U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration

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

FROM: Captain Anne K. Lynch, NOAA
Commanding Officer, NOAA Marine Operations Center-Atlantic

SUBJECT: Project Instruction for NF-16-02/03
Bluefin Tuna Ecology and Coral Reef Ecosystem Research

Attached is the final Project Instruction for NF-16-02/03 Bluefin Tuna Ecology and Coral Reef Ecosystem Research, which is scheduled aboard NOAA Ship *Nancy Foster* during the period of April 29 – June 28, 2016. Of the 50 DAS scheduled for this project, 25 days are funded by a Line Office Allocation and 25 DAS are Program Funded. 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.

Attachment

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FINAL PROJECT INSTRUCTIONS

Date Submitted: April 8, 2016

Platform: NOAA Ship *Nancy Foster*

Project Number(s): NF-16-02 and NF-16-03 (NF-16-02/03)

Project Title: Bluefin Tuna Ecology (BTE) and Coral Reef Ecosystem Research (CRER)

Project Dates: April 29, 2016 to June 28, 2016

Prepared by: _____ Dated: 4/8/16
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NOAA/NMFS/SEFSC/FORCES

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Approved by: _____ Dated: 4/25/2016
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I. Overview

A. Brief Summary and Project Period

National Oceanic and Atmospheric Administration (NOAA) scientists from the Southeast Fisheries Science Center (SEFSC) and the Atlantic Oceanographic and Meteorological Laboratory (AOML) in Miami, Florida will be collaborating on two joint projects this year aboard the NOAA Ship *Nancy Foster* (NF). This collaboration will serve to maximize data collection and minimize costs. These project instructions will serve as a guide for both missions. An overview of each project is given below.

FOCUS 1. Bluefin Tuna Ecology (BTE)

Background and Scientific Objectives

Atlantic bluefin tuna (ABT) is the highest-valued Atlantic tuna species on the market today. The species is an important export for American fishermen, with the majority of the product going to Japanese markets. The United States also imports ABT for consumption from a number of nations. Management of the ABT fishery in the Atlantic Ocean, Gulf of Mexico, and the Caribbean Sea is carried out in accordance with agreements by the International Commission for the Conservation of Atlantic Tunas (ICCAT) and the National Marine Fisheries Service (NMFS). In U.S. waters, ABT are subject to two regulations: the Magnuson-Stevens Fishery Conservation and Management Act and the Atlantic Tunas Convention Act. Given the highly migratory behavior of this species, its management is a complex, international concern. ABT are overfished throughout their range in the Atlantic Ocean, and current population levels are at an historic low. Plankton surveys targeting larval ABT have been completed by NMFS annually in the northern Gulf of Mexico since 1977 using a fixed-grid of stations. However, this current ichthyoplankton sampling strategy is limited to the U.S. Exclusive Economic Zone (EEZ). Previous sampling expeditions have found small numbers of ABT larvae along the Yucatan shelf, in the Loop Current just north of the Yucatan Channel, and in the Straits of Florida. To gain a better understanding of the importance of alternative spawning sites and to improve management of the western Atlantic stock, we propose to sample areas adjacent to confirmed spawning grounds and assess their potential contribution to the overall spawning activity.

NOAA and ICCAT scientists use the larval abundance data collected from the northern Gulf of Mexico surveys to calculate a larval index of spawning stock biomass. Variability in the current larval index is high: up to 100% of the mean and larger. It is likely that physical oceanographic factors contribute to this variance, but relationships between the distribution of ABT larvae and environmental conditions are currently not well known. In addition, little is known about ABT spawning outside the U.S. EEZ. Initial analyses of larval ABT abundances from 1977 to the present

indicate that while larvae are found across the Gulf of Mexico between late April and early June, it is not clear what effect, if any, mesoscale features have on these observed larval distributions. This uncertainty is partially an artifact of the design of the fixed-grid surveys, as the distance between sampled stations is large enough to preclude reliable correlations between ABT larvae and environmental gradients. Also the current index does not take into account multiple sources of larvae and the possibility of extended regional spawning.

ABT are known to spawn in areas outside the Gulf of Mexico, but the numbers of spawning individuals and the geographic extent of spawning is unknown. As these areas have not been included in the standard larval surveys, it is critical to define possible alternative spawning sites. Previous results suggest ABT spawning north of the Bahamas and north of Cozumel, Mexico. Additionally, preliminary results from collections taken in 2015 south of Cuba suggest there may be limited ABT spawning in this region as well. Results from the 2015 survey have provided evidence that larval transport via the Yucatan current, and persistent eddy translation south of Cuba may be important mechanisms for maintaining regional population connectivity. Our 2016 survey will extend the larval survey into the relatively unexplored regions of the western Caribbean to determine the extent of ABT spawning and use adaptive sampling methods to further develop a larval habitat model for this species. Additionally, it will increase our understanding of larval transport, the role of eddies in larval retention, trophic ecology, and other mechanisms by which larvae are either exported or retained.

During FOCUS 1 of our 2016 research survey aboard NF, we will continue our study of the distribution and abundance of ABT and other tuna larvae in the Gulf of Mexico and western Caribbean Sea. The 2016 survey will build upon the data collected from our 2015 expedition to Cuba and Mexico by applying adaptive sampling methods in both predicted larval ABT and other tuna habitats, as well as in areas that are key to understanding larval transport and retention across the region. The collected data will help to further develop a larval habitat model for ABT, reduce the variance in the calculation of the ABT larval index (which will improve regional stock assessments), and increase our knowledge of the role that ocean circulation features play in maintaining regional ABT stocks and the associated trophic ecology. Our collaborators in this research include scientists from the Instituto Español de Oceanografía (IEO) in Spain, El Colegio de la Frontera Sur (ECOSUR) and the Instituto Nacional de Pesca (INAPESCA) in Mexico.

In addition to pelagic tuna larvae, the 2016 survey will sample other ecologically and commercially important larval species found near regional coastal reefs. These species include snapper, grouper, parrotfish, and spiny lobster larvae, and they will be sampled concurrently during the search for ABT larvae. Understanding population connectivity across this portion of the Intra-Americas Sea (IAS) and the role that the major current

systems play in the dispersal/retention of these species is critical for developing adaptive management strategies for regional Marine Protected Areas (MPA). Our collection strategy will serve to help identify possible spawning locations, examine growth and survival of larvae, and increase our understanding of species recruitment to benthic habitat.

FOCUS 2. Coral Reef Ecosystem Research (CRER)

Background and Scientific Objectives

The United States Virgin Islands' (USVI) Grammanik Bank, located to the south of St. Thomas, is the site of a multi-species spawning aggregation for economically important fish including yellowfin grouper, Nassau grouper, tiger grouper, and dog snapper. Fishing pressure at this suspected source of larval recruits prompted the U.S. Caribbean Fishery Management Council (CFMC) in 2005 to close the bank yearly from February to April. A series of banks south of St. Thomas and St. John, around St. Croix, and south of the British Virgin Islands (BVI) provides similar habitats and spawning aggregation sites. Prior to the inception of this study, the biological and physical processes which drive production on these banks, and the circulation connecting these areas, had not been quantified. As the 2005 management decisions were made in the absence of these data, regional MPA designations and temporary closures are presently based on professional judgment rather than quantifiable, defensible scientific information. In addition, meeting new annual catch limit (ACL) requirements of the Magnuson-Stevens reauthorization has become a priority of the CFMC. However, data limitations preclude comprehensive stock assessments for most fisheries in the region.

To address these data gaps, NOAA scientists from SEFSC and AOML in Miami, Florida, working with scientists from the University of the Virgin Islands (UVI) and Department of Planning and Natural Resources (DPNR) in St. Thomas, are presently conducting a multi-year, interdisciplinary research project utilizing the NF to conduct biological and physical oceanographic surveys of the Virgin Islands (VI) bank ecosystems and surrounding regional waters. The long-term sustainability of fisheries in the VI and surrounding regions will depend on a comprehensive understanding of regional spawning aggregations, larval transport, and overall larval recruitment in the study area.

Data collected from this program will not only provide information on a data-poor region, but have the potential to address two additional specific needs. First, should economically important species of grouper, snapper, and parrotfish be delineated from individual island groups (e.g. Puerto Rico, St. Thomas/St. John, and St. Croix), from the U.S. Caribbean, or from the broader Caribbean region? This interdisciplinary effort will provide information on the interconnectivity of fish populations and assist

in this stock delineation. Secondly, indices of abundance have been identified as a critical component of the length-based assessment methods currently employed in the Caribbean. However, regional indices are lacking, or in some cases nonexistent. This research will serve to improve existing and generate new indices of abundance for the study area, including not only U.S. waters, but also the surrounding regions.

During FOCUS 2 of our 2016 research project aboard NF, we plan on sampling water properties, currents, and dispersal and transport of fish larvae in the VI and neighboring regions. Results from the survey can enhance our understanding of regional spatial variation in the supply of fish larvae between managed and non-managed areas, as well as insights into the relative importance of Grammanik Bank as a source of juvenile fishes recruiting to the waters of the VI.

The survey work associated with the two project components (areas of focus) outlined above will include shipboard neuston, mini-bongo, and Multiple Opening and Closing Net Environmental Sensing System (MOCNESS) trawl tows, as well as Conductivity-Temperature-Depth (CTD) casts measuring temperature, salinity, dissolved oxygen, chlorophyll, colored dissolved organic matter (CDOM), and water velocity. Continuous surface measurements of temperature, salinity, chlorophyll, CDOM, and water velocity will also be collected via the ship's flow-through system and hull-mounted acoustic Doppler current profiler (ADCP). Approximately 20 satellite-tracked, Lagrangian surface drifters will also be deployed to study the regional circulation. Bathymetric data will be collected from the ship's depth sounders. Satellite imagery of sea surface temperature, altimetry, and ocean color will be used to aid in the interpretation of shipboard and drifter observations and in the determination of sampling site locations (adaptive sampling). Additionally, nearshore sampling gear deployed from small boats, such as light-traps and channel nets, may be used to target late larval stages, particularly parrotfish, snapper, and grouper, as they recruit to benthic habitats.

Following the completion of FOCUS 2, a supplementary project, conducted by the United States Geological Survey (USGS), will recover two existing research moorings located in the U.S. Caribbean near Puerto Rico and St. Croix. The operations associated with this work are also included in these project instructions.

The following project instructions outline operations to be conducted aboard the NOAA Ship *Nancy Foster* (NF) between 29 April 2016 and 28 June 2016 (NF-16-02 and NF-16-03, collectively NF-16-02/03).

B. Days at Sea (DAS)

Of the 50 DAS scheduled for this project, 0 DAS are funded by an OMAO allocation, 25 DAS are funded by a Line Office Allocation, 25 DAS are Program Funded, and 0 DAS are Other Agency funded. This project is estimated to exhibit a Medium Operational Tempo.

PROJECT PERIOD

29 April 2016 through 28 June 2016 (NF-16-02/03)

29 April 2016	Depart from San Juan, Puerto Rico (begin NF-16-02 Leg I transit)
03 May 2016	Arrive at Miami, FL (end NF-16-02 Leg I)
07 May 2016	Depart from Miami, FL (begin NF-16-02 Leg II)
08 May 2016	Arrive at Havana, Cuba (pending clearance) (end NF-16-02 Leg II)
10 May 2016	Depart from Havana, Cuba (begin NF-16-02 Leg III)
19 May 2016	Arrive at Cozumel, Mexico (end NF-16-02 Leg III)
23 May 2016	Depart from Cozumel, Mexico (begin NF-16-02 Leg IV)
30 May 2016	Arrive at Cienfuegos, Cuba (pending clearance) (end NF-16-02 Leg IV)
01 June 2016	Depart from Cienfuegos, Cuba (begin NF-16-03 Leg I)
05 June 2016	Arrive at Charlotte Amalie, St. Thomas, USVI (end NF-16-03 Leg I)
08 June 2016	Depart from Charlotte Amalie, St. Thomas, USVI (begin NF-16-03 Leg II)

PROJECT PERIOD (Continued)

17 June 2016	Arrive at St. Croix, USVI (end NF-16-03 Leg II)
19 June 2016	Depart from St. Croix, USVI (begin NF-16-03 Leg III)
25 June 2016	Arrive at Miami, FL (end NF-16-03 Leg III)
26 June 2016	Depart from Miami, FL (begin NF-16-03 Leg IV transit)
28 June 2016	Arrive at Charleston, SC (end NF-16-03 Leg IV)

C. Operating Area

24-hour survey operations are scheduled to begin on Leg III of NF-16-02. Leg I is reserved as a transit from Puerto Rico to Miami, FL where personnel and equipment for NF-16-02/03 will be loaded. Leg II is a short transit from Miami, FL to Havana, Cuba; gear trials will be conducted during this leg (prior to the start of intensive sampling on Leg III). Participating Cuban scientists will embark from Havana.

The sampling effort during NF-16-02 will utilize an adaptive sampling plan. Sampling will take place along specific oceanographic features to define larval ABT habitat. The use of satellite imagery, as well as larval ABT habitat models, will be used to determine sampling locations where the probability of collecting species of interest is the highest. Furthermore, in situ observations provided by the ship's flow through and hull-mounted sensors will further designate physical features of interest (as current boundaries or eddy features). Once identified, intensive sampling across the feature will be performed.

The adaptive sampling procedures described above preclude knowing exact sampling locations (stations) more than a week or two before departure. Therefore, in lieu of providing a complete station list with the final project instructions, general sampling areas of interest will be highlighted. One week prior to the start of each leg, a tentative track line and station list will be provided to the bridge. The stations provided will be used as a guide and may change throughout the survey with station additions and omissions as determined by environmental conditions.

The primary operational area for NF-16-02 is shown in Figure 1. Once NF departs Havana on Leg III (NF-16-02), scientific sampling efforts will commence. The ship will work westward, following the northwestern coastline of Cuba (near the Peninsula de Guanahacabibes) towards the Yucatan Channel. Sampling will continue across the Yucatan Channel into Mexican jurisdictional waters. Leg III (NF-16-02) will conclude in San Miguel, Cozumel (Mexico).

Scientific sampling will continue on Leg IV (NF-16-02), following NF departure from San Miguel. During this leg, the ship will initially work in Mexican waters east of the Yucatan Peninsula, before moving eastward to the water south of Cuba. Leg IV (NF-16-02) will conclude in Cienfuegos, Cuba. Collaborating Cuban scientists will disembark at Cienfuegos. Figures 2 and 3 show tentative tracklines for Legs III and IV of NF-16-02 respectively.

Upon departure from Cienfuegos (Leg I of NF-16-03), NF will sail to Charlotte Amalie, St. Thomas. En route to St. Thomas, the vessel will conduct a personnel transfer of 7 to 8 persons (see section F) in Montego Bay, Jamaica. NF will depart Charlotte Amalie on Leg II of NF-16-03 and sample across the U.S. Caribbean before arriving in Frederiksted, St. Croix. A tentative survey for the region is shown in Figure 4. Some members of the science party will disembark via small boat at Charlotte Amalie. All remaining AOML and SEFSC scientists will disembark NF at Frederiksted following this leg. USGS scientists will meet the ship in Frederiksted and will sail with the vessel upon its departure. This leg (Leg III of NF-16-03) will begin with the recovery of two USGS moorings in the vicinity of Puerto Rico and St. Croix. Following the completion of these operations, the ship will transit to Miami. All NF-16-02/03 gear will be unloaded from the ship while it is in Miami. Following this port stop, NF will transit to Charleston, SC (Leg IV of NF-16-03) which will mark the conclusion of this year's project.

Figure 1. Overview of sampling and operational area for NF-16-02.

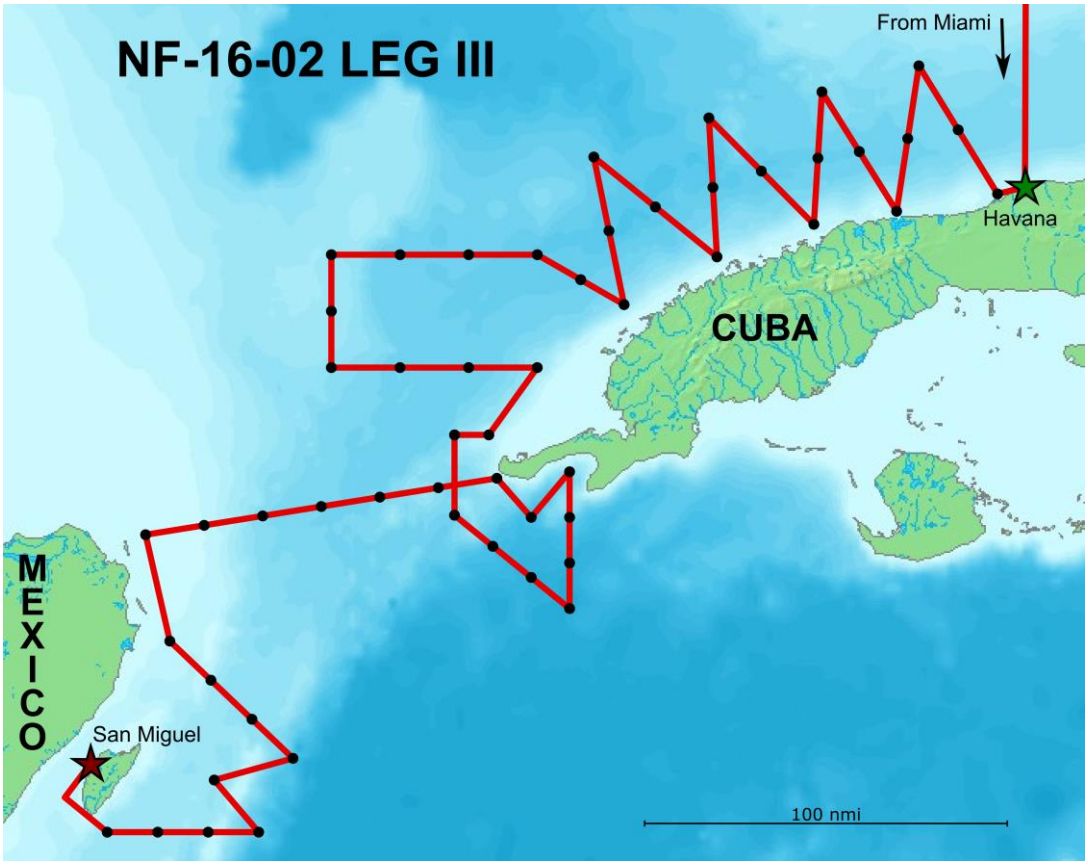

Figure 2. Tentative trackline (red line) and station locations (black dots) for Leg III of NF-16-02 are shown. Based on ocean conditions across the sampling area, these stations will likely change prior to the start of Leg III. Departure (green star) and arrival (red star) ports of call are also shown.

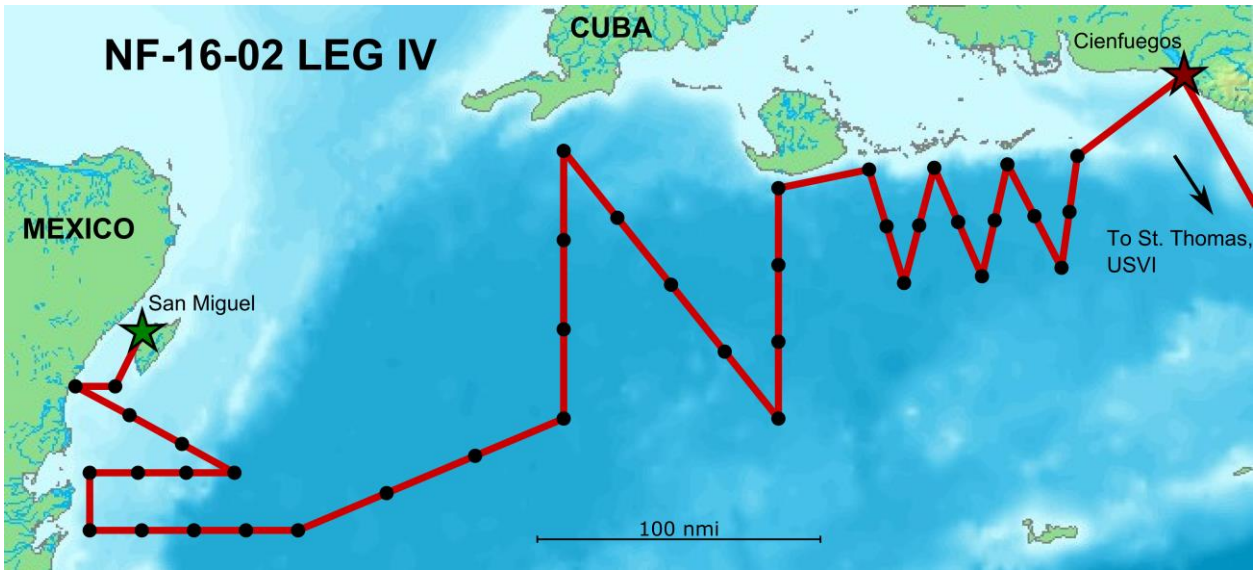

Figure 3. Tentative trackline (red line) and station locations (black dots) for Leg IV of NF-16-02 are shown above. Based on ocean conditions across the sampling area, these stations will likely change prior to the start of Leg IV. Departure (green star) and arrival (red star) ports of call are also shown.

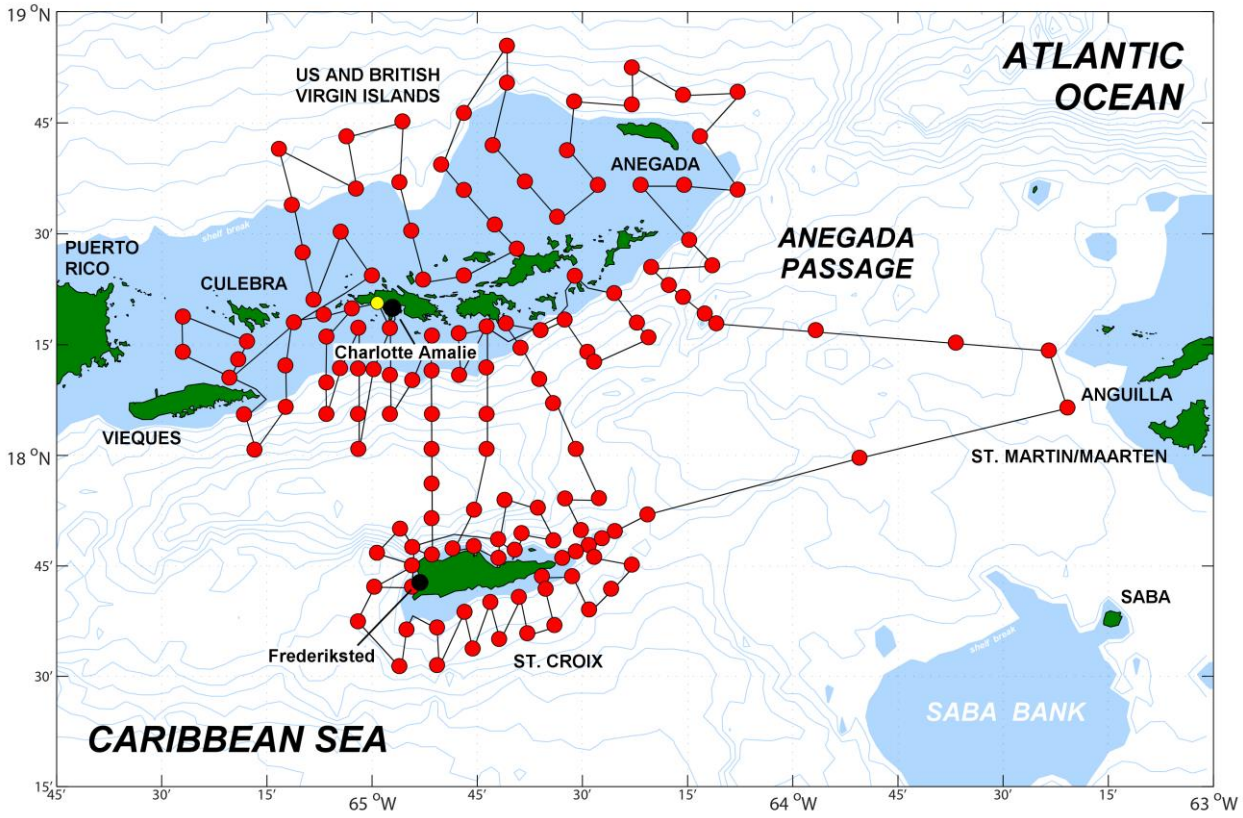

Figure 4. Tentative trackline (black line) and station locations (red dots) for Leg II of NF-16-03 are shown above. Based on ocean conditions across the sampling area, these stations will likely change prior to the start of Leg II. Departure (Charlotte Amalie) and arrival (Frederiksted) ports of call are shown as black dots. The location of potential small boat transfers in Brewers Bay, St. Thomas is also shown (yellow dot).

D. Summary of Objectives

1) Collect physical and biological data from 100% of all planned project $CTDO_2$/LADCP cast and net tow stations located throughout the survey area.

2) Collect a single merged (complete and continuous) sea surface flow-through data set (SST, SSS, chl_a, and CDOM) for the entire project period devoid of time, position, or data dropouts.

3) Collect a complete and continuous TRDI VMDas 150 kHz hull-mounted ADCP data set, interfaced with directional GPS heading input (POSMV), for the entire project period devoid of time, position, or data dropouts.

4) Deploy ~20 satellite-tracked Lagrangian surface drifting buoys and ~48 expendable bathythermograph (XBT) probes.

5) Collect a complete and continuous bathymetric time-series (ascii) from the ship's Knudsen depth sounder for the entire project period (with time, position, and quality flag) devoid of time, position, or data dropouts.

6) Conduct directed sampling targeting potential ABT (*Thunnus thynnus*) and other tuna species spawning areas in the Caribbean Sea including Cuban and Mexican waters.

7) Assess the occurrence, abundance, and geographical distribution of the early life stages of spring spawning fishes, especially ABT, in support of annual stock assessments through the use of sub-surface Neuston net (S10) tows.

8) Measure the vertical distribution of fish larvae by sampling at discrete depths in the water column at selected locations using a 1 m Multiple Opening and Closing Net Environmental Sensing System (MOCNESS).

9) Evaluate trophic pathways relative to the early life dynamic primarily of ABT larvae with the use of stable isotope analysis of samples collected using a mini-bongo net.

10) Collect recruitment-stage larvae using passive gear (light traps and channel nets) in near-shore locations along the shore of Cuba and US Caribbean for species distribution comparisons between offshore life stages.

11) Collect an acoustic time-series from the ship's Simrad EK60 at specific locations during the survey (as determined by environmental conditions). Provide a real-time display of recorded observations from the EK60 instrumentation when it is in use. The

ADCP may be switched off for short periods of time to improve the quality of the EK60 data (i.e. reduce interference).

12) Provide short-term access (~1 hour at a time) for 1-2 scientists to the ship's X Band radar during the survey (at the discretion of the Commanding Officer and OOD) to assist with locating and observing both internal wave forms and frontal structures. To properly view the features, temporary adjustments to the radar's settings will be made.

13) Completely recover all gear and scientific instrumentation associated with two USGS scientific moorings presently deployed in the U.S. Caribbean study area.

14) Conduct multi-beam survey operations in the vicinity of Guanahacabibes Peninsula and northern Cuba if time and conditions allows.

E. Participating Institutions

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F. Scientific Personnel

Name (Last, First)	Title	Date Aboard	Date Disembark	Gender	Affiliation	Nationality
Carrillo- Bibriezca, Laura	Oceanographer	6-May	20-May	F	ECOSUR	Mexico
Le Henaff, Matthieu	Oceanographer	6-May	20-May	M	UM-CIMAS	France
Rawson, Grant	Oceanographer	6-May	20-May	M	UM-CIMAS	USA
Tawa, Atsushi	Fisheries Expert	6-May	20-May	M	NRIFSF	Japan
Vasquez-Yeomans, Lourdes	Fisheries Expert	6-May	20-May	F	ECOSUR	Mexico
Laiz Carrion, Raul**	Fisheries Expert	6-May	2-Jun	M	IEO	EU/Spain
Lamkin, John**	Fisheries Expert	6-May	2-Jun	M	NOAA-SEFSC	USA
Malca, Estrella**	Chief Scientist	6-May	2-Jun	F	UM-CIMAS	USA
Mostowy, Jason**	Fisheries Expert	6-May	2-Jun	M	UM-CIMAS	USA
Rasmuson, Leif**	Postdoctoral Student	6-May	2-Jun	M	UM-CIMAS	USA
Shiroza, Akihiro**	Fisheries Expert	6-May	2-Jun	M	UM-CIMAS	Japan
Privoznik, Sarah	Watch Chief	6-May	18-Jun	F	UM-CIMAS	USA
Montes Pérez, Yoandry	Oceanographer	8-May	31-May	M	GEOCUBA	Cuba
Morales Fadragas, Ofelia	Visiting Scientist	8-May	31-May	F	MINAL	Cuba
Lindo, David***	Oceanographer	22-May	31-May	M	CUNY	EU/Spain
Oliver, Catalina Mena**	Visiting Scientist	22-May	2-Jun	F	IEO	EU/Spain
Johns, Libby	Oceanographer	22-May	6-Jun	F	NOAA-AOML	USA
Gerard, Trika*	Fisheries Expert	22-May	16-Jun	F	NOAA-SEFSC	USA
Smith, Ryan	Chief Scientist	22-May	18-Jun	M	NOAA-AOML	USA
Duke, Mara*	Student	7-Jun	16-Jun	F	UVI	USA
Habtes, Sennai*	Fisheries Expert	7-Jun	16-Jun	M	UVI	USA
Sabine, Alexis*	Fisheries Expert	7-Jun	16-Jun	F	DPNR-USVI	USA
Denson, LaTreese	PhD Student	7-Jun	18-Jun	F	UM-CIMAS	USA
Doering, Kathryn	Fisheries Expert	7-Jun	18-Jun	F	UM-CIMAS	USA
Ender, Alexandra	Fisheries Expert	7-Jun	18-Jun	F	UM-CIMAS	USA
Ferra Elias, Angela	Student	7-Jun	18-Jun	F	UPR	USA
Reynoso, Omar	Visiting Scientist	7-Jun	18-Jun	M	ANAMAR	Dom. Rep.
Saintilus, Nixon	Visiting Scientist	7-Jun	18-Jun	M	SEMANAH	Haiti
Wilson, Adrianne	Student Intern	7-Jun	18-Jun	F	FAMU	USA
Zygas, Aras	NOAA Corps	7-Jun	18-Jun	M	NOAA-SEFSC	USA
Otis, Dan	Oceanographer	7-Jun	25-Jun	M	USF	USA
Borden, Jonathan	USGS	18-Jun	25-Jun	M	USGS	USA
Brosnahan, Sandra	USGS	18-Jun	25-Jun	F	USGS	USA
DiCosmo, Nicholas	USGS	18-Jun	25-Jun	M	USGS	USA

* Personnel to be transferred via small boat in St. Thomas prior to the vessel's arrival in St. Croix
**Personnel to be transferred via small boat in Montego Bay
***Mr. Lindo may disembark in Cienfuegos, if not, he will continue to Montego Bay

G. Administrative

1. Points of Contact

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2. Diplomatic Clearances

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

pending Anguilla (UK)
pending Bahamas (UK)
pending British Virgin Islands including Anegada (UK)
pending Cayman Islands (UK)
granted Cuba
pending Dominican Republic
pending Haiti
pending Jamaica
pending Mexico
pending Turks and Caicos (UK)

3. Licenses and Permits

Not Applicable

II. Operations

A. Project Itinerary:

29 April 2016	Depart:	San Juan, Puerto Rico *begin NF-16-02*
03 May 2016	Arrive:	Miami, FL *staging*
07 May 2016	Depart:	Miami, FL (0900)
08 May 2016*	Arrive:	Havana, Cuba (0900)
10 May 2016	Depart:	Havana, Cuba (0900)
19 May 2016	Arrive:	Cozumel, Mexico (1600)
23 May 2016	Depart:	Cozumel, Mexico (1000)
30 May 2016*	Arrive:	Cienfuegos, Cuba (1600) *end NF-16-02*
01 June 2016	Depart:	Cienfuegos, Cuba (0900) *begin NF-16-03*
05 June 2016	Arrive:	Charlotte Amalie, St. Thomas, USVI (1600)
08 June 2016	Depart:	Charlotte Amalie, St. Thomas, USVI (0900)
17 June 2016**	Arrive:	St. Croix, USVI (1600)
19 June 2016	Depart:	St. Croix, USVI (0900)
25 June 2016	Arrive:	Miami, FL (0900) *destaging*
26 June 2016	Depart:	Miami, FL
28 June 2016	Arrive:	Charleston, SC *end NF-16-03*

* Port calls in Cuba are pending the approval of the Cuban government and the U.S. Department of State. In the event that docking in Havana is not possible, Cuban scientists will be transferred via small boat to NF on 08 May 2016 and sampling will begin after embarking the Cuban scientists. In the event that docking in Cienfuegos is not possible, Cuban scientists will be transferred via small boat to shore on or about 29 May 2016 (exact date and time to be determined). The Chief Scientists will work with the vessel's command to develop a contingency plan for ports of call/personnel transfers if docking in Cuba is not allowed by Cuba or the U.S. State Department.

** A personnel transfer via small boat will take place to disembark visiting scientists from St. Thomas. The transfer should take place prior to the vessel's arrival in St. Croix.

While underway, scientific operations will be conducted on a 24 hour basis. Scientific personnel will stand 12 hour watch schedules set by the Chief Scientists. Scientific shifts will run from 0000 to 1200 and from 1200 to 0000.

The Chief Scientists are authorized to alter the project instructions and station plan, following a consultation with the Commanding Officer, preferably routed through the Operations Officer or Watch Officer, as needed throughout the project, to focus scientific investigation and to maximize data collection. Additionally, the Chief Scientists and/or Watch Leaders may alter sampling protocol in order to optimize the scientific survey effort. A copy of all foreign clearance documents will be provided to the Commanding Officer at least one week prior to sailing.

Outreach events for students and personnel from collaborating institutions in the form of ship tours are planned for the Miami, Cozumel, and St. Thomas port stops. Details of the events will be coordinated with NF OPS as the survey approaches.

B. Staging and Destaging:

All required scientific gear for NF-16-02/03 will be loaded aboard NF in Miami, FL, between 04 and 06 May 2016, prior to the ship's departure on NF-16-02 Leg II.

For the duration of NF-16-02/03, a -80° C freezer (43.8" H x 28.5" W x 28.8" D, 432 lbs.) will be used for sample storage. The freezer draws 115 V at 16 A (Phase 1, 60Hz) and requires an NEMA 5-20P type outlet. It is requested that the freezer is stored in place of the stand-up freezer on the starboard side of the wetlab (keeping the combination refrigerator/freezer). Other options for storage in interior spaces can be considered if there is not sufficient space in the wetlab. One 180L dewar of liquid nitrogen will also be loaded.

All scientific gear will be unloaded from NF on 25 June 2016 in Miami, FL, following the ship's completion of NF-16-03 Leg III.

C. Operations to be Conducted:

1. Approximately 300 $CTDO_2$/LADCP profiles (up to full depth profiles).
2. Approximately 335 net tows:
   (100 mini-bongo, 140 Neuston/S10/S50, 95 MOCNESS).
3. Continuous hull-mounted ADCP survey.
4. Discrete and continuous (on transit legs) EK60 surveys.
5. Continuous flow-through TSG/chl_a/CDOM survey.
6. Continuous bathymetric survey.
7. Drifter deployments.
8. XBT deployments.
9. Passive sampling gear deployments/recoveries in near shore waters via small boat.
10. Multibeam surveys at targeted sites.
11. USGS mooring recoveries.

Station Operations

Prior to conducting any station operations, the NF will act in accordance with the ***Mitigation Measures for Protected Species*** formalized **"Move-On"** Rule:

If any marine mammals, sea turtles or other protected species are sighted around the vessel before setting the gear, the vessel may be moved away from the animals to a different section of the sampling area if the animals appear to be at risk of interaction with the gear at the discretion of the Chief Scientist and Scientific Watch Leader. In most cases, fishing gear is not deployed if marine mammals or sea turtles have been sighted near the ship unless those animals do not appear to be in danger of interactions with the gear, as determined by the judgment of the Chief Scientist and Scientific Watch Leader.

AOML and SEFSC will initiate a process for its Chief Scientists, Scientific Watch Leaders, and vessel officers to communicate with each other about their experiences with protected species interactions during research work with the goal of improving decision-making regarding avoidance of adverse interactions. As noted in the Status Quo Alternative description of mitigation measures, there are many situations where professional judgment is used to decide the best course of action for avoiding protected species interactions before and during the time research gear is in the water.

The intent of this mitigation measure would be to draw on the collective experience of people who have been making those decisions, provide a forum for the exchange of

information about what went right and what went wrong, and try to determine if there are any rules-of-thumb or key factors to consider that would help in future decisions regarding avoidance practices. AOML and SEFSC would coordinate not only among its staff but also with those from other fisheries science centers with similar experience.

Station operations will utilize the majority of the main deck. Any small boat stored on the main deck must not interfere with J-Frame or A-Frame operations ($CTDO_2$/LADCP casts, Neuston/S10, mini-bongo, or MOCNESS tows).

$CTDO_2$/LADCP Operations: $CTDO_2$ casts will include either the ship's or AOML's CTD frame, the ship's CTD instrument, AOML's Lowered ADCP instruments (on some casts), and the ship's Rosette sampler. Approximately 300 casts will be conducted. Many will be conducted to full water column depth. These casts will be performed using the ship's Markey winch (spooled with .322 conducting cable) in conjunction with the ship's J-Frame boom and a metered block.

Net / Trawl Operations: Operations will vary, utilizing either mini-bongo, Neuston/S10/S50, or 1-m MOCNESS rigs. Trawl type and location will depend on the work area and scientific results yielded during the course of the project. Approximately 335 tows will be conducted (~140 Neuston/S10, ~100 mini-bongos, ~95 MOCNESS). MOCNESS tows will be performed using the ship's DT Marine winch (spooled with .322 conducting cable), A-Frame boom, and a metered block. Mini-bongo and Neuston/S10 tows will be performed using the ship's "Little" DT winch and the J-Frame. This winch should be spooled with .322 conducting cable and terminated with an electrical connection compatible with an SBE 39 temperature/pressure recorder and a SBE 19 CTD. The associated block (non-metered) must have a shiv diameter large enough as to not damage the wire as it passes through the block under tension (this block should be mounted aft of the metered CTD block). The SBE 39 temperature/pressure recorder will be furnished by the science party (the ship's SBE 19 will serve as a backup for this instrument).

Underway Operations

The ship shall continuously collect position (GPS), hull-mounted ADCP, fisheries acoustic, meteorological, thermosalinograph (TSG), chl_a and UV/CDOM fluorometer, and bathymetric data while underway (UV/CDOM flow-through fluorometers will be provided by the science party). Directional GPS information from the ship's POSMV GPS should be properly interfaced with the ship's hull mounted ADCP, EK60 and SCS system. On transit legs (NF-16-02 Leg I and NF-16-03 Leg III), the ship's ADCP shall be run continuously. To augment the ship's existing TSG, a self-contained optical instrumentation suite may be added to the ship's flow-through system downstream of existing equipment. Short-term access to the ship's X-

band radar (at the discretion of the Commanding Officer) is requested for 1-2 scientists in 1 hour increments to assist with locating and observing both internal waves and frontal structures related to fisheries acoustic operations. Temporary adjustments to the radar's settings will be necessary to observe the structures. Radar use will be restricted to low-traffic, high-visibility conditions during the day (with the permission of the OOD). It is also requested that the data mentioned above be collected on all legs of both surveys including transits (e.g. Puerto Rico to Miami).

Drifting buoy and XBT deployments will be conducted periodically throughout the survey. Approximately 20 satellite-tracked Lagrangian surface drifters and 48 XBT probes will be deployed by hand at predetermined coordinates while the ship is underway.

Small Boat Operations

Near-shore sampling is planned for the southern portion of Cuba and in the U.S Caribbean. Operations will take place in shallow waters not navigable by NF, necessitating the use of a small boat. Temporary passive sampling gear will be installed at select locations. Sampling will consist of a maximum of two nights of light trap deployments. Each deployment will require two small boat operations: one operation for deployment of the traps just before sunset and another operation for recovery the following morning just after sunrise. The small boat for said operations should be able to accommodate 3-4 scientists and no more than 100-150 lbs. of equipment. In addition to near-shore sampling, small boats will be required as needed throughout the project to facilitate personnel transfers.

Multibeam Survey Operations

At the request of other projects concerned with MPAs/sanctuaries, multibeam survey operations in the vicinity of Guanahacabibes and Banco de San Antonio may be conducted if time allows. More specific information on areas of interest will be provided at a later date.

Dive Operations

No dive operations are planned for NF-16-02/03.

Mooring Operations

Two mooring recoveries are planned during Leg III of NF-16-03, prior to transiting back to Miami:

Two USGS Sediment Trap Moorings, originally deployed from NF in 2015, will be recovered. Both are at a depth of approximately 800 meters. Upon occupying station at the location of each mooring, the USGS team will deploy acoustic gear to establish communications with the mooring and determine its exact location. With strict communications with the bridge, the moorings will be released and recovered using protocols already put in place with the crew of the NF.

D. Dive Plan

Dives are not planned for this project.

E. Applicable Restrictions

None.

III. Equipment

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

ITEMS SHOWN IN RED ARE NF-16-02/03 MISSION CRITICAL!

The following NF communications devices should be on board, in working order, and available for use during NF-16-02/03:

1) INMARSAT-B
2) HF SSB/DSC transceiver
3) cellular telephone
4) Iridium Telephone
5) VHF Radios
6) handheld NOAA radios for ship-to-launch and deck communications

The following NF navigational devices should be on board, in working order, and available for use during NF-16-02/03:

1) 200 kHz and 50 kHz single beam transducer with Furuno FE-700 echo sounder
2) Transas ES2 and ECDIS, software Navi-Sailor 2400
3) Transas ES2 for transiting, operations, and video feed from lab
4) RADAR: S-band/X-band w/ ARPA
5) Dynamic Positioning Displays: forward and aft console
6) Furuno Universal AIS FA-100
7) gyrocompass: 2 Meridian Surveyors and 9 repeaters
8) NAVTEX
9) Young Wind Tracker

The following NF scientific gear should be on board, in working order, and available for use during NF-16-02/03:

1) 200 kHz single beam transducer with Knudsen echo sounder for shallow water surveying
2) 150 kHz Ocean Surveyor hull-mounted ADCP
3) 12 kHz transducer with Knudsen echo sounder for deep water surveying (~5000 m depth)
4) Kongsburg-Simrad EM 710 MultiBeam system
5) Applanix POS M/V
6) SBE 45 MicroTSG
7) SBE 21 TSG
8) SBE 19 CTD. Instrument should be calibrated prior to departure.
9) SBE 9/11+ CTD and deck unit system configured with a 12-bottle rosette sampler and 12 Niskin bottles. Data acquisition via SeaSave v7 or later version. All sensors should be calibrated prior to departure. SPARE CABLES; COND, TEMP, AND O2 SENSORS; AND SPARE PUMP MUST ALSO BE AVAILABLE FOR USE WITH THIS GEAR!
10) SCS with real-time file access
11) Headset or handheld communication devices (either VHF, NOAA, or telephone) for simultaneous communications between winch operator, dry lab, and bridge.

The following NF deck equipment should be on board, in working order, and available for use during NF-16-02/03:

1) A-Frame – for net tows off of the stern
2) J-Frame – for net tows and CTD casts off of the port side
3) Hydrographic Winch #1 (Markey) – spooled with ~5000 m of .322 conductor cable (wire rope) and configured for use with the ship's J-Frame (winch should be able to pay-out / haul-in cable at 60 meters per minute)
4) Hydrographic Winch #2 (DT Marine) – spooled with ~3000 m of .322 conductor cable (wire rope) and configured for use with the ship's A-Frame (winch should be able to pay-out / haul-in cable at 45 meters per minute)
5) Hydrographic Winch #3 ("HB" DT Marine) spooled with ~ 300 m of .322 conductor cable (wire rope) and configured for use with the ship's J-Frame (winch should be able to pay-out / haul-in cable at 30 meters per minute)
6) Two metered blocks (one spare) for use with the Markey and DT Marine winches
7) Two non-metered blocks (one spare) for use with tow operations
8) Air-tuggers, as needed
9) Deck cranes, as needed
10) Portable deck cleats as needed

11) Quick-release 55-gallon drum storage on 01 deck for up to two drums of ethanol (plus deck storage for additional drums) to be used in the preparation of scientific samples.

The following NF small boats should be on board, in working order, and available for use during NF-16-02/03:

1) At least one NF small boat should be aboard and available for use in survey operations and gear/personnel transfers during the course of the project.
2) ANY SMALL BOAT STORED ON THE MAIN DECK MUST NOT INTERFERE WITH A-FRAME OR J-FRAME OPERATIONS ($CTDO_2$/LADCP CASTS, NEUSTON/S10, MINI-BONGO, OR MOCNESS TOWS).

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

In addition to the suite of oceanographic and meteorological instruments on board the NF, the science party will load the following scientific gear on board:

1 fluorometer spares box (yellow pelican case)
1 chl_a sampling box (gray plastic, flip-top case)
1 SBE 9plus (CTD) storage case (black plastic, roll-on case)
1 SBE 11plus (deck unit) storage case (black plastic, roll-on case)
1 SBE 39 Temperature/Depth recorder
1 ADCP spares "ADCP1" storage case (black plastic, roll-on case)
1 electrical spares "ELECT SUPPLIES CASE" storage case (black plastic case)
1 CTD parts "SBE/INT PARTS 1" storage case (black plastic, roll-on case)
1 computer supplies "COMP TOOLS" storage case (black plastic, roll-on case)
1 USF water sampling supplies case (tan plastic, roll-on case)
1 tool bag (red/black canvas, roll-on tool bag/case)
1 CTD spare sensors case (gray plastic case)
4 .322 wire grips (for CTD and MOCNESS)
1 white CTD/LADCP frame configured with:
21 niskin bottles, 1 SBE carousel, 1 SBE 9plus, 2 RDI WH300 ADCPs,
1 LADCP external battery pack, 1 Kongsberg altimeter, 2 WetLabs fluorometers
1 shop rags box
1 computer monitor (cardboard box)
2 oxygen sampling supplies boxes (red, flip-top plastic boxes)
1 oxygen analysis computer (cardboard box)
1 oxygen sampling supplies box (clear, flip-top plastic box)
1 oxygen sampling supplies box (blue, flip-top plastic box)
1 oxygen reagents box (blue, flip-top plastic box) containing:
1 liter, sodium iodide **(HAZMAT)**
1 oxygen reagents box (cardboard box) containing:

	1 liter, manganese chloride **(HAZMAT)**
1	oxygen repipettes (gray Rubbermaid container)
6	oxygen sample bottle cases (green, flip-top plastic boxes)
8	CO2 sample bottle cases (gray, flip-top plastic boxes)
1	CO2 sampling supplies box (gray pelican case) containing:
	100 ml Mercuric Chloride **(HAZMAT)**
1	spare ADCP (gray plastic, roll-on case)
6	salinity sample bottle cases (blue plastic boxes w/ clear snap-top lids)
1	empty dewar (tan with black top)
2	DI water (plastic carboy)
1	amsteel rope (orange spool)
2	folding D-containers (black plastic)
2	office/lab supplies (black plastic, roll-on cases)
2	sterile water (clear plastic containers)
1	empty, vented manifold waste water carboy (clear plastic carboy)
1	microbiology supplies with manifold (blue/gray Rubbermaid container)
1	Cuba charts (white cardboard tube)
1	-80°C chest freezer (43.8" H x 28.5" W x 28.8" D, 432 lbs.). The freezer draws 115 V at 16 A (Phase 1, 60Hz) and requires an NEMA 5-20P type outlet. It is requested that the freezer is stored in place of the stand-up freezer on the starboard side of the wetlab (keeping the combination refrigerator/freezer). Other options for storage in interior spaces can be considered if there is not sufficient space in the wetlab.
1	180 L dewar filled with liquid nitrogen **(HAZMAT)**
4	20-50 liter liquid nitrogen dewars **(HAZMAT)**
20	Surface drifting buoys
4	boxes of XBT probes
1	XBT hand-launcher and XBT data acquisition computer
1	mini-bongo frame with nets
2	neuston frames
4	boxes/crates with three neuston and 9 MOCNESS nets
2	styrofoam shipping coolers
1	45 kg weight for Bongo frame w/ cable line already attached
5	Light Traps and anchors
7	buckets for sample collection
1	wooden table, w/ top and white sink
50	boxes of 12 units each of 16 oz. EMPTY glass jars w/ lids
15	boxes of 12 units each of 32 oz. EMPTY glass jars w/ lids
3	55 gallon drums of ethanol **(HAZMAT)**
3	Overpacks for 55 gallon ethanol drums (with spill response kit)
1	empty 55 gal. drum for disposal of waste ethanol
2	plastic 5 gal. EMPTY carboy
2	black plastic trunk with gear (3'x3'x5'), can be strapped on deck

5 Rubbermaid bins
1 1 m MOCNESS frame and associated electronics
2 FORCES microscopes
2 FORCES science computers
1 500 mL container 10% formalin **(HAZMAT)**
1 500 mL container RNAlater **(HAZMAT)**
3 4x4 White Fish Boxes (personal and mooring gear) (USGS)
3 4x4 Wire baskets (folded, for glass floats) (USGS)
2 Empty pallets (for packing Sediment Traps) (USGS)

All **HAZMAT** *items listed will be stored aboard the NF in accordance with NOAA ship regulations and safe handling procedures outlined in each HAZMAT MSDS.*

IV. Hazardous Materials

A. Policy and Compliance

The Chief Scientists are responsible for complying with FEC 07 Hazardous Materials and Hazardous Waste Management Requirements for Visiting Scientific Parties (or the OMAO procedure that supersedes it). By Federal regulations and NOAA Marine and Aviation Operations policy, the ship may not sail without a complete inventory of all hazardous materials by name and quantity, MSDS, appropriate spill cleanup materials (neutralizing agents, buffers, or absorbents) in amounts adequate to address spills of a size equal to the amount of chemical brought aboard, and chemical safety and spill response procedures. Documentation regarding those requirements will be provided by the Chief of Operations, Marine Operations Center, upon request.

Per OMAO procedure, the scientific party will include with their project instructions and provide to the CO of the respective ship 30 days before departure:

- List of chemicals by name with anticipated quantity
- List of spill response materials, including neutralizing agents, buffers, and absorbents
- Chemical safety and spill response procedures, such as excerpts of the program's Chemical Hygiene Plan or SOPs relevant for shipboard laboratories
- For bulk quantities of chemicals in excess of 50 gallons total or in containers larger than 10 gallons each, notify ship's Operations Officer regarding quantity, packaging and chemical to verify safe stowage is available as soon as chemical quantities are known.

Upon embarkation and prior to loading hazardous materials aboard the vessel, the scientific party will provide to the CO or their designee:

- An inventory list showing actual amount of hazardous material brought aboard
- An MSDS for each material
- Confirmation that neutralizing agents and spill equipment were brought aboard sufficient to contain and cleanup all of the hazardous material brought aboard by the program
- Confirmation that chemical safety and spill response procedures were brought aboard

Upon departure from the ship, scientific parties will provide the CO or their designee an inventory showing that all chemicals were removed from the vessel. The CO's

designee will maintain a log to track scientific party hazardous materials. MSDS will be made available to the ship's complement, in compliance with Hazard Communication Laws.

Scientific parties are expected to manage and respond to spills of scientific hazardous materials. Overboard discharge of hazardous materials is not permitted aboard NOAA ships.

B. Inventory

See attached Appendix A.

C. Chemical safety and spill response procedures

See attached Appendix A.

D. Radioactive Materials

No Radioactive Isotopes are planned for this project.

V. Additional Projects

A. Supplementary ("Piggyback") Projects

In situ optical profiles, TSG and CTD chl_a, CTD CDOM, and all associated samples will be utilized to improve algorithms and ground-truth remotely-sensed (satellite) ocean color data.

B. NOAA Fleet Ancillary Projects

Any additional work will be subordinate to the primary project and will be accomplished only with the concurrence of the Commanding Officer and the Chief Scientists.

The following projects will be conducted by ship's personnel in accordance with the general instructions contained in the MOC Directives, and conducted on a not-to-interfere basis with the primary project:

1) SEAS Data Collection and Transmission
2) Marine Mammal Reporting
3) Bathymetric Trackline
4) Weather Forecast Monitoring

5) Sea Turtle Observations
6) Automated Sounding Aerological Program

VI. Disposition of Data and Reports

A. Data Classifications

The Chief Scientists and Co-Principal Investigators will be responsible for the disposition, feedback on data quality, and archiving of data collected on board the ship for the primary project. They will also be responsible for the dissemination of copies of these data to participants of the survey and to any other requesters based on the timelines outlined in the project's original DOS research clearance request. The ship may assist in copying data and reports insofar as facilities allow.

The Chief Scientists will receive all original data gathered by the ship for the primary project, and this data transfer will be documented on NOAA Form 61-29 "Letter Transmitting Data". The Chief Scientists in turn will furnish the ship a complete inventory listing all data gathered by the scientific party detailing types and quantities of data.

The Commanding Officer is responsible for all data collected for ancillary projects until those data have been transferred to the project's Principal Investigators or their designees. Data transfers will be documented on NOAA Form 61-29. Copies of ancillary project data will be provided to the Chief Scientists when requested.

Either the ship's Survey Technician (ST) or Electronics Technician (ET) will translate the data from the SCS to an ASCII format and provide the data to the science party as required throughout the course of the project.

B. Responsibilities

Reserved

VII. Meetings, Vessel Familiarization, and Project Evaluations.

A. Pre-Project Meeting

The Chief Scientists 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 Scientists in arranging this meeting.

B. Vessel Familiarization Meeting

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

C. Post-Project Meeting

The Commanding Officer is responsible for conducted a meeting no earlier than 24 hrs before or 7 days after the completion of a project to discuss the overall success and shortcomings of the project. Concerns regarding safety, efficiency, and suggestions for future improvements shall be discussed and mitigations for future projects will be documented for future use. This meeting shall be attended by the ship's Commanding Officer, the Chief Scientists, and the Operations Officer.

D. Project Evaluation Report

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

VIII. Miscellaneous

A. Meals and Berthing

The ship will provide meals for the scientists listed above. Meals will be served 3 times daily beginning one hour before scheduled departure, extending throughout the project, and ending two hours after the termination of the project. Since the watch schedule is split between day and night, the night watch may often miss daytime meals and will require adequate food and beverages (for example a variety of sandwich

items, cheeses, fruit, milk, juices) during what are not typically meal hours. Special dietary requirements for scientific participants will be made available to the ship's command at least seven days prior to the project.

Berthing requirements, including number and gender of the scientific party, will be provided to the ship by the Chief Scientists. The Chief Scientists 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 Scientists are 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 Scientists are 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 Scientists will ensure that all non-NOAA or non-Federal scientists aboard also have proper orders. It is the responsibility of the Chief Scientists 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 Scientists or the NOAA website:

http://www.corporateservices.noaa.gov/noaaforms/eforms/nf57-10-01.pdf.
All NHSQs submitted after March 1, 2014 must be accompanied by NOAA Form (NF) 57-10-02 - Tuberculosis Screening Document in compliance with OMAO Policy 1008 (Tuberculosis Protection Program).

The completed forms should be sent to the Regional Director of Health Services at the applicable Marine Operations Center. The NHSQ and Tuberculosis Screening Document should reach the Health Services Office no later than 4 weeks prior to the

start of the project to allow time for the participant to obtain and submit additional information should health services require it, before clearance to sail can be granted. Please contact MOC Health Services with any questions regarding eligibility or completion of either form. Ensure to fully complete each form and indicate the ship or ships the participant will be sailing on. The participant will receive an email notice when medically cleared to sail if a legible email address is provided on the NHSQ.

The participant can mail, fax, or email the forms to the contact information below. Participants should take precautions to protect their Personally Identifiable Information (PII) and medical information and ensure all correspondence adheres to DOC guidance:
(http://ocio.os.doc.gov/ITPolicyandPrograms/IT_Privacy/PROD01_008240).
The only secure email process approved by NOAA is Accellion Secure File Transfer which requires the sender to setup an account. Accellion's Web Users Guide is a valuable aid in using this service, however to reduce cost the DOC contract doesn't provide for automatically issuing full functioning accounts. To receive access to a "Send Tab", after your Accellion account has been established send an email from the associated email account to accellionAlerts@doc.gov requesting access to the "Send Tab" function. They will notify you via email usually within 1 business day of your approval. The 'Send Tab" function will be accessible for 30 days.

Contact information:

Regional Director of Health Services
Marine Operations Center – Atlantic
439 W. York Street
Norfolk, VA 23510
Telephone: 757.441.6320
Fax: 757.441.3760
E-mail: MOA.Health.Services@noaa.gov

Prior to departure, the Chief Scientists must provide a listing of emergency contacts to the Executive Officer for all members of the scientific party, with the following information: 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 Scientists to ensure members of the scientific party report aboard with the proper attire.

D. Communications

A progress report on operations prepared by the Chief Scientists may be relayed to the program office. Sometimes it is necessary for the Chief Scientists to communicate with another vessel, aircraft, or shore facility. Through various means of communications, the ship can usually accommodate the Chief Scientists. 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.

OTHER MEANS OF CONTACT:

NANCY FOSTER (WTER)

IN PORT

Home Port (Charleston, SC):
843-529-0731, 0855 (Voice)
843-991-6326 (Fax, *note: call first*)
Cellular (*note: primary home port means of contact*):

843-991-6326 (Ship)
843-697-0584 (CO)
843-697-0901 (OOD)

NANCY FOSTER (WTER)

AT SEA

Inmarsat B:

011-870-336-991-210 (Voice)

011-870-336-991-212 (Data)
011-870-336-991-213 (Telex)
011-870-391-031-069 (HSD)

Iridium:

011-8816-7632-5653
808-434-5653 (*note: from land, dial this number*)

VoIP:

541-867-8915

Program contacts:

ryan.smith@noaa.gov	305-361-4328
estrella.malca@noaa.gov	305-361-4295
john.lamkin@noaa.gov	305-361-4226
libby.johns@noaa.gov	305-361-4360
aras.j.zygas@noaa.gov	305-361-4573
justin.kibbey@noaa.gov	305-361-4421

E. IT Security

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

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

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

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

F. Foreign National Guests Access to OMAO Facilities and Platforms

All foreign national access to the vessel shall be in accordance with NAO 207-12 and RADM De Bow's March 16, 2006 memo (http://deemedexports.noaa.gov). National

Marine Fisheries Service personnel will use the Foreign National Registration System (FNRS) to submit requests for access to NOAA facilities and ships. The Departmental Sponsor/NOAA (DSN) is responsible for obtaining clearances and export licenses and for providing escorts required by the NAO. DSNs should consult with their designated Line Office Deemed Export point of contact to assist with the process.

Foreign National access must be sought not only for access to the ship involved in the project but also for any Federal Facility access (NOAA Marine Operations Centers, NOAA port offices, USCG Bases) that foreign nationals might have to traverse to gain access to and from the ship. The following are basic requirements.

Full compliance with NAO 207-12 is required.

Responsibilities of the Chief Scientists:

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

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

Responsibilities of the Commanding Officer:

1. Ensure only those foreign nationals with DOC/OSY clearance are granted access.
2. Deny access to OMAO platforms and facilities by foreign nationals from countries controlled for anti-terrorism (AT) reasons and individuals from Iran without written approval from the Director of the Office of Marine and Aviation Operations and compliance with export and sanction regulations.

3. Ensure foreign national access is permitted only if unlicensed deemed export is not likely to occur.
4. Ensure receipt from the Chief Scientists or the DSN of the FNRS or Servicing Security Office email granting approval for the foreign national guest's visit.
5. Ensure Foreign Port Officials, e.g., Pilots, immigration officials, receive escorted access in accordance with maritime custom to facilitate the vessel's visit to foreign ports.
6. Export Control - 8 weeks in advance of the project, provide the Chief Scientists with a current inventory of OMAO controlled technology onboard the vessel and a copy of the vessel Technology Access Control Plan (TACP). Also notify the Chief Scientists of any OMAO-sponsored foreign nationals that will be onboard while program equipment is aboard so that the Chief Scientist can take steps to prevent unlicensed export of Program controlled technology. The Commanding Officer and the Chief Scientists will work together to implement any access controls necessary to ensure no unlicensed export occurs of any controlled technology onboard regardless of ownership.
7. Ensure all OMAO personnel onboard receive the briefing on Espionage Indicators (NAO 207-12 Appendix A) at least annually or as required by the Servicing Security Office.

Responsibilities of the Foreign National Sponsor:

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

IX. Appendices

APPENDIX A. HAZARDOUS MATERIALS

List of Hazardous Materials

Common Name of Material	Quantity	Notes	Trained Individual(s)	Spill Control
Manganese Chloride	1 Liter, (600 g/L)	Solution	Ryan Smith, Grant Rawson	MC
Alkaline Sodium Iodide	1 Liter, (320g Sodium Hydroxide + 600 g Sodium Iodide)	Solution	Ryan Smith, Grant Rawson	S
Ethyl Alcohol	165 gal (3 drums)	Solution	Estrella Malca, Sarah Privoznik	E
Mercuric Chloride	100 mL	Solution	Ryan Smith, Grant Rawson	M
Liquid Nitrogen	180 L	Liquid gas	Estrella Malca, Sarah Privoznik	L
10% Formalin	500 mL	Solution	Estrella Malca, Sarah Privoznik	F
RNA later™	500 mL	Solution	Estrella Malca, Sarah Privoznik	R

Chemical Safety and Spill Response Procedures

E: ETHYL ALCOHOL

- Do not inhale vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapors accumulating to form explosive concentrations. Vapors can accumulate in low areas.
- Stop leak / contain spill if possible and safe to do so. Prevent product from entering drains.
- Highly flammable liquid. Eliminate all sources of ignition. All equipment used when handling this product must be grounded.
- A vapor suppressing foam may be used to reduce vapors. Do not touch or walk through spilled material.
- Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations.

- Use clean non-sparking tools to collect absorbed material.

F: FORMALIN

- Ventilate area of spill.
- Eliminate all sources of ignition.
- Remove all non-essential personnel from area.
- Clean-up personnel should wear proper protective equipment and clothing.
- Absorb material with suitable absorbent and containerize for disposal.

L: LIQUID NITROGEN

- Use personal protection (full face shield, safety glasses, loose fitting thermal insulated or leather gloves, safety shoes, long sleeve shirts and trousers without cuffs).
- Evacuate all personnel from the affected area.
- Ventilate area or remove containers to a well ventilated location.
- To increase rate of vaporization, spray large amounts of water onto the spill from an upwind position.

M: MERCURIC CHLORIDE

- Use proper personal protective equipment.
- Absorb spills with absorbent (vermiculite, sand, fuller's earth) and place in suitable containers labeled for later disposal.
- Keep out of sewers and drains.

MC: MANGANESE CHLORIDE

- Use personal protective equipment.
- Avoid breathing vapors, mist or gas.
- Ensure adequate ventilation.
- Prevent further leakage or spillage if safe to do so.
- Do not let product enter drains.
- Discharge into the environment must be avoided.
- Soak up with inert absorbent material and dispose of as hazardous waste.
- Keep in suitable, closed containers for disposal.

S: ALKALINE SODIUM IODIDE

- Use personal protective equipment.
- Avoid breathing vapors, mist or gas. Ensure adequate ventilation.
- Do not let product enter drains.
- Soak up with inert absorbent material and dispose of as hazardous waste.

- Keep in suitable, closed containers for disposal.

R: RNAlater™

- Use personal protective equipment. Avoid contact with eyes, skin, and clothing.
- Avoid breathing vapors, mist or gas. Ensure adequate ventilation.
- Do not let product enter drains.
- Soak up with inert absorbent material and dispose of as hazardous waste.
- Keep in suitable, closed containers for disposal.

Inventory of Spill Kit supplies

Product Name	**Amount**	**Chemicals it is useful against**	**Amount it can clean up**
Pro Sorb Granular Absorbent	70 lb	F, E, M, S, MC, R	95 gal.
Spilltech HazMat Sorbents	144 ft roll	F, E, M, S, MC, R	60 gal.

APPENDIX B. PROJECT WAYPOINTS AND STATION LOCATIONS

Prior to each leg of NF-16-02/03, a preliminary list of waypoints for the next leg (outlining a planned track and station locations) will be provided to the ship. Though the general work area will remain the same, tracklines and station locations/activities may change based on environmental conditions and our adaptive sampling methodology.