



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: LCDR 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-16-09
Pelagic Acoustic Trawl

Attached is the final Project Instruction for GU-16-09, Pelagic Acoustic Trawl, which is scheduled aboard NOAA Ship *Gordon Gunter* during the period of October 11 – November 22, 2016. Of the 40 DAS scheduled for this project, 40 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 OpsMgr.MOA@noaa.gov at Marine Operations Center-Atlantic.



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

3209 Frederic St.
Pascagoula, MS 39564

Project Instructions

Date Submitted: 09/09/2016

Platform: NOAA Ship GORDON GUNTER

Cruise Number: GU-16-09

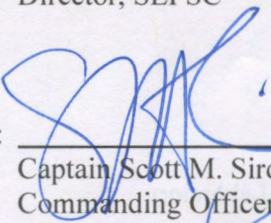
Project Title: Pelagic Acoustic Trawl

Cruise Dates: 10/11/2016 - 11/22/2016

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Field Party Chief **Date:** 09/09/2016

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Lab Director **Date:** 09/15/2016

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Dr. Bonnie Ponwith
Director, SEFSC **Date:** 09/15/2016

Approved by: 
Captain Scott M. Sirois, NOAA
Commanding Officer
Marine Operations Center - Atlantic **Date:** 9/23/16

I. Overview

A. Brief Summary and Project Period

Sample the northern Gulf of Mexico (GOM) with 90 ft high-opening fish trawl to determine the abundance and distribution of benthopelagic fauna species from October 11 to November 22, 2016.

B. Days at Sea (DAS)

Of the 40 DAS scheduled for this project, 0 DAS are funded by an OMAO allocation, 40 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 _____ Operational Tempo.

C. Operating Area

United States northern Gulf of Mexico in water depths between 30 and 275 fm (50 – 500 m) from 82°00' to 97°00' W and 25°00' to 30°00' N (Figure 1). A list of station locations will be provided to the Operations Officer.

D. Summary of Objectives

1. Primary Objectives

- a. Sample the northern GOM with 90-ft high-opening fish trawl to determine the abundance and distribution of benthopelagic fauna.
- b. Collect size measurements to determine population size structure.
- c. Collect biological samples of selected species.
- d. Conduct conductivity/temperature/depth (CTD) casts to profile temperature, salinity, conductivity, transmissivity, dissolved oxygen concentrations and fluorometry.
- e. Collect acoustic data with EK60.
- f. Calibrate the EK60.

2. Secondary Objectives

- a. Conduct additional trawl sampling.
- b. Conduct additional CTD casts.

E. Participating Institutions

1. National Marine Fisheries Service (NMFS) – Pascagoula Laboratory

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

Name (Last, First)	Title	Leg	Date		Gender	Affiliation	Nationality
			Aboard	Disembark			
Campbell, Matthew	WS	2	11/3/16	11/22/16	M	NMFS	US
Felts, Paul	WS	2	11/3/16	11/22/16	M	NMFS	US
Grace, Mark	WL	1 & 2	10/11/16	11/22/16	M	NMFS	US
Hamilton, Alonzo	WS	1 & 2	10/11/16	11/22/16	M	NMFS	US
Hendon, Michael	FPC	1	10/11/16	10/30/16	M	NMFS	US
Hopkins, Nick	WS	1	10/11/16	10/30/16	M	NMFS	US
Ingram, Walter	WS	2	11/3/16	11/22/16	M	NMFS	US
Moser, John	WS	1 & 2	10/11/16	11/22/16	M	NMFS	US
Pollack, Adam	FPC	2	11/3/16	11/22/16	M	Riverside ¹	US
Rademacher, Kevin	WL	1 & 2	10/11/16	11/22/16	M	NMFS	US
Wilkinson, Kenny	WS	1	10/11/16	10/30/16	M	NMFS	US

FPC – Field Party Chief, WL – Watch Leader, WS – Watch Stander, 1 – Riverside Technology, Inc.,

G. Administrative

1. Points of Contacts

- a. Field Party Chief: Adam Pollack; 3209 Frederic St., Pascagoula, MS 39567; (228) 549-1613; Adam.Pollack@noaa.gov
- b. Field Party Chief: Michael Hendon; 3209 Frederic St., Pascagoula, MS 39567; (228) 549-1643; Michael.Hendon@noaa.gov
- c. Trawl Unit Leader: Gilmore “Butch” Pellegrin; 3209 Frederic St., Pascagoula, MS 39567; (228) 549-1688; Gilmore.Pellegrin@noaa.gov
- d. Operations Officer: NOAA Ship Gordon Gunter, 151 Watts Ave, Pascagoula, MS 39567; (228) 327-7905; OPS.Gordon.Gunter@noaa.gov

2. Diplomatic Clearances

None Required.

3. Licenses and Permits

This project will be conducted under the Scientific Research Permit (U.S.) issued by National Marine Fisheries Service on April 23, 2013 to Brandi Noble

- a. NMFS Highly Migratory Species Division Scientific Research Permit
- b. NMFS Southeast Regional Office
- c. Flower Gardens National Marine Sanctuary
- d. FKNMS Scientific Research Permit: Permit No. FKMS-2012-073
- e. NMFS Sea Turtle Permit
- f. Texas Scientific Research Permit: SPR-0596-796

- g. Louisiana Saltwater Scientific Collection Permit: Permit No. 1953
- h. Mississippi Saltwater Scientific Collection Permit
- i. Alabama Saltwater Scientific Collection Permit
- j. Florida Special Activity License: Permit No. SAL-14-0135-SR

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

Leg	Departure Date	Departure Location	Arrival Date	Arrival Location
1	October 11, 2016	Pascagoula, MS	October 30, 2016	Pascagoula, MS
2	November 3, 2016	Pascagoula, MS	November 22, 2016	Pascagoula, MS

B. Staging and Destaging:

Staging: October 5 – 7, 2016 – Pascagoula, MS

Destaging: November 22 – 26, 2016 – Pascagoula, MS

C. Operations to be Conducted

NOAA Ship Gordon Gunter will depart Pascagoula, MS on October 11, 2016 to conduct the Pelagic Acoustic Trawl survey. The 30-day cruise will be conducted in two 15-day legs, requiring 24 hr operations with two scientific watches: 12 am – 12 pm and 12 pm – 12 am. Sampling will begin in the western GOM with the break between legs occurring approximately midway through the cruise track. Trawling stations will consist of CTD casts followed by trawling tows. There may be occasions when the scientific party will request a second CTD cast at trawl sites (based on dissolved oxygen concentrations and magnitude of catch). The FPC or Watch Leader may alter the order of activities to facilitate catch processing. Trawling station locations are not to be moved without prior consultation with the Watch Leader on watch or the FPC.

During the first leg, a test cast of the CTD will be conducted in 100 m of water as soon as possible. The data will be transmitted back to the lab to ensure the CTD is properly functioning. The Engineering Department is requested to test the conveyor system during the CTD cast. Any problems encountered during the test can then be corrected prior to arriving on the first station. Communication between the scientists and the bridge while on station will be accomplished via hand held radios. During rough weather, the watch leader with consultation from the ship's crew will determine which sampling gear can be deployed safely. The FPC should be notified of any delays to sampling due to mechanical, medical, or weather issues as well.

At some point during the cruise, the EK60 will need to be calibrated. Ideally, the ship would anchor in a minimum of 40m of water with minimal wind and waves. If we are not shallow enough to anchor, we would like to conduct the calibration while drifting. We expect this calibration to take 12 to 24 hours to complete. The full calibration procedure can be found in the appendix.

1. Station Operations

Ten min prior to arrival on station, the bridge watch is asked to notify scientists so that preparations can be made. 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.

a. CTD Cast

CTD profiles and environmental data collection will be performed at each station. We request that the ship come to a complete stop, after which the CTD array is to be deployed to just below the water's surface where it will sit for 3 min. The goal is to allow the unit to equilibrate to ambient temperature but not come out of the water. After the 3-min soak, the unit is to be lowered to approximately 2 m above the bottom or a maximum depth of 500 m. Upon completing the cast, the CTD should be carefully set on deck, taking care not to jar the sensitive electronics. At least once a week, a water sample will be taken during a CTD cast. During these casts, the CTD protocol will be as described with the exception that the CTD unit will be held at max depth for 1 min, a water sample collected, and then retrieved.

The watch leader will clear the y-connections periodically throughout the cruise. Additional environmental data collected during daylight hours are water color Forel-Ule, percent cloud cover, and sea condition. The CTD will be in use 24 hours/day. Dissolved oxygen concentrations from sensors on the CTD will be verified using an Orion 3 Star Portable D.O. meter made by Thermo Scientific at the beginning of each leg and then every five days by the FPC. The FPC will transmit data to an FTP site of NOAA's National Coastal Data Development Center located at the Stennis Space Center, Bay St. Louis, Mississippi.

b. Trawl Sampling

At proposed trawling sites, the ship is asked to survey the bottom along the path of the upcoming tow to check for obstructions that may damage the trawl. If the trawl path is determined to be clear of obstructions, the ship will proceed to conduct one tow with the 90-ft trawl. If the trawl path is determined to be untrawlable, then the ship is requested to move no more than 5 miles from the trawl location and survey again. A maximum of three surveys will be conducted. If after the third survey the trawl path is still untrawlable, then the station will be dropped and the ship will proceed to the next station.

Each trawl will be towed for 30 min after the gear has sufficiently settled on the bottom as determined by the ITI net mensuration system, descent rate charts, and/or judgment of the Chief Boatswain. The net will be towed at approximately 3 to 3.5 kt (speed over ground), and exact tow speed will be determined by the behavior of the gear (i.e., the head rope will

need to be fished at 8 m from the bottom, and the foot rope will need to remain near the bottom). Tow depth will be kept as close to constant as possible and depend upon the depth at the beginning of the tow. At the end of the 30 min tow, the ship is requested to quickly increase speed to 5 kt for 2-5 min. This pulse will help force fish in the body of the net into the cod end. Upon completing a station, the ship will proceed to the next sampling site.

The deck department is requested to shake down the net after each tow to remove all organisms. For larger catches the deck department may be requested to weigh the catch with a crane scale. If the net is damaged during the trawl but there are organisms, the deck crew is requested to remove all organisms before proceeding with net repair if net repair is at all possible. In the case of the loss of a trawl net, the ship will attempt retrieval of net by towing a chain with a large grapple along the trawl track in the opposite direction of the initial tow. The amount of time dedicated to trawl retrieval will be decided by the FPC. At any time that the trawl is not secure by the deck department, the scientific party will don personal protective equipment (PPE), which includes, but not limited to, work vest and hardhat. In case of extreme mud in the net, the deck department, OOD, and watch leader will determine the best way to wash down the gear before the catch is emptied from the net.

c. 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. Mitigation Measure for Protected Species

Under the Preferred Alternative, the SEFSC will initiate a formalized “Move-on” Rule. If any marine mammals, sea turtles or other protected species are sighted around the vessel before setting the gear, the vessel may be moved away from the animals to a different section of the sampling area if the animals appear to be at risk of interaction with the gear at the discretion of the Field Party Chief (Chief Scientist) and Scientific Watch Leader. In most cases, fishing gear is not deployed if marine mammals or sea turtles have been sighted near the ship unless those animals do not appear to be in danger of interactions with the gear, as determined by the judgment of the FPC (Chief Scientist) and Scientific Watch Leader.

The SEFSC will initiate a process for its FPC (Chief Scientist), Scientific Watch Leaders and vessel officers to communicate with each other about their experiences with protected species interactions during research work with the goal of improving decision-making regarding avoidance of adverse interactions. As noted in the Status Quo Alternative description of mitigation measures, there are many situations where professional judgment is used to decide

the best course of action for avoiding protected species interactions before and during the time research gear is in the water. The intent of this mitigation measure would be to draw on the collective experience of people who have been making those decisions, provide a forum for the exchange of information about what went right and what went wrong, and try to determine if there are any rules-of-thumb or key factors to consider that would help in future decisions regarding avoidance practices. The SEFSC would coordinate not only among its staff but also with those from other fisheries science centers with similar experience.

The SEFSC deploys a wide variety of gear to sample the marine environment during all of their research cruises, such as plankton nets, oceanographic sampling devices, video cameras, and ROVs. These types of gear are not considered to pose any risk to protected species because of their small size, slow deployment speeds, and/or structural details of the gear and are therefore not subject to specific mitigation measures. However, the officer on watch and crew monitor for any unusual circumstances that may arise at a sampling site and use their professional judgment and discretion to avoid any potential risks to protected species during deployment of all research equipment.

i. Monitoring methods

The officer on watch (or member of the Scientific Party), and crew standing watch on the bridge visually scan for marine mammals, sea turtles, and other ESA-listed species (protected species) during all daytime operations. Bridge binoculars are used as necessary to survey the area upon arrival at the station, during visual and sonar reconnaissance of the trawl line to look for potential hazards (e.g., commercial fishing gear, unsuitable bottom for trawling, etc.), and while the gear is deployed. If any marine mammals or sea turtles are sighted by the bridge or deck crew prior to setting the gear or at any time the gear is in the water, the bridge crew and/or Chief Scientist are alerted immediately. Environmental conditions (e.g., lighting, sea state, precipitation, fog, etc.) often limit the distance for effective visual monitoring of protected species.

ii. Operational Procedures

If any marine mammals, sea turtles or other protected species are sighted around the vessel before gear deployment, in most cases, gear is not deployed unless those animals do not appear to be in danger of interactions with the gear, as determined by the judgment of the Field Party Chief/Scientific Watch Leader (Chief Scientist). The vessel may be moved or gear deployment may be delayed until the animals no longer appear to be at risk of interaction with the gear.

If trawling operations have been delayed because of the presence of marine mammals or sea turtles, the vessel resumes trawl operations only when these species have not been recently sighted or otherwise determined to no longer be at risk. This decision is at the discretion of the Field Party Chief (Chief Scientist) or Scientific Watch Leader and is dependent on the situation,

Once the trawl net is in the water, if protected species are sighted before the gear is fully retrieved, the most appropriate response to avoid incidental take is determined by the professional judgment of the Field Party Chief (Chief Scientist) or Scientific Watch Leader in consultation with the officer on watch as necessary. These judgments take into consideration the species, numbers, and behavior of the animals, the status of the trawl net operation (net opening, depth, and distance from the stern), the time it would take to retrieve the net, and safety considerations for changing speed or course. Most marine mammals have been caught during haul-back operations, especially when the trawl doors have been retrieved and the net is near the surface and no longer under tension.

In some situations, risk of adverse interactions may be diminished by continuing to trawl with the net at depth until the marine mammals and/or sea turtles have left the area before beginning haul-back operations. In other situations, swift retrieval of the net may be the best course of action. The appropriate course of action to minimize the risk of incidental take of protected species is determined by the professional judgment of the Field Party Chief (Chief Scientist) or Scientific Watch Leader based on all situational variables, even if the choices compromise the value of the data collected at the station.

Care is taken when emptying the trawl, including opening the cod end as close as possible to the deck of the checker (or sorting table) in order to avoid damage to protected species that may be caught in the gear but are not visible upon retrieval. The gear is emptied as quickly as possible after retrieval in order to determine whether or not protected species are present.

iii. Tow Duration

Standard tow durations for bottom trawl surveys are 30 minutes at targeted depth, excluding deployment and retrieval time, to reduce the likelihood of attracting and incidentally taking protected species. These short tow durations decrease the opportunity for curious marine mammals to find the vessel and investigate. Tow times are less than the 55 minute tow time restriction required for commercial shrimp trawlers not using turtle excluder devices (TEDs) (50 CFR 223.206). The resulting distance towed is typically one to two nautical miles or less, depending on the survey and trawl speed. Short tow times reduce the likelihood that captured sea turtles would drown.

2. EK60 Acoustic Data

During the survey, the EK60 will be used in order to collect acoustic data to produce estimates of biomass. The EK60 will operate continuously night and day. The ST or ET on duty will be responsible for turning the EK60 on or off so that the bridge sounders may be operated as determined by the OOD. When the EK60 is running, it should be synchronized with the ES60 and ADCP. The EK60 display should be checked periodically for evidence of interference from

other acoustic systems. Gordon Gunter has the following acoustic systems that potentially corrupt data collected with the Simrad EK60

- a. 75 kHz RDI Ocean Surveyor ADCP, controlled from Dry Lab
- b. 200 kHz Furuno echosounder, controlled from Bridge.
- c. 50/200 kHz Simrad EQ50 echosounder, controlled from Bridge.
- d. 300 kHz Sperry Doppler Speed Log, controlled from ET office with repeater display on Bridge.

Anytime use of these systems is not critical for vessel operations they should be powered off to avoid interference with Simrad EK60 data collection.

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

Conditions that preclude normal operations include poor weather conditions.

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 winches with wire and meter readout to accomplish CTD/bottle casts up to a 500 m depth. Winch speed should be variable to include 50 m/min during pay-out. Spare slip rings for each winch. Fully functional wire readouts for each winch.
3. Net reel - for spooling the 90 ft HBOT
4. Trawl winches with sufficient wire to fish in 500 m (275 fm) depths and meter readouts to determine warp length
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. With red end caps for proper storage between stations.
 - 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. With red end caps for proper storage between stations.
- 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. With red end caps for proper storage between stations.
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. Furuno 951 GPS
 - i UTC 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. Furuno doppler 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 and/or ST 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.
19. Simrad EK60 Splitbeam Echosounders operating at
 - a. 18 kHz
 - b. 38 kHz
 - c. 120 kHz
 - d. 200 kHz

20. Transducer layout plan showing location of EK60 transducers relative to ship frame numbers
21. Calibration rigging equipment
 - a. Three 18 ft. outrigger poles
 - b. Manual control reels
22. Inside and outside conveyor belts for processing catches.
23. Freezer space for preserving scientific specimens.
24. DRYLAB REMOTE COMPUTERS - Due to the nature of the work involved with data collection for this survey, it is recommended that all three (3) FSCS Remote units be verified for the following prior to sailing:
 - a. All three computers are 100% operational
 - b. All three computers are properly setup to interface as SCS clients
 - c. Two of the units have a functioning copy of Microsoft Office 2003 Professional or greater consisting of:
 - i. Microsoft Word 2003 or Greater
 - ii. Microsoft Excel 2003 or Greater
 - iii. Microsoft Access 2003 or Greater
 - iv. PowerPoint 2003 or Greater
 - d. All three computers must be able to print to a functioning printer.
25. FPC COMPUTER - It is requested the following software be installed on the computer in the FPC's stateroom:
 - a. Microsoft Office 2003 Professional or greater consisting of:
 - i. Microsoft Word 2003 or Greater
 - ii. Microsoft Excel 2003 or Greater
 - iii. Microsoft Access 2003 or Greater
 - iv. PowerPoint 2003 or Greater
 - v. R (<https://www.r-project.org/>)
 - vi. R Studio (<https://www.rstudio.com/>)
 - vii. QGIS (<http://www.qgis.org/en/site/>)
 - viii. SAS (Statistical Analysis System) – It is recommended that the lab's Shipboard Systems Specialist be permitted to install this software to ensure the latest version of the software is installed. This software is licensed for installation on the ship.
26. Due to the reporting requirements of this survey, we request an increase in Internet bandwidth so that data packages can be transmitted to shore in near real-time. CTD data are processed at sea and transmitted to the National Centers for Environmental Information (NCEI). These data are then shared with the National Data Buoy Center (NDBC), Global Temperature Salinity Profile Program (GTSPP), Naval Oceanographic Office (NAVOCEANO), and Fleet Numerical in Monterey, California (FNMOC). The optimal reporting frequency is near real-time, but at least every 4 to 6 hours so internet dependability is essential.

B. Equipment and Capabilities provided by the scientists

1. 90-ft HOBOT survey trawls (4); and bridles and rigging (3 sets)
2. 3.5m steel doors (2 sets)
3. Trawl hardware box
4. Spare webbing and net repair materials
5. Three electronic fish measuring boards
6. Three touch screen monitors for the FSCS
7. Three FSCS workstations

8. FSCS Server
9. Three label printers
10. Five hundred plastic specimen bags
11. Five Marel 1100 electronic weighing scales with calibration weights
 - a. Two 30-kg capacity
 - b. Three 6-kg capacity
12. Field data sheets
13. Crane scale
14. Fish baskets, shovels, sorting rakes and trays
15. Three Niskin bottles
16. Safety goggles
17. Latex and Nitrile puncture resistant work gloves
18. Grapple and chain for retrieving lost trawl
19. Handheld Orion 3 star meter and equipment box
20. Five ICOM VHF Marine handheld radios (IC-M72)
21. Various clerical supplies
22. Dissecting Microscopes
23. Fish and Invertebrate Identification Reference Materials
24. Toughbook (hooked to the ships public internet)
25. EK60 Calibration Supplies
 - a. Calibration Target
 - b. 200 ft. of lightweight nylon twine
 - c. 1 lb. weight or shackle
 - d. 4 lb. weight
 - e. Spectra fishing line
 - f. Dishwashing liquid

IV. Hazardous Materials

A. Policy and Compliance

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

B. 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 hours 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 hrs before or 7 days after the completion of a project to discuss the overall success and short comings of the project. Concerns

regarding safety, efficiency, and suggestions for future improvements shall be discussed and mitigations for future projects will be documented for future use. This meeting shall be attended by the ship's officers, applicable crew, the 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 FPC. 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 FPC. The FPC and Ops Officer will work together on a detailed berthing plan to accommodate the gender mix of the scientific party taking into consideration the current make-up of the ship's complement. The 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 FPC 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 four 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 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 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 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

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

IX. Appendices

A. Figures

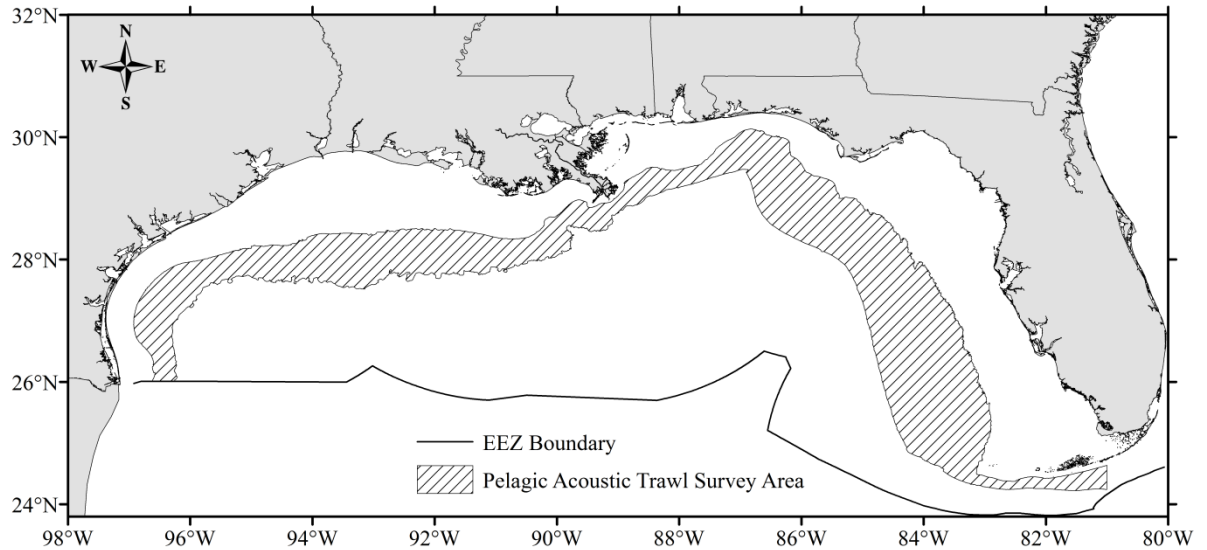


Figure 1. Pelagic Acoustic Trawl survey operational area between 50 and 500 m.

B. Calibration Procedure for EK60

1. Ship Requirements

- a. Perform CTD cast to provide temperature and salinity for upper 50m of water column
- b. Ship will drift, without maneuvering, in water at least 40 m deep with wind initially on the port side.
- c. Ship will periodically be required to make a slow turn to put wind on opposite side. This maneuver will probably be required once for each of four EK60 transducers.
- d. Except for emergencies, maneuvering should only occur at scientists request and must be done very slowly to prevent fouling the suspended calibration gear.
- e. Ship will refrain from discharging waste during calibration activities.

2. Weather Requirements

- a. Low (ideally zero) winds and calm (ideally flat) seas are necessary to make calibration successful
- b. If the ship drifts at a speed through the water of 2 kt or more it is very difficult to control the location of the calibration target and perform a worthwhile calibration of the echosounder system

3. Preparation

- a. Conduct CTD cast to obtain measurements of temperature and salinity for upper 50m of water column
- b. ER60 Software settings
 - i. Set transducer depths to zero
 - ii. Set Ping Control to Interval and Rate to 1 sec
 - iii. Set echogram range to 40m
 - iv. Set data recording range to 60m

4. Deploying Calibration Target

- a. Calibration target must be kept clean and not dropped on deck or banged against hull during deployment. Scratches or other damage and oil or other contaminants on the surface of the sphere will alter its acoustic target strength. Prior to calibration, soak target sphere in a solution of 1-part dishwashing liquid and 4-parts water to discourage entrapment of bubbles on sphere surface when immersed in seawater for calibration. Otherwise calibration target should be kept in its protective case
- b. Mount Outriggers
- c. Rig snap swivels on ends of downrigger lines through pulleys on outriggers
- d. Lower ends of downrigger lines to sea surface and set depth counters to zero; depth counters should not be reset again during calibration
- e. Bring ends of the two downrigger lines on one side of ship up to a common point midway between the mounting locations
- f. Pull the downrigger line from the other side of the ship under hull to attach to the two lines
 - i. Position 1 lb. weight at midpoint of 200 ft. nylon cord
 - ii. Drop weight from bow of vessel and walk the ends of cord back to the single outrigger position on one side and midpoint of outrigger locations on other side
 - iii. Attach end of cord to single downrigger line and lower until counter indicates 150 ft. depth
 - iv. Retrieve the cord from the other side and attach swivels of all three lines together
- g. Attach monofilament loop on calibration target to spectra fishing line with 4 lb. weight attached at lower end and upper end attached to three downrigger lines.
 - i. Length of line between the target and the weight, and between the target and downrigger swivels must be at least two acoustic pulse lengths.
 - ii. For 1 msec acoustic pulse lengths, 5 m spacing is recommended
- h. Lift the calibration target out of detergent solution using the line and without touching it lower it and the 4lb weight into the water
 - i. Lower 4 lb. weight and target until they are suspended from two outriggers
- j. Simultaneously lower two outriggers so counters read 115 ft.
- k. Return opposite downrigger from 140 ft. to 115 ft.
- l. Adjust downriggers so that echoes from calibration target are observed near center of the beam of the first transducer to be calibrated, at approximately 25m depth

5. Collect Calibration Data

- a. Calculate the average temp and salinity for upper 30m of water column, enter these values in ER60 Environment dialog window
- b. Start recording of raw data
- c. Calculate sphere target strength at each EK60 frequency using the specific depth, temperature, and salinity of the sphere location
- d. Start and follow the Calibration procedure from the EK60 Operations Manual for the first transducer
- e. Adjust position of target in transducer beam to collect at least 25 echoes in each quadrant of the beam
- f. Echoes near the center of the beam are most important for estimating biomass
- g. If the downriggers can't be adjusted to put the target in windward portions of the transducer beam, the ship must be turned to make that the leeward side of the transducer beam
- h. When enough target echoes have been collected with the first transducer, Save the results and continue with the other transducers in the same fashion

6. Recover Calibration Target

- a. Lower the single outrigger on one side so that the calibration target can be retrieved
- b. Rinse the calibration target in fresh water and store it safely

7. Resume survey data collection