare for station. Scientists and deck personnel should be ready and standing by for bridge's call that the ship is on station and ready to proceed. Smoking is not permitted near or while handling any plankton nets due to the likelihood of burning holes in the nets.

Bongo Sampling

The SEAMAP bongo plankton sampler is comprised of two 61 cm diameter collars with two 0.335 mm nets. Prior to deployment of the bongo sampler, the watch leader must run software programs and prepare them for the bongo cast. The lab scientist must make sure the bridge and deck are ready to deploy before hitting >Ok on SBE 19 SEACAT program because this program only allows 60 s to turn on the magnetic switch or the setup process must be repeated, often including re-booting the computer. The lab scientist should wait for the bridge and deck to relay their readiness to deploy gear, hit ok on the program, have the deck turn on the magnetic switch at the appropriate time, and wait for data to begin scrolling. There is a small delay between the switch and data scroll, therefore, the lab scientist will relay to the deck when to put the net into the water. The bongo sampler is towed in an oblique path from near bottom, or 200 m maximum, to the surface. The SBE-19 SEACAT will be used to monitor the tow path of the bongo net. Vessel speed should be adjusted during the bongo tow to maintain a 45°

wire angle in order to uniformly sample throughout the water column. If angle exceeds 55°, falls to 35° or if combined variation exceeds 15°, then tow must be repeated (the samples will be saved until a better tow is completed). If available, an electronic wire angle indicator with readouts on the bridge and in the dry lab will also be used to monitor wire angle. The net depth will be monitored on the dry lab computer by the watch leader. The Deck Scientist will report wire angles periodically during downcast. On the watch leader's command at maximum depth, stop payout of cable and immediately start retrieval (do not allow net to 'settle'). At that time, the Deck Scientist (or winch operator) will report wire angle and wire out to the watch leader. The watch leader should tell the winch operator to slowly retrieve the bongo array at 20 m per min for tow depths of 100 m or deeper; for shallower stations the retrieval rate will be determined at each station based on station depth. The Deck Scientist (or winch operator) must report wire angle and remaining wire out to watch leader when asked for (on upcast or downcast).

The Deck Scientist should report when the bongo array breaks the surface. Time will be recorded to the second (by the watch leader) when net breaks surface and flowmeters stop turning, at which time the winch operator immediately pulls the frame from the water; taking care not to let the bongo array continue to fish once it breaks the surface. When possible, plankton will be rinsed into cod end of net with seawater hose while the net hangs over the side. In high winds, the watch leader may request that the net is brought directly on board and rinsed down completely on deck. The bongo frame and net are placed on deck. Great care must be taken not to rest the frame on the nets, scrape the net with the frame against the deck, or walk on the ichthyoplankton nets. The abrasions can cause holes in the nets requiring repair or replacement of these expensive sampling devices.

If bottom sediment is present in both samples, the tow must be repeated. Any marginal sample will be saved until completion of the next tow. If bottom sediment (no more than 2 Tb) is present in only one sample the tow need not be repeated. Initial preservative for right bongo samples is 95% ETOH (ethyl alcohol) and initial preservative for left bongo samples is 10% formalin. Formalin preserved samples are transferred to 95% ETOH after 36 h. Ethanol samples will be transferred to new 95% ETOH after 24 h.

Neuston Sampling

The neuston net is a 1 x 2 m frame outfitted with a 0.950 mm mesh net. Each neuston tow will be conducted for 10 min at a vessel speed of approximately 2 kt to keep half the frame submerged in the water. If necessary, the ship should steam forward in a wide arc to keep the neuston net (mouth opening) out of the influence of the prop wash. The duration of a neuston tow may be shortened up to 5 min when there are high concentrations of jellyfish, ctenophores, Sargassum, floating weed and/or debris. After retrieval, plankton is rinsed into cod end with seawater while net hangs over side (if windy, watch leader may request net to be brought directly on board and rinsed on deck). Samples will be preserved in 95% ETOH initially and transferred to new 95% ETOH after 24 h.

Dual Mesh Bongo Sampling

The SEAMAP dual-mesh bongo plankton sampler is comprised of two 61 cm diameter collars with a 0.335 mm and 0.202 mm net. Prior to deployment of the bongo sampler, the watch leader must run software programs and prepare them for the bongo cast. The lab scientist must make sure the bridge and deck are ready to deploy before hitting >Ok on SBE 19 SEACAT program because this program only allows 60 s to turn on the magnetic switch or the setup process must be repeated, often including re-booting the computer. The lab scientist should wait for the bridge and deck to relay their readiness to deploy gear, hit ok on the program, have the deck turn on the magnetic switch at the appropriate time, and wait for data to begin scrolling. There is a small delay between the switch and data scroll, therefore, the lab scientist will relay to the deck when to put the net into the water. The bongo sampler is towed in an oblique path from near bottom, or 200 m maximum, to the surface. The SBE-19 SEACAT will be used to monitor the tow path of the bongo net. Vessel speed should be adjusted during the bongo tow to maintain a 45° wire angle in order to uniformly sample throughout the water column. If angle exceeds 55°, falls to 35° or if combined variation exceeds 15°, then tow must be repeated (the samples will be saved until a better tow is completed). If available, an electronic wire angle indicator with readouts on the bridge and in the dry lab will also be used to monitor wire angle. The net depth will be monitored on the dry lab computer by the watch leader. The Deck Scientist will report wire angles periodically during downcast. On the watch leader's command at maximum depth, stop payout of cable and immediately start retrieval (do not allow net to 'settle'). At that time, the Deck Scientist (or winch operator) will report wire angle and wire out to the watch leader. The watch leader should tell the winch operator to slowly retrieve the bongo array at 20 m per min for tow depths of 100 m or deeper; for shallower stations the retrieval rate will be determined at each station based on station depth. The Deck Scientist (or winch operator) must report wire angle and remaining wire out to watch leader when asked for (on upcast or downcast).

The Deck Scientist should report when the bongo array breaks the surface. Time will be recorded to the second (by the watch leader) when net breaks surface and flowmeters stop turning, at which time the winch operator immediately pulls the frame from the water; taking care not to let the bongo array continue to fish once it breaks the surface. When possible, plankton will be rinsed into cod end of net with seawater hose while the net hangs over the side. In high winds, the watch leader may request that the net is brought directly on board and rinsed down completely on deck. The bongo frame and net are placed on deck. Great care must be taken not to rest the frame on the nets, scrape the net with the frame against the deck, or walk on the ichthyoplankton nets. The abrasions can cause holes in the nets requiring repair or replacement of these expensive sampling devices.

If bottom sediment is present in both samples, the tow must be repeated. Any marginal sample will be saved until completion of the next tow. If bottom sediment (no more than 2 Tb) is present in only one sample the tow need not be repeated. Initial preservative for the dual-mesh right and left bongo samples is 10% formalin. Formalin preserved samples are transferred to 95% ETOH after 36 h.

SEAMAP CTD Profiles

The CTD unit with the SBE 32 water carousel with three Niskin bottles will be

deployed to just below the surface of the water when all areas are ready. When at the surface, the lab scientist will start the CTD recording. The sampler must then remain submerged for 3 min at the surface for the temperature gauge to adjust to the water temperature after sitting on deck between stations. After the 3 min soak period it will be lowered to a depth of 200 m or 2 m above the bottom. After the cast, the CTD is carefully set on deck, taking care not to jar the sensitive electronics. During each CTD profile, water samples will be collected at the surface, bottom (or max depth), and the in situ observed chlorophyll maximum.

Egg sampling

A CUFES will be used to sample fish eggs and invertebrate zooplankton from near surface waters at regular intervals throughout the survey. The system consists of a concentrator and collector that are connected to the ship's main sea chest and associated pump. This pump will be running continuously throughout the survey once the first CUFES sample is taken. The Bridge will be notified when a CUFES sample is taken, if requested, otherwise the CUFES log book will remain available for officers to copy for their records. No special operations by the ship will be needed for sampling while underway; however, a sample may be collected on station during CTD deployment and may require the ship to hold position until sampling is complete. Samples will be preserved and remain in 95% ETOH. In the areas where the SEAMAP state partners collect standard plankton samples (i.e., bongo, neuston, CTD), the *Gunter* will steam the track line while CUFES samples are collected. The FPC will remain in contact with the state partners and in the event that they are unable to sample any of their designated stations, the *Gunter* will stop at these stations and deploy the standard gear.

Spatial Resolution Sampling

Examination of the spatial resolution of our sampling grid will be conducted by sampling between standard SEAMAP grid stations at the 15 nm point (Table 2). These 37 stations are located off of Texas, Louisiana, and Florida (Figure 1). Sampling at these stations will be conducted using a bongo tow, a neuston tow, and a CTD cast. Remaining survey time and weather will determine priority of these samples.

Jellyfish data collection

Jellyfish and select ctenophores collected in plankton samples will be rinsed, removed from the sample (when time permits), identified, counted, measured, and weighed. These data will be recorded on special data sheets and noted in the SEAMAP Access database.

Modifications to Field Operations

Sampling protocol may be altered by the FPC or watch leader in order to optimize sampling for time conservation. The FPC may alter the project instructions in order to accomplish mission objectives but will do so only after consulting with the CO. If additional time becomes available during a leg, the FPC will provide the ship with further station locations at that time, after consulting with the CO. The watch schedule for the scientific party will be posted. At times the schedule may change due to unforeseen circumstances during the cruise. If the schedule does change the ship will be notified.

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 CO.

Scientific dives are not planned for this project. If the ship must conduct dive ops while at sea the CO will confer with the FPC as to when the dive ops will occur so the dive will have the least impact on the scientific work.

E. Applicable Restrictions

Inclement weather

III. Equipment

A. Equipment and Capabilities Provided by the Ship

1. Because of the importance of the CTD equipment package to record environmental data and the need for the Scientific Computing System (SCS) to populate the Fishery Scientific Computing System (FSCS), an Electronics Technician is imperative.
2. Hydrographic winch with wire and meter readout to accomplish CTD/bottle casts and bongo tows up to a 500 m depth. Winch speed should be variable to include 50 m/min during pay-out and 20 m/min during haul back (for bongo tows). Spare slip rings for each winch. Fully functional wire readouts for each winch.
3. Winch, block and wire for deploying neuston net.
4. ADCP
5. One (1) Primary SBE 9plus CTD configured as follows:
 - a. Unit should be mounted horizontally and mounted in the water sampling frame. The frame should be examined to ensure it is in good physical condition and there are no breaks present in any of the welds supporting the frame.
 - b. The standard 12 position SBE 32 Carousel should be properly mounted in the water sampler section of the frame and tested to ensure that all 12 bottle positions are working properly and respond to software requests for firing.
 - c. The internal Digiquartz pressure sensor should be in good working order and have a calibration/service date not to exceed 365 days.
 - d. The primary sensor suite should be installed and consist of the following (the sensors should have a calibration date as recent as possible, not to exceed 365 days):
 - i. One (1) SBE 3 Premium Temperature sensor
 - ii. One (1) SBE 4 Conductivity sensor
 - iii. One (1) SBE 43 Dissolved Oxygen sensor

- iv. One (1) “Y” air bleeder valve. Valve should be checked to ensure it is not clogged.
 - v. One (1) Wetlabs Wetstar pumped fluorometer
 - vi. One (1) SBE 5T pump that has been checked by Seabird within the last 365 days for proper operation
 - vii. One (1) Wetlabs C-Star transmissometer
 - viii. Proper plumbing. Tubing should be checked to ensure it meets Seabird’s recommended method of plumbing and is free from cracks and holes. With red end caps for proper storage between stations.
- e. The secondary sensor suite should be installed and consist of the following (the sensors should have a calibration date as recent as possible, not to exceed 365 days):
- i. One (1) SBE 3 Premium Temperature sensor
 - ii. One (1) SBE 4 Conductivity sensor
 - iii. One (1) SBE 43 Dissolved Oxygen sensor
 - iv. One (1) “Y” air bleeder valve. Valve should be checked to ensure it is not clogged
 - v. One (1) Wetlabs Wetstar pumped fluorometer
 - vi. One (1) SBE 5T pump that has been checked by Seabird within the last 365 days for proper operation
 - vii. One (1) Wetlabs C-Star transmissometer
 - viii. Proper plumbing. Tubing should be checked to ensure it meets Seabird’s recommended method of plumbing and is free from cracks and holes.
- f. The unit should be properly terminated and connected to a properly functioning SBE 11 Deck Unit. The deck unit should be connected to allow the following:
- i. Proper control of the SBE Water Sampler Carousel via the SEASAVE application
 - ii. Integration of a proper NMEA signal from a GPS unit.
6. A second SBE 9plus profiler should be available as well. Unit does not have to be configured as a complete functioning ready-to-install on the sea cable unit; however, it should have the following components available:
- a. Sensors for a Primary suite (with a calibration date as recent as possible, not to exceed 365 days):
 - i. One (1) SBE 3 Premium Temperature sensor
 - ii. One (1) SBE 4 Conductivity sensor
 - iii. One (1) SBE 43 Dissolved Oxygen sensor
 - iv. One (1) “Y” air bleeder valve. Valve should be checked to ensure it is not clogged.
 - v. One (1) Wetlabs Wetstar pumped fluorometer
 - vi. One (1) SBE 5T pump that has been checked by Seabird within the last 365 days for proper operation.
 - vii. One (1) Wetlabs C-Star transmissometer
 - viii. Proper plumbing. Tubing should be checked to ensure it meets

Seabird's recommended method of plumbing and is free from cracks and holes.

- b. Sensors for a complete Secondary suite (with a calibration date as recent as possible, not to exceed 365 days):
 - i. One (1) SBE 3 Premium Temperature sensor
 - ii. One (1) SBE 4 Conductivity sensor
 - iii. One (1) SBE 43 Dissolved Oxygen sensor
 - iv. One (1) "Y" air bleeder valve. Valve should be checked to ensure it is not clogged.
 - v. One (1) Wetlabs Wetstar pumped fluorometer
 - vi. One (1) SBE 5T pump that has been checked by Seabird within the last 365 days for proper operation.
 - vii. One (1) Wetlabs C-Star transmissometer.
 - viii. Proper plumbing. Tubing should be checked to ensure it meets Seabird's recommended method of plumbing and is free from cracks and holes.
7. A second SBE 11 Deck Unit should be on the ship to be put into service if needed.
8. Two (2) fully operational SBE 19 SEACAT profilers should be available. One of the units should be installed on the sea cable. Both units should have calibration dates not to exceed 365 days.
9. Two (2) functional SBE 36 Deck units should be available (1 for backup) that are configured for the model SEACAT being supplied.
10. Two (2) PDIM units should be available for use with the SBE 19 units. One of these PDIM units should be installed on the primary SBE19 on the sea cable. These PDIM units should also be the proper units that are used with the model SEACATs being used.
11. A fully functional SBE 21 thermosalinograph should be available for the survey. The unit should have calibrations that do not exceed 365 days. The calibration data must be verified/entered into the SEABIRD-TSB.CAL file in the Ship Directory of SCS.
12. The Turner 10-AU Fluorometer associated with the flow-through system should be verified as working. Proper spare bulbs should be made available to the rotating ET so they can be replaced as needed during the survey.
13. It is highly desirable to have the following additional spare sensors on-board if possible:
 - a. One (1) SBE 43 DO Sensor
 - b. One (1) SBE 3 Temperature Sensor
 - c. One (1) SBE 4 Conductivity Sensor
 - d. One (1) Wetlabs Wetstar pumped fluorometer
 - e. One (1) Wetlabs C-Star Transmissometer
 - f. One (1) SBE 5T Pump
14. Copies of all calibration sheets for CTD profilers, TSG, and spare sensors should be provided to the laboratories' Shipboard System Specialist prior to sailing.
15. CTD capable winch and J-frame for CTD casts, with sufficient

electromechanical cable for casts to 500 m.

16. NMEA GPS input to CTD header file.

17. SCS data requested: The SCS system should be fully operational for the duration of the survey. A listing of any sensors that will not be functional for the survey should be provided prior to sailing to the FPC, taking into consideration that event templates will have to be checked by the Shipboard System Specialists to ensure there will be no impact or an alternative sensor can be selected.

a. SIMRAD MX 512

i. SIMRAD MX 512UTC time

ii. Latitude

iii. Longitude

iv. Speed over ground

v. Course over ground

b. Furuno GP-90 GPS

i. Latitude

ii. Longitude

iii. Speed over ground

iv. Course over ground

c. Sperry speed log

i. Speed through the water

ii. Speed over ground

d. EQ50 and EK60 depth in meters

e. Gyro-heading

f. Air temperature (°C)

g. Corrected barometric pressure

h. True wind speed

i. True wind direction

j. Information should be passed to the Rotating ET to ensure the following:

i. The Automatic Logger Control on the SCS Server must be enabled anytime ACQ is started and should use the default of 0:00:00 (Midnight GMT).

ii. The contents of the Eventdata folder should be allowed to remain present for the duration of the survey (they should not be deleted between legs). This will ensure that event IDs do not restart for the respective events during the survey.

k. SEASAVE SOFTWARE: Prior to sailing, the proper .CON files should be built in SEASAVE. The software should be set to look for the proper .CON file for the respective instrument.

18. It is also highly desirable that the ASCII Out function be allowed to feed CTD data into SCS via serial cable.

B. Equipment and Capabilities Provided by the Scientists

1. Flowmeters (6)
2. 2- 61 cm bongo frames, chain and weight, (6) 0.335 mm nets
3. 3- 1 x 2 m neuston frames, (4) 0.950 mm nets, (2) 0.500 mm nets
4. Bongo/neuston gear and equipment box
5. Plankton sampling supplies box
6. Plankton preserving jars, lids and labels
7. Turner Designs 10-AU benchtop Fluorometer
8. Chemical transfer pumps
9. GF/F filters
10. 6 Niskin bottles
11. 4 Garden hoses for washing down nets, nozzles, and hose repair parts
12. Plankton transfer table
13. 5 gal buckets
14. Various clerical supplies
15. Spare batteries for the SBE 19 SEACAT profilers
16. CUFES concentrator and collector

IV. Hazardous Materials

A. Policy and Compliance:

The FPC is 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
Formaldehyde solution (37%)	2 x 10 gal carboy		See C.1 Below	See C.1 Below
Ethanol	3 x 55 gal drum		See C.1 Below	See C.1 Below
Triton X (1%)	1 x 2 gal carboy		See C.1 Below	See C.1 Below
Methanol	10 x 1 gal plastic bottles		See C.1 Below	See C.1 Below

C. Chemical safety and spill response procedures

1. Precaution – all personnel handling chemicals will wear the appropriate PPE. All personnel are trained in handling chemicals.
2. Prevention – all chemicals will be secured before the survey departs. All personnel will be aware of the location of all chemicals. A MSDS for all chemicals brought aboard will be given to the ship before sailing.
3. Response – if a spill occurs scientists will immediately leave the area and alert the bridge. Scientists will defer to the ship's spill plan for a cleanup. Kitty litter and formalin neutralizing agent will be on board for potential spill cleanups.

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*

1. OMAO Data
2. Program Data

B. Responsibilities:

The FPC is responsible for submission of a ROSCOP II form (NOAA, Form 2423) to the National Oceanographic Data Center within 30 days after cruise termination.

VII. Meetings, Vessel Familiarization, and Project Evaluations

A. Pre-Project Meeting: The FPC and CO 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 FPC in arranging this meeting.

B. Vessel Familiarization Meeting: The CO 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 h of the project's start and is normally presented by the ship's Operations Officer.

- C. Post-Project Meeting: The CO is responsible for conducting a meeting no earlier than 24 h before or no later than seven 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, vessel coordinator, FPC, and members of the scientific party and is normally arranged by the Operations Officer and FPC.
- 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.oma.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 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 three 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 Field Party Chief. The FPC and CO 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 FPC 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 FPC 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 FPC will ensure that all non NOAA or non-Federal scientists aboard also have proper orders. It is the responsibility of the FPC 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 CO. 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
E-mail MOA.Health.Services@noaa.gov

Prior to departure, the FPC 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's 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 FPC to ensure members of the scientific party report aboard with the proper attire.

D. Communications

A progress report on operations prepared by the FPC may be relayed to the program office. Sometimes it is necessary for the FPC to communicate with another vessel, aircraft, or shore facility. Through various means of communications, the ship can usually accommodate the FPC. 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 e-mail and the Very Small Aperture Terminal (VSAT) link. Standard VSAT bandwidth at 128kbs is shared by all vessel 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 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 three days of embarking.

F. Foreign National Guests Access to OMAO Facilities and Platforms

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

IX. Appendices

Table 1. NOAA Ship *Gordon Gunter* cruise GU-14-05, plankton stations 21 August – 30 September 2014. Bongo and neuston tows will be taken at all stations in addition to CTD. Station order is subject to change.

SEAMAP ISS Number	Plankton Gear	Latitude	Longitude
B030	PN	26°01'00	96°00'00
B316	PN	26°01'00	96°30'00
B032	PN	26°01'00	97°00'00
B238	PN	26°30'00	97°00'00
B239	PN	26°30'00	96°30'00
B031	PN	27°00'00	96°00'00
B328	PN	27°00'00	96°40'00
B051	PN	27°00'00	97°12'00
B235	PN	27°30'00	97°00'00
B234	PN	27°30'00	96°30'00
B233	PN	28°00'00	96°30'00
B327	PN	28°20'00	96°20'00
B230	PN	28°30'00	96°00'00
B231	PN DM	28°00'00	96°00'00
B232	PN DM	27°33'00	96°00'00
B225	PN DM	27°30'00	95°30'00
B326	PN	27°45'00	95°30'00
B226	PN DM	28°00'00	95°30'00
B228	PN	28°30'00	95°30'00
B221	PN	29°00'00	95°00'00
B222	PN DM	28°30'00	95°00'00
B223	PN DM	28°00'00	95°00'00
B243	PN	27°30'00	94°30'00
B217	PN DM	28°00'00	94°30'00
B218	PN DM	28°30'00	94°30'00
B219	PN	29°00'00	94°30'00
B220	PN	29°25'36	94°30'00
*B213 _(LA)	CUFES	29°30'00	94°00'00
B214	PN	29°00'00	94°00'00
B215	PN DM	28°30'00	94°00'00
B216	PN DM	28°00'00	94°00'00
B244	PN	27°30'00	93°30'00

Table 1 continued.

SEAMAP ISS Number	Plankton Gear	Latitude	Longitude
B209	PN DM	28°00'00	93°30'00
B210	PN DM	28°30'00	93°30'00
B211	PN	29°00'00	93°30'00
*B212 _(LA)	CUFES	29°32'12	93°32'12
*B206 _(LA)	CUFES	29°30'00	93°00'00
B207	PN	29°00'00	93°00'00
B208	PN DM	28°30'00	93°00'00
B023	PN DM	28°00'00	93°00'00
B245	PN	27°30'00	92°30'00
B202	PN DM	28°00'00	92°30'00
B203	PN DM	28°30'00	92°30'00
B204	PN	29°00'00	92°32'30
*B205 _(LA)	CUFES	29°25'00	92°27'24
B200	PN	29°00'00	92°00'00
B201	PN DM	28°30'00	92°00'00
B022	PN DM	28°00'00	92°00'00
B246	PN	27°30'00	91°30'00
B195	PN DM	28°00'00	91°30'00
B196	PN DM	28°30'00	91°30'00
*B197 _(LA)	CUFES	29°00'00	91°30'00
*B193 _(LA)	CUFES	28°47'00	90°53'00
B194	PN DM	28°30'00	91°00'00
B017	PN DM	28°00'00	91°00'00
B247	PN	27°30'00	90°30'00
B190	PN DM	28°05'00	90°30'00
B191	PN	28°30'00	90°30'00
*B192 _(LA)	CUFES	28°54'00	90°33'00
*B188 _(LA)	CUFES	29°00'00	90°00'00
B189	PN	28°30'00	90°00'00
B016	PN DM	28°00'00	90°00'00
B186	PN	28°30'00	89°30'00
*B187 _(LA)	CUFES	28°57'48	89°33'18
*B183 _(MS)	CUFES	29°00'00	89°00'00
B184	PN	28°30'00	89°00'00

Table 1 continued.

SEAMAP ISS Number	Plankton Gear	Latitude	Longitude
*B180 _(MS)	CUFES	29°00'00	88°30'00
*B323 _(MS)	CUFES	29°13.2'00	88°30'00
*B179 _(MS)	CUFES	29°30'00	88°30'00
*B178 _(MS)	CUFES	30°00'00	88°28.2'00
*B177 _(AL)	CUFES	30°00'00	87°57'00
*B176 _(MS)	CUFES	29°30'00	88°02.4'00
*B322 _(MS)	CUFES	29°15'00	88°00'00
B174	PN	29°30'00	87°30'00
*B173 _(AL)	CUFES	29°59'00	87°30'00
*B321 _(AL)	CUFES	30°14'18	87°30'00
B319	PN	30°20'00	87°00'00
B172	PN	29°59'00	87°00'00
B320	PN	29°48'00	87°00'00
B169	PN	29°30'00	86°30'00
B168	PN	30°00'00	86°30'00
B318	PN	30°18'00	86°28'00
B167	PN	30°00'00	86°00'00
B166	PN	29°30'00	86°00'00
B165	PN	29°12'00	86°00'00
B157	PN	29°48'00	85°30'00
B158	PN	29°30'00	85°31'00
B156	PN	29°30'00	84°56'00
B140	PN	29°30'00	84°30'00
B138	PN	29°30'00	84°00'00
B139	PN	29°45'00	84°00'00
B115	PN	29°30'00	83°37'00
B114	PN	28°54'00	83°15'00
B116	PN	29°00'00	83°30'00
B137	PN	29°00'00	84°00'00
B141	PN	29°00'00	84°30'00
B155	PN	29°00'00	85°00'00
B159	PN	29°00'00	85°30'00
B160	PN	28°40.2'00	85°30'00
B154	PN	28°30'00	85°00'00
B142	PN	28°30'00	84°30'00
B136	PN	28°32'00	84°00'00

Table 1 continued.

SEAMAP ISS Number	Plankton Gear	Latitude	Longitude
B117	PN	28°30'00	83°30'00
B113	PN	28°30'00	83°04'00
B112	PN	28°00'00	83°00'00
B118	PN DM	28°00'00	83°30'00
B135	PN DM	28°00'00	84°00'00
B143	PN DM	28°00'00	84°30'00
B153	PN	28°00'00	85°00'00
B144	PN DM	27°30'00	84°30'00
B134	PN	27°30'00	84°00'00
B119	PN DM	27°30'00	83°30'00
B111	PN	27°30'00	83°00'00
B097	PN	27°00'00	82°32'00
B110	PN	27°00'00	83°00'00
B120	PN DM	27°00'00	83°30'00
B133	PN DM	27°00'00	84°00'00
B145	PN DM	27°00'00	84°30'00
B146	PN DM	26°30'00	84°30'00
B132	PN DM	26°30'00	84°00'00
B121	PN DM	26°30'00	83°30'00
B109	PN	26°30'00	83°00'00
B098	PN	26°30'00	82°30'00
B096	PN	26°00'00	82°00'00
B099	PN	26°00'00	82°30'00
B108	PN	26°00'00	83°00'00
B122	PN DM	26°00'00	83°30'00
B131	PN DM	26°00'00	84°00'00
B147	PN	26°00'00	84°30'00
B148	PN	25°30'00	84°30'00
B130	PN DM	25°30'00	84°00'00
B123	PN DM	25°30'00	83°30'00
B107	PN DM	25°30'00	83°00'00
B100	PN	25°30'00	82°30'00
B095	PN	25°30'00	82°00'00
B088	PN	25°28'30	81°43'00

Table 1 continued.

SEAMAP ISS Number	Plankton Gear	Latitude	Longitude
B089	PN	25°00'00	81°33'30
B094	PN	25°00'00	82°00'00
B101	PN	25°00'00	82°30'00
B106	PN DM	25°00'00	83°00'00
B124	PN DM	25°00'00	83°30'00
B129	PN DM	25°00'00	84°00'00
B262	PN	25°00'00	84°30'00

PN – Denotes bongo, standard neuston and CTD

DM – Denotes dual-mesh bongo

*– Denotes stations where plankton will be sampled by state SEAMAP partners. As this cruise progresses, the FPC will remain in contact with the coordinators for the state vessels. In the event that the state vessels may be unable to sample these stations, PN gear will be deployed by the *Gunter* at these stations.

Table 2. Plankton stations to examine spatial resolution aboard NOAA Ship *Gordon Gunter* cruise GU-14-05 from 21 August to 30 September 2014. Bongo and neuston tows will be taken at all stations in addition to CTD. Station order is subject to change and survey time/weather will determine priority of these samples.

SEAMAP ISS Number	Plankton Gear	Latitude	Longitude
LU001	PN	27°15'00	96°15'00
LU002	PN	27°45'00	96°15'00
LU003	PN	28°15'00	95°45'00
LU004	PN	27°45'00	95°45'00
LU005	PN	28°45'00	94°45'00
LU006	PN	28°15'00	94°45'00
LU007	PN	27°45'00	94°45'00
LU008	PN	28°15'00	94°15'00
LU009	PN	28°45'00	94°15'00
LU010	PN	28°45'00	93°45'00
LU011	PN	28°45'00	83°45'00
LU012	PN	28°45'00	84°15'00
LU013	PN	28°15'00	84°15'00
LU014	PN	28°15'00	83°45'00
LU015	PN	27°45'00	83°45'00
LU016	PN	27°45'00	84°15'00
LU017	PN	27°15'00	84°15'00
LU018	PN	27°15'00	83°45'00
LU019	PN	26°45'00	83°15'00

SEAMAP ISS Number	Plankton Gear	Latitude	Longitude
LU020	PN	26°45'00	83°45'00
LU021	PN	26°15'00	83°45'00
LU022	PN	26°15'00	83°15'00
LU023	PN	28°15'00	93°45'00
LU024	PN	28°15'00	93°15'00
LU025	PN	28°45'00	93°15'00
LU026	PN	28°45'00	92°45'00
LU027	PN	28°15'00	92°45'00
LU028	PN	28°15'00	92°15'00
LU029	PN	28°45'00	92°15'00
LU030	PN	28°15'00	91°45'00
LU031	PN	25°45'00	84°15'00
LU032	PN	25°45'00	83°45'00
LU033	PN	25°45'00	83°15'00
LU034	PN	25°45'00	82°45'00
LU035	PN	25°15'00	84°15'00
LU036	PN	25°15'00	83°45'00
LU037	PN	25°15'00	83°15'00

PN – Denotes bongo, standard neuston and CTD

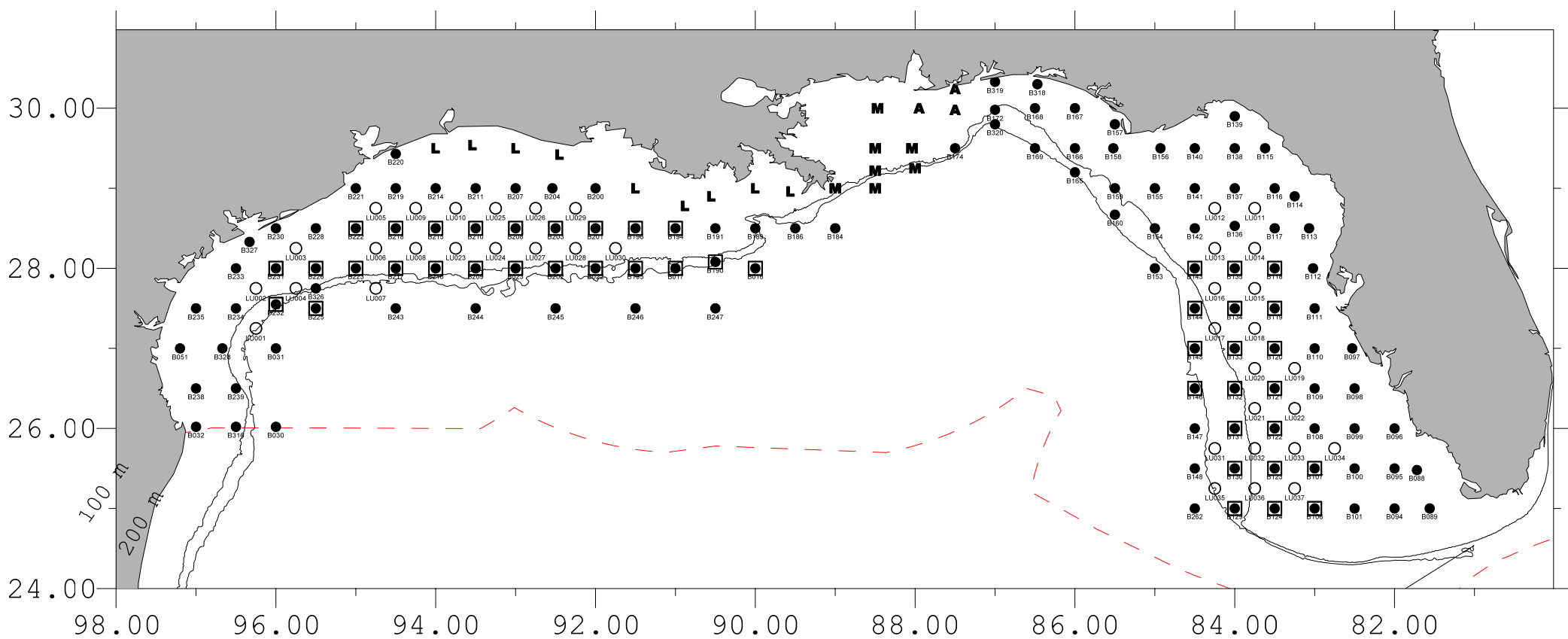


Figure 1. Cruise track with standard SEAMAP plankton stations for NOAA Ship *Gordon Gunter* GU-14-05 August 21 – September 30, 2014. Closed circles represent stations where bongo, neuston, and CTD are to be completed. Dual-mesh bongo stations are represented with an open box around a closed circle. The spatial resolution stations are represented by an open circle. Stations sampled by state SEAMAP partners are represented by the corresponding first letter (A = Alabama, L = Louisiana, M = Mississippi).