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: Lieutenant Commander Jeffery Taylor, NOAA
Commanding Officer, NOAA Ship *Henry B. Bigelow*

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

SUBJECT: Project Instruction for HB-16-03
AMAPPS Abundance Survey

Attached is the final Project Instruction for HB-16-03, AMAPPS Abundance Survey, which is scheduled aboard NOAA Ship *Henry B. Bigelow* during the period of June 27 – August 25, 2016. Of the 54 DAS scheduled for this project, 54 days are funded by a Line Office Allocation. This project is estimated to exhibit a Medium Operational Tempo. Acknowledge receipt of these instructions via e-mail to **OpsMgr.MOA@noaa.gov** at Marine Operations Center-Atlantic.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northeast Fisheries Science Center
166 Water Street
Woods Hole, MA 02543-1026

Final Project Instructions

Date Submitted: June 9, 2016

Platform: NOAA Ship *Henry B. Bigelow*

Project Number: HB-16-03, Legs 1, 2, and 3

Project Title: AMAPPS abundance survey

Project Dates: 27 June – 25 August 2016

Prepared by: Debra Palka Dated: 6/20/16
Debra Palka
Chief Scientist
PSB, NEFSC, Woods Hole

Approved by: Dated: 6/16/16
William A. Karp, Ph.D.
Science and Research Director
Northeast Fisheries Science Center

Approved by: Dated: 6/23/16
FOR Captain Scott M. Sirois, NOAA
Commanding Officer
Marine Operations Center - Atlantic

I. Overview

A. Brief Summary and Project Period

B. Days at Sea (DAS)

Of the 54 DAS scheduled for this project, 0 DAS are funded by an OMAO allocation, 54 DAS are funded by a Line Office Allocation, 0 DAS are Program Funded, and 0 DAS are Other Agency funded. This project is estimated to exhibit a _Medium_ Operational Tempo.

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

Shelf, slope and offshore waters extending from Cape Hatteras, NC to the Scotian Shelf

D. Summary of Objectives

The objectives of all three legs are to:

1) Determine the distribution and abundance of marine mammals, sea turtles and sea birds within the study area;

2) Collect vocalizations of cetaceans using passive acoustic hydrophones;

3) Determine the distribution and relative abundance of plankton using bongo nets with CTDs, midwater trawls, visual plankton recorder and EK-60;

4) Collect hydrographic and meteorological data, and

5) When possible, collect biopsy samples and photo-identification pictures of cetaceans.

E. Participating Institutions

NMFS-Northeast Fisheries Science Center, Woods Hole, MA, Protected Species Branch
NMFS-Northeast Fisheries Science Center, Woods Hole, MA, Oceanography Branch
NMFS-Northeast Fisheries Science Center, Woods Hole, MA, Ecosystem Survey Branch
Integrated Statistics, Inc., Woods Hole, MA
Bureau of Safety and Environmental Enforcement - Gulf of Mexico Region

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

Abbreviations are defined below table.
The shipboard Foreign National Sponsor for Legs 1 & 2 are Debra Palka and for Leg 3 is Peter Duley.

Name (Last, First)	Title	Date Aboard	Date Disembark	Gender	Affiliation	Nationality
Davis, Genevieve	PA team	8/9/2016	8/25/2016	F	IS, Inc	US
Gurnee, Julianne	PA team	6/27/2016	7/14/2016	F	IS, Inc	US
Haver, Samara	PA team	7/18/2016	8/5/2016	F	IS, Inc	US
Izzi, Annamaria	PA team	6/27/2016	8/5/2016	F	IS, Inc	US
Stanistreet, Joy	PA team	8/9/2016	8/25/2016	F	IS, Inc	US
Tremblay, Christopher	PA team	6/27/2016	7/14/2016	M	IS, Inc	US
Chevez, Samuel	Visual team	6/27/2016	7/14/2016	M	IS, Inc	US
Porter, Lauren	Oceanography	6/27/2016	7/14/2016	F	Volunteer	US
Force, Michael	Seabird team	6/27/2016	8/25/2016	M	IS, Inc	Canada
Gatzke, Jennifer	Visual team	6/27/2016	8/25/2016	F	IS, Inc	US
LaBrecque, Erin	Visual team	6/27/2016	8/25/2016	F	IS, Inc	US
Metheny, Nicholas	Seabird team	6/27/2016	8/25/2016	M	IS, Inc	US
Pusser, Todd	Visual team	6/27/2016	8/25/2016	M	IS, Inc	US
Roden, Carol	Visual team	6/27/2016	8/25/2016	F	IS, Inc	US
Yin, Suzanne	Visual team	6/27/2016	8/25/2016	F	IS, Inc	US
Broughton, Elisabeth	Oceanography	6/27/2016	8/5/2016	F	NEFSC	US
Hardee, Rachel	Visual team	6/27/2016	8/5/2016	F	IS, Inc	US
Holt, Richard	Visual team	6/27/2016	8/5/2016	M	IS, Inc	US
Palka, Debra	Chief Scientist	6/27/2016	8/5/2016	F	NEFSC	US
Epperson, Deborah	Visual team	7/18/2016	8/5/2016	F	BSEE	US
Jech, Michael	Oceanography	7/18/2016	8/5/2016	M	NEFSC	US
Aschettino, Jessica	Visual team	8/9/2016	8/25/2016	F	IS, Inc	US
Cerchio, Sal	Visual team	8/9/2016	8/25/2016	M	IS, Inc	US
Cholewiak, Danielle	Chief Scientist	8/9/2016	8/25/2016	F	NEFSC	US
Duley, Peter	Visual team	8/9/2016	8/25/2016	F	NEFSC	US

PA= Passive acoustic team.

IS, Inc=Integrated Statistics, Inc.

BSEE= Bureau of Safety and Environmental Enforcement.

M=male.

F=Female.

G. Administrative

1. Points of Contacts:

Principal investigator for all 3 legs and Chief Scientist Legs 1 & 2: Dr. Debra Palka, NEFSC, 166 Water St., Woods Hole, MA 02543; 508-495-2387; debra.palka@noaa.gov

Chief Scientist Leg 3: Dr. Danielle Cholewiak; NEFSC, 166 Water St., Woods Hole, MA 02543; 508-495-2010; danielle.cholewiak@noaa.gov

Protected Species Branch Chief: Dr. Sean Hayes, Branch Chief; NEFSC, 166 Water St., Woods Hole, MA 02543; 508-495-2347; sean.hayes@noaa.gov

Vessel Operations Coordinator: Nathan J. Keith; NEFSC, 166 Water St, Woods Hole, MA 02543; 508-495-2224; Nathan.Keith@noaa.gov

Commanding Officer *Henry B. Bigelow* : LCDR Jeffrey Taylor Ship Cell 774-487-7585: VOIP 541-867-8929: Iridium 808-684-1194; CO.Henry.Bigelow@noaa.gov

Ops Officer *Henry B. Bigelow*: LT Laura Gibson Ship Cell 774-487-7585: VOIP 541-867-8929: Iridium 808-684-1194; OPS.Henry.Bigelow@noaa.gov

2. Diplomatic Clearances

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

3. Licenses and Permits

This project will be conducted under the following Scientific Research Permits:

- Marine Mammal Protected Species Permit Number 17355-1 (US) issued by Office of Protected Resources on 21 May 2015 to NEFSC (William Karp).
- Foreign Fishing Vessel License (Canada) #343609
- Species at Risk Act permit (Canada) issued by Canada (Marci Penney) on 14 Apr 2016 to NOAA (Debra Palka and Peter Duley)

II. Operations

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

A. Project Itinerary:

The cruise will consist of three parts, with a port call between the parts.

Leg I 27 Jun – 14 Jul 2016:

23-24 Jun:	Load gear to be used for all three legs
27 Jun:	Embark scientific personnel, depart for local small boat training, then depart Newport, RI to study area
27 Jun - 14 Jul:	Conduct the survey per Operational Plans
14 Jul:	Return to Newport, RI, disembark and/or exchange scientists.

Leg II 18 Jul – 5 Aug 2016:

18 Jul:	Embark scientific personnel, calibrate EK60 off pier, then depart Newport, RI
18 Jul - 5 Aug:	Conduct the survey per Operational Plans
5 Aug:	Arrive Woods Hole, MA, disembark and/or exchange scientists.

Leg III 9 Aug – 25 Aug 2016:

9 Aug:	Embark scientific personnel and depart Woods Hole, MA
9 - 25 Aug:	Conduct the survey per Operational Plans
25 Aug:	Return to Newport, RI, disembark scientists and unload scientific gear.

B. Staging and Destaging:

Staging:	23-24 Jun
Destaging:	25 Aug

C. Operations to be conducted:

1. Distance Training/Testing – All three legs

Prior to beginning operations (or within the first couple of days of each leg, depending upon the weather) perform training and testing of observers' ability to estimate sighting distances. This could be accomplished by having NOAA Ship *Henry B. Bigelow* stay in precisely the same position and point the bow towards a clear view of the horizon. Visual observers using binoculars and naked eye will estimate the distance to a black buoy that is deployed from a small boat which has been deployed from NOAA Ship *Henry B. Bigelow*. The GPS location of the small boat will be compared to the GPS location of the two sighting platforms to determine the true distance between the sighting platform and the buoy which can then be compared to the estimated distances made by the observers. The buoy will be placed at

various positions around NOAA Ship *Henry B. Bigelow* from meters in front of the ship to 5 nautical miles in front of the ship. Training of observers will be done by having the true distance reported to the observers immediately after they make their estimate the distance. Testing will be done by withholding the true distance information until after a series of estimated distances have been made.

2. Visual Marine Mammal-Sea Turtle Sighting Team – All three legs

During all three legs, a visual line-transect survey will be conducted during daylight hours (approximately 0600-1800 local time with a 1 hour break at lunchtime) using the two independent team procedure. Depending on the weather, surveying may be conducted after dinner until dusk. Each team has 4 people (of which 1 is off-effort). Surveying will be conducted during good weather conditions (Beaufort sea state 4 and below) while traveling about 10 – 11 knots as measured over the ground, at least 6 knots. Survey activity will be conducted along transects whose starting point and direction may be a modification of pre-determined track lines depending on daily weather conditions, satellite imagery, and sea conditions. Thus, the exact track lines to be covered during a day will be determined no later than 19:30 the night before during the daily briefing.

Scientific personnel will form two visual marine mammal-sea turtle sighting teams; one on the flying bridge and the other on the anti-roll tank platform. Both teams will use two 25x150 powered binoculars to detect animal groups. Observers on each team will rotate positions within a team every 30 minutes. Sightings and effort data will be entered by the scientists using a hand held data entry system.

The upper team on the flying bridge will require 1 serial GPS feed and 1 feed to the ship's SCS. The lower team on the roll tank will require 1 feed to the ship's SCS.

The visual teams, acoustic team, and bridge personnel will be in radio contact with each other and data entered by the visual teams will be displayed for the acoustic team to see (who will be located in the dry lab) using the ship's intranet system.

Bridge officers are requested to give a couple minutes notice before the ship will be starting and ending each transect line and at the beginning and end of the day.

At times when it is not possible to positively identify a species, surveying will go off-effort and the ship will head in a manner to intercept the animals in question. When the species identification is confirmed and the group's vocalizations are recorded, the ship shall proceed back to the point the ship departed from the track line. When the ship gets close to the original departure point, the bridge will inform the survey teams that they are approaching the track line and then, when the ship is back on the track line and at surveying speed, the bridge would again notify the teams that we are back on-effort.

In addition there will be a fifth big eye binocular stand mounted on the flying bridge that is independent of the two four-person visual sighting teams. This binocular will be used by the chief scientist who will be attempting to identify if groups of animals have been detected by one or both teams or collecting dive time data from groups that can be followed with the binoculars.

3. Seabird Sighting Team- All three legs

When the visual marine mammal-sea turtle sighting teams are on-effort and whenever else feasible, the seabird team will be visually searching for seabirds. This team will be located on the flying bridge. The two people on this team will switch off every two hours so that at any time there is at least one seabird observer on-effort. This observer will search for seabirds using the naked eye, and use hand held binoculars to confirm the species identification and group size. The seabird team members will follow standard 300m strip-transect protocols for seabirds. Seabird sightings and effort data will be entered by the scientists using a hand held, at sea, data entry system.

There will be times, particularly in Beaufort sea state 5 conditions when the ship is transiting on a track line and the seabird and passive acoustic teams will be on-effort collecting data even though the visual marine mammal-turtle team will not be on-effort.

4. Cetacean Biopsy and Photograph Collection – All three legs

At the discretion of the Chief Scientist, the ship will break effort from the track line and travel to investigate groups of cetaceans. At this time, and perhaps at other times, several scientists will be responsible to photograph the animals to confirm the species identification. Most photographs will be taken from the bow of the ship. Photographs will be collected using a 6.3 digital SLR camera (Canon EOS D10) equipped with a 100-300 mm zoom lens. A 500 mm 4.5 power lens will also be available for taking pictures. Time stamped JPEG images will be saved onto the cameras' compact flash cards and downloaded onto a desktop computer at the end of each day. All images will be kept in the NEFSC Protected Species Branch digital archives. Copies of all humpback whale fluke and dorsal fin images will be sent to the North Atlantic Humpback Whale Catalogue at College of the Atlantic, Bar Harbor, ME, and to the Center for Coastal Studies in Provincetown, MA.

At the discretion of the Chief Scientist, when the ship breaks to investigate a group of cetaceans, biopsy samples may be collected from the bow of the NOAA Ship *Henry B. Bigelow*. Biopsy samples will be collected using crossbows. The bolts have hollow stainless steel tips with tines inside to retain the samples. The tips themselves are 5mm in diameter and 25-40m in length. Molded foam near the bolts' tip is used to keep the tip floating so they can be retrieved after the shot. A "Game Tracker" line dispensing system will be used to retrieve bolts when sampling from the bow of NOAA Ship *Henry B. Bigelow*.

Biopsy samples will be processed in the ship's wet lab at the end of each day. Each sample will be placed in a vial containing dimethyl sulfoxide (DMSO). The samples will be sent to Dr. Patricia Rosel of the Southeast Fisheries Science Center for genetic analysis.

5. Acoustic Detection Team

This team will be responsible for recording vocalizations of cetaceans using passive acoustics. Acoustic data will primarily be collected using a towed hydrophone array, but will also be collected using sonobuoys during evening "listening stations". At night during legs 1 and 2, limited passive acoustic work will be conducted, with nighttime focus on oceanography work. At night during leg 3 passive acoustic experiments will be the main focus with very limited oceanography work.

5.1 DAYTIME OPERATIONS – all three legs

When the visual marine mammal-sea turtle sighting team is on-effort, the acoustic detection team will also be on-effort and the array deployed. The acoustic array will be deployed every survey morning after the CTD/Bongo, at approximately 05:45h. The array will also be deployed at nighttime as discussed in more detail below.

The acoustic team will be stationed inside the ship, with the most likely location being in the dry lab, where it was located previously. From this location, the acoustic team will maintain contact with the upper visual team to be notified of each new cetacean group. This information will be transmitted to the visual team's data stream using the ship's intranet system as well as via radio that is held by the visual team members.

Additionally, a protocol will be established between the acoustic and visual teams to facilitate data collection when the ship breaks survey track to investigate a group of animals. This protocol will include the following: a) before the ship breaks from the track line, notify the acoustic team when the ship will break track (so that the recording equipment settings can be adjusted to compensate for the increase in noise experienced during maneuvering); b) and once the visual team is satisfied with species identification and collection of photographs, etc., the ship may be asked to maintain a straight-line transit for five minutes to facilitate the collection of high quality acoustic recordings before returning to trackline.

Recordings of acoustic detections will be made onto several laptop and desk top computers, utilizing two of the ship's computers if possible. The acoustic team will require 3-4 GPS feeds from the ship. The main passive acoustic hydrophone array consists of a 400m cable with 8 hydrophone elements. The array should be mounted onto the starboard side net reel, and will be deployed off the stern with the assistance of several members of the deck crew and the acoustic team. The steel beams previously built by the ship to accommodate the array on the net reel should be installed. A removable deck cable will connect between the hydrophone array cable and the computers in the lab. A second towed array will be brought on board as a back-up.

The ship will be requested to slow to 2-3 kts for the deployment and recovery of the array, which takes approximately 5-10 minutes. While the array is in the water, the ship will be requested not to make turns greater than 60°, so as to minimize strain on the electrical wires inside the array. Therefore, maneuvers at the end of the tracklines or to follow animals will require a broad turn radius. In addition, when the ship is operating in waters less than 100m depth, maneuvering may be restricted while the array is in the water. In these situations, the visual team and the bridge should communicate with the acoustics team to determine whether the array should be retrieved before the ship breaks track.

5.2 NIGHTTIME OPERATIONS – Legs 1 & 2

During Leg 1, the passive acoustics team will deploy a sonobuoy each evening as an additional acoustic monitoring station. Sonobuoy operations are aimed at detecting vocalizing baleen whales. The sonobuoy should be deployed approximately 1nmi from where oceanographic operations are planned, so that the acoustic team can monitor the signal throughout the period that the oceanographic team is collecting data. Sonobuoys will automatically scuttle after a preset transmission period, therefore it is not required to recover them.

During Legs 1 and 2, in conjunction with the oceanography work, the passive acoustics team may also deploy the towed hydrophone array to collect nighttime acoustic data during the time between the evening and morning bongo/CTD. The oceanography and passive acoustics team will consult nightly to make this decision.

5.3 NIGHTTIME OPERATIONS – Leg 3

During Leg 3, oceanography work will be limited to only morning, noon and evening bongo/CTD to allow passive acoustic work all night long every night possible.

Each evening during Leg 3, the acoustic team will deploy a sonobuoy as an evening "listening station". Ideally, the sonobuoy would be deployed approximately 1 nmi from where the evening bongo/CTD are planned to take place, so that the buoy can be monitored during those oceanographic operations. The sonobuoy will be monitored for approximately 1 hr. Afterwards, the acoustic array will be deployed following the evening bongo/CTD and the evening bridge meeting. The acoustic team will monitor the array until it is recovered in the morning prior to the morning bongo/CTD (approximately 5:30am).

Nightly trackline coverage will depend on the position of the ship; the chief scientist will plot out the tracklines each evening with the bridge, with the goal of ending the nighttime effort at the same place where the visual/acoustic team will resume effort in the morning. At times, the nighttime acoustic team may ask the bridge to slow down or revisit an area if particular vocalizations of interest are detected.

6. Hydrographic and plankton, micronekton, and fish data collection

At night during legs 1 and 2, limited passive acoustic work will be conducted, with nighttime focus on oceanography work. At night during leg 3 passive acoustic experiments will be the main focus with very limited oceanography work.

Position, date, time, ship's speed and course, water depth, surface temperature, salinity, and chlorophyll, weather characteristics, along with other variables will be obtained from the ship's sensors and logged into the Science Computer System (SCS), as is normally done for all surveys. Data requirements will be coordinated with the Commanding Officer, Electronics Technician and Survey Department at the beginning of the project. It is requested that the sensors be operational, calibrated and that logging capabilities be enabled. In addition, a subset of these data (Table 1) will be routinely collected and recorded at least once a second during survey operations and will be logged into a specially created file that will be used by the cetacean scientists on a daily basis. At the end of the visual survey day (after 1800) the data in the specially created file will be made available to the Chief Scientist.

Other operations: At the discretion of the Chief Scientist, survey lines may be temporarily broken to conduct other operations, such as, but not limited to, additional CTD casts or plankton tows, photographing species of interest, testing of the acoustic gear and additional distance training. Special plankton sampling requests will be accommodated as time permits.

It is suggested that every evening, representatives from the bridge, deck crew, chief scientist, oceanography team and passive acoustic team meet to refine the oceanographic sampling strategies for that night and following day.

Sampling equipment included:

- EK60 multi-frequency echosounder for plankton, micronekton, and fish distribution
- ADCP (Acoustic Doppler Current Profiler) for currents, synchronized to the EK60 to minimize interference
- CTDs for hydrography (max depth 3000 m)
- 61cm Bongo plankton net equipped with two 333 μm mesh nets with the CTD mounted on the wire 1m above the bongo nets (max depth 200m)
- 2m x 1m modified neuston net with 333 μm mesh net with CTD mounted on the wire 1m above the net. (max depth 100m)
- Midwater Trawl to collect zooplankton and micronekton and ground-truth EK60 data (max depth 1000 m)
- V-fin black and white VPR with CTD mounted on the wire 1m above the V-fin to collect images of zooplankton and ground-truth EK60 acoustic data (max depth 600 m)
- Imaging FlowCytobot connected to the scientific flow through system

CTD Support: CTD operators will be trained and certified by the Center's Oceanography Branch. CTD operator training requires two hours and must be completed prior to the beginning of the cruise unless a trainer is included in the scientific complement. In the event that CTD difficulties are encountered during the cruise, shore based support is available. Requests for support should be forwarded NEFSC.CTDHelp@noaa.gov which is monitored daily. Once contact has been established via email, to assure continuous support, the CTD help address above should be copied on ***all*** email communications.

6.1 IMAGING FLOWCYTOBOT – Leg 1

An Imaging Flow Cytobot unit provided by Woods Hole Oceanographic Institution will be plumbed into the scientific flow-through system and used for continuous underway sampling of phytoplankton during the first leg. The unit will require a very small amount of seawater from the flow-through system and 110 VAC. This unit will be brought to the ship as early as possible during staging to ensure optimal installation and functionality.

6.2 DAYTIME SAMPLING – All legs

EK60 data will be collected continuously during the day on every second day to collect passive acoustic data both with and without the active acoustic signals.

ADCP data will be collected continuously when the EK60 is active. The University of Hawaii will be providing a new server with updated software and coordinating with the ship's Survey and Electrical Technicians to install the updates.

The daytime plan includes sampling with a Bongo net instrumented with the Seabird 19+ CTD. A 61cm Bongo plankton net equipped with two 333 μm mesh nets with the CTD mounted on the wire 1m above the nets will be deployed at least three times a day: once before the day's surveying started (about 05:00-05:30), at lunch time (about 12:00 when the ship stopped surveying), and again after surveying was completed for the day (approximately 18:00, depending upon weather and the time of sunset). The bongo will be towed in a double oblique profile using standard MARMAP protocols. The ship's speed through

the water will be approximately 1.5 knots. Wire out speed will be 50m/min and wire in speed will be 20m/min. Tows will be to within 5 m of the bottom not to exceed 200 m, even when bottom is deeper than 205 m. Upon retrieval, samples will be rinsed from the nets using seawater and preserved in 5% formaldehyde and seawater.

It might be possible to do some water column sampling during daytime on days when the sighting conditions are unfavorable. The oceanography team will be off-watch and so it likely will not be possible to do intensive operations like net tows. EK60 and ADCP data, and potentially some CTD casts, might be possible.

6.3 NIGHTTIME SAMPLING Legs 1 and 2

During Legs 1 and 2 during night when the visual cetacean and turtle survey teams are off-effort, physical and biological sampling of the water column will be conducted employing a combination of underway (ADCP, EK60, towed VPR) and station-based sampling (CTD, midwater trawl, 1m neuston net, and bongo). The amount of time available each night for sampling and the target site will be determined by the vessel's position at the end of each day's visual surveying and the desired start location the following day.

During Leg 3 only the daily three bongo/CTDs will be conducted (see 6.2.1) because passive acoustics will be the focus for nighttime research.

6.3.1 The 2x1 m Neuston – Legs 1 and 2

A modified 2m x 1m neuston net will be used to conduct plankton sampling targeting larval bluefin tuna where bottom depths are greater than 1000m, especially near the north edge Gulf Stream frontal features. When possible comparison tows will be conducted in the Gulf Stream or bisecting the northern Gulf Stream wall.

Sampling will begin with a 200m bongo cast so samples can be compared to historical data. The neuston gear will be equipped with a 333μ mesh net with a cod end bucket and will be towed at a ship's speed of 1-1.5 knots in a tow-yo fashion for 10 minutes between the surface and 25m. In the event of large gelatinous zooplankton samples tow times may be reduced. All samples will be rinsed from the net using seawater and preserved in 85% Ethanol. At the end of each leg samples will be transported to the NMFS lab at Narragansett, RI for processing.

6.3.2 VPR – Legs 1 and 2

The self contained black and white V-fin VPR (Davpr 05) will be deployed when bottom depths are shallow, when the ship is near the shelf break or canyon, or large volumes of gelatinous zooplankton, especially salps, are present. The V-fin will be equipped with a Seabird SBE49 Fastcat CTD and a Wet Labs combination fluorometer and turbidity sensor. The V-fin will be towed at speeds of 2 – 4 kts and will be towed for 0.5 – 1.5 hours. The camera imaging area will be set based on location, previous VPR hauls, or the types of plankton collected with the bongo nets. Two types of tows will be conducted. The first type is a single depth tow targeting distinct layers on the EK60 to provide temporally fine scale plankton data to assist in the ground truthing of the EK60 data and to examine plankton patchiness. The second type is a tow-yo haul which can be used to describe the water column structure and plankton depth

distributions. Tow-yo hauls will be conducted if there are no distinct layers on the EK60, the oceanography looks interesting or we are sampling a cross-canyon transect. Tow-yo hauls will also be able to quantify plankton, especially salps, before deciding whether to deploy the larger nets samplers. Data will be processed at sea to identify in focus regions of interest (ROIs), identify plankton groups, and plot oceanographic conditions and plankton densities.

6.3.3 EK60 Calibration – Leg 2 on 18Jul2016

The multifrequency EK60s should be calibrated prior to Leg 2. About ½ day is required to calibrate. Calibrations are conducted at the Newport Naval Anchorage across the channel from the Newport Naval Base, in 90 -100 ft. A wireless calibration system is used to suspend spheres under the EK60 transducers mounted on the retractable keel. The retractable keel will be positioned flush with the keel.

6.3.4 Pelagic trawl – Leg 2

Systematic and opportunistic night-time sampling of small prey layers will be conducted using a small mid-water trawl. Sampling will take place as often as possible to ground truth the EK60 recordings.

The net may be towed targeting layers as seen by the ship's EK60 echo sounder. A bongo/CTD cast as described above may be conducted in conjunction with the trawling operations to collect complimentary hydrographic and plankton data. Casts will be to a maximum of 200 m.

One survey technician from the vessel will be required to assist oceanography staff during each watch.

A shallow-water mid-water trawl (Fig. 1) will be used as the primary mid-water trawl and a polytron midwater rope trawl (Fig. 2) will be brought as a backup to collect biological samples and verify species composition of acoustic backscatter. Both trawls will use the 3.5-m suberkrub doors and the 1.8-m suberkrub doors will be brought as backup. The shallow-water mid-water trawl will use 100-lb tom weights, whereas the polytron trawl will use 600-lb tom weights. The trawls will be rigged similarly (Fig. 3). The shallow-water midwater trawl is designed to be fished at speeds of about 2 – 2.5 knots and the polytron fished at about 4 – 4.5 knots. The midwater trawls will be deployed during survey operations, and targeted on acoustic backscatter to a maximum depth of about 1000 m. The duration and depth of the trawls are not standardized, thus it is incumbent upon the Chief Scientist or Watch Chief to communicate with the bridge officers the haul duration and depths.

6.3.5 Simrad FS70 Trawl Monitoring and Third-wire Winch System – Leg 2

The trawl will be monitored using at least the FS70 and possibly the Scanmar systems. The Simrad FS70 trawl monitoring system is required for pelagic trawling. It is a third-wire device that provides real-time trawl performance information through its sonar images of the trawl opening. The Scanmar wireless trawl sensors provide point measurements of the trawl depth, horizontal and vertical opening, and door spread. The scientific party will record measurements at specified intervals during each deployment.

The Simrad FS70 will be deployed with every haul. Typically, the trawl will be fished obliquely. Officers will record the time, date, navigational, and station data in FSCS, while the scientists will record the catch data for each station deployment. Catch data will be recorded using the FSCS on-board entry system.

6.3.6 Trawl Catch Processing – Leg 2

Trawl catch will be processed at a sorting table that will need to be located on the back deck. Fish will be sorted by species and weighed en masse. Fish length will be measured for up to 150 individuals of each species. The complete fish handling system will not be used, but we request FSCS support for two stations: the "watch chief" station to process the fish and one station for lengths and weights. The bottom-trawl SCS event will be used and completed by the bridge officer during the trawl.

6.4 NIGHTTIME SAMPLING Leg 3

Only the three bongo/CTD oceanographic sampling will be conducted on Leg 3; once before the day's surveying started (about 05:00-05:30), at lunch time (about 12:00 when the ship stopped surveying), and again after surveying was completed for the day (approximately 18:00, depending upon weather and the time of sunset). Passive acoustics will be the focus of nighttime research.

Special Consideration – All legs:

During daylight hours when the visual line-transect surveys are being conducted, we require that the jackstaff be lowered so that the observers have a clear view of the waters in front of the ship.

The three big eye stands for the upper bridge and and two stands for the anti-roll tank platforms should be mounted to the deck and inspected to ensure they work properly. Also, a tarp or canvas should be mounted on the flying bridge to shade the observers.

We request assistance from the ship's ET and survey techs so that we can load ship's SCS data directly into the data collection computers on the two visual sighting platforms and also into the acoustic team's computer.

The steel pipes should be mounted on the reel to accommodate the towed array. To deploy the passive acoustic array we require assistance from the ship's personnel. The array is not to be deployed without the presence of at least one of the passive acoustic team members.

If possible the acoustic team would like the use of two of the ship's computers, like we did in previous years.

To deploy the CTD, bongo, and VPR we request the use of the two hydro winches on the starboard 02 deck with the ship's standard terminations and two deck personnel (one to run the winch and 16 one to help with deployment).

On all legs, the survey tech will be needed to turn the active acoustics off and on and adapt/maintain the event logs. It is expected the active acoustics will be in passive mode every other day during the day time and in active mode on the alternative days, where the acoustics should be set for the day starting at some time before 6 am. At night the active acoustics will be coordinated with the collection of plankton, trawl and passive acoustic data.

At night during Legs 1 and 2, in addition to the two deck personnel we need one of the ship's survey techs, as we have done on previous mammal trips. Leg 1 will be the leg with fewer duties for the survey tech. We will be doing lots of plankton work during the night watch. One of the nets is a larger 1x2m and may require extra help during deployment/retrieval and during the rinse down. The survey tech may be needed to help process catches or run the CTD program if tows are done in quick succession. When

running the VPR the tech may be needed to help with deployment/recovery if the weather is inclement. Deployment/retrieval duties will also depend on number of deck crew on the night watch. Leg 2 will continue plankton work and will add the midwater trawl(s). Survey tech will be needed to help sort the catch and for assistance with the 3d wire set-up. We will absolutely need the extra pair of hands.

At night during Leg 3, we need help from one of the ship's survey techs to help conduct the morning (5am) and evening (6pm) bongo/CTD's, with the help of visual and/or passive acoustic scientists.

We request assistance from the ship's ET and/or survey techs to mount a VHF antenna & cabling for sonobuoy operations. The VHF antenna should be mounted in a location that is as high as possible with the least interference from electronic devices.

Bird Tracking Antenna?

D. Dive Plan

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

Dives are not planned for this project.

E. Applicable Restrictions

Conditions which preclude normal operations:

Visual marine mammal searching requires good sighting conditions: Beaufort sea state of 4 or below (some Beaufort 5 may occur); no rain; visibility of 2 miles or more.

The Visual seabird, passive acoustic and oceanography teams may continue surveying even when the Beaufort sea stat is 6 and above, at the discretion of the Commanding Officer and deck lead.

If the passive acoustic array is deployed, the ship has limited abilities to slow down when in water with a bottom depth of less than 100 m. This is to ensure the array (400m long) does not drag on the bottom.

The oceanographic sampling during the day or night may have to be altered if there are fixed gear and multiple vessels in the region of the sampling station.

"Take" of Protected Resources: Under the Marine Mammal Protection Act (MMPA) and Endangered Species Act (ESA) it is unlawful to take a protected species. The MMPA defines take as "harass, hunt, capture, kill, or collect, or attempt to harass, hunt, capture, or collect" **unless specifically authorized under a Marine Mammal Protected Species Permit**. The ESA defines take as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct." An incidental take is one that is incidental to, but not the purpose of, otherwise lawful activities.

In the event of an incidental take of a marine mammal or federally listed threatened or endangered species during the cruise, the chief scientist will take the following actions:

Marine turtle, Sturgeon and Atlantic salmon bycatch: All marine turtles, sturgeon and Atlantic salmon taken incidental to fishing activities, must be documented and handled according to established procedures in **the Endangered Species Act Section 7 Consultation Biological Opinion (BIOIP)** issued on November 30, 2012. Dead turtles shall, if feasible, be frozen and returned to the Woods Hole Laboratory. Please refer to the appendices, (appendix B – E of the BIOP) for handling and sampling procedures. Information should be collected on the separate Sturgeon and Turtle Data Collection Sheets and required information should be submitted within 24 hours of the take to Incidental.Take@noaa.gov, Elizabeth.Josephson@noaa.gov, Nathan.Keith@noaa.gov, Sarah.Pike@noaa.gov for PSIT entry.

Marine mammal bycatch: All marine mammals taken incidental to fishing activities must be documented and handled according to established protocols outlined in the **Procedures & Actions for Incidental Takes of Marine Mammals in Research & Monitoring Activities** located in the appendices. Information should be collected on the Marine Mammal Data Collection Sheet and required PSIT information should be submitted within 24 hours of the take to Incidental.Take@noaa.gov, Elizabeth.Josephson@noaa.gov, Nathan.Keith@noaa.gov, Sarah.Pike@noaa.gov.

Migratory bird salvage: Please refer to the Federal Fish and Wildlife "Special Purpose – Salvage" Permit located in the appendices for the salvage of dead migratory birds (except species listed as threatened or endangered under the Endangered Species Act; see 50 CFR 17.11).

III. Equipment

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

ITEM	QUANTITY
Scientific Computer System	1
Flow-through and meteorology sensors	ample
Hydro winches on starboard 02 deck to deploy the CTD, bongo and VPR	
Deck equipment to deploy CTD & bongo	ample
Deck equipment to deploy VPR	ample
Deck equipment to deploy mid-water trawl	ample
Stands to support big eye binoculars	5
Steel casing for net reel to hold acoustic array	1
Simard EK60 Scientific Sounder	1
ME70	1
Movable platforms at the bow to allow a photographer or biopsier to see over the ship's bow	2
Safety harness to be worn by photographer or biopsier who use the above movable platforms and might be leaning over edge	2
Small boat and associated safety equipment (for distance training)	1
Working system to lower forward light mast during visual surveying	1
Handheld radio with ship's frequencies	3
Ship's desktop computers to be used for passive acoustic recording	2

FS70 trawl monitor	2
Constant tension winch	1
FSCS	2

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

The following sampling and scientific equipment will be placed aboard NOAA Ship *Henry B. Bigelow* prior to departure:

ITEM	QUANTITY
Portable computers	10
Desk top computer	ample
Hand held binoculars	4
25x150 binoculars and yokes	6
Data logs, computerized and paper	ample
Photographic equipment	ample
Plywood floating replica for distance training	1
Desks (for sighting platforms)	2
Chairs (for sighting platforms)	5
Bongo equipment and supplies	ample
Passive acoustic array	2
Passive acoustic data collection equip	ample
CTD	2
Video Plankton Recorder	1
Pelagic trawl	2
Sorting table	1
2m x 1m Neuston net	1
Wooden crate with 48 sonobuoys	1-2
VHF antenna & cabling for sonobuoy operations, to be mounted on mast or similarly high location	1

IV. Hazardous Materials

A. Policy and Compliance

The Chief Scientist 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

The MSDS forms are available in separate pdf files.

Common Name of Material	**Qty**	**Notes**	**Trained Individual**	**Spill control**
Formaldehyde solution (37%)	2 x 20 L	Alkalinity, Stored in ship chem. lkr	Elisabeth Broughton	F
Ethanol (97%)	2 x5 gal	Flammability. Cans will be kept in Flammable locker. When in use stored in a 4 gallon carboy in the plankton nook fume hood	Elisabeth Broughton	E

Common Name of Material	Qty	Notes	Trained Individual	Spill control
Dimethyl sulfoxide (DMSO)	30/2 oz tubes	Tubes will be kept sealed in a box under the fume hood	Peter Duley/Debra Palka	D
Bleach	1 gal	Stored under the fume hood	Peter Duley/Debra Palka	B

C. Chemical safety and spill response procedures

F: Formalin/Formaldehyde

- Ventilate area of leak or spill. Remove all sources of ignition.
- Wear appropriate personal protective equipment.
- Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible.
- Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb withSpill X FP, and place in a chemical waste container.
- Do not use combustible materials, such as saw dust.

E: Ethanol

- Stop and contain spill.
- Eliminate all sources of ignition and static.
- If large spill and in confined poorly-ventilated areas use self-contained breathing apparatus.
- Absorb spill with paper towels, sand, vermiculite or equivalent absorbent material. Dispose of absorbent materials in a safe place, like a fume hood to evaporate or incinerated soaked materials.
- Flush area with plenty of water

D: DMSO

- Wear appropriate protective equipment and clothing during clean-up.
- Ventilate the area.
- Do not breathe the vapor or get liquid in eyes or on skin/clothing.
- Dilute and flush to wastewater treatment or absorb with inert material and place into a container for later disposal.

B: Bleach

- Control spill.
- Containerize liquid and use absorbents on residual liquid. Place into a container for later disposal.
- Wash area and let dry.
- Breathing protection should be worn in enclosed and/or poorly ventilated areas until hazard assessment is complete.

Inventory of Spill Kit supplies

Product Name	Amount	Chemicals it is useful against	Amount it can clean up
Spill-X-FP	1.68 kg	Formaldehyde	10 gallons

D. Radioactive Materials

No Radioactive Isotopes are planned for this project.

V. Additional Projects

A. Supplementary ("Piggyback") Projects

A supplementary GPS antenna and a shipboard PARR sensor will be used for the CTDs. These are already installed and will remain in their current locations throughout the AMAPPS survey.

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. All EK60 data are archived at NOAA's NCEI Boulder.

A. Data Classifications: *Under Development*

a. OMAO Data

b. Program Data

B. Responsibilities: *Under Development*

VII. Meetings, Vessel Familiarization, and Project Evaluations

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

B. Vessel Familiarization Meeting: The Commanding Officer is responsible for ensuring scientific personnel are familiarized with applicable sections of the standing orders and vessel protocols, e.g., meals, watches, etiquette, drills, etc. A vessel familiarization

meeting shall be conducted in the first 24 hours of the project's start and is normally presented by the ship's Operations Officer.

C. Post-Project Meeting: The Commanding Officer is responsible for 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 Chief Scientist, and members of the scientific party and is normally arranged by the Operations Officer and Chief Scientist.

D. Project Evaluation Report

Within seven days of the completion of the project, a Customer Satisfaction Survey is to be completed by the Chief Scientist. The form is available at http://www.omao.noaa.gov/fleeteval.html and provides a "Submit" button at the end of the form. Submitted form data is deposited into a spreadsheet used by OMAO management to analyze the information. Though the complete form is not shared with the ships', specific concerns and praises are followed up on while not divulging the identity of the evaluator.

VIII. Miscellaneous

A. Meals and Berthing

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

Berthing requirements, including number and gender of the scientific party, will be provided to the ship by the Chief Scientist. The Chief Scientist and Commanding Officer will work together on a detailed berthing plan to accommodate the gender mix of the scientific party taking into consideration the current make-up of the ship's complement. The Chief Scientist is responsible for ensuring the scientific berthing spaces are left in the condition in which they were received; for stripping bedding and linen return; and for the return of any room keys which were issued. The Chief Scientist is also responsible for the cleanliness of the laboratory spaces and the storage areas utilized by the scientific party, both during the project and at its conclusion prior to departing the ship.

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

that the ship becomes uninhabitable and/or the galley is closed during any part of the scheduled project.

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

B. Medical Forms and Emergency Contacts

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

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

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

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

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

Contact information:

Regional Director of Health Services
Marine Operations Center – Atlantic
439 W. York Street
Norfolk, VA 23510
Telephone 757-441-6320

Fax 757-441-3760
Email MOA.Health.Services@noaa.gov

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

C. Shipboard Safety

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

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

D. Communications

A progress report on operations prepared by the Chief Scientist may be relayed to the program office. Sometimes it is necessary for the Chief Scientist to communicate with another vessel, aircraft, or shore facility. Through various means of communications, the ship can usually accommodate the Chief Scientist. Special radio voice communications requirements should be listed in the project instructions. The ship's primary means of communication with the Marine Operations Center is via email and the Very Small Aperture Terminal (VSAT) link. Standard VSAT bandwidth at 128kbs is shared by all vessels staff and the science team at no charge. Increased bandwidth in 30 day increments is available on the VSAT systems at increased cost to the scientific party. If increased bandwidth is being considered, program accounting is required and it must be arranged through the ship's Commanding Officer at least 30 days in advance.

E. IT Security

Any computer that will be hooked into the ship's network must comply with the *OMAO Fleet IT Security Policy* 1.1 (November 4, 2005) prior to establishing a direct connection to the NOAA WAN. Requirements include, but are not limited to:

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

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

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

F. Foreign National Guests Access to OMAO Facilities and Platforms

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

Full compliance with NAO 207-12 is required.

Responsibilities of the Chief Scientist:

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

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

Responsibilities of the Commanding Officer:

1. Ensure only those foreign nationals with DOC/OSY clearance are granted access.
2. Deny access to OMAO platforms and facilities by foreign nationals from countries controlled for anti-terrorism (AT) reasons and individuals from Cuba or Iran without written approval from the Director of the Office of Marine and Aviation Operations and compliance with export and sanction regulations.
3. Ensure foreign national access is permitted only if unlicensed deemed export is not likely to occur.
4. Ensure receipt from the Chief Scientist or the DSN of the FNRS or Servicing Security Office email granting approval for the foreign national guest's visit.
5. Ensure Foreign Port Officials, e.g., Pilots, immigration officials, receive escorted access in accordance with maritime custom to facilitate the vessel's visit to foreign ports.
6. Export Control - 8 weeks in advance of the project, provide the Chief Scientist with a current inventory of OMAO controlled technology onboard the vessel and a copy of the vessel Technology Access Control Plan (TACP). Also notify the Chief Scientist of any OMAO-sponsored foreign nationals that will be onboard while program equipment is aboard so that the Chief Scientist can take steps to prevent unlicensed export of Program

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

7. Ensure all OMAO personnel onboard receive the briefing on Espionage Indicators (NAO 207-12 Appendix A) at least annually or as required by the Servicing Security Office.

Responsibilities of the Foreign National Sponsor:

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

VIII. Appendices

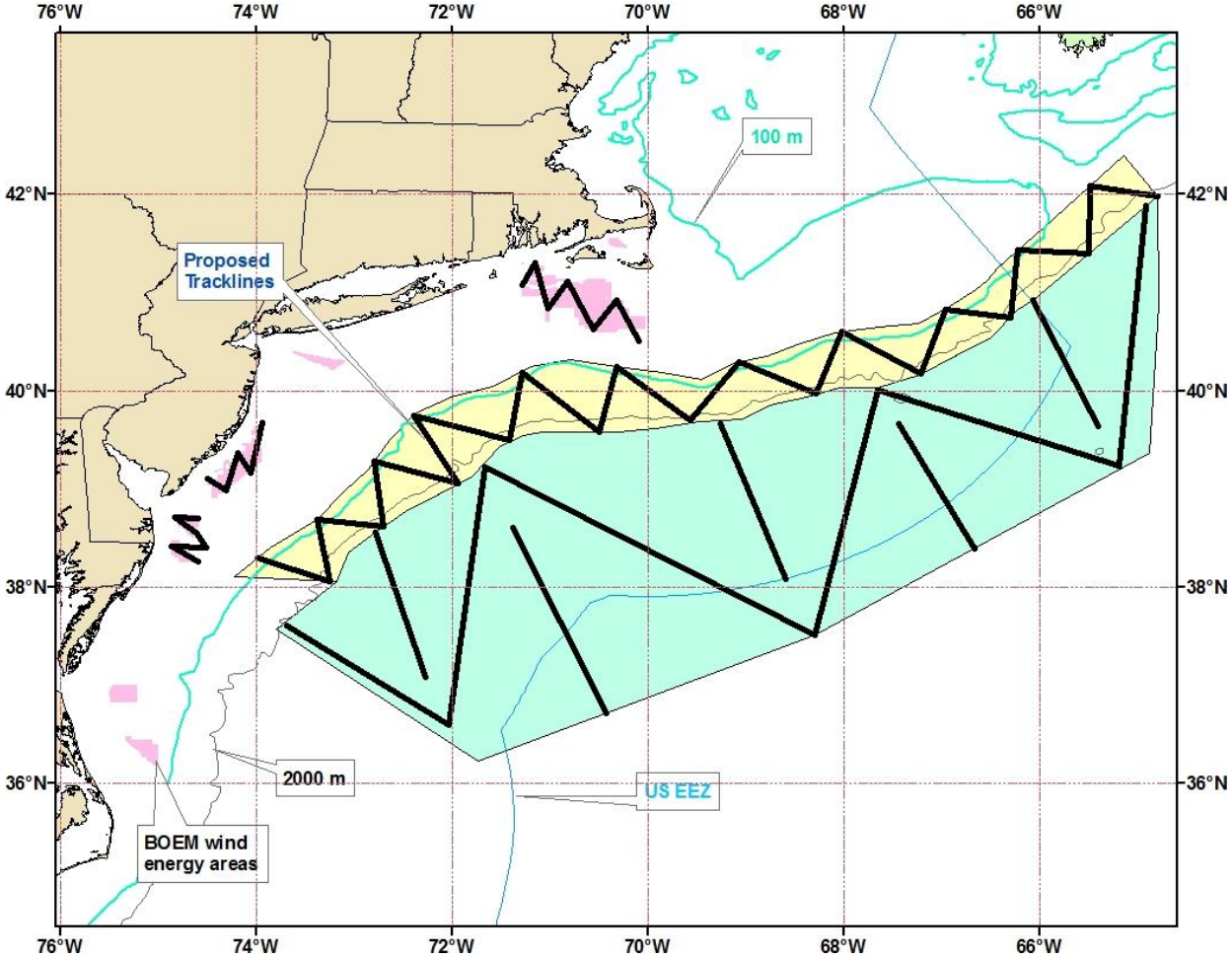

Figure 1. Proposed track lines to be completed during the daytime within any of the Legs. Lines can be surveyed in any order during any leg, in Beaufort sea states of 4 or less. Order of lines are usually dictated by the weather conditions. Additional lines will be added if all are completed in good sighting conditions under the guidance of Debra Palka.

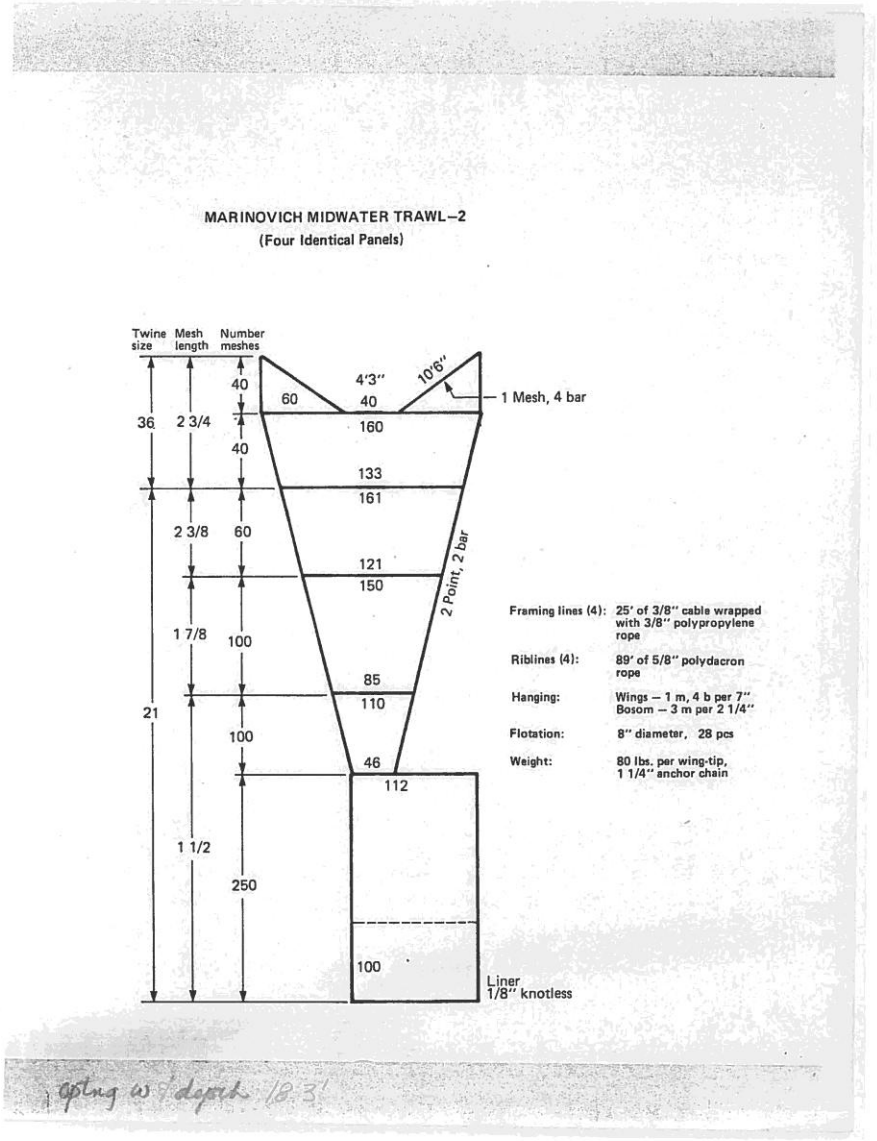

Figure 2. Shallow-water mid-water trawl (Swan Net Gundry)

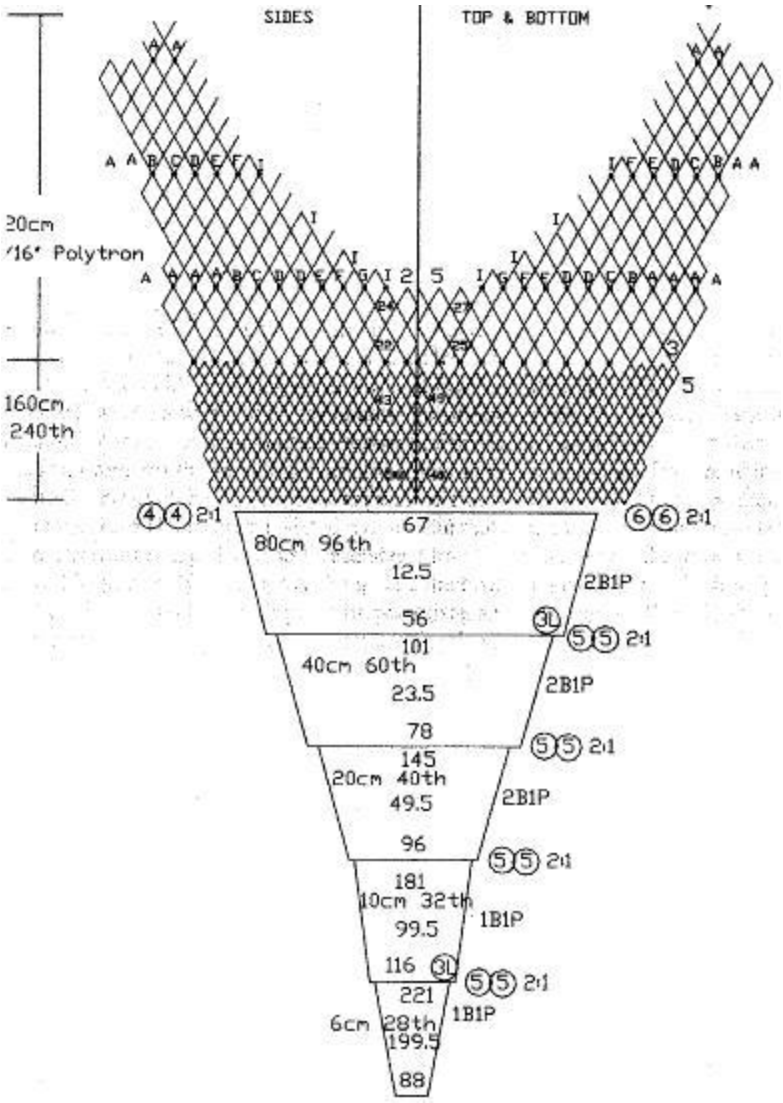

Figure 3. Polytron mid-water rope trawl (Superior Trawl).

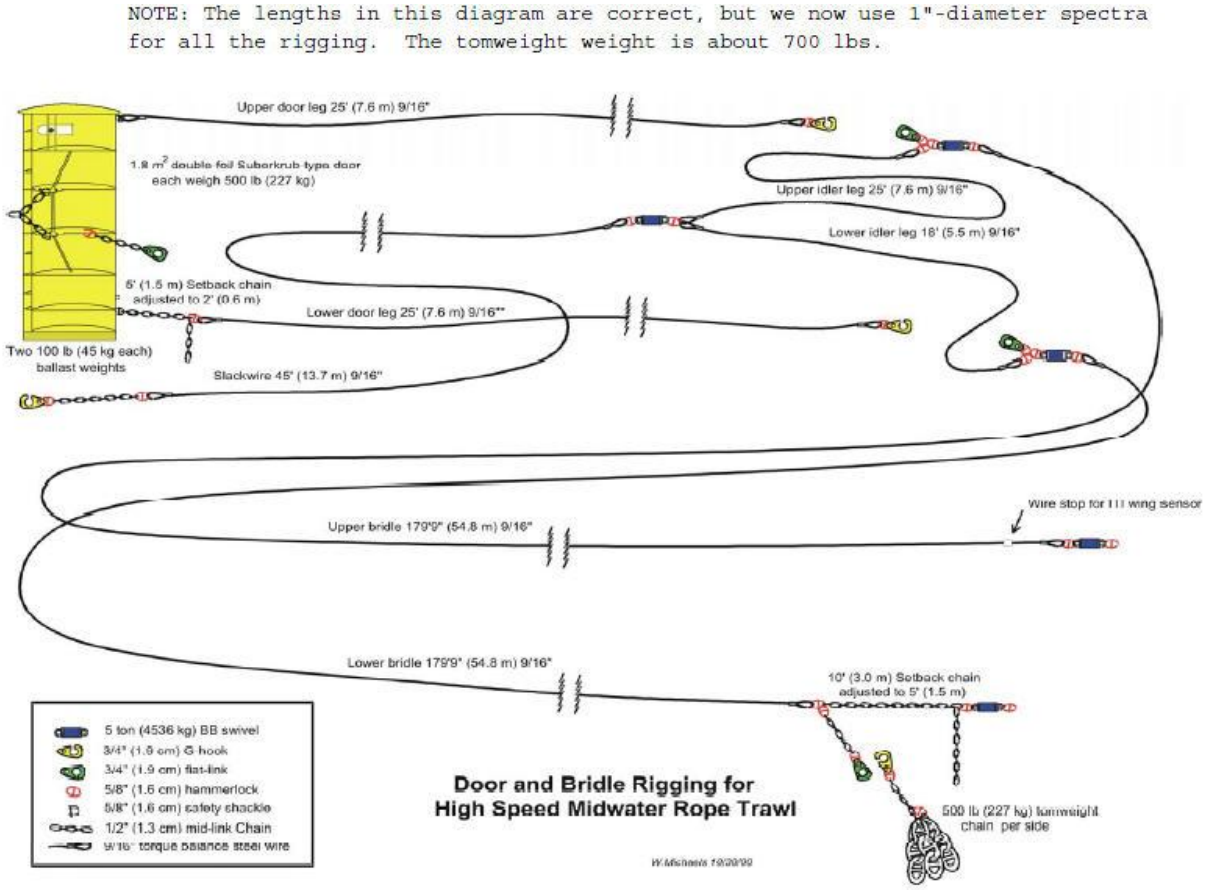

Figure 4. Rigging for the pelagic trawls.