

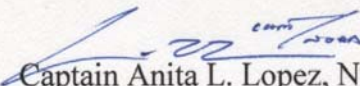


UNITED STATES DEPARTMENT OF COMMERCE

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

AUG 20 2013

MEMORANDUM FOR: Commander Ricardo Ramos, NOAA
Commanding Officer, NOAA Ship *Okeanos Explorer*

FROM: 
Captain Anita L. Lopez, NOAA
Commanding Officer, NOAA Marine Operations Center-Atlantic

SUBJECT: Project Instruction for EX-13-05
Summer Ecosystems Monitoring Survey (ECOMON)

Attached is the final Project Instruction for EX-13-05, ECOMON, which is scheduled aboard NOAA Ship *Okeanos Explorer* during the period of 23 August – 04 September, 2013. Of the 13 DAS scheduled for this project, 13 DAS are based funded by OMAO in support of NMFS. This project is estimated to exhibit a High Operational Tempo. Acknowledge receipt of these instructions via e-mail to OpsMgr.MOA@noaa.gov at Marine Operations Center-Atlantic.

Attachment

cc:
MOA1





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 Instruction

AUG 20 2013

Date Submitted: August 13, 2013

Platform: NOAA Ship *Okeanos Explorer*

Project Number: EX 1305

Project Title: Summer Ecosystem Monitoring Survey

Project Dates: 23 August – 04 September 2013

Approved by: Russell W. Bean Date: 8-13-2013
William A. Karp, Ph.D.
Science and Research Director
Northeast Fisheries Science Center

Approved by: [Signature] Date: 20 AUG 13
CAPT ANITA L. LOPEZ
Captain Anita L. Lopez, NOAA
Commanding Officer
Marine Operations Center – Atlantic

COMMANDING OFFICER

NOAA Ship *Okeanos Explorer*

PROJECT INSTRUCTION: EX-13-05 Summer Ecosystem Monitoring Survey.

Project Dates: 23 August – 04 September 2013

Area of Operation: The continental shelf from Southern New England waters to Georges Bank and the Gulf of Maine, to the Nova Scotia Shelf (including stations in Canada's Exclusive Economic Zone). Stations will be occupied in waters with depths ranging between 15 and 500 meters.

Objectives: The cruise has numerous objectives to address research goals of several programs within the Ecosystem Process Division of the NEFSC and outside collaborators including: Climate research program, Ocean acidification program, Ecosystem science in support of stock assessments program, Science in support of ecosystem assessments program, development of new technologies to support ecosystem studies, habitat mapping and NEFSC outreach and education objectives. The specific objectives include:

- 1) Assess changing biological and physical conditions which influence the sustainable productivity of the living marine resources of the northeast continental shelf ecosystem using CTD's and bongo nets at stations located at predetermined randomly stratified locations. CTD will collect electronic data on temperature, salinity, density, and oxygen.
- 2) Trends in ocean acidification and nutrient levels will be determined by collecting water samples using a rosette sampler at predetermined fixed locations.
- 3) Detail incursion of Labrador Current water into the Gulf of Maine by conducting CTD casts in deep basin areas.
- 4) Collect samples for the Census of Marine Zooplankton Project by the use of 20-cm bongos piggybacked above the 61-cm bongos.
- 5) Analyze the size spectrum of water column particles using the Laser In-Situ Scattering and Transmissometry (LISST) instrument.
- 6) Determine the abundance and distribution of larval and juvenile yellowtail flounder (*Limanda ferruginea*) in the survey areas surveyed.
- 7) Report northern right whale and other marine mammal bird and turtle sightings.
- 8) Collect acoustic data using the EK60 single beam unit from along the cruise track, as well as SCS data.
- 9) Collect data with new optical plankton equipment, the Imaging FlowCytobot plumbed into the Scientific Seawater System
- 10) Conduct sea floor mapping in the Wilkinson and Georges Basin areas of the Gulf of Maine.
- 11) Conduct opportunistic Isaacs-Kidd midwater trawls near areas of puffin habitat that are near our planned cruise track in the Gulf of Maine.

Diplomatic Clearances: This project involves Marine Scientific Research in waters under the jurisdiction of Canada. Consent has already been received from Canada.

Licenses and Permits: Canada's Foreign Fishing Vessel License was provided with the diplomatic note.

Key Points of Emphasis:

- 1. Watches are likely to be on a 12 “on”, 12 “off” basis.**
- 2. The vessel will depart from and return to Davisville, Rhode Island. No port calls are planned.**
- 3. Smoking will not be permitted during rosette deployments and water sample processing to minimize contamination of water samples.**

Planned Itinerary:

21-22 August:	Load and set up scientific equipment, including 7' x 12' container on aft deck. Flowcytobot will be installed in lab in consultation with personnel from vessel & WHOI.
23 August:	Embark scientific personnel and depart Davisville for anchorage in East Passage of Narragansett Bay, where calibration of EK60 will be undertaken. Upon completion of EK60 calibration, the 3-person calibration team will depart <i>Okeanos Explorer</i> via small boat to the Naval Station, Newport, RI. Prior to small boat operations please contact Naval Station Newport Dispatch office at (401) 841-4041(24/7) for clearance. Cruise activities will commence upon the return of the small boat to the vessel
4 September:	Return to Davisville. Disembark scientific personnel and off-load scientific equipment and samples.

Operational Plans: The survey consists of 120 random stratified stations in the Middle Atlantic Bight, Southern New England, Georges Bank and the Gulf of Maine (Figure 1 and Appendix A).

Depending on the duration of the cruise and weather, fewer stations might be sampled. These will be sampled with an array of bongo nets: a 61 cm bongo frame equipped with two 333 micron mesh nets, and a smaller 20 cm bongo frame equipped with two nets of that same mesh (Figure 2). Bongo nets are towed at 1.5 to 2.0 knots, in a double oblique manner, from the surface down to within 5 meters of the bottom, or a maximum depth of 200 meters. Net depth is monitored in real time from the CTD unit attached just above the nets. A subset of 15 stations from the cruise will be sampled with a similar array except that the 20 cm bongo frames will be equipped with 165 micron mesh nets. There will be five fixed position stations in the Gulf of Maine that will be sampled for plankton using a bongo net, and for water using a Niskin bottle rosette equipped with 12 10-liter bottles provided by the Northeast Fisheries Science Center. There will also be an additional thirty fixed position stations that will be sampled using only the Niskin bottle rosette sampler (Figure3). The rosette sampler will be equipped with a Laser In-Situ Scattering and Transmissometry (LISST) instrument mounted vertically in place of one of the Niskin bottles to provide particulate counts and measurements. The Imaging FlowCytobot will be plumbed into the scientific flow-through system and used throughout the cruise (Figure 4). This cruise will represent the first operational deployment of this new technology in the northeast U.S. shelf ecosystems.

Program Supplied Equipment

The Ecosystem Monitoring program will provide the following equipment:

1-Rosette

1-911 CTD

12-10 liter bottles

2-61cm bongo frames and nets

1- 6ft wide Isaacs-kidd mid-water trawl

2-Seabird seacatt 19 and profiler

A small van will be installed on the aft deck (7'x12'; ~3500 lbs) for additional storage space for samples and chemicals. No power to the van will be required. Two cubic feet of freezer space in the ship's lab is required for the nutrient samples. A temperature of -15⁰ C. will be sufficient for these samples.

Opportunistic larval and juvenile fish sampling is planned in the northern Gulf of Maine in the vicinity of Matinicus Rock (43 47.099 N 68 51.250 W), Seal Island (43 53.250 N 68 44.420 W), and Eastern Egg Rock (43 51.648 N 69 22.928 W) (Figure 5). This sampling will be done, time and weather permitting, using a 6 foot wide (183 cm) Isaacs-Kidd midwater trawl, which will be towed using the same wire used for the bongo tows (Figure 6). It is deployed and towed at the same rate and in the same manner as the bongo nets are towed, the only difference being that the Isaacs Kidd net is towed only to within 10 meters of the bottom. Its depth is determined

in real-time by the use of a Seabird CTD unit mounted on the towing wire just as with the bongo nets. This net, with larger mesh and a wider mouth area than the bongos, will be used to capture larval and juvenile fish in the vicinity of puffin breeding colonies in this region of the Gulf of Maine. Although its mouth area is larger than the combined bongo net mouth area, its larger graduated mesh offers less drag so it behaves in a similar manner to the bongo net array. This net has been used routinely aboard the Delaware II and Henry Bigelow from the same winch and A-frame as the bongos were deployed from.

Mapping will be done in the Gulf of Maine, time and weather permitting, using the EK60 and/or the multibeam. Two 8-hour blocks of time will be allocated for the Wilkinson Basin and one 8-hour block of time in Jordan Basin (Figure 7) or on the Schoodic Ridge. Schoodic Ridge is preferred over the Jordan Basin. The bounding coordinates and a graphic have been sent to the vessel and are also listed in Appendix C. These operations will be lead by an OER scientist. Mapping will be done for an 8-hour period on the Schoodic Ridge, (Jordan Basin may be substituted if the vessel cannot get that far north in the Gulf of Maine), followed by work on nearby Ecomon stations, and then will resume for a maximum of two 8-hour periods in the Wilkinson Basin area if time permits. Twenty four hours is the maximum time that will be dedicated to the mapping effort, and may be less if sampling falls behind schedule.

Station positions are included in Appendix A, while a proposed cruise track is in Figure 1. These have also been provided to the vessel prior to sailing to allow ample time for processing and review by the Commanding Officer. For operations in Canadian waters, the Chief Scientist will provide a Foreign Fishing Vessel License prior to departure. The Commanding Officer and Chief Scientist will jointly modify the track during the cruise as weather conditions and time constraints vary to best achieve the cruise objectives. Highest reasonable cruising speeds should be employed to improve the potential to complete the cruise objectives.

We request that the cable terminations for the conductive tow cable on the hydrographic winch to be used be redone prior to this cruise. The slip rings should be checked several days in advance of the cruise so that issue can be dealt with without delays to the sailing schedule. We also request that at the end of the cruise the electronics technician provide the chief scientist with a copy of the data from the EK60 transducer, and the SCS system. An external hard-drive will be provided by the chief scientist for this purpose. A copy of the SCS data should also be provided to DMS personnel in Woods Hole. To minimize any contamination of samples collected from the flow-through seawater system it is requested that this system be flushed with fresh water prior to the cruise. If the entire system cannot be flushed, then as much of the system as possible should be flushed to reduce the growth of fouling organisms in the piping. It is critical that there be no smoking near the sampling equipment nor during the time before and after deployment of the sampling equipment. Smoking contaminates the nutrients and OA (Ocean Acidification) samples.

Protected Resources:

North Atlantic right whale protection: The vessel is requested to adhere to right whale protection regulations. Information on Seasonal Management Area (SMA) and Dynamic Management Area (DMA) regulations and information for protecting right whales from collisions with vessels are provided through the NOAA Protected Resources website (<http://www.nmfs.noaa.gov/pr/shipstrike/>), Right Whale Sighting Advisory System (SAS) website (<http://www.nefsc.noaa.gov/psb/surveys/>), the U.S. Coast Guard's "Notices To Mariners" and NOAA weather radio.

Mariners are urged to use caution and proceed at safe speeds in areas where right whales occur. U.S. Law (50 CFR 224.105) prohibits operating vessels 65 feet (19.8 meters) or greater in excess of 10 knots in Seasonal Management Areas (SMAs) along the U.S. east coast. Mariners are also requested to route around voluntary speed restriction zones, Dynamic Management Areas (DMAs) or transit through them at 10 knots or less. Approaching within 500 yards of right whales is prohibited, unless the Chief Scientist is in possession of an ESA/MMPA permit allowing such approaches.

Whale sightings: Sightings of right whales, or dead or entangled whales of any species, are extremely valuable and reports are urgently requested. Please report all right whale sightings north of the Virginia-North Carolina border to 978-585-8473; right whale sightings south of that border should be reported to 904-237-4220. Right whale sightings in any location may be reported to the U.S. Coast Guard via VHF channel 16. Protocols for reporting sightings are described in the Guide to Reporting Whale Sightings placard. The placard is available online: (http://www.nefsc.noaa.gov/read/protosp/mainpage/surveys/documents/Guide_to_Reporting_Whale_Sightings.pdf) and laminated copies will be provided by the Protected Species Branch upon request. It is requested that this placard be kept on the bridge for quick reference and to facilitate rapid reporting (via satellite phone if necessary). Opportunistic sightings of other marine mammal species that are live and well may be reported using the Platforms of Opportunity (POP) forms and protocols.

Endangered Species Act and Marine Mammal Protection Act reporting requirements: This reporting is required and is in addition to the reports in the above two sections. If the ship has an interaction with a sturgeon, whale, dolphin, porpoise, marine turtle, or seal (e.g., collision with a whale or bycatch of a sea turtle), the NMFS Northeast Regional Office must be notified within 24 hours of the interaction. If an interaction with any of those species occurs or if the vessel's company notices an animal that is entangled, injured, in distress, or dead, they should contact the Northeast Regional Office's 24-hour hotline at 866-755-6622 to report the incident and receive further instructions.

Marine turtle bycatch: All marine turtles taken incidental to fishing activities must 1) be handled and resuscitated according to established procedures, 2) be clearly photographed (multiple views if possible, including at least one photograph of the head scutes), 3) be identified to the species level, 4) have width and length (carapace notch to notch, and notch to tip) measured in centimeters, 5) have supporting data recorded including GPS or Loran coordinates recorded describing the location of the interaction; time of interaction; date of interaction; condition of the animal upon retrieval (alive uninjured, alive injured, fresh dead,

decomposed, comatose or unresponsive); the condition of the animal upon return to the water; GPS or Loran coordinates of the location at which it was released; and a description of the care or handling provided. Live animals shall then be returned to the sea. Dead animals shall, if feasible, be frozen and returned to the Woods Hole Laboratory.

Marine mammal bycatch: All marine mammals taken incidental to fishing activities must 1) be clearly photographed (multiple views if possible, including at least one photograph of the head, 2) be identified to the species level, 3) have body length (snout to tail (seals), beak to the notch in the fluke/tail (whales, dolphins and porpoises)), measured in centimeters, 4) have supporting data recorded including GPS or Loran coordinates recorded describing the location of the interaction; time of interaction; date of interaction; condition of the animal upon retrieval (alive uninjured, alive injured, fresh dead, decomposed, comatose or unresponsive). Live animals shall then be returned to the sea. Dead animals shall, if feasible, be frozen and returned to the Woods Hole Laboratory.

Stellwagen Bank: Any artifacts brought aboard the vessel due to fishing in the Stellwagen Bank National Marine Sanctuary must be immediately returned, as near as possible, to the location of interception. An artifact is defined as anything of man-made origin with the exception of modern fishing gear. Stations located within Stellwagen Bank will be identified prior to the cruise and reported to the chief scientist.

IT Security: Any computer that will be hooked into the ship's network must comply with the *NMAO Fleet IT Security Policy* 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 these 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.

Data Management: All station and biological data will be electronically recorded. At the completion of the cruise, all data will be electronically transmitted to the NEFSC data management system based in Woods Hole, MA. Samples and data collected for specific individuals, agencies or organizations will be processed by same. Plankton samples will be processed through the NEFSC laboratory in Narragansett, RI. Data from the CTD will be processed at the NEFSC Woods Hole Laboratory.

Foreign National Access and Deemed Export Controls:

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>). The foreign national's sponsor is responsible for obtaining clearances and export licenses required and for providing for required escorts by the NAO. Programs sponsoring foreign nationals should consult with their designated line office personnel to assist with the process.

The following are basic requirements. Full compliance with NAO 207-12 is required.

Responsibilities of the Chief Scientist:

1. Provide the Commanding Officer with the e-mail generated by the FRNS granting approval for the foreign national guest's visit. This e-mail 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 Regional Security Officer.
4. Export Control - *The NEFSC currently neither possesses nor utilizes 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 NMAO approval 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 of the NOAA Foreign National List spreadsheet for each foreign national in the scientific party.
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 cruise, 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 Regional Security Officer.

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 Departmental Sponsor/NOAA 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, 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 Guest) as required by NAO 207-12 Section 5.03.h.

Communications: Routine communications will be conducted between *Okeanos Explorer* and Woods Hole via email. Satellite based voice communication is available; the Command shall accommodate the Chief Scientist when requested. The ship's primary means of communication with the Marine Operations Center is 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 it must be arranged at least 30 days in advance.

Hazardous Material: The Chief Scientist is responsible for complying with DMS 15, Fleet Environmental Compliance #07, Hazardous Material and Hazardous Waste Management Requirements for Visiting Scientists, released July 2002. Details regarding those requirements will be provided by the Chief of Operations, Marine Operations Center – Atlantic upon request and may be reached at 757-441-6716.

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 the anticipated quantity brought aboard, MSDS and appropriate neutralizing agents, buffers, and/or absorbents in amounts adequate to address spills of a size equal to the amount of chemical brought aboard and a chemical hygiene plan. The amount of hazardous material arriving and leaving the vessel shall be accounted for by the Chief Scientist.

Hazardous Materials Inventory

The following chemicals will be placed aboard *Okeanos Explorer* prior to departure, and MSDS's and neutralizing chemicals for the formaldehyde will be provided to the ship's OPS officer at that time or sooner:

<u>ITEM</u>	<u>QUANTITY</u>	<u>FURNISHED BY</u>
37% Formaldehyde	10 gal	NMFS, NEFSC, Narragansett, RI
90% Ethyl alcohol (ethanol)	20 gal	NMFS, NEFSC, Narragansett, RI
Mercuric chloride (saturated soln.)	50 ml	NMFS, NEFSC, Narragansett, RI
Acetone	500 ml	NMFS, NEFSC

Radioactive Isotopes: N/A

Medical Clearances: NOAA Fleet Medical Policy requires all personnel embarking on NOAA vessels to furnish a completed copy of the NOAA Health Services Questionnaire (NHSQ) to the Health Services Office of the Marine Operations Center. This form should be submitted 30 days in advance of sailing, but no later than 7 days in advance of sailing. The Chief Scientist is responsible for the timely submission of NHSQs for scientific personnel to the Health Services Office.

Accident/Illness Reporting: Mishaps, injuries and near misses must be reported to the vessel's Executive Officer and Medical Person in Charge so that appropriate reporting can be made through the OMAO chain of command. In addition, all work-related mishaps involving scientific staff that result in an employee injury or illness, or any work related mishap or near miss, including those that do not require first aid or medical attention, must be reported within 24 hours of occurrence to the NOAA Fisheries Deputy Assistant Administrator for Operations. The reporting will be accomplished using a Mishap Reporting Form, via email, originating from the Chief Scientist, through the OMI Facility Operations and Safety (FOS) Branch (Jack.Emberg@noaa.gov with copies sent to Linda.Arlen@noaa.gov and Joseph.Finnegan@noaa.gov

Email Contact: The following should be included as recipients of the daily e-mail message:

Wendy.Gabriel@noaa.gov	{FEMAD Chief}
Fred.Serchuk@noaa.gov	{Acting READ Chief}
Thomas.Noji@noaa.gov	{EPD Chief}
Bill.Karp@noaa.gov	{Science and Research Director}
Russell.Brown@noaa.gov	{Deputy Science and Research Director}
Nathan.Keith@noaa.gov	{NEFSC Vessel Coordinator}
Jon.Hare@noaa.gov	{Oceanography Branch Chief}
Tamara.Holzwarth-Davis@noaa.gov	{Oceanography Branch}
co.explorer@noaa.gov	{Commanding Officer – <i>Okeanos Explorer</i> }
Michael.S.Abbott@noaa.gov	{NEFSC Port Captain}
ops.explorer@noaa.gov	{Operations Officer – <i>Okeanos Explorer</i> }

Watches: Vessel operations will be conducted 24 hours per day. The scientific watch schedule will be determined and submitted as part of the Addendum one week prior to sailing. Scientific personnel will be on duty for 12 hour watches each day.

Meals and Berthing: Meals and berthing are required for up to 10 scientists. Meals will be served 3 times daily beginning one hour before scheduled departure, extending throughout the cruise, and ending two hours after the termination of the cruise. The Chief Scientist is responsible for determining the rosters of scientific watch parties. The OPS/CO will assign scientific staterooms/berths.

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 two weeks prior to the survey.

All NOAA Scientists will have proper travel orders when assigned to a NOAA ship. The Chief Scientist will ensure that all non-NOAA and/or non-Federal employee scientists aboard will also have proper orders or the means to support themselves in the event that the ship becomes uninhabitable and/or the galley is closed during a port call during any part of the scheduled project.

Pre-Cruise Meeting: Prior to departure the Chief Scientist will conduct a meeting of the scientific party to train them in sample collection and inform them of cruise objectives. Some vessel protocols, e.g., meals, watches, etiquette, etc., will be presented by the ship's Operations Officer.

Post Cruise Reporting Requirements: Upon completion of each cruise leg, a post-cruise meeting will be held (unless prior alternate arrangements are made) and attended by the ship's officers, the Chief Scientist, members of the scientific party, the Vessel Coordinator and the Port Captain to review the cruise. Concerns regarding safety, efficiency, and suggestions for improvements for future cruises should be discussed. Minutes of the post-cruise meeting will be distributed to all participants via email and to the CO.MOC.Atlantic@noaa.gov and ChiefOps.MOA@noaa.gov. The Port Captain, if attending, is responsible for the recording and distributing the minutes. In his/her absence, the Operations Officer shall be responsible for the minutes.

Within 20 days of the completion of each cruise leg, a Ship Operation Evaluation form is to be completed by the Chief Scientist and submitted to NOAA's Office of Marine and Aviation Operations. The Chief Scientist will also provide a Cruise Report to the NEFSC vessel coordinator.

Personnel List (Scientific):

<u>Name</u>	<u>Title</u>	<u>Organization</u>
Jerry Prezioso	Chief Scientist	NOAA/NMFS Narragansett, RI
Tamara Holzwarth-Davis	Oceanography Ops	NOAA/NMFS Woods Hole, MA
Cristina Bascunan	Oceanography Ops	NOAA/NMFS Woods Hole, MA
Liwei Zhu	Student Volunteer	URI / GSO Narragansett, RI
Jenna Martin-Fisher	Student Volunteer	University of Maine
Patrick Bledsoe	Student Volunteer	URI/GSO Narragansett, RI
Mashkoor Malik	Mapping Specialist	NOAA OER Silver Spring, MD
Female scientist TBD	FlowCytobot Specialist	WHOI Woods Hole, MA
Nicholas Metheny	Marine mammal/bird observer	CUNY Staten Island, NY
Glen Davis	Marine mammal/bird observer	CUNY Staten Island, NY
Emily Brownlee	Graduate Student	MIT/WHOI Woods Hole, MA

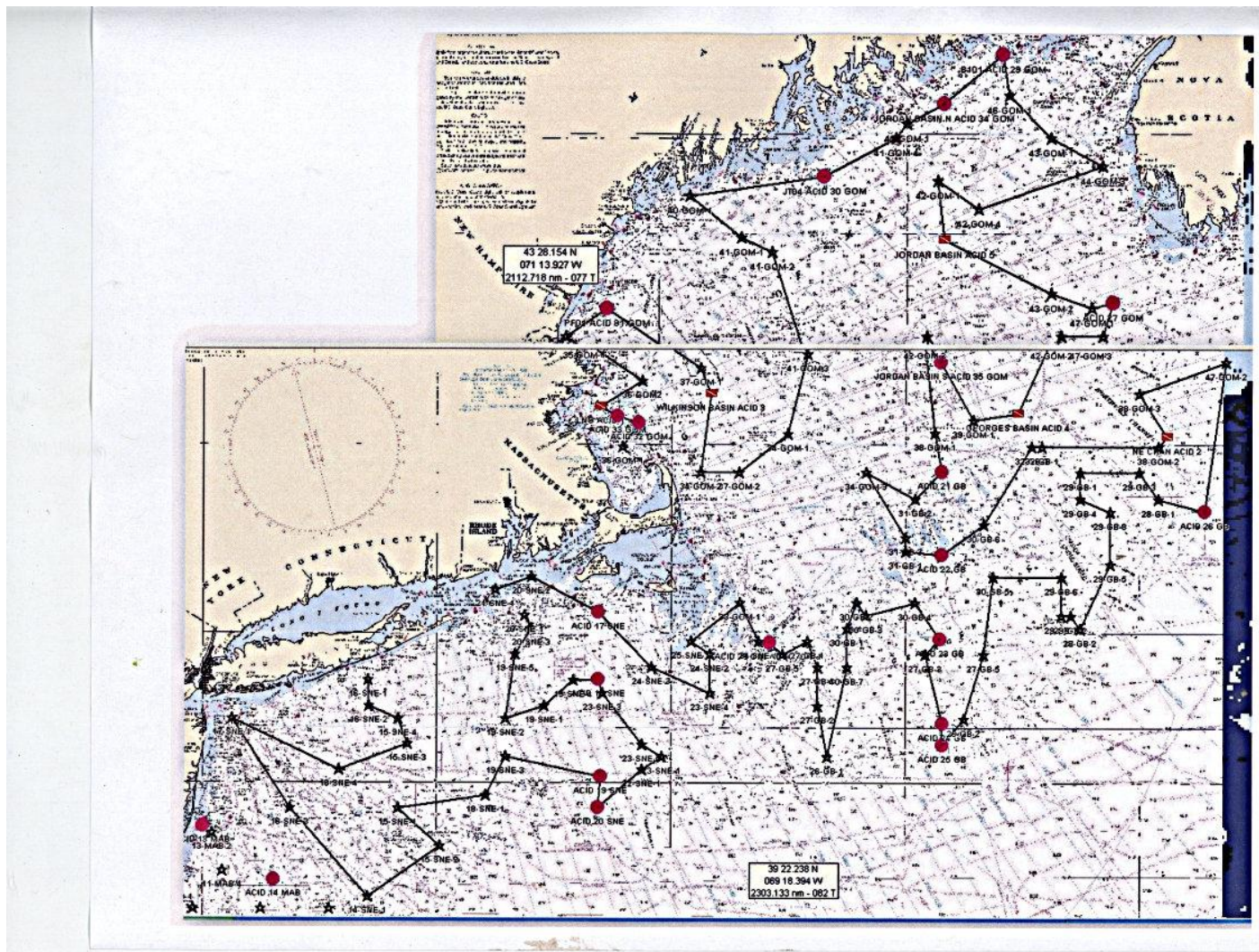


Figure 1. Proposed cruise track for *Okeanos Explorer* Summer Ecosystems Monitoring Survey, during 23 August – 4 September 2013.



Figure 2. Plankton net sampling array, showing 61 and 20 cm bongo nets.



Figure 3. A Niskin bottle rosette sampler equipped with a Laser In-Situ Scattering and Transmissometry (LISST) instrument, visible as a black cylinder mounted horizontally below the 10 liter Niskin bottles.

Figure 4. FlowCytobot will be plumbed into the scientific flow-through system to provide continuous sampling of surface phyto-and micro-zooplankton. This will be the first use of the technology on a NOAA vessel.

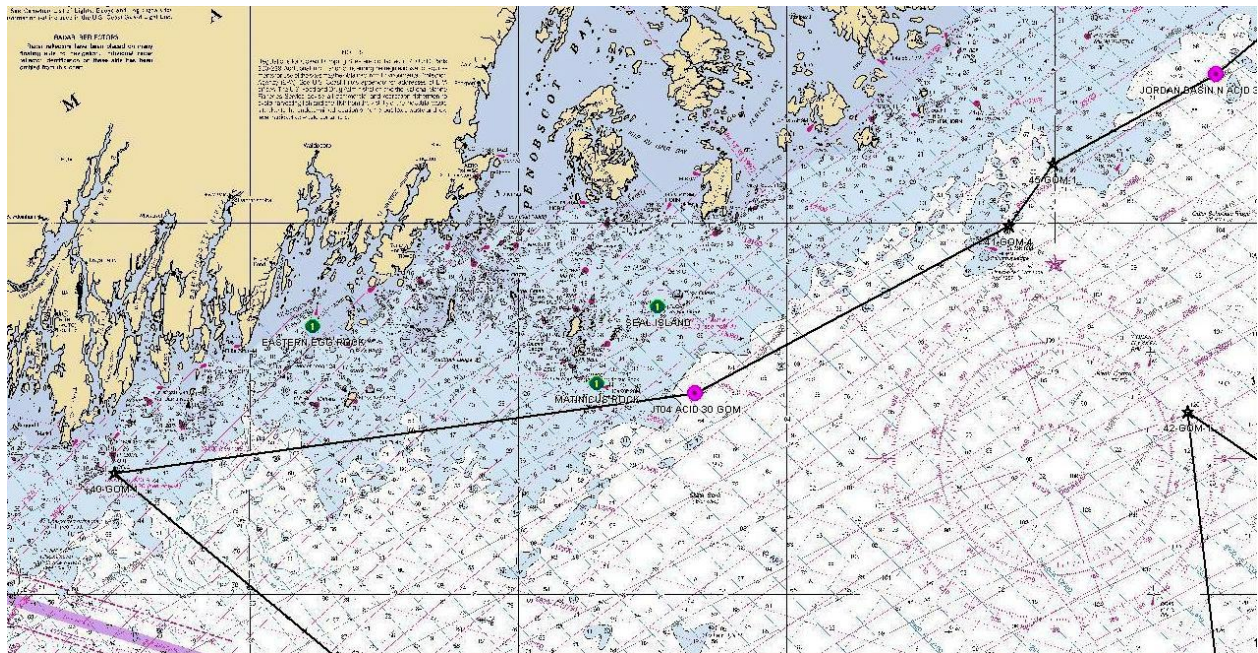


Figure 5. Puffin nursery areas (in green) near proposed cruise track where opportunistic Isaacs-Kidd midwater trawls are planned, time and weather permitting.



Figure 6. Isaacs-Kidd Midwater Trawl (6 foot wide) . Deployed and towed similarly to a bongo net, it is used for catching larval and juvenile fish.

Figure 7. Mapping boxes for Wilkinson and Jordan Basins and Schoodic Ridge on EX 1305 Ecomon cruise. Wilkinson Basin and Schoodic Ridge are the preferred mapping sites. Jordan Basin will replace Schoodic Ridge if vessel is unable to get as far north as Schoodic Ridge area. Georges Basin will not be mapped.

Appendix A.

LIST OF STATION POSITIONS FOR EX 1305 AUGUST ECOSYSTEM MONITORING CRUISE

Type	Name	Lat (DDMM)		Long (DDMM)	
Fixed+Bongo	LNG (Acid 1)	42	25.01	70	36.797
Fixed+Bongo	NE Ch (Acid 2)	42	13.5	65	46.002
Fixed+Bongo	Wilkinson Basin (Acid 3)	42	30	69	40.002
Fixed+Bongo	Georges Basin (Acid 4)	42	22.42	67	2.675
Fixed+Bongo	Jordon Basin (Acid 5)	43	24	67	42
Fixed	Acid 17 SNE	41	6.306	70	37.334
Fixed	Acid 18 SNE	40	40.2	70	37.334
Fixed	Acid 19 SNE	40	2.226	70	36.068
Fixed	Acid 20 SNE	39	49.95	70	37.333
Fixed	Acid 21 GB	42	0.404	67	41.43
Fixed	Acid 22 GB	41	28.2	67	41.43
Fixed	Acid 23 GB	40	55.72	67	42.51
Fixed	Acid 24 GB	40	22.97	67	41.43
Fixed	Acid 25 GB	40	14.74	67	41.43
Fixed	Acid 26 GB	41	45.14	65	26.528
Fixed	Acid 27 GOM	43	1.652	66	20.486
Fixed	Acid 32 GOM	42	18.94	70	16.762
Fixed	Acid 33 GOM	42	21.4	70	27.924
Fixed	Great South Ch	40	54	69	9.444
Fixed	BI01 Acid 29 GOM	44	29.13	67	13.66
Fixed	JT04 Acid 30 GOM	43	46.3	68	40.2
Fixed	PF01 Acid 31 GOM	42	59.92	70	25.3
Fixed	Jordan Basin N	44	12	67	42
Fixed	Jordan Basin S	42	42.06	67	42
Bongo	14-SNE-1	39	14.9	72	35.082
Bongo	15-SNE-1	39	49.88	72	20.088
Bongo	15-SNE-2	39	34.89	72	30.084

Bongo	15-SNE-3	40	14.87	72	15.09
Bongo	15-SNE-4	40	24.87	72	20.088
Bongo	16-SNE-1	40	39.86	72	35.082
Bongo	16-SNE-2	40	29.87	72	35.082
Bongo	16-SNE-3	39	49.88	73	15.066
Bongo	16-SNE-4	40	4.878	72	50.076
Bongo	17-SNE-1	40	24.87	73	45.054
Bongo	18-SNE-1	39	54.88	71	35.106
Bongo	19-SNE-1	40	29.87	71	5.118
Bongo	19-SNE-2	40	24.87	71	25.11
Bongo	19-SNE-3	40	9.876	71	25.11
Bongo	19-SNE-4	40	39.86	70	50.124
Bongo	19-SNE-5	40	49.86	71	20.112
Bongo	20-SNE-1	41	4.854	71	15.114
Bongo	20-SNE-2	41	19.85	71	0.12
Bongo	20-SNE-3	40	59.86	71	0.12
Bongo	21-SNE-1	41	14.85	71	30.108
Bongo	22-SNE-1	40	4.878	70	15.138
Bongo	23-SNE-1	40	9.876	70	5.142
Bongo	23-SNE-2	40	44.86	69	0.168
Bongo	23-SNE-3	40	34.87	70	35.13
Bongo	23-SNE-4	40	34.87	69	40.152
Bongo	23-SNE-5	40	14.87	70	15.138
Bongo	24-SNE-1	40	54.86	69	15.162
Bongo	24-SNE-2	40	49.86	69	40.152
Bongo	24-SNE-3	40	44.86	70	10.14
Bongo	25-SNE-1	40	54.86	69	50.148
Bongo	26-GB-1	40	9.876	68	40.176
Bongo	26-GB-2	40	24.87	67	30.204
Bongo	27-GB-1	40	54.86	68	50.172
Bongo	27-GB-2	40	29.87	68	45.174
Bongo	27-GB-3	40	49.86	67	50.196
Bongo	27-GB-4	40	44.86	68	45.174
Bongo	27-GB-5	40	49.86	67	20.208
Bongo	27-GB-6	40	49.86	67	20.208
Bongo	28-GB-1	41	49.84	65	50.244
Bongo	28-GB-2	40	59.86	66	30.228
Bongo	29-GB-1	41	59.83	66	30.228
Bongo	29-GB-2	41	4.854	66	35.226
Bongo	29-GB-3	41	59.83	66	0.24
Bongo	29-GB-4	41	49.84	66	30.228

Bongo	29-GB-5	41	24.85	66	15.234
Bongo	29-GB-6	41	19.85	66	40.224
Bongo	29-GB-7	41	4.854	66	40.224
Bongo	29-GB-8	41	44.84	66	15.234
Bongo	30-GB-1	40	59.86	68	30.18
Bongo	30-GB-2	41	9.852	68	25.182
Bongo	30-GB-3	41	4.854	68	20.184
Bongo	30-GB-4	41	9.852	67	55.194
Bongo	30-GB-5	41	19.85	67	15.21
Bongo	30-GB-6	41	39.84	67	20.208
Bongo	30-GB-7	40	44.86	68	30.18
Bongo	31-GB-1	41	29.84	68	0.192
Bongo	31-GB-2	41	49.84	67	55.194
Bongo	31-GB-3	41	34.84	68	0.192
Bongo	32-GB-1	42	9.828	66	50.22
Bongo	32-GB-2	42	9.828	66	55.218
Bongo	33-GOM-1	41	9.852	69	25.158
Bongo	34-GOM-1	42	14.83	69	0.168
Bongo	34-GOM-2	41	59.83	69	45.15
Bongo	34-GOM-3	41	59.83	68	20.184
Bongo	35-GOM-1	42	49.81	70	45.126
Bongo	36-GOM-1	42	9.828	70	25.134
Bongo	36-GOM-2	42	34.82	70	15.138
Bongo	37-GOM-1	42	39.82	69	45.15
Bongo	37-GOM-2	41	59.83	69	25.158
Bongo	38-GOM-1	42	14.83	67	45.198
Bongo	38-GOM-2	42	9.828	65	50.244
Bongo	38-GOM-3	42	29.82	66	0.24
Bongo	39-GOM-1	42	19.82	67	25.206
Bongo	40-GOM-1	43	39.79	69	45.15
Bongo	41-GOM-1	43	24.8	69	20.16
Bongo	41-GOM-2	43	19.8	69	5.166
Bongo	41-GOM-3	42	44.81	68	50.172
Bongo	41-GOM-4	43	59.78	68	5.19
Bongo	42-GOM-1	43	44.79	67	45.198
Bongo	42-GOM-2	42	49.81	66	45.222
Bongo	42-GOM-3	42	49.81	67	50.196
Bongo	42-GOM-4	43	34.79	67	25.206
Bongo	43-GOM-1	43	59.78	66	50.22
Bongo	43-GOM-2	43	4.806	66	50.22
Bongo	44-GOM-3	43	49.79	66	25.23

Bongo	45-GOM-1	44	4.782	68	0.192
Bongo	46-GOM-1	44	14.78	67	10.212
Bongo	47-GOM-1	42	59.81	66	30.228
Bongo	47-GOM-2	42	34.82	65	15.258
Bongo	47-GOM-3	42	49.81	66	25.23

APPENDIX B:

FLOWCYTOBOT INFORMATION

30 July 2013, H.M. Sosik, WHOI

1

Imaging FlowCytobot – Underway sampling on NOAA Ship *Okeanos Explorer*, Summer Ecosystem

Monitoring Survey (NOAA EX 1305)

Woods Hole Oceanographic Institution, CINAR project

PI: Heidi M. Sosik

hsosik@whoi.edu

508-289-2311

Cruise participant:

Emily Brownlee

MIT/WHOI Joint Program graduate student (PhD Candidate)

ebrownlee@whoi.edu

508-289-3360

Introduction - Imaging FlowCytobot (IFCB) is an automated submersible imaging-in-flow cytometer (Olson and Sosik 2007, Sosik and Olson 2007) (Fig. 1). IFCB uses a combination of video and flow cytometric technology to both capture images of nano- and microplankton and measure their chlorophyll fluorescence. The images obtained with Imaging FlowCytobot have resolution high enough ($\sim 1 \mu\text{m}$) that many plankton taxa can be recognized to genus or even species (Fig. 2). These observations make it possible, not only to estimate taxon-specific abundances, but also biomass (by computing cell volume from image dimensions; Moberg and Sosik 2012) and size distributions.

Logistical requirements - During the cruise, IFCB will be located on board the *Okeanos Explorer* (ideally

in the wet lab) and configured to sample semi-continuously (5 mL every 20 minutes) and automatically from the ship's underway seawater system. Because IFCB is measuring live delicate planktonic organisms, it is important that the ship's underway flow have low residence time (after intake from the ocean) and a pumping system that does not damage cells. A system that avoids production or accumulation of air bubbles in the flow is also important. A waste flow of 5 mL every 20 minutes (equivalent to intake) is discharged from the instrument and either plumbed to a drain or 20-L carboy. IFCB is 8 inches in diameter and 32 inches tall and weighs approximately 70 pounds in air. It must be

maintained in an upright orientation during operation. We would like to secure the instrument in an out-of-the-way location in the ship's wet lab, padded with some shock absorbing material to minimize vibrations.

IFCB will be connected to an external power supply (provided by WHOI) that operates on standard AC power. IFCB data are stored internally, but we will also connect a laptop (via Ethernet, either ship's network or our own two-point network) to enable near real time inspection of images (Sosik and

Figure 1. Imaging FlowCytobot

(IFCB) ready for deployment in

its underwater housing. It can

also be operated in an underway

sampling mode on board ship.

30 July 2013, H.M. Sosik, WHOI

2

Futrelle 2012; Fig. 3) and provide a means for external control in case sampling protocol or focus adjustments are required.

Figure 3. Snap shot of the existing web-based IFCB data dashboard (<http://ifcb-data.whoi.edu/>) for the Martha's Vineyard Coastal Observatory showing the time series navigation tool (top) and a mosaic of images (phytoplankton, microzooplankton, and detritus) from a single time series sample selected by the user. We will configure a laptop-based dashboard for shipboard access to all images collected during the cruise.

Nanophytoplankton Diatoms Dinoflagellates Ciliates

Figure 2. Example plankton images collected by IFCB during deployments at the Martha's Vineyard Coastal Observatory.

30 July 2013, H.M. Sosik, WHOI

3

References

Moberg, E. A., and H. M. Sosik. 2012. Distance maps to estimate cell volume from two-dimensional plankton images. *Limnol. Oceanogr. Methods* 10: 278-288.

Olson, R. J., and H. M. Sosik. 2007. A submersible imaging-in-flow instrument to analyze nano- and microplankton: Imaging FlowCytobot. *Limnol. Oceanogr. Methods* 5: 195-203.

Sosik, H. M., and J. Futrelle. 2012. Informatics solutions for large ocean optics datasets, p. 1-7. *Proceedings of Ocean Optics XXI*.

Sosik, H. M., and R. J. Olson. 2007. Automated taxonomic classification of phytoplankton sampled with imaging-in-flow cytometry. *Limnol. Oceanogr. Methods* 5: 204-216.

Sosik, H. M., R. J. Olson, and E. V. Armbrust. 2011. Flow cytometry in phytoplankton research, p. 171-185. *In* D. J. Suggett, O. Prasil and M. A. Borowitzka [eds.], *Chlorophyll a fluorescence in aquatic sciences: Methods and applications*. *Developments in Applied Phycology* 4. Springer.

APPENDIX C:

BOUNDING BOXES FOR MAPPING IN THE GULF OF MAINE

Wilkinson Basin 16 Hours Box		Jordan Basin mapping box		SchoodicRidgeline	
Longitude	Latitude	Longitude	Latitude	Longitude	Latitude
-69.7377	42.7784	-67.85	43.5	-67.6716	44.05667
-69.7088	42.80519	-67.85	43.25	-67.5717	44.20667
-69.3987	42.49692	-67.66	43.25		
-69.4271	42.46844	-67.66	43.5		

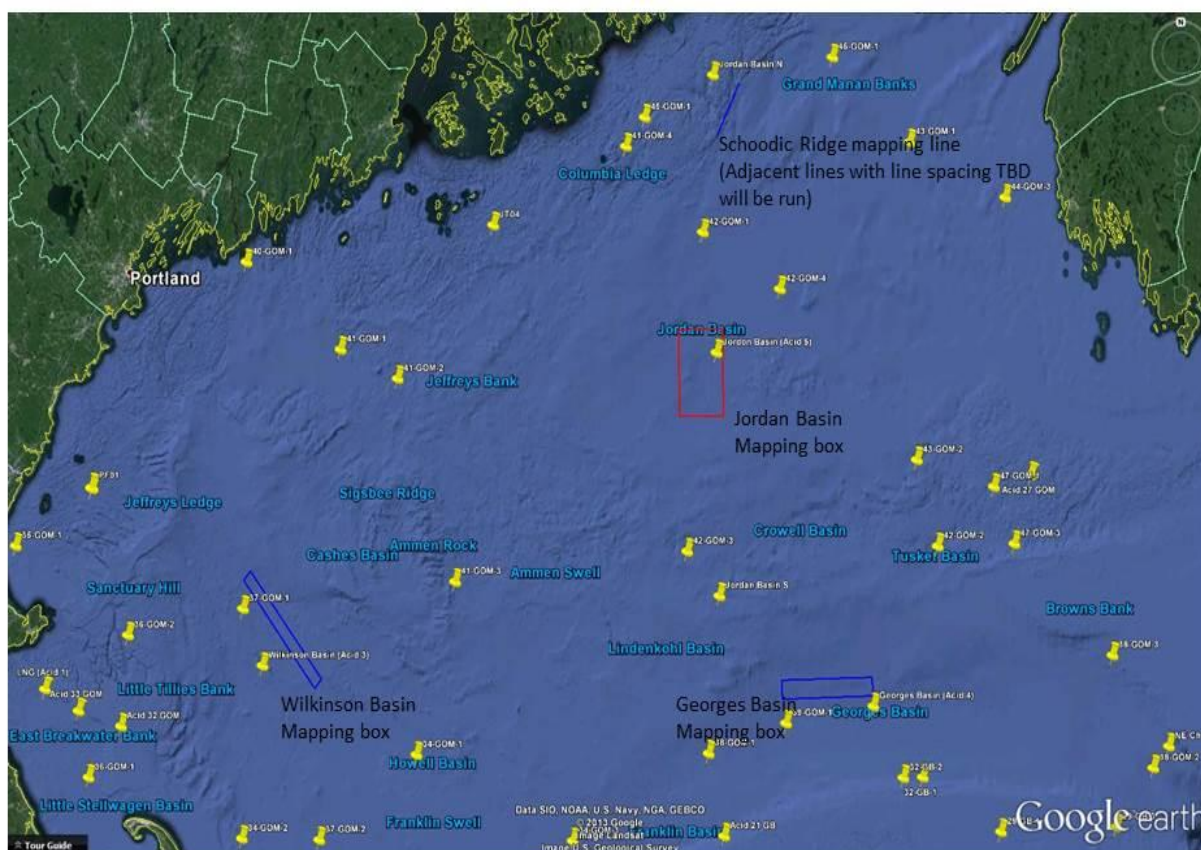


Image showing Jordan and Wilkinson Basin Mapping Boxes and Schoodic Ridge Mapping Line. Other box on Georges Basin will NOT be visited due to time constraints

APPENDIX D:

CANADIAN FOREIGN FISHING VESSEL LICENCE



Fisheries
and Oceans

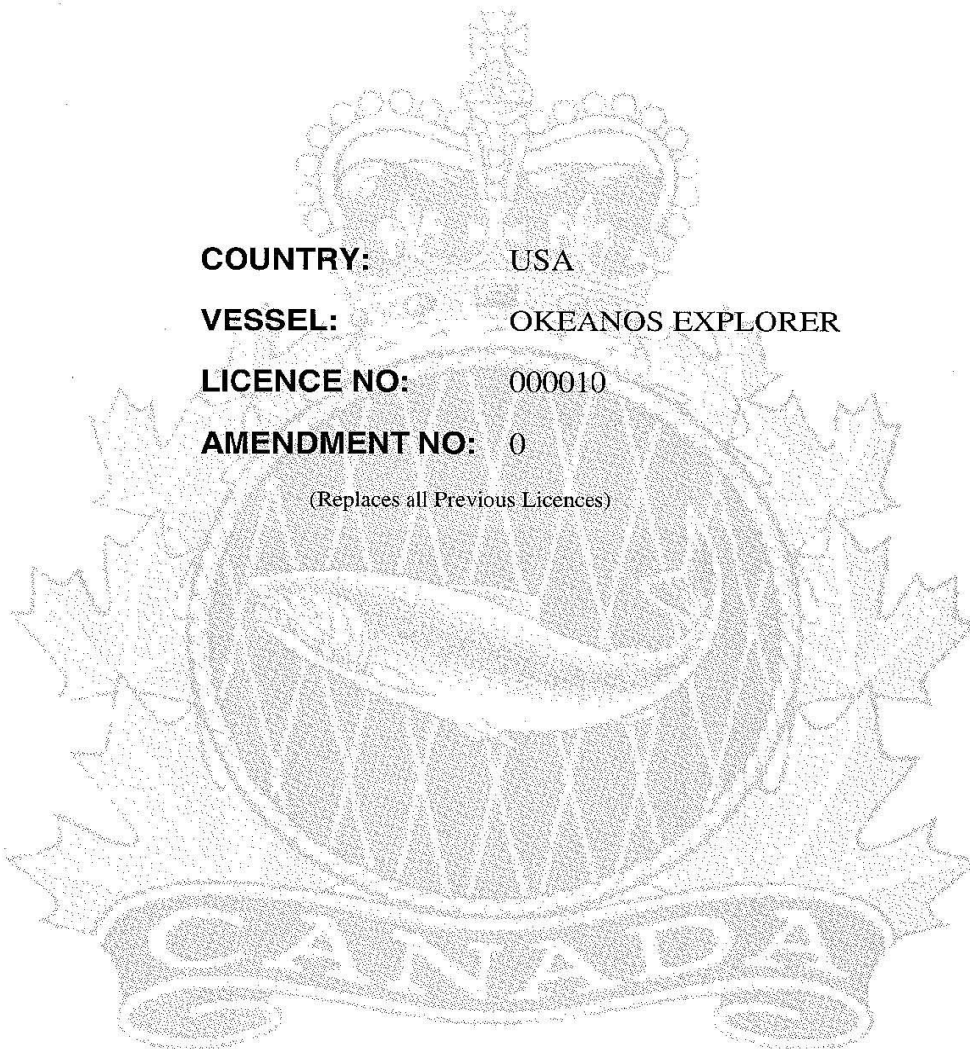
Pêches
et Océans

FOREIGN FISHING VESSEL LICENCE

LICENCE DES BÂTIMENTS DE PÊCHES ÉTRANGERS

COUNTRY: USA
VESSEL: OKEANOS EXPLORER
LICENCE NO: 000010
AMENDMENT NO: 0

(Replaces all Previous Licences)



FOREIGN FISHING VESSEL LICENCE

LICENCE DES BÂTIMENTS DE PÊCHES ÉTRANGERS

Licence No 000010
Year: 2013

OKEANOS EXPLORER

Page No: 2
Amendment No: 0

VESSEL SPECIFICATIONS

Vessel: OKEANOS EXPLORER
Country: USA
Port of Registry: WOODS HOLE (MASS)
Side No: 337
Call Sign: WTDH
Registered No: R337

Length (m):
Crew:
Net Tonnage (t): 1616.0
Gross Tonnage (t): 2312.0
Calling Freq:
Working Freq:

Description of Vessel:

Type: RESEARCH VESSEL (FOREIGN)
Hull Colour: WHITE
Built: MOSS POINT, MISS, 1988

Log Book Information:

Fishing Log:
Production Log:
Transshipment Log:

Owner:

NOAA
NATIONAL MARINE FISHERIES SERVICE
166 WATER ST.

Master:

RAMOS, CDR RICARDO
NOAA, NATIONAL MARINE FISHERIES SVC

Agent:

KEITH, NATHAN
NOAA, NATIONAL MARINE FISHERIES SVC
166 WATER ST.
WOODS HOLE, MA 02543



FOREIGN FISHING VESSEL LICENCE

LICENCE DES BÂTIMENTS DE PÊCHES ÉTRANGERS

Licence No 000010
Year: 2013

OKEANOS EXPLORER

Page No: 3
Amendment No: 0

1.0 REGIONAL DIRECTOR

The Regional Director-General designated under the Coastal Fisheries Protection Regulations for the purposes of this licence is the Regional Director-General of the Department of Fisheries and Oceans for the Maritimes Region.

2.0 AUTHORIZED ACTIVITIES

The above mentioned vessel, is authorized to enter that portion of Canadian Fisheries Waters known as Fishing Zone(s) 4, and to engage in fishing for the purposes of scientific research as described in this licence

2.1 AUTHORIZED COMMERCIAL FISHING ACTIVITIES

n/a

2.2 AUTHORIZED FISHERY SUPPORT ACTIVITIES

n/a

2.3 AUTHORIZED RESEARCH ACTIVITIES

The above mentioned vessel, is authorized to conduct the undernoted fisheries research:-

2.3.1 GENERAL RESEARCH

START DATE: August 19, 2013

END DATE: August 30, 2013

NORTHEAST CONTINENTAL SHELF ECOSYSTEM
(PELAGIC COMPONENTS) 4X, 5Y & GULF OF MAINE

2.4 AUTHORIZED PORT ACTIVITIES

n/a

3.0 FISHING AREAS



FOREIGN FISHING VESSEL LICENCE

LICENCE DES BÂTIMENTS DE PÊCHES ÉTRANGERS

Licence No 000010
Year: 2013

OKEANOS EXPLORER

Page No: 4
Amendment No: 0

- 3.1** Known/expected coral concentrations occur in the areas of greater than 200 metres depth in Northeast Channel, along the edges of Georges Bank, and in the Jordan Basin area. These corals are considered important habitat and are the subject of conservation measures in Canadian waters. Caution should be taken to minimize gear interactions with corals if they are found during the study. (Contact: Glen Herbert; 902-426-9900; glen.herbert@dfo-mpo.gc.ca)

Survey will avoid the Northeast Channel Coral Conservation Area.

4.0 AUTHORIZED GEAR AND EQUIPMENT

- 4.1** Oceanographic Equipment
4.2 Mid-Water Trawl
4.3 Plankton nets (bongo)
CTD
Fluorometer
Thermosalinograph

5.0 PROHIBITED SPECIES

n/a

6.0 REPORTING REQUIREMENTS

- 6.1** The following reports shall be made via one of the three following methods:-

- via telephone (902) 426-9966, or,
- via fax (902) 426-5010, or,
- via e-mail licensing.dartmouth@dfo-mpo.gc.ca

- 6.2** In accordance with the Coastal Fisheries Protection Regulations the master of this vessel shall:-

- (a) at least 24 hours prior to the entry of this vessel into Canadian fisheries waters, notify the Regional Director-General of the estimated time of entry of the vessel into such waters and the location of such entry.
- (b) at least 24 hours prior to the entry and/or departure from a Canadian port this vessel shall notify the Regional Director-General of the estimated time of entry and/or departure of the vessel from such port.
- (c) at least 72 hours prior to the departure from Canadian fisheries waters, this vessel shall notify the Regional Director-General of the estimated time of departure of the vessel from such waters, and the location of such departure.

7.0 SPECIAL CONDITIONS



FOREIGN FISHING VESSEL LICENCE

LICENCE DES BÂTIMENTS DE PÊCHES ÉTRANGERS

Licence No 000010
Year: 2013

OKEANOS EXPLORER

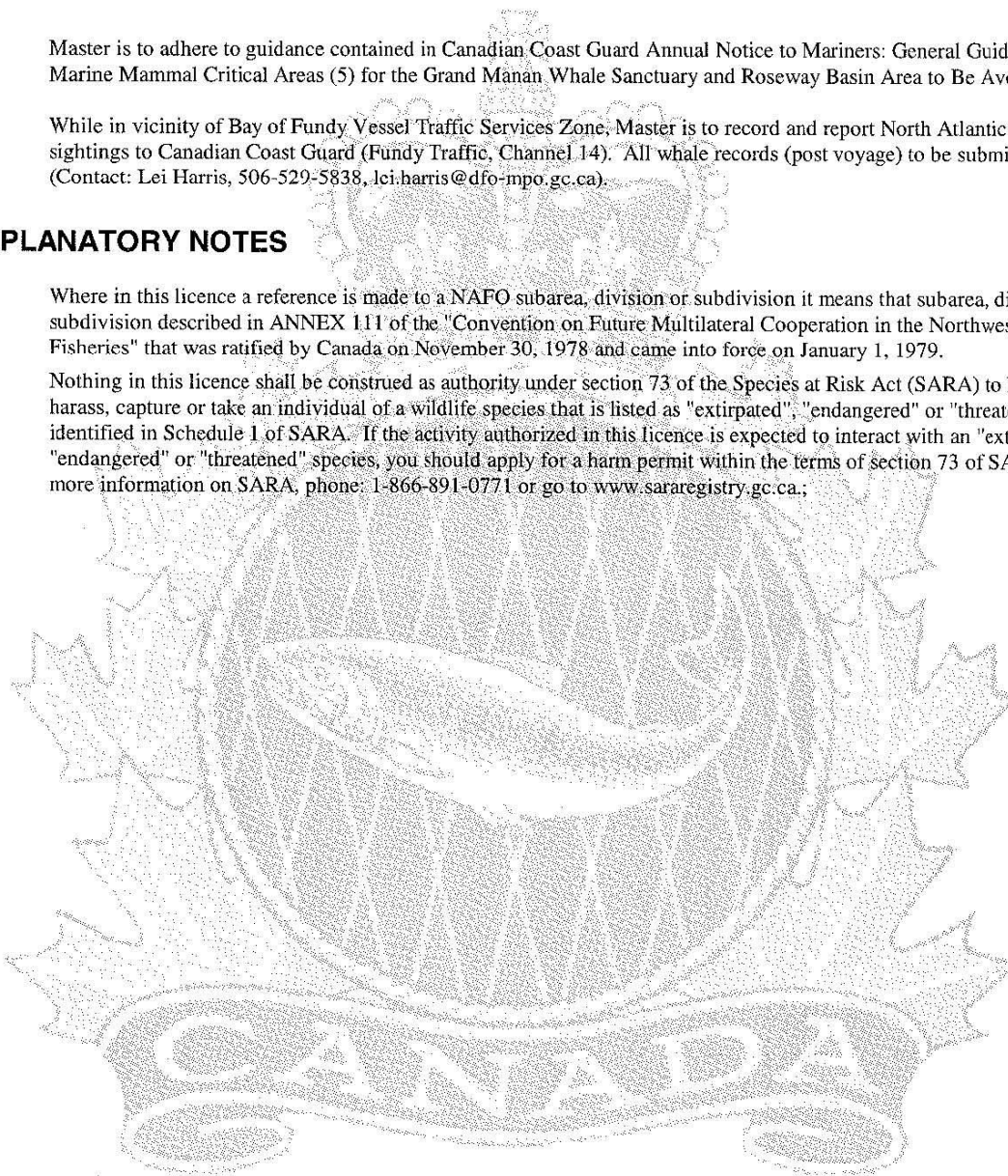
Page No: 5
Amendment No: 0

- 7.1** Master is to adhere to guidance contained in Canadian Coast Guard Annual Notice to Mariners: General Guidelines for Marine Mammal Critical Areas (5) for the Grand Manan Whale Sanctuary and Roseway Basin Area to Be Avoided.

While in vicinity of Bay of Fundy Vessel Traffic Services Zone, Master is to record and report North Atlantic right whale sightings to Canadian Coast Guard (Fundy Traffic, Channel 14). All whale records (post voyage) to be submitted to DFO (Contact: Lei Harris, 506-529-5838, lei.harris@dfo-mpo.gc.ca).

8.0 EXPLANATORY NOTES

- 8.1** Where in this licence a reference is made to a NAFO subarea, division or subdivision it means that subarea, division or subdivision described in ANNEX 111 of the "Convention on Future Multilateral Cooperation in the Northwest Atlantic Fisheries" that was ratified by Canada on November 30, 1978 and came into force on January 1, 1979.
- 8.2** Nothing in this licence shall be construed as authority under section 73 of the Species at Risk Act (SARA) to kill, harm, harass, capture or take an individual of a wildlife species that is listed as "extirpated", "endangered" or "threatened" as identified in Schedule 1 of SARA. If the activity authorized in this licence is expected to interact with an "extirpated", "endangered" or "threatened" species, you should apply for a harm permit within the terms of section 73 of SARA. For more information on SARA, phone: 1-866-891-0771 or go to www.sararegistry.gc.ca;





FOREIGN FISHING VESSEL LICENCE

LICENCE DES BÂTIMENTS DE PÊCHES ÉTRANGERS

Licence No 000010
Year: 2013

OKEANOS EXPLORER

Page No: 6 of 6
Amendment No: 0


Issued By:


CONNIE FARR
FOREIGN LICENSING OFFICER

DATE

May 30, 2013

Approved By:


REGIONAL DIRECTOR

DATE

MAY 30 2013

Issued Location:

HALIFAX

