



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

July 6, 2017

MEMORANDUM FOR: Captain Donn Pratt, NOAA
Master, NOAA Ship *Nancy Foster*

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

SUBJECT: Project Instruction for NF-17-07
FKNMS Coral Reef Mapping and Condition Assessment, and
Fisheries Acoustics Characterization

Attached is the final Project Instruction for NF-17-06, FKNMS Coral Reef Mapping and Condition Assessment, and Fisheries Acoustics Characterization, which is scheduled aboard NOAA Ship *Nancy Foster* during the period of July 20 to August 09, 2017. Of the 19 DAS scheduled for this project, 19 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 Ocean Service
 Office of the National Marine Sanctuaries
 1305 East West Highway
 Silver Spring, Maryland 20910

Final Project Instructions

Date Submitted: June 26, 2017
Platform: NOAA Ship *Nancy Foster*
Project Number: NF-17-07 (OMAO)
Project Title: FKNMS Coral Reef Mapping and Condition Assessment,
 and Fisheries Acoustics Characterizations
Project Dates: July 20, 2017 to August 09, 2017

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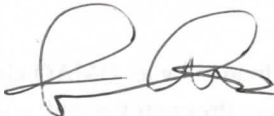
Michael Buchman Dated:
 Chief Scientist
 Florida Keys National Marine Sanctuary

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Edward Lindelof Dated:
 Acting Superintendent
 Florida Keys National Marine Sanctuary

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Steve Gittings, Ph.D. Dated:
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 NOS/ONMS

Approved by:  LT/NOAA 7/6/17
 Captain Scott Sirois, NOAA Dated:
 Commanding Officer
 Marine Operations Center - Atlantic

FOR



I. Overview

A. Brief Summary and Project Period

This project builds on past research and monitoring in Florida Keys National Marine Sanctuary (FKNMS) with the Florida Fish and Wildlife Conservation Commission (FWC) and the National Centers for Coastal Ocean Science (NCCOS) and focuses on connectivity between the network of marine reserves in the Dry Tortugas region, including the connections between populations of fish in the waters of the Florida Keys, Marquesas, Dry Tortugas National Park (DRTO), the Tortugas Ecological Reserve North (TER-N) and spawning habitat at Riley's Hump (RH), located within the Tortugas Ecological Reserve South (TER-S), and surrounding reef habitats including areas such as Warsaw Hole. The purposes of the cruise are to (1) collect video images using an Remotely Operated Vehicle (ROV) along transects of bottom features of interest identified from past multibeam seafloor surveys; (2) collect multibeam bathymetry in gap areas, partly to aid in location features of interest for subsequent ROV work; and, (3) conduct observations and maintenance of an acoustic array in and near the study areas.

The cruise will begin July 20th with transiting from Charleston, SC toward Key West where scientists and gear will be loaded (on July 26th). En route, when the ship approaches the sanctuary, multibeam bathymetric surveys of two focus areas, plus a swath along the entire FKNMS reef tract outward from the 19m contour will be conducted. The operational portion of the cruise will commence July 27th departing from Key West and working for approximately five days off of the Hawk Channel area, conducting diving and drop camera operations off small launches in the morning, and ROV surveys off the ship in the afternoon and on into early evening. Additional bathymetry will be collected during night operations. The second five days of the operational period will continue the same sort of work in the Dry Tortugas and Riley's Hump areas. The ship will return to Key West for demobilization/disembarking on August 5th, and then depart August 7th for St Petersburg, FL.

B. Days at Sea (DAS)

Of the 19 DAS scheduled for this project, 0 DAS are funded by an OMAO allocation, 19 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

Operations will be conducted primarily in three main areas of the FKNMS (Figure 1, red polygon): (1) an area off of Carysfort Reef, plus a transect along the 19m contour outward along the entire reef tract line; (2) offshore from Hawk Channel; and, (3) the Marquesas and Dry Tortugas (See Appendix 1).

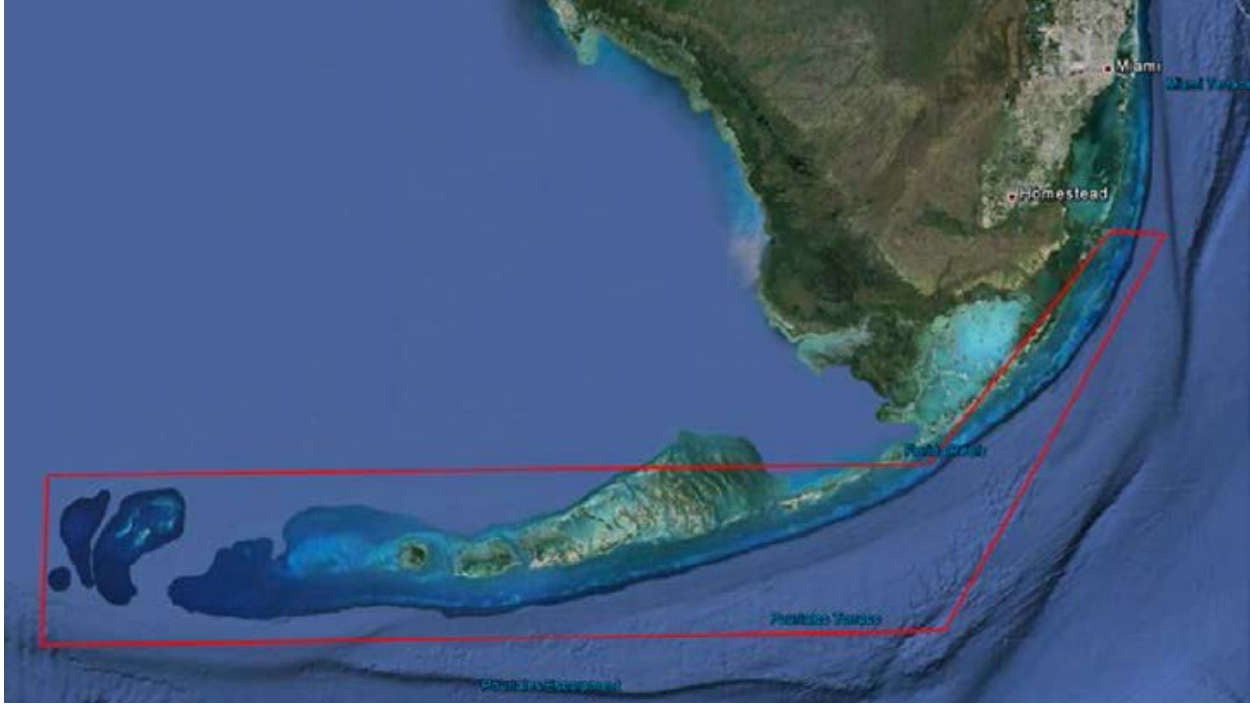


Figure 1: Boundary of FKNMS (shown in red)

D. Summary of Objectives

- Servicing tag telemetry receivers - Deploy scuba divers to recover, download and redeploy acoustic receivers (VR2s) Divers will also survey and observe fish near the VR2s.
- ROV operations – a ship-based ROV will target fish aggregations and benthic habitat features, primarily at deeper depths (up to 300m). Depending on environmental conditions, ROV surveys will be conducted daily off the ship during this mission in the afternoon and into evenings.
- Habitat groundtruthing – Small boat-based drop camera, stereocamera, and/or diver visual surveys over bathymetry habitat features of interest, or for habitat validation purposes. (If sea conditions and safety require, these operations may also be conducted from the ship using the J-frame when sampling deeper sites.) (See Appendix 2 for additional stereocamera information)
- Dive and drop camera via small boat on fish aggregations or benthic habitat features as required for the mission.
- Multibeam survey target areas - Appendix 1 shows general areas of interest for MBES surveys. Surveys will be conducted primarily during the evening and overnight periods and will be used to refine the ROV locations for the following day.

E. Participating Institutions

NOAA's National Ocean Service (NOS) – Office of National Marine Sanctuaries (ONMS)

NOAA's National Ocean Service – Office of National Marine Sanctuaries, Florida Keys National Marine Sanctuary (FKNMS)

NOAA's National Ocean Service - National Center for Coastal Ocean Sciences (NCCOS)

Florida Fish and Wildlife Conservation Commission (FWC)

University of North Carolina Wilmington (UNCW)

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

	Name (Last, First)	Title	Date Aboard	Date Disembark	Gender	Affiliation	Nationality
1	Buchman, Michael	Chief Scientist	7/26	8/7	M	NOAA	US
2	Abbitt, LTJG Rosemary	Scientist	7/26	8/7	F	NOAA	US
3	Katchenago, LTJG John	UDS	7/26	8/7	M	NOAA	US
4	Keller, Jessica/	Scientist	7/26	8/7	F	FWC	US
5	Herbig, Jennifer	Scientist	7/26	8/7	F	FWC	US
6	Renchen, Jeffrey	Scientist	7/26	8/7	M	FWC	US
7	Morley, Dannielle	PI	7/26	8/7	F	FWC	US
8	White, Jason	ROV Op	7/26	8/7	M	UNC	US
9	Horn, Lance	ROV Op	7/26	8/7	M	UNC	US
10	Erik Glidden	ROV Op	7/26	8/7	M	UNC	US
11	Taylor, Chris	PI	7/26	8/7	M	NOAA	US
12	Vander Pluym, Jenny	Scientist	7/26	8/7	F	NOAA	US
13	Ebert, Eric	Scientist	7/26	8/7	M	NOAA	US
14	Mabroc, Ayman	Scientist	7/26	8/7	M	NCCOS	Egypt

G. Administrative

1. Points of Contacts:

Chief Scientist: Michael Buchman
Office: 305-809-4693
Cell: 305-360-1654
Email: Mike.Buchman@noaa.gov

Principal Investigator Chris Taylor
Office: 252-838-0833
Email: Chris.Taylor@noaa.gov

Principal Investigator: Danielle Morley
Office: 305-289-2330
Email: Danielle.Morley@MyFWC.com

Ops Officer: ENS Keith Hanson
Ship VoIP: 541-867-8915
Ship Iridium: 808-434-5653
Email: ops.nancy.foster@noaa.gov

2. Diplomatic Clearances

None Required.

3. Licenses and Permits

This project will be conducted under the Scientific Research Permit (U.S.) issued by Florida Keys National Marine Sanctuary (U.S.) to Dr. Alejandro Acosta (Principal Investigator). This permit will be presented to the ship by the time it sails.

FKNMS Research Permit: FKNMS- 2013-040-A2 includes a provision for the Area to Be Avoided.

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:

Project Period: July 20th – August 9th, 2017 (NF-17-07)

Depart: Charleston, SC, July 20th, 2017 (transit with bathymetry)

Arrive: Key West, FL July 25th, 2017
Load Vessel: Key West, FL July 26th, 2017
Depart: Key West, FL July 27th, 2017, by 1000

Operations will focus on the Hawks Channel area off Key West for roughly the first five days of the operational days. During the second half of this leg, operations will move through the Marquesas to the Dry Tortugas area (DRTO). Initial efforts in the DRTO will focus on Riley's Hump, weather permitting.

Arrive: Key West, FL August 5th, 2017
Offload Vessel: Key West, FL August 6th, 2017
Depart: Key West, FL August 7th, 2017
Arrive: St Petersburg, FL August 9th, 2017

B. Staging and Destaging:

Staging area/dock is at NAS Truman Annex, Navy Mole Pier. Most staging will occur on July 26th, 2017. We will need crane ops from approximately 0800 to 1000 to load science equipment on July 26th and to unload on August 6th, 2017. ROV gear will be loaded and offloaded from this location.

C. Operations to be conducted:

Sea bottom Video Acquisition Operations:

Benthic habitats in moderate depth water (>10m and <300m) will be visually characterized primarily using a ROV. Exceptions to the 0.5 mile exclusion zone from 30 foot contours may be made during daylight hours in safe weather conditions and at the discretion of the CO. This data will be collected to confirm the nature of hard bottom features identified on previous surveys and to assess the health, utilization, and diversity of benthos identified. Shallower depths will be assessed using stereo and/or drop cameras. However, depending on conditions, some deeper depths may also be assessed using these smaller units.

ROV (deployed from *Nancy Foster*):

The topside control system will be operated from the Wet Lab. The ROV will be deployed using the J-frame. A hydrophone pole will be mounted/deployed through the moonpool. The pole can be easily retrieved before transiting to a new location. ROV operations will conform to SOPs that have previously been used by UNCW aboard *Nancy Foster*.

The ROV sampling approach will be operated to conduct transects. The selection of ROV transects will largely be determined by results obtained on previous surveys and as refined by overnight multibeam bathymetry collected by NOAA technicians. Sampling will be conducted using a modified stratified random sampling approach. Stratified "regions" of interest will be identified for deployment based on visual and analytical

assessment of the multibeam data. A number of sample stations (2-5) will be randomly identified within the “region.” The geodetic coordinates will be provided to the Bridge as well as targeted in Hypack® for display on the Bridge. Once the ship is on station, the ultra-short baseline (USBL) hydrophone pole will be rotated into position, and the ROV powered up for deployment. Deployment of the ROV at the deepest depths (250m) will require the most time on station. Time estimates: 1) 15-minutes to deploy the ROV to the seafloor, 2) 1-hour transects, and 3) 20-minutes for retrieval. The scientists anticipate sampling 7 to 8 transects per day for a 10-hour shift (Personnel are not to work more than 12 hours in a given day). Ship deckhand, safety observer, and deck boss (and other personnel, as appropriate) will be required during recovery and deployment, but can otherwise be operated by the scientists.

Drop Camera: (deployed from launches or *Nancy Foster*):

Live boat deployment of this small drop camera will be conducted either from launches or *Nancy Foster*. We anticipate deployments of 20-30 minutes depending on current and wind conditions. A team of two scientists and one coxswain will be needed to operate the drop camera from small boats. Dive operations can occur simultaneously with this Drop Camera deployment, because it is launched from a small boat. No nighttime surveys are required or scheduled. Drop Camera (small boat based) surveys will be conducted over bathymetry habitat features of interest, or for habitat validation purposes. A snorkeler may be needed to confirm locations of desired features – all snorkeling will adhere to the limits and requirements outlined in the NOAA scientific dive manual. (If sea conditions and safety require, drop camera operations may also be conducted from the ship using the J-frame when sampling deeper sites.) Waypoints for stations will be provided to the Operations Officer and coxswain the night before operations. Scientists will enter coordinates into GPS on small boats.

Stereo Camera: (deployed from *Nancy Foster*):

A stationary, underwater stereocamera system will be used to collect 3D video and images to collect data on benthic fish. A camera system consists of a stereo-still camera pair and a single video camera housed in a ~15cm diameter X 50cm long anodized aluminum cylinder. The cameras are powered by 12V DC batteries in a separate housing, connected by cable to the back of the camera cylinder. There are two cylinders and two batteries mounted inside a cube-shaped ‘pod’ to be deployed on a site. The cube also contains GoPro cameras positioned on the adjacent sides to record surrounding habitat; the four cameras together provide a 360° view. The cube measures approximately 90cm on each side and ~90cm tall. The camera is attached to a surface buoy and deployed for 30 min. per site. Data are recorded internally for later download. (Appendix 2: Camera Deployment and Fish Assemblage Validation)

VR2 Downloads: (divers deployed from launches)

Teams of 2 divers will replace the existing VR2 receivers from locations in Key West, Marquesas and Riley’s hump (Appendix 3). Divers will bring down a newly programmed

VR2, remove the existing VR2 and place the new one in the station and secure it. The previous VR2 will be brought to the surface for downloading and reprogramming.

Multibeam Operations:

Overnight periods will be used to collect multibeam bathymetry in the vicinity of ROV operations and weather/stand down days may also be allocated by the Principal Investigator (in consultation with the ship's crew) for that purpose. Methods will adhere to those SOPs specified by NOAA staff and the ship's personnel. The multibeam data will inform the selection of additional ROV deployment areas, and be used to supplement NOAA benthic coverage maps. Fishery acoustics will be collected during all multibeam survey operations and opportunistically when other operations permit.

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.

The Dive Emergency Assistance Plan and Dive Plan encompassing all legs of NF-17-07 are presented in Appendix 4.

E. Applicable Restrictions

Poor field conditions:

1. Tropical cyclone activity is possible during this mission – the Commanding Officer (CO) will determine best mitigation practice for the ship in this scenario.
2. Summertime thunderstorms could influence dive ops periodically – teams will deploy/retreat at the direction of the CO in coordination with the Chief Scientist.
3. Oceanic currents could be too strong for safe ROV or diving operations – Chief Scientist to advise CO.

Equipment failure:

1. ROV failure will not jeopardize the primary objectives of this mission – an attempt to correct an issue with ROV will be made, but not at the expense of the field schedule.
2. Nitrox compressor failure will jeopardize the mission – in this case, the ship could do a touch-and-go or hold station near shore while either FKNMS boats or NF small boats transfer bottles from FKNMS in Key West for delivery of enough scuba tanks to complete the mission (to be coordinated by Chief Scientist).
3. Dive equipment failure – spare parts will be on hand to fix the most common problems.

Safety concerns:

1. Dive related injuries – NOAA Dive Masters will be on board to supervise all dive operations while underway; Lieutenant (junior grade) John Katchenago will serve as Unit Dive Supervisor (UDS) and Dive Master for the duration of the cruise. A diving safety drill along with a diver and coxswain safety meeting will also be coordinated with the CO on the first day of diving operations to prepare all teams for an unlikely dive injury scenario. The most likely dive emergency will be AGE or DCS.
2. General deck operations – CO (or their designee) can relay safety issues surrounding deck ops to Chief Scientist and party. To facilitate safety, daily safety meetings will occur on the bridge ~0745 between command, operations, department heads and chief scientist or designee
3. Exposure – Coxswains and science crew will need to stay hydrated and protected from sun/rain exposure.

Unforeseen circumstances: The CO and/or the Chief Scientist will determine best mitigation for unforeseen circumstances with a ‘safety first’ approach.

III. Equipment

- A. Equipment and Capabilities provided by the ship (itemized)
 1. Two small boats with bottom finders and GPS, access to 12VDC power.
 2. 2 Downriggers (EK60 Calibration set) adapted with plate for gunwale of small boats
 3. Dry laboratory space with access to two ship computers.
 4. Wet laboratory space with electrical outlets (i.e., 120V), and running fresh and salt water.
 5. Air compressor to fill scuba cylinders.
 6. Nitrox compressor with NN 30-36% capability; with tanks to be filled at 32% NN.
 7. 15 Nitrox tanks
 8. One emergency oxygen kit per small boat
 9. Multibeam and fishery sonar systems (e.g., Reson, Kongsberg and Simrad systems), and supporting equipment (e.g., Underway CTD).
 10. Freezer space for bait/chum storage.
 11. Hand-held radios for communication between bridge, deck, and ROV teams.
 12. Dynamic Positioning System
- B. Equipment and Capabilities provided by the scientists (itemized)
 1. Two portable emergency oxygen kits (50 lbs each).
 2. Two oxygen analyzers for verifying nitrox mixtures (1 lb each).
 3. Mohawk ROV (requires hook-up to ship’s three-phase power).
 4. USBL Underwater tracking system and hydrophone
 5. 15-18 scuba tanks, along with three storage racks for them.
 6. Appropriate number of RASS pony bottles for all working dives and science dives > 100fsw.
 7. VR2 sonic receivers (Each receiver weighs 2.6 lbs with up to 2 new VR2 receivers).

8. Up to 15 laptop computers (possibly one per scientist) (standard weight for laptops; one Toughbook laptop weighs 7 lbs).
9. One or two trained science party members to mix breathing gas and/or fill scuba cylinders (*Nancy Foster* crew will train them at start of project).
10. 2 drop camera systems (NCCOS with spares, each with cables is 35 lbs)
11. Stereoscopic Camera (Two (2) FWC units, each camera weighs ~100 pounds dry).
12. Dive Master Kit
13. Current meters (Three (3) FWC units, each current meter is ~6 lbs and the stand weighs ~40 lbs dry)

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

No HAZMAT is planned for this project.

C. Chemical safety and spill response procedures

None required.

D. Radioactive Materials

No Radioactive Isotopes are planned for this project.

V. Additional Projects

A. Supplementary ("Piggyback") Projects

No Supplementary Projects are planned.

B. NOAA Fleet Ancillary Projects

No NOAA Fleet Ancillary Projects are planned.

VI. Disposition of Data and Reports

Disposition of data gathered aboard NOAA ships will conform to NAO 216-101 *Ocean Data Acquisitions* and NAO 212-15 *Management of Environmental Data and Information*. To guide the implementation of these NAOs, NOAA's Environmental Data Management Committee (EDMC) provides the *NOAA Data Documentation Procedural Directive* (data documentation) and *NOAA Data Management Planning Procedural Directive* (preparation of Data Management Plans). OMAO is developing procedures and allocating resources to manage OMAO data and Programs are encouraged to do the same for their Project data.

A. Data Classifications: *Under Development*

a. OMAO Data

b. Program Data

B. Responsibilities:

We request that the Ship's data storage be made available during the cruise to store all digital data multibeam and project planning files (~3 TB). The science party will transfer that data from the Ship storage to scientist drives prior to the end of the cruise. The

scientists will be responsible for providing data archives to NGDC and AHB as part of R2R within 12 months of the completion of the cruise. In order for this to be accomplished up to five scientist Government computers will need network access to the ship's data storage device so that the data can be moved from the acquisition computer to storage, and subsequently accessed by other Government computers tasked with data post-processing.

VII. Meetings, Vessel Familiarization, and Project Evaluations

- A. Pre-Project Meeting: The Chief Scientist and Commanding Officer will conduct a meeting of pertinent members of the scientific party and ship's crew to discuss required equipment, planned operations, concerns, and establish mitigation strategies for all concerns. This meeting shall be conducted before the beginning of the project with sufficient time to allow for preparation of the ship and project personnel. The ship's Operations Officer usually is delegated to assist the Chief Scientist in arranging this meeting.
- B. Vessel Familiarization Meeting: The Commanding Officer is responsible for ensuring scientific personnel are familiarized with applicable sections of the standing orders and vessel protocols, e.g., meals, watches, etiquette, drills, etc. A vessel familiarization meeting shall be conducted in the first 24 hours of the project's start and is normally presented by the ship's Operations Officer.
- C. Post-Project Meeting: The Commanding Officer is responsible for conducted a meeting no earlier than 24 hrs before or 7 days after the completion of a project to discuss the overall success and shortcomings of the project. Concerns regarding safety, efficiency, and suggestions for future improvements shall be discussed and mitigations for future projects will be documented for future use. This meeting shall be attended by the ship's officers, applicable crew, the Chief Scientist, and members of the scientific party and is normally arranged by the Operations Officer and Chief Scientist.
- D. Project Evaluation Report

Within seven days of the completion of the project, a Customer Satisfaction Survey is to be completed by the Chief Scientist. The form is available at

<https://sites.google.com/a/noaa.gov/omao-intranet-dev/operations/marine/customer-satisfaction-survey> and provides a "Submit" button at the end of the form. It is also located at

https://docs.google.com/a/noaa.gov/forms/d/1a5hCCkgIwaSII4DmrHPudAehQ9HqhRqY3J_FXqbJp9g/viewform. Submitted form data is deposited into a spreadsheet used by OMAO management to analyze the information. However, the complete form is not shared with the ships, specific concerns and praises are followed up on while not divulging the identity of the evaluator.

VIII. Miscellaneous

A. Meals and Berthing

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

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

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

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

B. Medical Forms and Emergency Contacts

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

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

The completed forms should be sent to the Regional Director of Health Services at the applicable Marine Operations Center. The NHSQ and Tuberculosis Screening Document should reach the

Health Services Office no later than 4 weeks prior to the start of the project to allow time for the participant to obtain and submit additional information should health services require it, before clearance to sail can be granted. Please contact MOC Health Services with any questions regarding eligibility or completion of either form. Ensure to fully complete each form and indicate the ship or ships the participant will be sailing aboard. 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 does not 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 one 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

Appendices

Appendix 1: Multibeam mapping and groundtruthing preferred operating area.

Multibeam mapping – Multibeam mapping priorities outlined in pink polygons for July 2017 cruise; the two in the Tortugas we will cover during our cruise time out there. The one area in the upper keys (near Carysfort Reef) and one off Key West are areas that we thought could be handled during transit times (See Figures 2a-d).

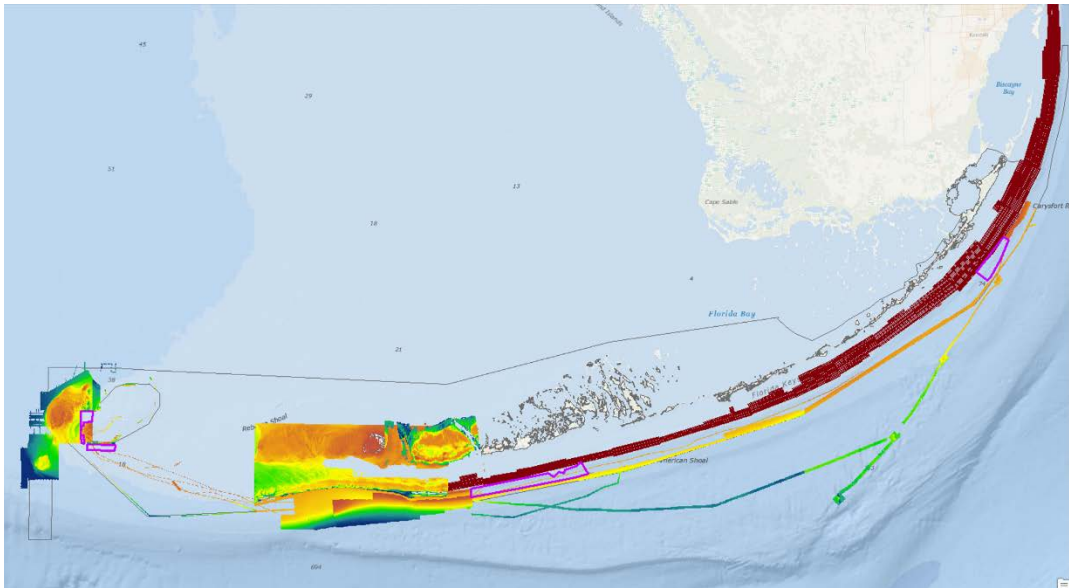


Figure 2a: Overview of multibeam mapping priorities outlined in pink polygons for July 2017 cruise.

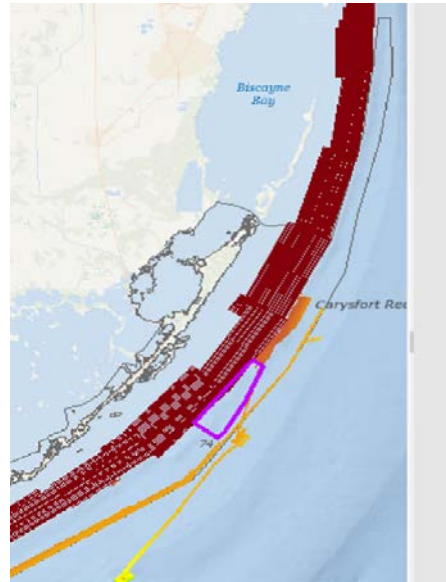
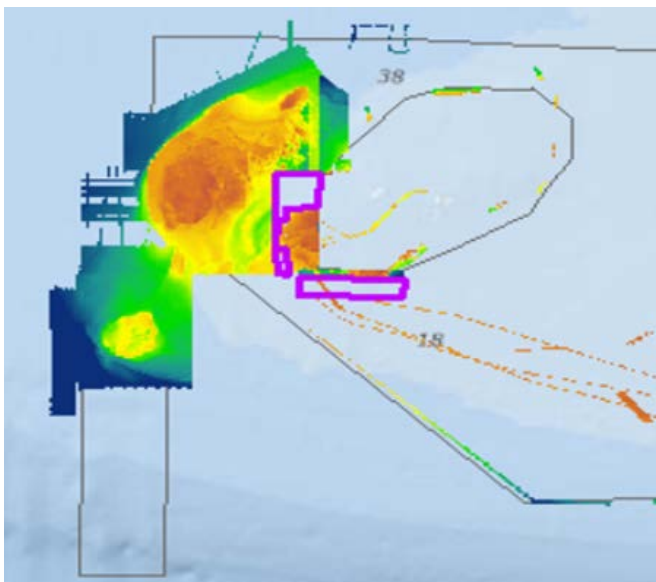


Figure 2b (left): Multibeam mapping priorities in Tortugas. **Figure 2c (right):** Upper Keys Multibeam mapping priorities.

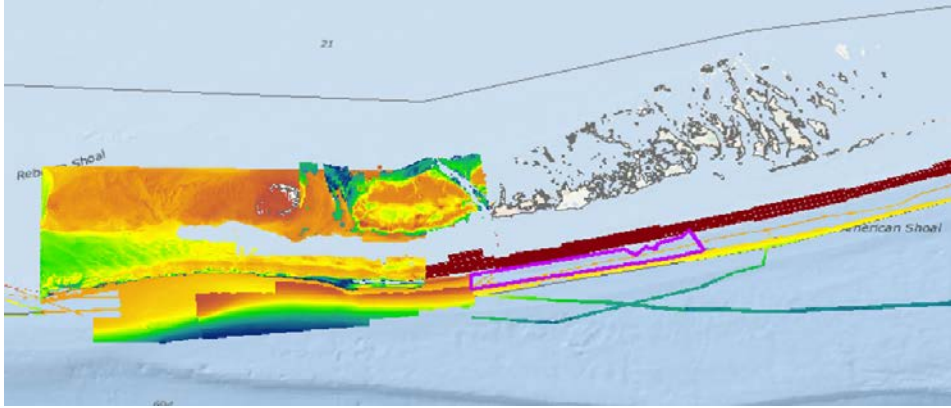


Figure 2d: Multibeam mapping priorities off Key West.

Appendix 2: Stereocamera

FWC – Fisheries Independent Monitoring program

The camera system consists of a stereo-still camera pair and a single video camera (Figure 3) housed in a ~15cm diameter X 50cm long anodized aluminum cylinder. The cameras are powered by 12V DC batteries in a separate housing, connected by cable to the back of the camera cylinder. There are two cylinders and two batteries mounted inside a cube-shaped ‘pod’ to be deployed on a site (Figure 4 & 5). The cube measure approximately 90cm on each side and ~90cm tall. Fully loaded with cameras, bridles, batteries, ballast, they are ~80lbs in air. Usually, a Manta CTD is mounted inside for water quality readings (temp, salinity, DO).

A safety component within the cube is a spool of 3/16” Amsteel line (~200m) attached to a non-compressible float (see in Figure 5). This float is triggered by an Hg-release-clip which degrades in saltwater after 2 days. Therefore, if the surface buoy becomes detached or pulled under the non-compressible buoy releases and come to the surface.

In addition to the camera cylinders, batteries and aluminum cube pods, there is 12-strand Amsteel line (~5/8” diameter) attaching the cube to the surface buoy. Line is measured out in 100’ sections and is generally set 1.25X or 1.5X depth, depending on currents. The surface buoy also has an accompanying trailer buoy to indicate direction line is tending. The line is stored in shrimp baskets between deployments. Usually, a grapple hook or boat hook is used to grab the main line between the large surface buoy and trailer buoy.

Camera Deployment and fish assemblage validation

The camera systems are deployed from the vessel using a snap-shackle release system where the cameras gently sink to the seafloor. The cameras are retrieved from the surface vessel using an electric or hydraulic winch. A surface buoy is attached to the pod/lander via a 12-strand synthetic line that is used to retrieve the cameras. The vessel positions directly above the camera to eliminate dragging.

The base is a 3’ x 3’ square aluminum tube with aluminum metal-mesh to protect the cameras/cables if landing on jagged rock. Without this mesh base, it is possible the camera pod would get hung and cause more damage. In order to eliminate damage to benthic resources and the camera, the gear is free from the vessel during deployment. The buoy line attaches to the pod 4-point bridle to allow for straight-upwards retrieval. In depths where the captain/chief scientist can see the bottom, we reposition the camera deployment to be over proximate sand, however if the bottom cannot be seen, the pod is deployed on a specific point identified by multibeam.



Figure 3. Forward view of camera system. Upper cameras are pair of fixed-distance stereo still cameras while single bottom camera is digital video camera. Files are recorded for both: 1) folder of left and right bitmap images (~1440 per 30 min. deployment) and 2) folder of .mp4 videos (~3-4 per 30min. deployment).



Figure 4. Stereo camera pod. Two cameras are placed inside, each facing 180° to the other. There are also GoPro cameras positioned on the adjacent sides to record surrounding habitat; the four cameras together provide a 360° view.



Figure 5. Stereo camera pods (2) with cameras mounted inside. Camera arrays are deployed with 12-strand AmSteel line to a surface buoy. They are retrieved using ships' hydraulics.

Appendix 3: Potential VR2 Locations.

Preference will be given to highlighted locations

Station Code	Name	Latitude	Longitude	D Lat	D Long	Date deployed	Depth (ft)
A. Busch		24°	81°		-		
	Adolphus Busch Wreck	31.851	27.713	24.53085	81.45355	7/22/2015	102
LKA - 33	Maryland Shoals Gate	24°	81°	24.5066	-81.5747	7/2/2014	55
LKA - 34	Maryland Shoals Gate	24°	81°	24.5058	-81.5747	7/2/2014	84
LKA - 31	Toppino/Logan Gate	24°	81°	24.4670	-81.7329	7/1/2014	50
LKA - 32	Toppino/Logan Gate	24°	81°	24.4644	-81.7330	7/1/2014	110
LKA - 28	Eye Glass Bar	24°	81°	24.4644	-81.7706	7/2/2014	84
LKA - 27	Eye Glass Bar	24°	81°	24.4583	-81.7707	7/1/2014	120
LKA - 29	Eye Glass Bar	24°	81°	24.4679	-81.7709	7/2/2014	76
LKA - 26	Eye Glass Bar	24°	81°	24.4582	-81.7742	7/1/2014	119
LKA - 30	Eye Glass Bar	24°	81°	24.4674	-81.7746	7/2/2014	76
LKA - 25	Eye Glass Bar	24°	81°	24.4581	-81.7776	7/1/2014	122
LKA - 23	Eye Glass Bar	24°	81°	24.4670	-81.7778	7/2/2014	81
LKA - 24	Eye Glass Bar	24°	81°	24.4635	-81.7780	7/2/2014	92
LKA - 22	Shipping Channel Gate	24°	81°	24.4654	-81.7967	7/2/2014	100
LKA - 21	Shipping Channel Gate	24°	81°	24.4672	-81.7969	7/2/2014	42
KW-24	Key West Line	24°	81°	24.43516	-	6/22/2015	124
KW-22	Key West Line	24°	81°	24.44198	-	6/22/2015	103
KW-20	Key West Line	24°	81°	24.44910	-	6/22/2015	32
KW-18	Key West Line	24°	81°	24.45616	-	6/22/2015	42
KW-16	Key West Line	24°	81°	24.46298	-	6/22/2015	44

KW-23	Key West Line	24° 26.218	81° 54.377	24.43696	- 81.90628	6/22/2015	65
KW-14	Key West Line	24° 28.224	81° 54.403	24.47040	- 81.90671	6/22/2015	39
KW-21	Key West Line	24° 26.656	81° 54.478	24.44426	- 81.90796	6/22/2015	91
KW-12	Key West Line	24° 28.662	81° 54.482	24.47770	- 81.90803	6/22/2015	36
KW-19	Key West Line	24° 27.082	81° 54.510	24.45136	- 81.90850	6/22/2015	31
KW-10	Key West Line	24° 29.081	81° 54.580	24.48468	- 81.90966	6/22/2015	41
KW-17	Key West Line	24° 27.506	81° 54.658	24.45843	- 81.91096	6/22/2015	38
KW-8	Key West Line	24° 29.513	81° 54.669	24.49188	- 81.91115	6/23/2015	47
KW-15	Key West Line	24° 27.932	81° 54.742	24.46553	- 81.91236	6/22/2015	41
KW-6	Key West Line	24° 29.930	81° 54.752	24.49883	- 81.91253	6/23/2015	40
KW-4	Key West Line	24° 30.360	81° 54.841	24.50600	- 81.91401	6/23/2015	32
KW-13	Key West Line	24° 28.368	81° 54.852	24.47280	- 81.91420	6/22/2015	41
KW-2	Key West Line	24° 30.784	81° 54.922	24.51306	- 81.91537	6/23/2015	25
KW-11	Key West Line	24° 28.791	81° 54.938	24.47985	- 81.91563	6/22/2015	41
KW-9	Key West Line	24° 29.221	81° 55.025	24.48702	- 81.91708	6/22/2015	41
KW-7	Key West Line	24° 29.647	81° 55.112	24.49411	- 81.91853	6/23/2015	46
KW-5	Key West Line	24° 30.069	81° 55.196	24.50115	- 81.91993	6/23/2015	35
KW-3	Key West Line	24° 30.497	81° 55.284	24.50828	- 81.92140	6/23/2015	32
KW-1	Key West Line	24° 30.924	81° 55.371	24.51540	- 81.92285	6/23/2015	15
MRQ-5	Marquesas	24° 26.935	82° 08.308	24.44892	-82.1385	9/24/2014	78
MRQ-4	Marquesas	24° 27.008	82° 09.164	24.45013	-82.1527	9/24/2014	79
MRQ-3	Marquesas	24° 27.061	82° 09.797	24.45102	-82.1633	9/24/2014	81
MRQ-2	Marquesas	24° 27.276	82° 10.293	24.4546	-82.1716	9/24/2014	72
MRQ-1	Marquesas	24° 27.160	82° 11.180	24.45367	-82.1863	9/24/2014	60

MQ-5	Marquesas Line	24° 27.252	82° 12.993	24.45420	- 82.21655	6/21/2015	51
MQ-3	Marquesas Line	24° 27.690	82° 12.997	24.46150	- 82.21661	6/21/2015	37
MQ-1	Marquesas Line	24° 28.107	82° 13.020	24.46845	- 82.21700	6/21/2015	31
MQ-4	Marquesas Line	24° 27.453	82° 13.410	24.45755	- 82.22350	6/21/2015	48
MQ-2	Marquesas Line	24° 27.887	82° 13.431	24.46478	- 82.22385	6/21/2015	33
MQ-6	Marquesas Line	24° 27.128	82° 13.434	24.45213	- 82.22390	6/21/2015	103
49	Riley's Hump	24° 30.762	83° 05.647	24.5127	-83.0941	7/3/2008	88
4	Riley's Hump	24° 29.631	83° 06.065	24.4939	-83.1011	7/14/2014	113
48	Riley's Hump	24° 29.364	83° 06.878	24.4891	-83.1146	7/2/2008	97
3	Riley's Hump	24° 29.968	83° 07.103	24.4995	-83.1184	7/13/2014	101
2	Riley's Hump	24° 29.435	83° 07.291	24.4906	-83.1215	7/12/2014	107
1	Riley's Hump	24° 30.077	83° 07.943	24.5013	-83.1324	7/11/2014	95

Appendix 4: Dive Emergency Assistance Plan and Dive Plan