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

MEMORANDUM FOR: Lieutenant Commander Jeffrey Shoup, NOAA
Commanding Officer, NOAA Ship *Nancy Foster*

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

SUBJECT: Project Instruction for NF-16-06
Florida Keys National Marine Sanctuary Coral Reef Condition Assessment, Coral Reef Mapping, and Fisheries Acoustics Characterization

Attached is the final Project Instruction for NF-16-06 Florida Keys National Marine Sanctuary Coral Reef Condition Assessment, Coral Reef Mapping, and Fisheries Acoustics Characterization, which is scheduled aboard NOAA Ship *Nancy Foster* during the period of August 4, – August 24, 2016. 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

Florida Keys National Marine Sanctuary
33 East Quay Road
Key West, FL 33040

Final Project Instructions

Date Submitted: July 22, 2016

Platform: NOAA Ship *Nancy Foster*

Project Number: NF-16-06 (OMAO)

Project Title: Florida Keys National Marine Sanctuary Coral Reef Condition Assessment, Coral Reef Mapping, and Fisheries Acoustics Characterizations

Project Dates: August 4, 2016 to August 24, 2016

Prepared by: DIEVENEY.ELIZABETH.J.1365880049 Digitally signed by DIEVENEY.ELIZABETH.J.1365880049 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=OTHER, cn=DIEVENEY.ELIZABETH.J.1365880049 Date: 2016.07.21 17:22:43 -04'00'

Beth Dieveney — Dated:
Deputy Superintendent
NOS/ONMS/SEGOM/FKNMS

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Ed Lindelof — Dated:
Acting Superintendent
NOS/ONMS/SEGOM/FKNMS

Approved by: GITTINGS.STEPHEN.R.DR.1365823754 Digitally signed by GITTINGS.STEPHEN.R.DR.1365823754 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=OTHER, cn=GITTINGS.STEPHEN.R.DR.1365823754 Date: 2016.07.22 00:44:26 -04'00'

Steve Gittings, Ph.D. — Dated:
Science Coordinator
NOS/ONMS

Approved by: FOR 7/29/16

Captain Scott Sirois, NOAA — Dated:
Commanding Officer
Marine Operations Center – Atlantic

I. Overview

A. Brief Summary and Project Period

Summary: The present 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.

For the 2016 FKNMS mission on NOAA Ship *Nancy Foster*, we will work in the waters of the Florida Keys, Marquesas, Dry Tortugas (RH, TER-S, TER-N) and Warsaw Hole. Two primary 'daytime' projects are proposed: (1) fish sampling, acoustic tagging, acoustic array receiver servicing in the Florida Keys, Dry Tortugas and Marquesas Keys., and (2) ROV and drop camera deployments on Warsaw Hole, Riley's Hump, TER-N, and Marquesas. One additional 'daytime' activity includes two deployments of a Wave Glider (a.) Warsaw Hole deployment/recovery, and (b.) Dry Tortugas deployment/recovery. Multibeam and fishery sonar surveys will be conducted primarily during nighttime hours, but will have occasional daytime requirements.

Project Period: August 4th with on-loading on August 9th– August 22nd, 2016 (off-loading/touch-and-go) and final arrival in Charleston, SC on August 24.

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 in two main areas of the Florida Keys National Marine Sanctuary (Figure 1: area shown as red polygon): 1) Lower Keys and Marquesas, and 2) Dry Tortugas.

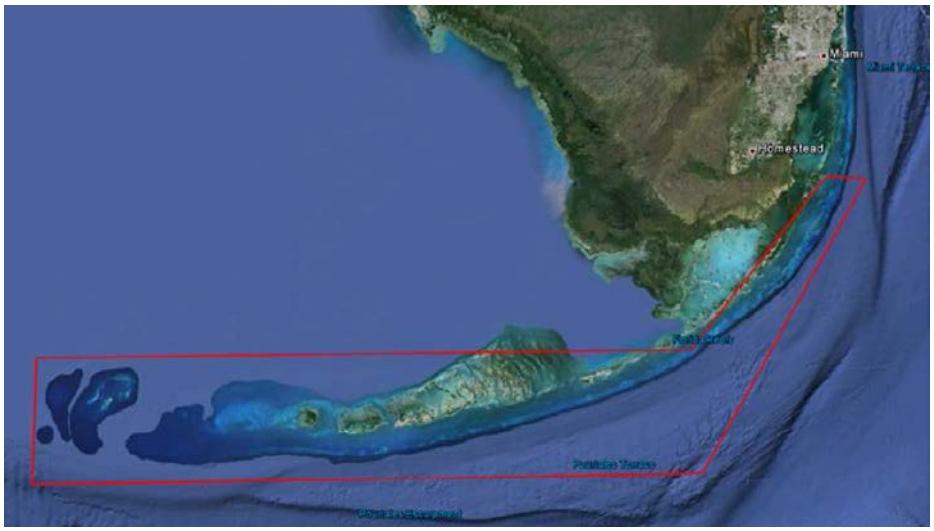


Figure 1. Boundary of FKNMS

D. Summary of Objectives

- Deploy scuba divers to recover, download and redeploy acoustic receivers (VR2s) in the vicinity of Lower Keys (15 acoustic receivers (VR2s)) and the Marquesas (5 acoustic receivers (VR2s). Twenty receivers will be serviced in total (Appendices 1 & 2).
- Use ship to deploy 'new' VR2 acoustic receiver stands and receivers to potentially expand Marquesas underwater acoustic array, if additional tagging makes it necessary.
- Deploy scuba divers to place fish traps in the vicinity of Lower Keys, Marquesas and Tortugas, and then acoustically tag 10-20 cubera snapper or black grouper *in situ*.
- ROV operations – a small-boat based Seabotix-ROV from Florida Fish and Wildlife Commission. ROV surveys will target fish aggregations and benthic habitat features. ROV to be deployed either from the ship, or from small boats, depending on environmental conditions. Four ROV surveys will be conducted in waters deeper than the maximum diving depth planned for this mission (125 feet).
- Habitat groundtruthing – Small boat-based drop camera, stereocamera, and/or diver visual surveys over bathymetry habitat features of interest, or for habitat validation purposes at up to 12 stations per day. (If sea conditions and safety require, these operations may also be conducted from the ship using the J-frame when sampling deeper sites such as Warsaw Hole.) (See Appendix 4 for additional Stereocamera information)
- Dive and drop camera via small boat on fish aggregations, fish traps, or benthic habitat features as required for the mission.
- Wave Glider operations – Wave glider will be deployed and recovered from the ship's J-Frame twice during the cruise: (a.) Warsaw Hole deployment/recovery, and (b.) Dry Tortugas deployment/recovery. While underway, the wave glider is remotely piloted or can operate autonomously. The wave glider has an array of sensors to collect oceanographic and atmospheric data. (See Section II.C.6 and Appendix 5)
- Multibeam target areas in the vicinity of the Marquesas, TER-N, Boca Grande Bar, Western Dry Rocks, and sections between DRTO and TER-N. Appendix 3 shows general areas of interest for MBES surveys.

- Acoustic Fishery Surveys - Fish distribution will be simultaneously mapped during multibeam sonar surveys using the Simrad EK60 suite.
- National Weather Service meteorologist provide on-site, impact-based marine weather decision support services, as well as offer any additionally needed marine meteorology expertise. Conduct and/or assist with meteorological and oceanographic observations, as needed. Observe weather-sensitive observations, communicate and determine areas for improvement regarding the quality, value, and presentation of NWS weather, water, and climate data, forecasts, and warnings. Learn specific operational weather-sensitive impacts, thresholds, and decisions through observation and dialogue with the other scientists and the ship's crew, in order to design future information products and services more useful to NOAA operators Provide a briefings/presentations to NOAA partners highlighting NWS mission, services, and capabilities.

E. Participating Institutions

NOAA's National Ocean Service - Office of National Marine Sanctuaries (NOS)
NOAA's National Ocean Service – Office of National Marine Sanctuaries, Florida Keys National Marine Sanctuary
NOAA's National Ocean Service - National Center for Coastal Ocean Sciences (NCCOS)
NOAA Fisheries - Southeast Fisheries Science Center (SEFSC)
NOAA's National Weather Service (NWS)
Florida Fish and Wildlife Conservation Commission (FWC)
Harbor Branch Oceanographic Institute (HBOI) at Florida Atlantic University

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

	Name (Last, First)	Title	Date Aboard	Date Disembark	Gender	Affiliation	Nationality
1	Abbitt, Rosemary	Scientist	8/10/2016	8/22/2016	F	NOAA	US
2	Acosta, Alejandro	Principal Investigator	8/10/2016	8/22/2016	M	Florida FWC	US
3	Anderson, Lonny	Scientist	8/10/2016	8/22/2016	M	FIU	US
4	Barbera, Paul	Scientist	8/10/2016	8/22/2016	M	Florida FWC	US
5	Cherubin, Laurent	Principal Investigator/ Wave Glider	8/14/16	8/22/16	M	Harbor Branch FAU	US
6	Eaken, Dave	Scientist	8/14/2016	8/22/2016	M	Florida FWC	US
7	Field, Don	Scientist	8/10/2016	8/22/2016	M	NOAA	US
8	Halonen, Jared	Scientist	8/10/2016	8/14/2016	M	NOAA	US

9	Jeffers, Kelsey	Scientist	8/10/2016	8/22/2016	F	NOAA	US
10	Keller, Jessica	Scientist	8/14/2016	8/22/2016	F	Florida FWC	US
11	Kasper, Kennard "Chip"	NWS Senior Forecaster	8/14/2016	8/22/2016	M	NOAA	US
12	Laing, William	Wave Glider Pilot	8/14/2016	8/22/2016	M	Harbor Branch FAU	US
13	Morley, Danielle	Scientist	8/10/2016	8/22/2016	F	Florida FWC	US
14	Renchen, Jeff	Scientist	8/10/2016	8/22/2016	M	Florida FWC	US
15	Rothwell, Chris	NWS General Forecaster	8/10/2016	8/14/2016	M	NOAA	US
16	Vander Pluym, Jenny	Chief Scientist	8/10/2016	8/22/2016	F	NOAA	US
17	Wile, Ariel	Scientist	8/10/2016	8/14/2016	F	Florida FWC	US

G. Administrative

1. Points of Contacts:

Chief Scientist: Jenny Vander Pluym
Office: 252-728-8777
Cell: 919-349-7214
Email: jenny.vanderpluym@noaa.gov

Principal Investigator: Dr. Alejandro Acosta
Office: 305-289-2330
Email: Alejandro.Acosta@MyFWC.com

Ops Officer: LT Linh Nguyen
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 Scientific Research Permits (U.S.) issued by Florida Keys National Marine Sanctuary (U.S.) to Bill Goodwin (FKNMS scientist) and Dr. Alejandro Acosta (Principal Investigator) on or about August 10th, 2016. These will be presented to the ship by the time it sails.

FKNMS Research Permit: FKNMS-2013-040-A2
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: A general itinerary is shown below, however one with more detail can be found in Appendix 6.

Project Period: August 4th – August 24th, 2016

Depart: Galveston, TX August 4, 2016 (NF-16-06 transit)

Arrive: Key West, FL August 7th, 2016

Load Vessel: Key West, FL August 9th, 2016

Depart: Key West, FL August 10th, 2016, by 1000

Science crew swap using small boat: Key West, FL August 14, 2016, 1600

Arrive: Key West, FL August 22, 2016

Offload Vessel: Key West, FL August 22, 2016

Depart: Key West, FL August 22, 2016

Arrive: Charleston, SC August 24, 2016

B. Staging and Destaging:

Staging area/dock is at NAS Truman Annex, Navy Mole PierTBD, Most staging will occur on August 9th, 2016. We will need crane ops from approximately 0800 to 1000 to load science equipment on August 9th, 2016. There will be a rotation of select science crew on August 14th, 2016.

De-staging will occur twice: 1) on August 14th, 2016 to swap select science crew members, 2) when back at port Key West on August 22nd 2016.

C. Operations to be Conducted:

1. Fish Tagging:

Logistics for trapping and diving are weather specific, and will be coordinated between the CO and Chief Scientists on site. Ideally, the divers and drop cameras will be deployed first to check the area where fish traps will be set, and again following the trap soak period. Traps will be equipped with GoPro cameras. After a soak time of -/+ 4 hours, the ROV, the drop camera, or divers (depending on site conditions) will be deployed to determine if any fish were caught that are appropriate for tagging. The acoustic tagging will be conducted underwater using a team of divers.

Additionally, divers will video tape their dives and record fish and habitat information. Based on the fish tagged, we will deploy new VR2s, if necessary.

2. VR2 Downloads:

Up to 46 VR2 acoustic tag receivers will be serviced during the mission. Teams of 2 divers will replace the existing VR2 receivers. 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. Dive depths could range from 20 fsw to 125 fsw. Dive operations will occur from ship's small boats.

3. Dives to Deploy New VR2 Stands:

New VR2 stands (and associated VR2 receivers) will be deployed by divers during the mission depending on fish tagging operations. In the event that a fish is tagged in a location far from an existing VR2, a new VR2 will be deployed. These stands are approximately 80lbs dry weight. Stands are dropped from small boats over the intended bottom features. Divers will follow the stand's marker buoy down to quickly locate the unit, situate the stand properly, install the acoustic receiver, then return to the surface. Dive depths could range from 20 fsw to 125 fsw.

4. Seabotix ROV Operations:

Live boat deployment of this small ROV will be conducted either from *Nancy Foster* or the small tender vessels. We anticipate deployments of 1 to 2 hours depending on current and wind conditions. A team of three people will be needed to operate the ROV. Dive operations can co-occur when this ROV is deployed, because it is launched from a small boat. Use of the ROV is primarily to assess habitat prior to deploying the stereo cameras. Stereo cameras will be the preferred method. No nighttime surveys are required or scheduled.

5. Drop Camera:

Live boat deployment of this small drop camera will be conducted either from *Nancy Foster* or the small tender vessels. 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 co-occur when this Drop Camera is deployed, 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 at up to 12 stations per day. 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 such as Warsaw Hole or near Riley's Hump.) 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.

6. Liquid Robotics Wave Glider:

Wave glider will be deployed and recovered twice during the cruise. The first evolution is planned for deployment in the vicinity of Boca Grande Bar/Warsaw Hole. It will remain underway and will be remotely piloted or operate autonomously for about 24 hours until it is retrieved in the vicinity of Boca Grande Bar/Warsaw Hole. The second evolution is planned for deployment at Riley's Hump. The wave glider will remain underway and will be remotely piloted or operate autonomously for 3-4 days until it is retrieved in the vicinity of the Dry Tortugas (Location to be determined in coordination with Chief Scientist, Wave Glider pilot and Field Operations Officer). While underway, the wave glider is powered by mechanical propulsion (wave power), and solar panels to charge the batteries. Both deployment and recovery during day light hours is preferred. The wave glider deployment requires two people to operate the J-frame, a small boat with a coxswain and scientist to ensure that the tow cable, which connects the towfish to the wave glider is not tangled in the wing section. The wave glider recovery requires two people to operate the J-frame, a small boat with a coxswain and support scientist to hook the wave glider before hoisting it on board. (Appendix 5)

7. Stereo Camera:

Dive buddy team will conduct diver visual surveys over bathymetry habitat features of interest, or for habitat validation using a Stereocamera to collect 3D video and images We will use stationary underwater cameras to collect data on reef fish in Warsaw Hole and in Riley's Hump deep-water site within the eastern Gulf of Mexico. 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 (Figure 7). The cube measures approximately 90cm on each side and ~90cm tall. A Manta CTD is positioned inside for water quality readings (temperature, salinity, dissolved oxygen). The camera is attached to a surface buoy and deployed for 30min. per site. Data are recorded internally for later download. (Appendix 4: Camera Deployment and Fish Assemblage Validation)

8. Multibeam Sonar Operations:

Multibeam survey areas will be provided to the Operations Officer prior to boarding the ship. Polygons and coordinates will be provided for use by ship Survey Department for

planning. Actual survey polygons for all proposed multibeam coverage during cruise operations will be provided or modified during daily operation meetings.

Multibeam operations will be conducted in selected areas throughout the Florida Keys archipelago. Multibeam operations will mostly occur during nighttime hours, with some daytime surveys around VR2 stations.

The Reson 7125 Seabat or Kongsberg EM710 sonars will be used for multibeam operations. Ship's Survey Department will determine appropriate frequency for operations given the depth of the survey area. Underway CTD casts will be taken at the discretion of the survey technicians (e.g., Samantha Martin or Nick Mitchell) and as appropriate to ensure high data quality.

9. Fishery Splitbeam Sonar Operations:

Fish distribution will be simultaneously mapped during multibeam sonar surveys using the Simrad EK60 suite. Additional areas 'of opportunity' for daytime this survey will be provided during daily operations meetings, particularly focusing on fish distributions around the Tortugas Ecological Reserve boundaries.

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 Plans encompassing all legs of NF-16-06 are presented in Appendices 7-9.

E. Applicable Restrictions

Poor field conditions:

1. Tropical cyclone activity is possible during this mission – the 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 either 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) Kelsey Jeffers will serve as DM 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 situation 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.

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 (1lb each).
3. One small ROV with separate gas powered generator for use to operate the ROV off the small boat. (Total weight for the ROV, generator and 5 gallon gas will be ~200 pounds).
4. 15-18 scuba tanks, along with 3 storage racks for them.
5. Appropriate number of RASS pony bottles for all working dives and science dives > 100fsw.
6. VR2 sonic receivers (Each receiver weighs 2.6 lbs we will be bringing up to 25 VR2 receivers, so a possible total of 65 pounds).
7. Up to 15 laptop computers (possibly one per scientist) (standard weight for laptops, however one Toughbook laptop weighs 7 lbs).
8. 3-5 chevron fish traps (The traps weigh between 30 – 45 pounds depending on their size).

9. Approximately 6 VR2 stands (~80lbs each).
10. 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).
11. 2 drop camera systems (with spares, each with cables is 35 lbs)
12. Wave Glider (listed as maximum 485 pounds).
13. Stereoscopic Camera (2 units and one spare, each camera weighs ~80 pounds in air).
14. Hand-held anemometer
15. Dive Master Kit
16. Bait for fish traps
17. Current meters (2 units, each current meter ~ 6 pounds and the stand weighs ~ 40 pounds in air)

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.

1.) The ROV will include a 5 gallon tank of gasoline for the portable gas powered generator. This will be brought on the small boat if/and when the ROV is used.

2.) The Wave Glider is powered by Lithium-ion batteries. The battery packs are manufactured by Inspired Energy. Each battery contains less than 8g of equivalent Lithium. (See Appendices 10 - 12) There are ten batteries in the main Computer Control Unit (CCU) totaling about 2.78 liters. An Auxiliary Power Unit (APU) with ten additional batteries may also be used for redundancy.

C. Chemical safety and spill response procedures

1.) Lithium-ion battery packs

Emergency Procedures: Lithium-ion batteries are prone to fire. Fire is generally preceded by the following signs: Swelling (ballooning), smoking, heating

Should any of these signs be observed, disconnect the batteries from their chargers immediately. If safe to do so, move the batteries to an outside area and prepare to initiate an emergency disposal. If not safe to do so, retrieve a CO2 fire extinguisher and observe the batteries for 15 minutes. Alert the bridge to the current situation; should a fire break out, report it immediately. (See Appendix 12 for Safety Data Sheet)

D. Radioactive Materials

No Radioactive Isotopes are planned for this project.

E. Inventory (itemized) of 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: *Under Development*

VII. Meetings, Vessel Familiarization, and Project Evaluations

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

B. Vessel Familiarization Meeting: The Commanding Officer is responsible for ensuring scientific personnel are familiarized with applicable sections of the standing orders and vessel protocols, e.g., meals, watches, etiquette, drills, etc. A vessel familiarization meeting shall be conducted in the first 24 hours of the project's start and is normally presented by the ship's Operations Officer.

C. Post-Project Meeting: The Commanding Officer is responsible for conducted a meeting no earlier than 24 hours before or 7 days after the completion of a project to discuss the overall success and short comings of the project. Concerns regarding safety, efficiency, and suggestions for future improvements shall be discussed and mitigations for future projects will be documented for future use. This meeting shall be attended by the ship's officers, applicable crew, the Chief Scientist, and members of the scientific party and is normally arranged by the Operations Officer and Chief Scientist.

D. Project Evaluation Report:
Within seven days of the completion of the project, a Customer Satisfaction Survey is to be completed by the Chief Scientist. The form is available at 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. Though the complete form is not shared with the ships’, specific concerns and praises are followed up on while not divulging the identity of the evaluator.

VIII. Miscellaneous

A. Meals and Berthing

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

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

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

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

B. Medical Forms and Emergency Contacts

The NOAA Health Services Questionnaire (NHSQ, NF 57-10-01 (3-14)) must be completed in advance by each participating scientist. The NHSQ can be obtained from the Chief Scientist or the NOAA website http://www.omao.noaa.gov/learn/marine-operations/about/project-planning/health-screening.

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

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

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

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

Contact information:

Regional Director of Health Services
Marine Operations Center – Atlantic
439 W. York Street
Norfolk, VA 23510
Telephone 757-441-6320
Fax 757-441-3760
Email: MOA.Health.Services@noaa.gov

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

C. Shipboard Safety

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

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

D. Communications

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

E. IT Security

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

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

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

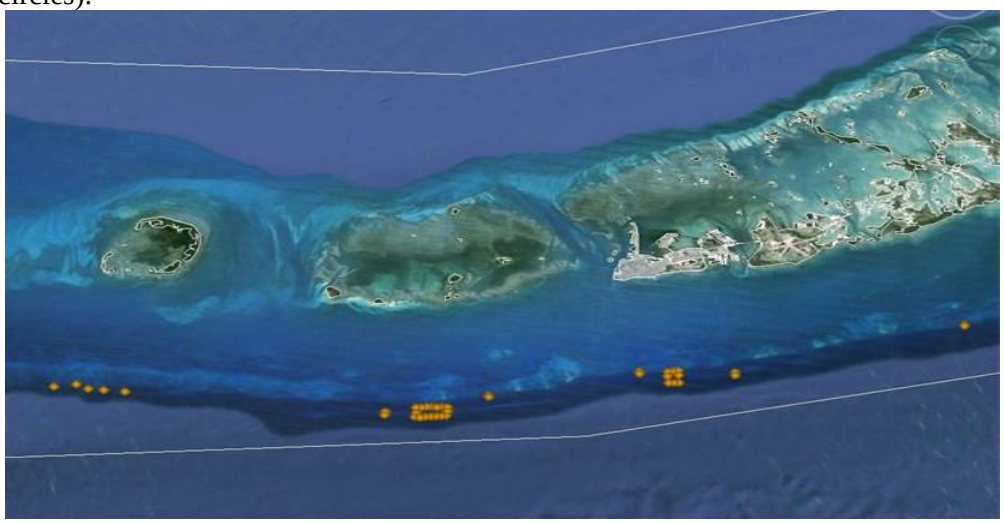
Non-NOAA personnel using the ship's computers or connecting their own computers to the ship's network must complete NOAA's IT Security Awareness Course within 3 days of embarking.

F. Foreign National Guests Access to OMAO Facilities and Platforms

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

IX. Appendices

1. Map of general locations of existing VR2s to be serviced in the vicinity of Key West (yellow circles).



2. Coordinates of existing VR2 station in the vicinity of Key West.

Station	Latitude	Longitude	Depth (ft)
MRQ-1	24° 27.160	82° 11.180	60
MRQ-2	24° 27.276	82° 10.293	72
MRQ-3	24° 27.061	82° 09.797	81
MRQ-4	24° 27.008	82° 09.164	79
MRQ-5	24° 26.935	82° 08.308	78
LKA-1	24° 26.022	81° 57.913	57
LKA-3	24° 26.002	81° 56.697	58
LKA-6	24° 25.822	81° 56.326	~111
LKA-7	24° 25.830	81° 56.115	~113
LKA-9	24° 25.852	81° 55.701	~115
LKA-11	24° 26.068	81° 55.454	69
LKA-12	24° 26.274	81° 55.456	~101
LKA-13	24° 26.293	81° 55.663	~107
LKA-14	24° 26.271	81° 55.874	~106
LKA-15	24° 26.297	81° 56.078	~106
LKA-16	24° 26.297	81° 56.288	~105
LKA-17	24° 26.260	81° 56.496	~110
LKA-18	24° 26.257	81° 56.705	~112
LKA-19A	24° 26.573	81° 55.736	54
LKA-20A	24° 26.505	81° 56.461	65

3. Multibeam mapping and groundtruthing preferred operating area.
    a. **Multibeam mapping** – noting that ship will stay clear of any lobster traps in the area.
        i. Tortugas North – multiple gaps in current map coverage
        ii. Sections between DRTO and Tortugas Ecological Reserve - North
        iii. Estimated time needed: 6 days of 12 hour multibeam surveys

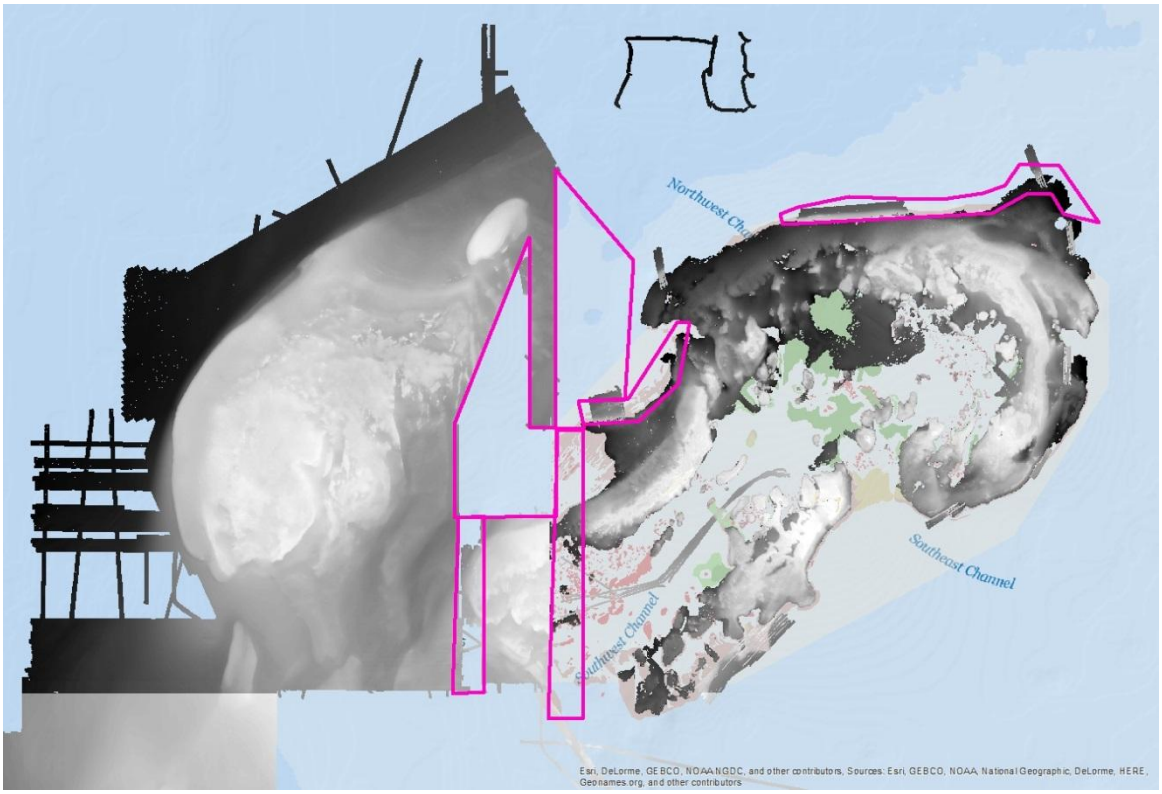


Figure 2. Multibeam mapping priorities outlined in pink polygons for August 2016 cruise.

    b. **Groundtruth validation**
        i. Within the regions being mapped while on the ship in Tortugas Ecological Reserve - North discussed above
        ii. Riley's Hump in TER-S: on top of the hump, the eastern edge, and the ridge to the west of the hump (cubera snapper spawning area) (Figure 3)
        iii. Boca Grande Bar and Marquesas: the region along the edge of the Unified Reef Map just outside the mapped area. There are indications that hardbottom habitats could be in these deeper depths (Figure 4)

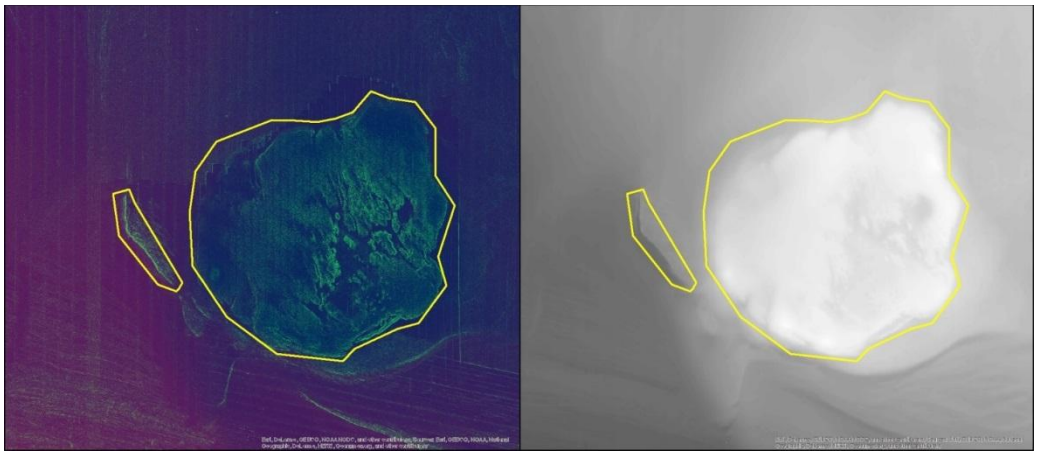


Figure 3. Riley's Hump multibeam coverage on the right with areas of interest for groundtruth validation in yellow perimeter. To the left, results of the PCA analysis showing more detailed features and contours.

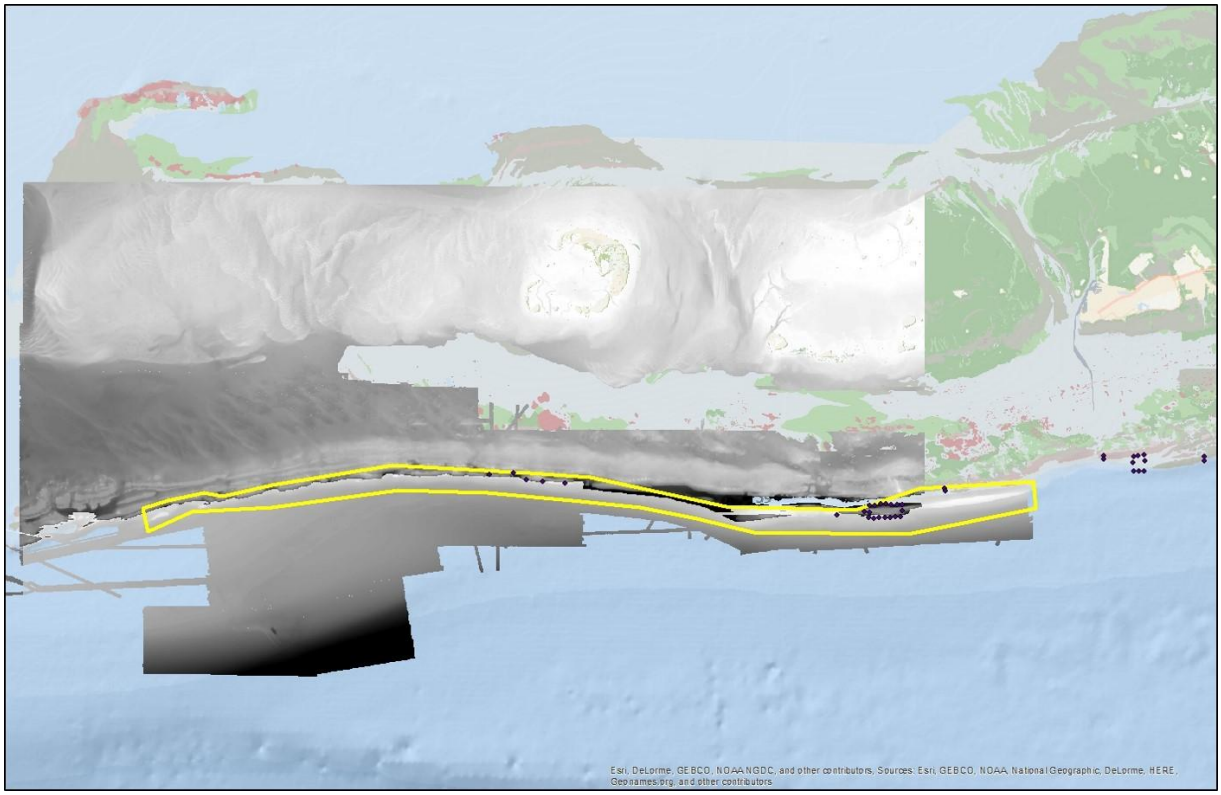


Figure 4. Boca Grande Bar region that is a priority for groundtruth validation, which is outlined in bright yellow. the points are the FWC locations for dive operations.

4. Stereocamera

FWC – Fisheries Independent Monitoring program

The camera system consists of a stereo-still camera pair and a single video camera (Figure 5) 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 6 & 7). 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 7). This float is triggered by a 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 which 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's 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 multi-beam.

i. Riley's Hump in TER-S: On top of the hump, the eastern edge, and the ridge to the west of the hump (cubera spawning area)
ii. Boca Grande Bar and Marquesas: The region along the edge of the Unified Reef Map just outside the mapped area. There are indications that hard-bottom habitats could be in these deeper depths.
iii. Warsaw Hole: Within the regions mapped with the ship and identified by the drop cameras.

Figure 5. 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 6. 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 7. 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.

5. Liquid Robotics Wave Glider Specs
   Glider Research and Operations Center (GROC)
   Harbor Branch Oceanographic Institute SV3 Wave Glider Missions

   Minimum Vessel and Operational Requirements: Version 1.0
   a. General: The Vessel will have been purpose built or suitably converted to undertake survey or unmanned vehicle operations in the designated geographical area during the requested season. The vessel must be seaworthy and supplied fully equipped, with current and valid certification for its classification during the proposed time period.
   - Length: 8m minimum depending on mission specifications
   - Speed: Minimum 10 knot top speed for transiting with ability to maintain steerage at 1 to 3 knots speed for launch/recovery
   - Classification: ABS, Lloyds, SOLAS A or equivalent
   - Vessel Control: Ability to maintain steerage at 1 to 3 knots.
   - Minimum Navigation Instrumentation Requirements:
     - Magnetic compass
     - Satellite positioning receiver
     - Marine echosounder, with hull-mounted transducer
   - Communications: Minimum Instrumentation Requirements:
     - Multi-channel Marine VHF R/T
     - Cellular phone (or satellite phone if operating outside cellular service areas)
   - Pier-side facilities or Vessel supplied support: Minimum mobilization/demobilization requirements:
     - Minimum 1 ton hoisting capability required to load vehicle and related support equipment at pier.
     - Ability to load a fully assembled wave glider from shore to vessel or vice versa.

- **<u>Assembled Wave Glider Size and Weight:</u> SV3: 2m x 4m deck by 2.5m tall with masts, or 1.5m tall without masts, Maximum 220kg (485lbs)**

b. Vessel Facilities

- Freshwater: Reasonable amount of potable water available for wash down of equipment when in use within saltwater environment

c. Vessel Lab Space

- Electrical Power: 120VAC/60Hz. Power and outlet type to be noted.

d. Vessel Working Deck

- Free Board and Rail Height: 1m maximum on working decks, as low as possible without being awash preferred. Max rail height 1m, or removable safety lines.
- Working Space: Minimum 2m from working rail or stern, by 4m along the working rail or stern of open deck space, with unimpeded access to overhead hoisting/lifting gear.
- Storage Space: Wave Glider must be capable of being stored for transit in a space free of typical deck wash. Wave Glider must be able to be moved directly from the storage location to the working area via hoisting or by rolling of vehicle cart with minimal rearranging of deck gear. Working space can be used for storage space during transit if it will not impact deployment or recovery of the vehicle. **Minimum storage dimensions per Wave Glider are: 2m x 4m deck by 2.5m tall with masts, or 1.5m tall without masts**
- Hoisting/Lifting Gear (A-frame, J-frame, Articulating Crane, Boom, etc.) with sufficient height to lift a 2.5m tall object from the working deck over any side or stern rails, and to the water, or vice-versa. All associated rigging for lifting/hoisting to be included and noted.
    - Minimum “Distance Outboard”: 1m
    - Minimum “Distance Inboard”: 1m
    - Minimum SWL: 1-ton
    - Maximum wire rope diameter: 1.0cm. Polypro or similar line preferred, however.322" conducting cable available on Nancy Foster will suffice.
    - Maximum weight of cable counterweight: 15kg
    - Deployment Package: Bottom of wave glider to lifting bail 1.5m; Mast 1.0m above lifting bail; Maximum 225kg static
    - Recovery Package: Bottom of wave glider to lifting bail 8.0m; Mast 1.0m above lifting bail; Maximum 225kg static.
    - Minimum Hoist “Height Over Rail” Requirement:
        - Minimum Single Pick Height Over Rail: 9.0m
        - Minimum Double Pick Height Over Rail: 3.0m
        - Minimum Hoist Cable Length: 15m + “Height Over Water” + Length Required to Maintain Safe “Minimum Scope”
- Visibility: Vessel deck areas need to have good lighting. All areas of the Vessel used for the Wave Glider deployment / recovery will be visible from the vessel controls and communications via line-of-sight.

6. General Daily Itinerary (subject to change)

Date	Time	Activity
8/9	morning	On-loading equipment
	0800–1000	Crane ops for science equipment
	2000	Select science team members to sleep on ship (e.g., NCCOS colleagues, FWRI colleagues)
8/10	0700	Mobilize rest of science crew and equipment
	morning	Depart Key West and Transit to Western Dry Rocks
		<LT Nguyen> welcome aboard/safety discussion, drills with science crew
	after lunch	Arrive in vicinity of Western Dry Rocks NF4-Deploy chevron fish traps and divers to bait traps NF3- Service VR2 receiver stations near LKA11 and 12 Commence scuba dive operations – scuba dive accident and safety drill – ship's crew also involved
	evening	Begin multibeam and fisheries acoustics/sonar surveys
8/11	0600	End multibeam operations
	0800–1100	NF4-Deploy divers to conduct surgery on appropriate fish in traps. NF3-Deploy divers to service VR2 receiver stations near LKA- 9, 7
	1300–1600	NF4 – Deploy divers to service VR2 receiver stations near LKA - 13, 14, 15, 16 NF3 – Drop camera operations
	1730–1900	NF4 - Deploy scuba divers to surgically tag fish and retrieve traps NF3 – Deploy divers to service VR2 receiver stations LKA 17, 19A, 20A
	1930	Secure from daytime operations; Continue multibeam and fisheries acoustics/sonar surveys in transit to Marquesas
8/12	0600	End multibeam operations
	0800–1100	Commence scuba dive operations in Marquesas NF4 – Deploy fish traps and divers to bait traps near MRQ- 3 NF3 – Deploy drop camera operations
	1300–1600	NF4 – Deploy divers to service VR2 receiver stations MRQ-1, 2, 3, 4,

		5 NF3 – Deploy drop camera operations
	1730–1900	NF4 – Deploy divers to tag appropriate fish caught in traps
	1930	Secure from daytime operations Continue multibeam and fisheries acoustics/sonar surveys
8/13	0600	End multibeam operations
	0800–1100	NF4 – Deploy divers to tag appropriate fish caught in traps NF3 – Drop camera operations
	1300–1600	NF4 – Possibly deploy new receiver stands in Marquesas area NF3 – Drop camera operations
	1730–1900	NF4 and NF3 – Deploy divers to tag appropriate fish and retrieve fish traps
	1930	Secure from daytime operations Continue multibeam and fisheries acoustics/sonar surveys
8/14	0600	End multibeam operations
	0800–1100	NF4 launches for science crew swap, to occur at FKNMS office docks. **Disembarking**: Rothwell, Halonen, Wile **Embarking**: Keller, Eaken, Kasper, Laing, Cherubin <LT Nguyen> welcome aboard/safety discussion, drills with new science team members
	1230–1600	Transit to Western Dry Rocks area; Commence dive operations (including diving drills if necessary) NF4 – Deploy divers to service VR2 receiver stations LKA- 6, 12, 11, 18, 3 NF3 – Drop camera operations
	1800	Secure from daytime operations Continue multibeam and fisheries acoustics/sonar surveys
	2200	Transit to Warsaw Hole
8/15	0600	End multibeam operations
	0800–1100	NF3 and NF4 - Commence deployment of drop cameras and Stereo cameras in Warsaw Hole area

	1300–1600	From *Nancy Foster* – Deployment of glider
	1730–1900	NF3 and NF4 – Deployment of drop cameras, retrieval and redeployment of stereo cameras
	1930	NF3 and NF4 – recover stereo cameras
		Continue multibeam and fisheries acoustics/sonar surveys
8/16		Warsaw Hole
	0600	End multibeam operations
	0800	NF3 and NF4 – Deployment of drop cameras and stereo cameras
	1300–1600	NF3 and NF4 – Deployment of drop cameras, retrieval of stereo cameras
	1700	From *Nancy Foster* – recover glider
	Evening	Continue multibeam and fisheries acoustics/sonar surveys. TRANSIT - to Riley's Hump
8/17	0600	Riley's Hump End multibeam operations
	0800–1100	NF4 - Set chevron fish traps and deploy divers to bait traps NF3 – Drop cameras deployments From *Nancy Foster* – deploy glider
	1300–1700	NF4 – Deploy divers to conduct tagging on appropriate fish caught in traps NF3 – Drop cameras deployments Secure from daytime dive operations
	1800	Deploy stereocamera
	1900	Secure from daytime operations
		Continue multibeam and fisheries acoustics/sonar surveys
8/18	0600	End multibeam operations
	0800–1100	NF3 and NF4- Deploy divers to tag fish in traps Retrieve stereocamera
	1300–1600	NF3 and NF4 - Commence ROV and/or drop camera operations on targets of interest

		Deploy stereo camera
	1700–1830	NF3 and NF4 – Deploy divers to tag appropriately caught fish Retrieve stereocamera
	1900	Secure from daytime dive operations
		Continue multibeam and fisheries acoustics/sonar surveys
8/19	0600	Tortugas North End multibeam operations
	0800–1100	NF3 and NF4 - Deploy divers to tag fish in traps
	1300–1630	NF3 - Continue ROV and/or drop camera operations on targets of interest NF4 – Continue ROV and/or drop camera operations on targets of interest
	1700–1830	NF3 and NF4 – Deploy divers to tag appropriately caught fish
	1900	Secure from daytime dive operations
		Continue multibeam and fisheries acoustics/sonar surveys
8/20	0600	End multibeam operations
	0800–1100	NF3 and NF4 - Deploy divers to tag fish in traps
	1300–1600	NF3 - Continue ROV and/or drop camera operations on targets of interest NF4 – Continue ROV and/or drop camera operations on targets of interest
	1730–1900	NF3 and NF4 – Deploy divers to tag appropriately caught fish
	1930	Secure from daytime dive operations
		Continue multibeam and fisheries acoustics/sonar surveys
8/21	0600	End multibeam operations
	0800–1100	NF3 and NF4 - Deploy divers to tag fish in traps
	1300–1600	NF3 and NF4 - Continue ROV and/or drop camera operations on targets of interest
	1730–1900	NF3 and NF4 – Deploy divers to tag appropriately caught fish and

		recover fish traps From *Nancy Foster* – recover glider
	1930	Secure from daytime dive operations Continue multibeam and fisheries acoustics/sonar surveys – begin transit back?
8/22	0600 Morning 0800 afternoon	End multibeam operations Transit to Key West Arrive: Key West Demobilize equipment and science crew Chief Scientist to debrief with CO and OPS officers TRANSIT - to Charleston
8/23		**TRANSIT -** to Charleston, SC
8/24		**TRANSIT -** to Charleston, SC; arrive in afternoon/evening

7. Draft dive plan for duration of NF-16-06 cruise.

NOAA Form 57-03-20
(7-14)

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

DIVE OPERATIONS PLAN

DIVE OPERATIONS

DATE(S) of DIVE OPERATIONS	8/10/16-8/21/16	DIVE OPS START TIME	0800	DIVE OPS STOP TIME	1700
LOCATION of DIVE OPERATIONS	Florida Keys and Dry Tortugas	DISTANCE FROM SHORE	10-80 m	EVAC TIME to CHAMBER	3-6 hrs*
PLATFORM or FACILITY	NOAA Ship Nancy Foster	DEPTH RANGE	0-125**	NUMBER of DIVERS	11
PLANNED NUMBER of DIVE EVOLUTIONS PER DAY	26	MAXIMUM NUMBER of DIVES to be LOGGED PER DAY	36	NUMBER of CONSECUTIVE DIVE DAYS	12

SAFE SHIP CHECKLIST REQUIRED	YES ☐ NO ☑	DIVE MODE	OPEN CIRCUIT SCUBA ☑ REBREATHER ☐	DIVE PURPOSE	SCIENTIFIC DIVE ☐ WORKING DIVE ☑
FLOAT PLAN REQUIRED	YES ☐ NO ☑	DECOMPRESSION CALCULATION	DIVE COMPUTER ☑ DECOMPRESSION TABLES ☐	DIVE DUTY	ON-DUTY DIVE ☑ OFF-DUTY DIVE w/SEP GEAR ☐

DIVERS (Attach additional sheets if more than 12 divers participate in the dive)

DIVEMASTER Kelsey Jeffers (NOAA)	LEAD DIVER Rosemary Abbitt (NOAA)	DIVER Jared Halonen (NOAA)-1st leg
DIVER Alejandro Acosta (FWC)	DIVER Dani Morley (FWC)	DIVER Paul Barbera (FWC)
DIVER Lonny Anderson (FIU)	DIVER Dave Eaken (FWC)-2nd leg	DIVER Jeff Renchen (FWC)
DIVER Jessica Keller (FWC)-2nd leg	DIVER Ariel Wile (FWC)-1st leg	DIVER [NF ship divers]***

DESCRIPTION

PURPOSE of DIVES and TASKS to be PERFORMED

Assess, remove, interrogate, and replace VR2 sonic receivers. *All working dives 100-125fsw will be conducted ONLY in locations within 4hrs evacuation time to chamber. **Working Dives 100-125fsw will be conducted by NOAA FTE personnel ONLY. FWC/FIU divers restricted to <100fsw on working dives ***To meet 4-person NOAA-only dive teams on dives >100fsw, ship divers will be utilized & may include: Jamie Park, Linh Nguyen, Sam Martin &/or Nick Mitchell

PRINCIPAL DIVER WORN EQIUPMENT and BREATHING MEDIA

Standard scuba equipment (SEP gear for NOAA divers) including RASS; All divers will use Air as main breathing gas for dives 100-125fsw; All divers will use NN28-32% for dives <100fsw. All dives will be conducted FO2 < 0.40 and PO2 < 1.40 ATA.

TOOLS and SPECIALIZED EQUIPMENT to be USED — Tethered comms dive? YES ☐ NO ☑

Small hand tools (e.g., wrench, small hand saw, scraper, screwdriver, pliers); camera & GoPro video

POTENTIAL HAZARDS and MITIGATIONS (Certain hazards are present on all dives (AGE, DCS, drowning, etc.). The hazards listed below are unique to this operation.)

Boats and down lines (topside support making other vessels aware, knife for entanglement), cuts, scrapes, fire coral, marine life, spiny sea urchins, stinging organisms such as jellyfish, sea lice, fire worms, lionfish, and stonefish (protective dive wear, attention to surroundings, first aid kit stocked and ready).

PRIMARY MEANS of EVACUATION for EMERGENCIES

Florida Fish and Wildlife Conservation Commission (law enforcement)/US Coast Guard. Emergency evacuation via USCG helicopter

AUTHORIZATION

SUBMITTED BY (DIVEMASTER/LEAD DIVER) Rosemary Abbitt	SIGNATURE ABBITT.ROSEMARY.PATRICIA.1401653402 2016.05.10 10:57:21 -04'00'	DATE 05/10/16
APPROVED BY (UNIT DIVING SUPERVISOR/DESIGNEE) Kelsey Jeffers	SIGNATURE JEFFERS.KELSEY.E.1405955415	DATE 05/10/16

RESET

8. Dive Emergency Assistance Plan – Key Largo to Marathon

NOAA Form 57-03-21
(02-15) Page 1 of 2

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

DIVING EMERGENCY ASSISTANCE PLAN

NOAA DIVING UNIT	DIVE LOCATION	CALENDAR YEAR
FKNMS - Key Largo	Florida Keys - Key Largo	2016

INSTRUCTIONS:

Complete a Diving Emergency Assistance Plan (DEAP) for each unique diving location and submit the plan to NDP.Diveplans@noaa.gov with the initial dive plan of each calendar year and every time any information on the DEAP changes.

GENERAL PROCEDURES:

A. Evaluate the victim's Circulation, Airway, and Breathing (CABs). If necessary, begin cardiopulmonary resuscitation (CPR) using a manually triggered ventilator (MTV) or bag-type oxygen resuscitator.

B. If the victim is breathing, but unconscious, place the victim in the recovery position and administer oxygen using a non-rebreather type mask.

C. If the victim is awake and alert, place the victim in a position of comfort and administer 100% oxygen using an MTV/demand oxygen resuscitator or non-rebreather type mask. If the victim is not nauseated, give clear non-alcoholic/non-caffeinated fluids to drink.

D. If the victim's condition is life threatening or urgent, call the local Emergency Medical Services (EMS) or U. S. Coast Guard (USCG) for transport to the nearest medical treatment facility.

E. If the victim's condition is not urgent, contact the NOAA Dive Medical Officer (DMO) for guidance. If unable to reach the NOAA DMO with 15 minutes, contact the Divers' Alert Network (DAN).

F. Use the Dive Accident Management Field Reference Guide to document a neurological exam and dive history information.

G. Gather additional information about the incident and prepare the victim for transport.

H. Secure the diver's gear for inspection. **DO NOT DISASSEMBLE GEAR OR EXHAUST AIR FROM THE SYSTEM**. Close the cylinder valve ONLY. Count and record number of turns required to secure the valve.

I. Call and speak to the NOAA DMO, (855) 822-DIVE (3483), to report the incident.

J. Call the Line Office Diving Officer (LODO) to report incident. If unable to reach the LODO, call the Deputy LODO. Continue calling until positive contact is made. Speak to a person, don't just leave a message.

EMERGENCY TRANSPORTATION CONTACTS:

Primary Shore Based Emergency Transportation	
NAME of TRANSPORTATION PROVIDER	Any EMS
POINT of CONTACT	911
PHONE NUMBER	911

Secondary Shore Based Emergency Transportation	
NAME of TRANSPORTATION PROVIDER	FKNMS Government Vehicle
POINT of CONTACT	FKNMS Key Largo
PHONE NUMBER	305-852-7717

At Sea Vessel Emergency Transportation	
NAME of TRANSPORTATION PROVIDER	USCG or FWC
POINT of CONTACT	USCG or FWC
PHONE NUMBER	Hail on VHF ch16; USCG-SAR 305-292-8727 FWC 305-289-2320

At Sea Aviation Emergency Transportation	
NAME of TRANSPORTATION PROVIDER	USCG
POINT of CONTACT	USCG
PHONE NUMBER	Hail on VHF ch16; USCG-SAR 305-292-8727

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U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

DIVING EMERGENCY ASSISTANCE PLAN

NOAA DIVING UNIT	DIVE LOCATION	CALENDAR YEAR
FKNMS - Key Largo	Florida Keys - Key Largo	2016

EMERGENCY CONTACTS:

Primary Operational Hyperbaric Chamber	
NAME of FACILITY	Mariners Hospital
ADDRESS of FACILITY	91500 Overseas Hwy, Tavernier FL
POINT of CONTACT	Dennis Holstein
PHONE NUMBER	Chamber 305-434-1603

Secondary Operational Hyperbaric Chamber	
NAME of FACILITY	Mercy Hospital
ADDRESS of FACILITY	3663 South Miami Ave, Miami FL
POINT of CONTACT	Hyperbaric Chamber
PHONE NUMBER	EMERGENCY 305-285-2171 Chamber 305-285-2970

Primary Hospital Emergency Room	
NAME of FACILITY	Mariners Hospital
ADDRESS of FACILITY	91500 Overseas Hwy, Tavernier FL
POINT of CONTACT	Emergency Room
PHONE NUMBER	305-434-1600

Secondary Hospital Emergency Room	
NAME of FACILITY	Homestead Hospital
ADDRESS of FACILITY	975 Baptist Way, Homestead FL
POINT of CONTACT	Emergency Room
PHONE NUMBER	786-243-8510 (or) 786-243-8605

USCG, Area Search and Rescue (SAR) Coordinator	
NAME of FACILITY	Atlantic Area SAR Coordinator
PHONE NUMBER	(757) 398-6700 (Atlantic)

USCG, Rescue Coordination Center (RCC)	
NAME of FACILITY	RCC Miami, FL
PHONE NUMBER	(305) 415-6800 (Miami)

NOAA DIVING PROGRAM CONTACTS:

Unit Diving Supervisor	
NAME	Kelsey Jeffers
EMERGENCY CELL PHONE NUMBER	703-585-6575

Divers Alert Network (DAN)	
EMERGENCY PHONE NUMBER	(919) 684-9111

Line Office Diving Officer	
NAME	Kim Roberson
EMERGENCY CELL PHONE NUMBER	240-997-8040
OFFICE PHONE NUMBER	301-713-3028 x229

Deputy Line Office Diving Officer	
NAME	Tane Casserley
EMERGENCY CELL PHONE NUMBER	757-284-1115
OFFICE PHONE NUMBER	757-591-7333

NOAA Diving Safety Officer	
EMERGENCY CELL PHONE NUMBER	(252) 723-1612
OFFICE PHONE NUMBER	(206) 526-6223

NOAA Diving Medical Officer	
EMERGENCY CELL PHONE NUMBER	(855) 822-3483
OFFICE PHONE NUMBER	(206) 526-6474

9. Dive Emergency Assistance Plan – Big Pine Key to Dry Tortugas

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U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

DIVING EMERGENCY ASSISTANCE PLAN

NOAA DIVING UNIT	DIVE LOCATION	CALENDAR YEAR
FKNMS - Key West	Florida Keys - Key West	2016

INSTRUCTIONS:

Complete a Diving Emergency Assistance Plan (DEAP) for each unique diving location and submit the plan to NDP.Diveplans@noaa.gov with the initial dive plan of each calendar year and every time any information on the DEAP changes.

GENERAL PROCEDURES:

A. Evaluate the victim's Circulation, Airway, and Breathing (CABs). If necessary, begin cardiopulmonary resuscitation (CPR) using a manually triggered ventilator (MTV) or bag-type oxygen resuscitator.

B. If the victim is breathing, but unconscious, place the victim in the recovery position and administer oxygen using a non-rebreather type mask.

C. If the victim is awake and alert, place the victim in a position of comfort and administer 100% oxygen using an MTV/demand oxygen resuscitator or non-rebreather type mask. If the victim is not nauseated, give clear non-alcoholic/non-caffeinated fluids to drink.

D. If the victim's condition is life threatening or urgent, call the local Emergency Medical Services (EMS) or U. S. Coast Guard (USCG) for transport to the nearest medical treatment facility.

E. If the victim's condition is not urgent, contact the NOAA Dive Medical Officer (DMO) for guidance. If unable to reach the NOAA DMO with 15 minutes, contact the Divers' Alert Network (DAN).

F. Use the Dive Accident Management Field Reference Guide to document a neurological exam and dive history information.

G. Gather additional information about the incident and prepare the victim for transport.

H. Secure the diver's gear for inspection. **DO NOT DISASSEMBLE GEAR OR EXHAUST AIR FROM THE SYSTEM.** Close the cylinder valve ONLY. Count and record number of turns required to secure the valve.

I. Call and speak to the NOAA DMO, (855) 822-DIVE (3483), to report the incident.

J. Call the Line Office Diving Officer (LODO) to report incident. If unable to reach the LODO, call the Deputy LODO. Continue calling until positive contact is made. Speak to a person, don't just leave a message.

EMERGENCY TRANSPORTATION CONTACTS:

Primary Shore Based Emergency Transportation	
NAME of TRANSPORTATION PROVIDER	Any EMS
POINT of CONTACT	911
PHONE NUMBER	911

Secondary Shore Based Emergency Transportation	
NAME of TRANSPORTATION PROVIDER	FKNMS Government Vehicle
POINT of CONTACT	FKNMS Key West
PHONE NUMBER	305-809-4700

At Sea Vessel Emergency Transportation	
NAME of TRANSPORTATION PROVIDER	USCG or FWC
POINT of CONTACT	USCG or FWC
PHONE NUMBER	Hail on VHF ch16; USCG-SAR 305-292-8727 FWC 305-289-2320

At Sea Aviation Emergency Transportation	
NAME of TRANSPORTATION PROVIDER	USCG
POINT of CONTACT	USCG
PHONE NUMBER	Hail on VHF ch16; USCG-SAR 305-292-8727

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U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

DIVING EMERGENCY ASSISTANCE PLAN

NOAA DIVING UNIT	DIVE LOCATION	CALENDAR YEAR
FKNMS - Key West	Florida Keys - Key West	2016

EMERGENCY CONTACTS:

Primary Operational Hyperbaric Chamber	
NAME of FACILITY	Mariners Hospital
ADDRESS of FACILITY	91500 Overseas Hwy, Tavernier FL
POINT of CONTACT	Dennis Holstein
PHONE NUMBER	Chamber 305-434-1603

Secondary Operational Hyperbaric Chamber	
NAME of FACILITY	Special Forces Underwater Operations
ADDRESS of FACILITY	Fleming Key, Key West FL
POINT of CONTACT	Duty Officer 24hr cell 305-797-2699
PHONE NUMBER	Chamber Supervisor 305-293-4157 Duty cell 305-797-2704

Primary Hospital Emergency Room	
NAME of FACILITY	Lower Keys Medical Center
ADDRESS of FACILITY	5900 College Rd, Key West FL
POINT of CONTACT	Emergency Room
PHONE NUMBER	305-294-5531

Secondary Hospital Emergency Room	
NAME of FACILITY	Fishermen's Community Hospital
ADDRESS of FACILITY	3301 Overseas Hwy, Marathon FL
POINT of CONTACT	Emergency Room
PHONE NUMBER	305-743-5533

USCG, Area Search and Rescue (SAR) Coordinator	
NAME of FACILITY	Atlantic Area SAR Coordinator
PHONE NUMBER	(757) 398-6700 (Atlantic)

USCG, Rescue Coordination Center (RCC)	
NAME of FACILITY	RCC Miami, FL
PHONE NUMBER	(305) 415-6800 (Miami)

NOAA DIVING PROGRAM CONTACTS:

Unit Diving Supervisor	
NAME	Kelsey Jeffers
EMERGENCY CELL PHONE NUMBER	703-585-6575

Divers Alert Network (DAN)	
EMERGENCY PHONE NUMBER	(919) 684-9111

Line Office Diving Officer	
NAME	Kim Roberson
EMERGENCY CELL PHONE NUMBER	240-997-8040
OFFICE PHONE NUMBER	301-713-3028 x229

Deputy Line Office Diving Officer	
NAME	Tane Casserley
EMERGENCY CELL PHONE NUMBER	757-284-1115
OFFICE PHONE NUMBER	757-591-7333

NOAA Diving Safety Officer	
EMERGENCY CELL PHONE NUMBER	(252) 723-1612
OFFICE PHONE NUMBER	(206) 526-6223

NOAA Diving Medical Officer	
EMERGENCY CELL PHONE NUMBER	(855) 822-3483
OFFICE PHONE NUMBER	(206) 526-6474

10. Hazardous Materials – Lithium-ion Battery Product Safety Data

Product Safety Data

INSPIRED ENERGY
SOLUTIONS FOR PORTABLE POWER

PRODUCT: Inspired Energy Rechargeable Battery Pack

CHEMICAL SYSTEM: Lithium Ion

SECTION I - MANUFACTURER INFORMATION

Inspired Energy, Inc.
25440 NW 8th Place,
Newberry, FL 32669

Telephone: (888) 5-INSPIRE (888-546-7747)

Date Prepared: September 10th 2012

SECTION II - PRECAUTIONS FOR HANDLING & USE

- Avoid shorting the battery
- Do not immerse in water.
- Do not disassemble or deform the battery
- Do not expose to, or dispose of the battery in fire.
- Avoid excessive physical shock or vibration.
- Keep out of the reach of children.
- Battery must be charged in approved charger.
- Never use a modified or damaged charger.
- For specified product use only.
- Store in a cool, dry and well-ventilated area.
- Never use a battery that has suffered abuse.
- 0% Cd, 0%Hg, 0%Pb
- Each battery contains < 8g of equivalent Lithium
- Each battery stores <100Wh or energy
- Refer to data sheet for operating instructions

Refer to the cell manufacturers' Product Safety Data Sheets for details of the Li Ion cells; available at www.inspiredenergy.com

SECTION III - PRODUCTS

2 & 3-cell Batteries	4-cell Batteries	6-Cell Batteries	7-Cell Batteries	8-Cell Batteries	9-cell Batteries	12-cell Batteries
NB2037xxxx 7.2V	ND2053xxxx 3.6V	NF2047xxxx 7.2V	PG3665xxxx 25.2V	NH2054xxxx 14.4V	Ni2020xxxx 10.8V	NL2020xxxx 10.8V
NC2040xxxx 10.8V	ND2017xxxx 7.2V	NF2030xxxx 10.8V		NH2057xxxx 7.2V	Ni2040xxxx 10.8V	NL2024xxxx 14.4V
NC2560xxxx 10.8V	ND2037xxxx 7.2V	NF2040xxxx 10.8V		PH2059xxxx 28.8V		NL2044xxxx 14.4V
	ND2057xxxx 7.2V			NH2034xxxx 14.4V		NL2050xxxx 10.8V
	ND2034xxxx 14.4V					NL2054xxxx 14.4V
	ND2054xxxx 14.4V					

Where "xxxx" indicates all different custom & standard model variants identified by alphanumeric suffixes.

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11. Hazardous Materials –
    a. Five gallon tank of gasoline
    b. Lithium-ion Battery Specification Summary

INSPIRED ENERGY 2016 PRODUCT LINE

NH2054	14.4V, 5.8Ah, 83Wh 14.4V, 6.8Ah, 98Wh

NH2054 SPECIFICATION SUMMARY	
PART NUMBERS:	NH2054HD29 - 2.9Ah cells, low temp NH2054HD34 - 3.4Ah cells, hi capacity
CHEMISTRY / CELL ARRAY:	8 Li-Ion 18650 cells / 4S2P array
CAPACITY / ENERGY:	NH2054HD29 - 5.8Ah / 83Wh NH2054HD34 - 6.8Ah / 98Wh
VOLTAGE:	Vmax=16.8V Vnom=14.4 V Vcutoff=9.6V
EQ. LI CONTENT:	8g
MAX CONTINUOUS DISCHARGE	8A
MAX CONT DISCHARGE TO CUTOFF VOLTAGE	80W
COMMUNICATIONS:	Fully SMBus rev 1.1 Compliant
DATA SYSTEM:	Fully SBDS rev 1.1 Compliant
CHARGING:	"CH" range desktop charger or other SMBus Level 3 compliant charger (LT 4100 recommended).
PHYSICAL DIMENSIONS:	HEIGHT: 23 mm / 0.9" LENGTH: 153 mm / 6.0" WIDTH: 79 mm / 3.1" WEIGHT: 434g / 15.3oz
MATING CONNECTOR:	Mating Connector List
REC. BATTERY CAVITY:	24 x 80mm cross section. The battery should be centered within this cavity.
DOWNLOADS:	NH2054HD24 Datasheet NH2054HD29 Datasheet NH2054HD31 Datasheet NH2054HD34 Datasheet User Notes

SAFETY DATA SHEET

This Safety Data Sheet Complies with directives from the United States Occupational Safety and Health Administration (OSHA), Canadian Controlled Product Regulations (WHMIS), the European Union Commission Regulation (EC) 1907/2006 & (EC) 2015/830, the Australian National Occupational Health and Safety Commission (NOHSC), the Taiwan Bureau of Standards, the Japan Ministry of Economy, the Inspection and Quarantine of the People's Republic of China (GB/T 16483-2008), and the Brazil Standard (ABNT NRB 14725-3).

SECTION I - PRODUCT AND COMPANY IDENTIFICATION

1.1 Product Identification:
Secondary Smart Lithium-Ion Battery Packs:

Model	Ratings	Model	Ratings	Model	Ratings
L02Dxxxx	7.2V,<24Wh,<10A	ND2017xxxx	7.2V,<41Wh,<3A	NL2020xxxx	10.8V,<97Wh,<10A
L03Dxxxx	10.8V,<37Wh,<10A	ND2037xxxx	7.2V,<49Wh,<10A	NL2024xxxx	14.4V,<97Wh,<10A
L04Dxxxx	7.2V,<49Wh,<10A	ND2057xxxx	7.2V,<49Wh,<10A	NL2044xxxx	14.4V,<97Wh,<10A
L04Dxxxx	14.4V,<49Wh,<10A	ND2034xxxx	14.4V,<49Wh,<10A	NL2050xxxx	10.8V,<97Wh,<10A
L06Dxxxx	10.8V,<73Wh,<10A	ND2054xxxx	14.4V,<49Wh,<10A	NL2054xxxx	14.4V,<97Wh,<10A
L08Cxxxx	14.4V,<98Wh,<10A	NF2047xxxx	7.2V,<73Wh,<10A	PG3665xxxx	25.2V,<73Wh,<20A
L08Dxxxx	14.4V,<98Wh,<10A	NF2030xxxx	10.8V,<73Wh,<10A	PH2059xxxx	28.8V,<98Wh,<10A
L12Dxxxx	14.4V,<97Wh,<10A	NF2040xxxx	10.8V,<73Wh,<10A	PH2054xxxx	14.4V,<98Wh,<20A
L16Dxxxx	14.4V,<98Wh,<10A	NH2054xxxx	14.4V,<98Wh,<10A	PH3054xxxx	14.4V,<58Wh,<20A
NB2037xxxx	7.2V <24Wh <10A	NH2057xxxx	7.2V,<98Wh,<12A	PH3059xxxx	28.8V,<43Wh,<20A
NC2040xxxx	10.8V,<37Wh,<10A	NH2034xxxx	14.4V,<98Wh,<10A	RH2024xxxx	14.4V,<98Wh,<20A
NC2560xxxx	10.8V,<22Wh,<2A	Ni2020xxxx	10.8V,<94Wh,<10A		
ND2053xxxx	3.6V,<49Wh,<10A	Ni2040xxxx	10.8V,<94Wh,<10A		

(Where "XXXX" is used to specific custom part number and capacity value.)

1.2 Company Identification:
Company Name: Inspired Energy, LLC
Address: 25440 NW 8th Place; Newberry, FL 32669
Telephone Number: +1-352-472-4855
Fax Number: +1-352-472-4859
Emergency Contact Number: +1-703-527-3887

SECTION II - HAZARD IDENTIFICATION

2.1 Classification of Products:
Secondary battery packs are enclosed in UL-94, V-0 enclosures designed to withstand temperatures and pressures encountered during normal use. The hazardous component in battery packs is the lithium-ion cell. Under normal use the battery cells present no physical danger of ignition or explosion and chemical danger of hazardous materials leakage.
Battery cells are designed to vent gas to prevent explosion, if exposed to a fire, added mechanical shocks, electrically abused or physically damaged. This leaked gas could contain material classified as hazardous.

2.2 Label and Markings:
2.2.1 Example of Battery Pack Markings:

2.2.2 Example of Packaging Labels:

(Used Only on Air Cargo Shipments)

2.3 Effect(s) of Hazard Exposure:
Human Health Effects if Exposed to Cell Venting:
Skin Contact: The steam or liquid of the cell electrolyte can have adverse reactions to the skin. If cell electrolyte contacts skin it can cause severe irritation or chemical burns.
Eye Contact: The steam or liquid of the cell electrolyte can have adverse reactions to the eyes. If cell electrolyte contacts the eyes it can cause severe irritation or chemical burns.
Inhalation: The steam or liquid of the cell electrolyte can have adverse reactions if inhaled. If cell electrolyte is inhaled it may cause severe respiratory irritation.
Ingested: Swallowing or ingesting the contents of an open cell can cause serious chemical burns to the mouth, esophagus and gastrointestinal tract.
Medical Conditions Aggravated by Exposure: Not Available
Interactions with Other Chemicals: Immersion in high conductivity liquids may cause corrosion and breaching of the cell or battery enclosure. If vented cell electrolyte contacts water it will generate detrimental hydrogen fluoride.
Environmental Effects: Not Available

SECTION III - COMPOSITION / INFORMATION OF INGREDIENTS

3.1 Classification of Hazardous Ingredients by Geographic Markets:
USA: This battery pack is an article pursuant to 29 CFR 1910.1200. The information contained in this Safety Data Sheet contains valuable information critical to the safe handling and proper use of the product. This SDS should be retained and available for employees and other users of this product.
Canada: This is not a controlled produced under WHMIS. The products listed in this Safety Data Sheet are defined as "Manufactured Articles" and is not subject to the regulations of the Hazardous Products Act.
EU: This product is an article according to the REACH Regulation (1907/2006).
Australia: The products listed in this SDS are constructed using Lithium-Ion cell or battery and is classified as an article and is not hazardous when used according to the recommendations of the manufacturer. The hazard is associated with the contents of the cell. If the cell or battery is compromised and starts to leak, based upon the battery ingredients the contents are classified as hazardous according to the criteria of the National Occupational Health and Safety Commission stated by SafeWork Australia.

Taiwan: This product is not classified as a dangerous good.
Japan: This product is not classified as a dangerous good.
China: This product is not classified as a dangerous good.
Brazil: This product is not classified as a dangerous good.

Cell Component	Chemical Name	Mass Range (Weight %)*
Electrolyte Salt	Lithium Hexafluorophosphate	1~5
Electrolyte Solvents	Ethylene Carbonate, Propylene Carbonate, Diethyl Carbonate, Dimethyl Carbonate, Ethyl Methyl Carbonate	5~20
PVDF	Polyvinylidenfluoride	<1
Base	Copper	1~15
Cathode	Lithium Cobaltite, Manganese, Nickel, Aluminum	20~50
Anode	Graphite, Carbon Black	13~18

(Quantities may vary depending on battery model)*

SECTION IV - FIRST-AID MEASURES

4.1 Description of First Aid Measures:
The hazardous component in secondary battery packs are in the internally sealed cells. **The following measures are only applicable if the cells have been abused/damaged causing exposure of hazardous materials noted under section three.**
Ingestion: Have the victim rinse mouth thoroughly. Do not induce vomiting. Contact your local poison control center. Immediately seek medical attention.
Inhalation: Remove victim from exposure to chemicals and into the fresh air. Immediately seek medical attention.
Skin Contact: Immediately flush with water. Immediately seek medical attention.
Eye Contact: If eye contact with the contents of a vented cell immediately flush eyes with water. Immediately seek medical attention.
Protection for First Aiders: Do not expose yourself to corrosive vapor-contaminated areas without a respirator.
First Aid Facilities: Eye wash bottle, fountain and safety showers (running water).

4.2 Most Important Symptoms & Effects Caused by Exposure:
Ingestion of cell contents may cause gastrointestinal tract irritation or even vomiting. Inhalation of vented cell vapors may lead to severe irritation of the mouth and upper respiratory tract causing a burning/pain sensation or inflammation in the nose and throat. Inhalation could also cause coughing or difficulty breathing. Eye contact may cause severe eye irritation, eye burning/pain and even possible irreversible damage. Skin contact may lead to irritation and possible chemical burns.

SECTION V - FIRE FIGHTING MEASURES

5.1 Extinguishing Media:
Suitable Extinguishing Media: Water, Fire Extinguishing Powder, Nitrogen Gas, Carbon Dioxide, or Foam.
Unsuitable Extinguishing Media: Oxidizing agents, reducing agents, acids or alkalis.
Explosion Data: Closed containers may explode when exposed to temperatures above 120°C (248°F).
Hazchem Code: 4W (Australia, New Zealand and Malaysia)
Sensitivity to Mechanical Impact: Extreme mechanical abuse could cause venting of the cells.
Sensitivity to Static Discharge: If electrolyte is exposed to electrostatic discharge it could ignite.

5.2 Special Hazards Arising from the Chemical:
If a cell vents and exposes lithium hexafluorophosphate mixed with water vapor, this could create a poisonous gas of hydrogen-fluoride gas. Degradation of the cell by heat may produce hazardous fumes of lithium, cobalt-manganese, hydrofluoric acid, hydrogen and oxides of carbon, aluminum, lithium, copper and cobalt.

5.3 Specific Method for Fire Fighting:
When battery cells combust they tend to ignite other cells in the adjacent area. Prevent this by flooding the area with Carbon Dioxide, Foam, Nitrogen Gas or Fire Extinguishing Powder. Although use of water will extinguish flame it may create hydrogen-fluoride gas.

5.4 Special Protective Equipment for Fire Fighters:
Respiratory Protection: Self-contained Breathing Apparatus
Hand Protection: Protective Gloves
Eye Protection: Full Face Breathing Apparatus or Googles
Body Protection: Protective Uniform

SECTION VI – ACCIDENTAL RELEASE MEASURES

If battery packs internal cells become damaged, they could possibly leak minuscule amounts of contaminates. The following procedures list precautions and steps to cleaning these contaminates.

6.1 Personal Precautions:
Quarantine contaminated area at a 33 feet (10 meters) radius from the center of contamination. Don protective equipment and clothing listed in Section 8.2.

6.2 Environmental Precautions:
Cover spilled materials with absorbent non-reactive material (ie. vermiculite). Keep contaminated non-reactive material away from soil, sewers or waterways. Inform appropriate authorities if contamination occurs.

6.3 Methods for Clean Up:
Quarantine contaminated area at a 33 feet (10 meters) radius from the center of contamination. Don protective equipment and clothing listed in Section 8. Do not touch Spilled material. Use only non-sparking tools and equipment. Do not expose spilled material to moisture. Seal all possible locations where contaminates might migrate into the environment. Clean up solids and place them into a waste container safe for disposing of contaminated trash. Clean up spilled liquids with vermiculite and place them into the same container. Appropriately transport contaminated material to a waste facility capable of handling contaminated materials.

6.4 Precautions to Prevent Secondary Hazard:
Avoid the release of collected materials. Do not bring the collected materials near open flame. Seal contaminates into a waste container safe for disposing of contaminated trash. Transport contaminates to an appropriate waste facility.

SECTION VII – HANDLING AND STORAGE

7.1 Precautions for Safe Handling:
Avoid shorting the battery. Do not immerse in water. Do not disassemble or deform the battery. Do not expose to, or dispose of the battery in fire. Avoid excessive physical shock or vibration. Keep out of the reach of children. Battery must be charged in an approved charger. Never use a modified or damaged charger. Use for specified product applications only. Store in a cool, dry and well-ventilated area. Never use a battery that has suffered abuse. Refer to data sheet for safe operating instructions.

7.2 Conditions for Safe Storage:
Store battery packs in a cool (25°C+/-5°C), Dry (<85% Humidity) well ventilated area. Keep battery packs in packaging material to prevent exposure to elements and conductive material.

Do not store battery packs near heat, high humidity, open flame, sunlight, water, seawater, strong acids, strong oxidizers, strong reducing agents, strong alkalis or metal wire.

7.3 Specific End Uses:
Rechargeable Smart Battery Packs are used across a wide market scope as a DC power supply for portable electronic devices.

SECTION VIII - EXPOSURE CONTROLS, PERSONAL PROTECTION

Under routine operation none of these safety procedures or equipment are required. Take the following safety measures only if the internal cells are comprised and leak or vent.

8.1 Exposure Control Measures:
Exposure Limit Values- ACGIH does not mention electrolyte as a controlled method. Not applicable.
Biological Monitoring-Not Applicable.
Control Banding- Not Applicable.
Recommended Monitoring Procedures- Follow standard monitoring procedures.
Derived no-effect level- Not Applicable.
Derived minimal effect level- Not Applicable.
Predicted no-effect concentrations- Not Applicable.

8.2 Personal Protective Equipment:
Engineering Controls- Special ventilation is only required if cell venting occurs.
Eye and Face Protection- Wear chemical resistant safety googles or face shield.
Hand Protection- Wear chemical resistant gloves.
Skin Protection- Wear long sleeved clothing. Solid clothing should be washed with detergent.
Respiratory Protection- Wear an approved half face inorganic vapor, gas, acid and particulate respirator.
Thermal Protection- Not Applicable.
Hygiene Measures- Do not eat, drink or smoke in work areas.
Environmental Exposure Controls- Do not release into the environment.

SECTION IX - PHYSICAL AND CHEMICAL PROPERTIES

Physical State- Sealed Solid
Appearance- Small Battery Pack
pH- Not Applicable
Relative Density- Not Applicable
Boiling Point- Not Applicable
Melting Point- Not Applicable
Viscosity- Not Applicable
Oxidizing Properties- Not Applicable
Flash Point- Not Applicable
Water Partition- Not Applicable
Vapor Pressure- Not Applicable
Vapor Density- Not Applicable

Solubility in Water- Insoluble
Water Distribution Coefficient- Not Applicable
Odor Type- Odorless
Odor Threshold- Not Applicable
Evaporation Rate- Not Applicable
Auto Ignition Temperature- Not Applicable
Flammability Limits- Not Applicable
Decomposition Temperature- 90°C

SECTION X - STABILITY AND REACTIVITY

10.1 Stability and Reactivity:
Stability- The battery packs manufactured by Inspired Energy are completely stable under normal use and in normal storage conditions.
Reactivity- The internal cells within the battery packs may become unstable due to abusive conditions.
Conditions to Avoid- Avoid shorting the battery. Do not immerse in water. Do not disassemble or deform the battery. Do not expose to, or dispose of the battery in fire. Avoid excessive physical shock or vibration. Keep out of the reach of children. Battery must be charged in approved charger. Never use a modified or damaged charger. For specified product use only. Store in a cool, dry and well-ventilated area. Never use a battery that has suffered abuse. Refer to data sheet for safe operating instructions.
Incompatible Materials- Do not immerse in water or any other high corrosive conductive liquid.
Hazardous, Decomposition Products- Internal cells may decompose to hydrogen fluoride, phosphorous oxides, sulfur oxides, sulfuric acid, lithium hydroxide, carbon monoxide and carbon dioxide.

SECTION XI - TOXICOLOGICAL INFORMATION

11.1 Information on Toxicological Effects:
The battery packs manufactured by Inspired Energy present no toxicological effects under normal use. The hazardous components of the battery packs are within the internal cell. Within recommended conditions the electrode materials and liquid electrolytes do not react when the cell remains sealed. Exposure to these hazardous components is only possible if the battery leaks or vents. The following toxicology data is in respect to a person coming into contact with exposed electrolyte of the cell.

11.2 Acute Toxicity:
Swallowed- The electrolyte contained within the cells of the battery pack is a corrosive material. Ingestion of this electrolyte would be harmful. Swallowing may result in nausea, vomiting, diarrhea, abdominal pain and chemical burns in the gastrointestinal tract. During normal usage ingestion of a sealed battery pack is physically impossible.

11.3 Skin Corrosion or Irritation:
The electrolyte contained within the cells of the battery pack is a corrosive liquid. If this corrosive liquid make contact to your skin they could cause irritation or even severe chemical burns. A sealed battery presents no danger to a person's hand or skin.

11.4 Serious Eye Damage or Irritation:
The electrolyte contained within the cells of the battery pack is a corrosive liquid. If this electrolytes makes contact with the eye it could cause irritation or even irreversible damage to the eye. A sealed battery presents no danger to eyes.

11.5 Respiratory or Skin Sensitization:
OECD Test 406 as performed by the cell manufacture, presented no evidence that the electrolyte contained within the cell of battery pack cause no respiratory or skin sensitizers.

11.6 Germ Cell Mutagenicity:
OECD Test 471, 475, 476, 478 and 479 Test 406 as performed by the cell manufacture, presented no evidence that the electrolyte contained within the cell of a battery pack cause no mutagenic effect.

11.7 Carcinogenicity:
The electrolyte contained within the cell of a battery pack is not considered by the cell manufacture to be a carcinogen.

11.8 Reproductive Toxicity:
OECD Test 414 and 421 Test 406 as performed by the cell manufacture, presented no evidence that the Electrolyte contained within the cell of a battery pack cause an hazard to the human reproductive system.

11.9 Specific Target Organ Toxicity (STOT) - Single Exposure:
Inhalation of vapors from a leaking cell within a battery pack will cause irritation or even severe pain to the mouth and respiratory tract. Sealed battery packs present no organ toxicity.

11.10 Specific Target Organ Toxicity (STOT) - Repeated Exposure:
OECD Tests 410 and 412 presented that prolonged exposure to a battery pack cells causes no organ damage.

11.11 Aspiration Hazards:
The electrolyte contained within the cell of the battery pack presents no aspiration concern. Although if the electrolyte is swallowed vomiting could occur and cause aspiration into the lungs.

SECTION XII - ECOLOGICAL INFROMATION

12.1 Ecotoxicity: A sealed battery pack does not pose any ecotoxicity hazard. The internal cells under normal use and conditions pose no ecotoxicity hazard. In the rare case the cells seal is broken or damaged the cell could leak electrolyte. If this electrolyte reacts with water it could potentially cause damage to flora and fauna. Follow the steps under Section 13 to insure cells are disposed of properly.

12.2 Persistence and Degradability: No data available.

12.3 Bio Accumulative Potential: Not applicable.

12.4 Mobility in Soil: No data available.

12.5 Results of PBT and vPvB Assessment: Not applicable.

SECTION XIII - DISPOSAL CONSIDERATIONS

13.1 Waste Treatment Methods: Recycling of Inspired Energy's Smart Battery Packs is strongly encouraged. Every battery has instructions for contacting the Rechargeable Battery Recycling Corp (RBRC) to ensure the appropriate recycling method within the USA. Every battery has the appropriate symbols to direct appropriate disposal in Europe. The battery packs internal cell's contents should not be released into the environment, do not dump into any sewers, on the ground or into any body of water. Do not dispose of battery packs in fire. Used battery packs should be stored in their original packaging. Ensure packs are stored in a manner to prevent short circuit of the cells. Battery pack should be fully discharged before recycling. Do break battery pack open before disposal.

13.2 Classification of Waste to comply with Waste Regulations:
USA: Expended batteries are not considered hazardous waste. Cells and batteries involved in a fire may be considered to be hazardous waste. Dispose of in accordance with local, state and federal laws and regulations. Consult universal/hazardous waste regulations for further information regarding disposal of spent batteries. If the internal cells are leaking/broken open, consult hazardous waste regulations under US Environmental Protection Agency's Resource Conservation and Recovery Act (RCRA). Also, consult state and local regulations for further disposal requirements.

	Inspired Energy is a committed partner in Call2recycle's Rechargeable Battery Recycling Corporation (RBRC) program. Promoting the recycling of Li-Ion battery packs by providing a toll-free telephone number to call and receive information to the nearest local recycling facility.

Canada: Expended battery packs are not considered hazardous waste. Cells and batteries involved in a fire may be considered to be hazardous waste. Dispose of in accordance with local, provincial and federal laws and regulations. Consult the Canadian Environmental Protection Act for additional details.
EU: Expended battery pack waste must be disposed of in accordance with relevant EC Directives and national, regional and local environmental control regulations. For disposal within the EC, the appropriate code according to the European Waste Catalogue (EWC) should be used. EU Waste Code: 16 06 05 – other batteries and accumulators.
Australia: Expended battery packs must be taken for recycling or disposal at an appropriate collection depot by suitably licensed contractors in accordance with government regulations.
Taiwan: Expended battery packs are not considered hazardous waste. Cells and batteries should be recycled at an appropriate collection site in accordance with government regulations.
Japan: Recycling of expended lithium-ion battery packs is regulated by the Wastes Disposal and Public Cleaning Law and the Law for Promotion of Effective Utilization.

13.3 Classification of Waste to comply with Transport Regulations: Expended Lithium-Ion Battery packs are not considered hazardous waste. Lithium-ion battery packs that have been involved in a fire maybe considered hazardous waste and should be marked and classified as such.

13.4 Classification of Waste Packaging Material: Under normal use packaging is not consider hazardous and should be disposed of in accordance with local recycling regulations. Packaging that has been exposed to a damaged leaking cells should be considered hazardous waste and disposed of in accordance to local rules and regulations.

SECTION XIV - TRANSPORT INFORMATION

14.1 UN Number: 3480 or 3481

14.2 UN Proper Shipping Name: 3480-Lithium Ion Batteries. 3481-Lithium Ion Batteries Contained in Equipment or Lithium Ion Batteries Packed with Equipment

14.3 Transport Hazard Classes:
Class: 9
Susidiary Risk: None
Labels: 9
Hazard No. (ADR): Not Applicable

14.4 Packing Group: II

14.5 Environmental Hazards: None

14.6 Special Precautions for User: Read Safety Data Sheet and Specification Data sheet before use. Australia, New Zealand and Singapore follow Hazchem Code: 4W.

14.7 Transport in bulk IBC Code: No applicable code.

14.8 Modal Information:

Land (ADR):	3480 – 188, 230, 310, 348 (Special packaging instruction P903 applies). 3481 – 188, 230, 248, 360 (Special packaging instruction P903 applies).
Land (RID):	3480 – 188, 230, 310, 348 (Special packaging instruction P903 applies). 3481 – 188, 230, 248, 360 (Special packaging instruction P903 applies).
Land (ADN)	3480 – 188, 230, 310, 348 (Special packaging instruction P903 applies). 3481 – 188, 230, 248, 360 (Special packaging instruction P903 applies).
Sea (IMDG):	188, 230, 310 (Special packaging instruction P903 applies). EmS: F-A, S-I; Stowage Category A IMDG Code: 9033
Air (IATA)	A88, A99, A154, A164, A183 (Packing Instruction 965, 966, 967). ERG Code: - Lithium ion cell or batteries - Lithium ion batteries in compliance with Packing Instruction 965. Lithium ion cell or batteries packed with equipment - Lithium ion batteries in compliance with Packing Instruction 966. Lithium ion cell or batteries contained in equipment - Lithium ion batteries in compliance with Packing Instruction 967.

Inspired Energy products listed under this SDS will conform to various sections of PI 965 or PI 966 or PI 967 based on the contents and packaging of the shipment. Please see the shipping documents for complete details for individual shipments. This document is not intended to replace or authorize shipments of lithium-ion cells; it is intended as a guide for use by trained individuals.

SECTION XV - REGULATORY INFORMATION

15.1 Safety, Health and Environmental Regulations/ Legislation:

United States Federal and State Regulations: TSCA Status: All ingredients in these products are listed on the TSCA inventory. **OSHA:** These products do not meet criteria as per Part 1910.1200, manufactured article. **SARA EPA Title III:** None. **Sec. 302/304:** None. **Sec. 311/312:** None. **Sec. 313:** None. **CERCLA RQ:** None. **Canadian Federal Regulations:** These products have been classified in accordance with the hazard criteria of the Controlled Products Regulations and the SDS contains all the information required by the Controlled Products Regulations. **WHMIS Classification:** Not Controlled, manufactured article. **New Substance Notification Regulations:** Lithium hexafluorophosphate is listed on the Non-Domestic Substance List (NDSL). All other ingredients in the product are listed, as required, on Canada's Domestic Substances List (DSL). **National Pollutant Release Inventory (NPRI) Substances:** These products do not contain any NPRI chemicals. **EU Regulations:** Regulation (EC) No. 1005/2009 on substances that deplete the ozone layer, Annex I: Not listed. Regulation (EC) No. 1005/2009 on substances that deplete the ozone layer, Annex II: Not listed. Regulation (EC) No. 850/2004 on persistent organic pollutants, Annex I as amended: Not listed. Regulation (EC) No. 689/2008 concerning the export and import of dangerous chemicals, Annex I, part 1 as amended: Not listed. Regulation (EC) No. 689/2008 concerning the export and import of dangerous chemicals, Annex I, part 2 as amended: Not listed. Regulation (EC) No. 689/2008 concerning the export and import of dangerous chemicals, Annex I, part 3 as amended: Not listed. Regulation (EC) No. 689/2008 concerning the export and import of dangerous chemicals, Annex V as amended: Not listed. Regulation (EC) No. 166/2006, REACH Article 59(10) Candidate List as currently published by ECHA: Not listed. **EU Authorizations:** Regulation (EC) No. 1907/2006, REACH Annex XIV Substances subject to authorization, as amended: Not listed. **EU Restrictions on use:** Regulation (EC) No. 1907/2006, REACH Annex XVII Substances subject to restriction on marketing and use as amended: Aluminum (CAS 7429-90-5) Directive 2004/37/EC: on the safety and health of pregnant workers and workers who have recently given birth or are

breastfeeding: Not listed. **Other EU Regulations** Directive 96/82/EC (Seveso II) on the control of major accident hazards involving dangerous substances: Not listed. Directive 94/33/EC on the protection of young people at work: Not listed. FSSF00058AG Inspired Energy's Page 13 of 15 August 2015 This Safety Data Sheet complies with the requirements of Regulation (EC) No. 1907/2006 and amended on 28 May 2015 by (EU) 2015/830.
Australia and New Zealand SUSMP: Not applicable **AICS:** All ingredients are on the AICS list. **HSNO Approval number:** Not applicable **HSNO Group Title:** Not applicable **NOHSC:10008 Risk Phrases:** R34 - Causes Burns. **NOHSC:1008 Safety Phrases:** S1 – Keep locked up. S2 – Keep out of reach of children. S23 – Do not breathe vapor. S24/25 – Avoid contact with skin and eyes. S26 – In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S27/28 – After contact with skin, take off immediately all contaminated clothing and wash immediately with plenty of water. S36/37/39 – Wear suitable protective clothing, gloves and eye/face protection. S56 – Dispose of this material and its container at hazardous waste or special waste collection point. S62 – If swallowed, DO NOT induce vomiting: seek medical advice immediately and show this container or label. S64 – If swallowed, rinse mouth with water (Only if the person is conscious).
EC Classification for the Substance/Preparation: These products are not classified as hazardous according to Regulation (EC) No. 1272/2008. Keep out of the reach of children.
Japanese Regulations Japanese Industrial Standards (JIS) JIS Z 7253:2012 Waste disposal and public cleaning law Law for Promotion of Effective Utilization of Resources
Taiwanese Regulations Regulation of Labelling and Hazard Communication of Dangerous and Harmful Materials: Labeling requirements and other relevant provision of chemicals, this product is not classified as dangerous goods. Toxic Chemicals Substance Control Law: Not Listed. CNS 1030016 Safety of primary and secondary lithium cells and batteries during transport.
Chinese Regulations General Rule for Classification and Hazard Communication of Chemicals (GB 13690-2009): Specifies the classification, labeling and hazard communication of chemicals in compliance with the GHS standard for chemical production sites and labeling of consumer goods. General Rule for Preparation of Precautionary Labels for Chemicals (GB 15258-2009): Specifies the relevant application methods of precautionary labels for chemicals. Safety Data Sheet for Chemical Products Content and Order of Sections (GB/T 16483-2008)

15.2 Chemical Safety Assessment: Not applicable.

SECTION XVI - OTHER INFORMATION

Preparation Date: March 24, 2016
Prepared by: Inspired Energy's Compliance Department
Revision: V1- Initial Release
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