U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Pacific Islands Fisheries Science Center
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Final Project Instructions

Date Submitted: April 12, 2015

Platform: NOAA Ship *Oscar Elton Sette*

Project Number: SE-15-04 (PIFSC)

Project Title: Hawaii Island and Line Islands Insular Bottomfish & Reef Fish Bio-Sampling

Project Dates: July 20, 2015 to August 12, 2015

Prepared by: _____ Dated: 4/12/2015
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Approved by: _____ Dated: JUN 15 2015
Michael P. Seki, Ph.D., Director
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Approved by: _____ Dated: 16 June 2015
Commander Matthew J. Wingate, NOAA
Commanding Officer
Marine Operations Center – Pacific Islands

I. Overview

A. Brief Summary and Project Period

This project period will start on July 20, 2015 and end August 12, 2015. The NOAA Ship *Oscar Elton Sette* will be engaged as support for a Fisheries Research and Monitoring Division (FRMD) Pacific Islands Fisheries Science Center (PIFSC), National Marine Fisheries Service (NMFS) fisheries research program. The primary objectives of the project are as follows: 1) collection of pelagic stage (larvae and juveniles) eteline snappers using a midwater COBB trawl towed at 175m, 100m and 25m depths over deep water offshore, 2) collect deep-slope bottomfish, 3) documentation of shark depredation/interaction with deep-slope bottomfish, 4) collection of coral reef fish for range wide analysis, 5) deploy juvenile bottomfish settlement traps.

B. Days at Sea (DAS)

Of the 24 DAS scheduled for this project, 24 DAS are funded by an OMAO allocation, 0 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 High Operational Tempo.

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

The Operating area for SE-15-04 is as follows:

The initial operations of the project will be conducted off the west side of Hawaii Island along the Kohala (between Upolu Point and Keahole Point) and Kona (between Kailua-Kona and Kealakekua Bay) coastlines and will include in-shore, deepslope, and offshore activities. Operation on and after 29 JUL 2015 will be around the Pacific Remote Island Area (PRIA) of the Line Islands, specifically Kingman Reef and Palmyra Atoll (see attached maps). Operations will also be conducted during the return leg from Kingman Reef to Ford Island.

D. Summary of Objectives

The scientific objectives of this project are to support deep-slope bottomfish bio-sampling of early pelagic and adult demersal stages, documentation of shark interactions and range wide sampling of select coral reef fishes:

1. Conduct nighttime midwater Cobb trawl haul in waters ~25 nmi offshore each night during the entire stay off Kona Coast. Trawl operations will target successive depth zones of 175 m, 100 m, and 25 m trawling for 1h at each of these depth zones during each trawl operation. During the Line Island leg, 1 trawl/night Cobb trawl operations will be conducted. During the return leg from Line Islands to Ford Island, two nighttime trawl hauls will be performed each night. Pelagic phase larvae and juveniles of the Deep-7 bottomfish species will be targeted; collected specimens will provide information on distribution, transport, pelagic duration, and connectivity studies.

2. Conduct daylight bottomfish sampling survey in the 50-400 m depth zone around the west side of Hawaii Island and the perimeter of the Line Islands (PRIAs) to collect adult specimens of bottomfish species. Bottomfish specimens will be processed to extract and preserve otoliths, gonads, and tissue samples for future life history studies Sampling will take place from both the Sette and a NOAA small boat.

3. Document shark depredation or other interactions that occur during the conduct of bottomfish bio-sampling operations. Efforts will include video photography using GoPro cameras attached to poles that can be quickly submerged alongside the vessel to document observed shark interaction. A GoPro camera in a pressure case will also be attached to the fishing mainline to document shark interactions at fishing depths. Efforts will be made to collect biopsy tissue samples of any sharks near the surface for DNA based species identification.

4. Conduct daylight spearfish sampling of coral reef species (eg. Chlorurus spilurus) from NOAA small boat in the shallow water along the Kona Coast and fringing reef of the Line Islands.

5. Juvenile bottomfish traps will target 50-100m of water along the Kona Coast, ranging from Keahole Point to Kawaihae and any favorable location surrounding the Line Islands.

6. The ship will collect oceanographic data from routine conductivity, temperature, depth (CTD) casts, continuous acoustic doppler current profiler (ADCP), and thermosalinograph (TSG) measurements while Hawaii Island, the Line Islands and during the return leg from Line Islands to Ford Island. CTD casts will be conducted once each night at the location immediately prior to the start of the first midwater Cobb trawl of the evening. The CTD cast measurements will also include fluorometer measurements and laboratory determination of nutrients, chlorophyll and accessory pigment determinations from water samples collected from sample bottles mounted on the CTD rosette. These data will be used to assess the influence of the physical dynamics on the biological productivity in the region.

7. Drifting nightlight dip-netting operations off the port side longline pit will be conducted when weather and current conditions are calm on a time available basis. When permissible, these operations will be conducted after the 1st Cobb trawl operation of the night has been completed.

8. Conduct 0-25m depth tows of the 6-ft. Isaacs-Kidd (IK) trawl hauls from the mid-port side J-frame targeting larval stages of pelagic and insular fishes.

9. The ship will provide support for any needed transportation of items and supplies to Palmyra Atoll for the Fish & Wildlife Service.

E. Participating Institutions

The participating Institutions during the cruise will include graduate students from Hawaii Pacific University (Kaneohe, Hawaii) and the University of Hawaii Manoa.

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

Name (Last, First)	Title	Date Aboard	Date Disembark	Gender	Affiliation	Nationality
Ryan Nichols	Chief Scientist	7/20/2015	8/12/2015	M	NOAA-PIFSC	USA
Meagan Luers	Fisheries Bio-Sampling Associate	7/20/2015	8/12/2015	F	University of Hawaii-JIMAR	USA
Joseph O'Malley	Fisheries Biologist	7/20/2015	8/12/2015	M	NOAA-PIFSC	USA
Robert Humphreys	Fisheries Biologist	7/20/2015	7/25/2015	M	NOAA-PIFSC	USA
Louise Giuseffi	Biological Technician	7/20/2015	8/12/2015	F	NOAA-PIFSC	USA
James Barlow	Biological Technician	7/20/2015	8/12/2015	M	NOAA-PIFSC	USA
Brett Taylor	Fisheries Biologist	7/20/2015	8/12/2015	M	University of Hawaii-JIMAR	USA
Eddie Ebisui III		7/20/2015	8/12/2015	M	Fisherman	USA
Dan Curran	Fisheries Biologist	7/20/2015	8/12/2015	M	NOAA-PIFSC	USA
Julianna Burdette	Graduate Student	7/20/2015	8/12/2015	F	Hawaii Pacific University	USA
Keena Guererro	Graduate Student	7/20/2015	8/12/2015	F	Hawaii Pacific University	USA
Zack Oyafuso	Graduate student	7/20/2015	7/25/2015	M	University of Hawaii	USA
Stefan Kropidlowski	Refuge Manager	7-25-2015	7/29/2019	M	FWS-NWR	USA

G. Administrative

1. Points of Contacts:

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2. Diplomatic Clearances - NA

3. Licenses and Permits

The Chief Scientist will oversee the submission of required permit applications with federal agencies prior to the start of the cruise. Special Activity Permit No. 2015-xx issued by Department of Land and Natural Resources, Division of Aquatic Resources to Dr. Donald R. Kobayashi. A copy will be made available to the Commanding Officer of NOAA Ship *Oscar Elton Sette* prior to cruise departure.

NEPA: This project meets the requirements of NOAA Administrative Order (NAO) Series 2166 Environmental Review Procedures, Sections 5.05 and 6.03c.3(a) for Categorical Exclusions (CE) for Research Programs.

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. This itinerary is based on a ship transit speed of 9.0 knots that may be altered by inclement weather or seas. All times in parentheses are estimates and subject to change.

A. Project Itinerary:

20 July	Embark scientific party, commence SE-15-04. Anticipated morning departure from Ford Island then transit to Kona Coast of Hawaii Island.
21 July	Arrive off of Kona Coast and commence project objectives. Daily operation areas will be chosen based on prevailing weather conditions, and may determine times in which operations proceed. Daily operations may include fathometer survey for potential bottom fishing grounds prior to the deployment of small boats, followed by a small boats safety meeting. Deploy two small boats for daytime bottomfishing and insular reef collection operations. After deployment of small boats, Sette will conduct juvenile settlement trap deployment/retrieval or gurdy fishing for bottomfish. Pending weather or unforeseen events, all small boats should return to *Sette* in the afternoon. Once small boat operations are secure, *Sette* shall transit to 25-nm offshore location to conduct a 1000-meter depth CTD cast (preference is to deploy CTD at 1730); Once CTD is secure, Cobb trawl operations shall begin at the 25-nm offshore location (preference is to commence at 1830). COBB trawl deployment will target 175m, 100m and 25m for 1-hour at each depth. On calm, slack current nights, drifting night-light operations and 0-25 m depth 6-Ft. Isaacs-Kidd (IK) trawl hauls from the mid-port side J-frame, and/or bottom handline operations from the ship may be conducted. Based on fishing and weather conditions, the Chief Scientist may conduct night bottomfishing operations or drifting night-light in lieu of CTD and COBB trawl operations.
22-25 July	Continue daily operations as outlined above, to include fathometer survey for potential bottom fishing grounds prior to the deployment of small boats followed by a small boats safety meeting. Deploy two small boats for daytime bottomfishing, and insular reef collection operations. After deployment of small boats, Sette will conduct juvenile settlement trap deployment/retrieval or gurdy fishing for bottomfish. Pending weather or unforeseen events, all small boats should return to *Sette* in the

	afternoon. Once small boat operations are secure, *Sette* shall transit to 25-nm offshore location to conduct a 1000-meter depth CTD cast (preference is to deploy CTD at 1730); Once CTD is secure, Cobb trawl operations shall begin at the 25-nm offshore location (preference is to commence at 1830). COBB trawl deployment will target 175m, 100m and 25m for 1-hour at each depth. On calm, slack current nights, drifting night-light operations, 0-25m depth 6-ft. Isaacs-Kidd (IK) trawl hauls from the mid-port side J-frame and/or bottom handline operations from the ship may be conducted. Based on fishing and weather conditions, the Chief Scientist may conduct night bottomfishing operations or drifting night-light in lieu of CTD and COBB trawl operations.
25 July	Complete COBB trawl and disembark Robert Humphreys and Zack Oyafuso, embark Refuge Manager Stefan Kropidlowski (targeting 0800). Begin transit to South Point fishing location if weather is favorable for bottomfishing; commence bottom fishing operations. Secure Kona coast scientific operations in the evening and transit to Palmyra Atoll.
26-29 July	Transit to Palmyra Atoll – Line Islands.
29 July	Arrival at Palmyra Atoll and commence Line Islands project objectives. Daily operation areas will be chosen based on prevailing weather conditions, and may determine times in which operations proceed. Daily operations may include fathometer survey for potential bottom fishing grounds prior to the deployment of small boats, followed by a small boats safety meeting. Deploy two small boats for daytime bottomfishing, and insular reef collection operations, one small boat will also transfer and disembark Refuge Manager Stefan Kropidlowski to Palmyra. After deployment of small boats, Sette will conduct juvenile settlement trap deployment/retrieval or gurdy fishing for bottomfish. Pending weather or unforeseen events, all small boats should return to Sette in the afternoon. Once small boat operations are secure, Sette shall transit to 25-nm offshore location to conduct a 1000-meter depth CTD cast (preference is to deploy CTD at 1730); Once CTD is secure, Cobb trawl operations shall begin at the 25-nm offshore location (preference is to commence at 1830). COBB trawl deployment will target 175m, 100m and 25m for 1-hour at each depth. On calm, slack current nights, drifting night-light operations, 0-25m depth 6-ft. Isaacs-Kidd (IK) trawl hauls from the mid-port side J-frame and/or bottom handline operations from the ship may be conducted. Based on fishing and weather conditions, the Chief Scientist may conduct night bottomfishing operations or drifting night-light in lieu of CTD and COBB trawl operations.
30 July	Continue daily operations as outlined above, to include fathometer survey for potential bottom fishing grounds prior to the deployment of small boats, followed by a small boats safety meeting. Deploy two small

	boats for daytime bottomfishing, and insular reef collection operations. After deployment of small boats, Sette will conduct juvenile settlement trap deployment/retrieval or gurdy fishing for bottomfish. Pending weather or unforeseen events, all small boats should return to Sette in the afternoon. On calm, slack current nights, drifting night-light operations and/or bottom handline operations from the ship may be conducted.
31 July	Daily operations will include fathometer survey for potential bottom fishing grounds prior to the deployment of small boats, followed by a small boats safety meeting. Deploy two small boats for daytime bottomfishing, and insular reef collection operations. After deployment of small boats, Sette will conduct juvenile settlement trap deployment/retrieval or gurdy fishing for bottomfish. Pending weather or unforeseen events, all small boats should return to Sette in the afternoon. Once small boat operations are secure, *Sette* shall transit to 25-nm offshore location to conduct a 1000-meter depth CTD cast (preference is to deploy CTD at 1730); Once CTD is secure, Cobb trawl operations shall begin at the 25-nm offshore location (preference is to commence at 1830). COBB trawl deployment will target 175m, 100m and 25m for 1-hour at each depth. On calm, slack current nights, drifting night-light operations, 0-25m depth 6-ft. Isaacs-Kidd (IK) trawl hauls from the mid-port side J-frame and/or bottom handline operations from the ship may be conducted. Based on fishing and weather conditions, the Chief Scientist may conduct night bottomfishing operations and drifting night-light in lieu of CTD and COBB trawl operations.
1 August	Continue daily operations as outlined above, to include fathometer survey for potential bottom fishing grounds prior to the deployment of small boats, followed by a small boats safety meeting. Deploy two small boats for daytime bottomfishing, and insular reef collection operations. After deployment of small boats, Sette will conduct juvenile settlement trap deployment/retrieval or gurdy fishing for bottomfish. Pending weather or unforeseen events, all small boats should return to Sette in the afternoon. Secure from operations in the evening, depart for Kingman Reef.
2 August	Arrive at Kingman Reef. Daily operations will include fathometer survey for potential bottom fishing grounds prior to the deployment of small boats, followed by a small boats safety meeting. Deploy two small boats for daytime bottomfishing, and insular reef collection operations. After deployment of small boats, Sette will conduct juvenile settlement trap deployment/retrieval or gurdy fishing for bottomfish. Pending weather or unforeseen events, all small boats should return to Sette in the afternoon. Once small boat operations are secure, Sette shall transit to 25-nm offshore location to conduct a 1000-meter depth CTD cast (preference is to deploy CTD at 1730); Once CTD is secure, Cobb trawl

operations shall begin at the 25-nm offshore location (preference is to commence at 1830). COBB trawl deployment will target 175m, 100m and 25m for 1-hour at each depth. On calm, slack current nights, drifting night-light operations, 0-25m depth 6-ft. Isaacs-Kidd (IK) trawl hauls from the mid-port side J-frame and/or bottom handline operations from the ship may be conducted. Based on fishing and weather conditions, the Chief Scientist may conduct night bottomfishing operations or drifting night-light in lieu of CTD and COBB trawl operations.

3 August — Continue daily operations as outlined above, to include fathometer survey for potential bottom fishing grounds prior to the deployment of small boats, followed by a small boats safety meeting. Deploy two small boats for daytime bottomfishing, and insular reef collection operations. After deployment of small boats, Sette will conduct juvenile settlement trap deployment/retrieval or gurdy fishing for bottomfish. Pending weather or unforeseen events, all small boats should return to Sette in the afternoon. On calm, slack current nights, drifting night-light operations and/or bottom handline operations from the ship may be conducted.

4 August — Daily operations will include fathometer survey for potential bottom fishing grounds prior to the deployment of small boats, followed by a small boats safety meeting. Deploy two small boats for daytime bottomfishing, and insular reef collection operations. After deployment of small boats, Sette will conduct juvenile settlement trap deployment/retrieval or gurdy fishing for bottomfish. Pending weather or unforeseen events, all small boats should return to Sette in the afternoon. Once small boat operations are secure, Sette shall transit to 25-nm offshore location to conduct a 1000-meter depth CTD cast (preference is to deploy CTD at 1730); Once CTD is secure, Cobb trawl operations shall begin at the 25-nm offshore location (preference is to commence at 1830). COBB trawl deployment will target 175m, 100m and 25m for 1-hour at each depth. On calm, slack current nights, drifting night-light operations, 0-25m depth 6-ft. Isaacs-Kidd (IK) trawl hauls from the mid-port side J-frame and/or bottom handline operations from the ship may be conducted. Based on fishing and weather conditions, the Chief Scientist may conduct night bottomfishing operations or drifting night-light in lieu of CTD and COBB trawl operations.

5 August — Continue daily operations as outlined above, to include fathometer survey for potential bottom fishing grounds prior to the deployment of small boats, followed by a small boats safety meeting. Deploy two small boats for daytime bottomfishing, and insular reef collection operations. After deployment of small boats, Sette will conduct juvenile settlement trap deployment/retrieval or gurdy fishing for bottomfish. Pending

	weather or unforeseen events, all small boats should return to Sette in the afternoon. On calm, slack current nights, drifting night-light operations, 0-25m depth 6-ft. Isaacs-Kidd (IK) trawl hauls from the mid-port side J-frame and/or bottom handline operations from the ship may be conducted. Conclude Line Islands operations and depart for Ford Island
6 August	No daytime operations. Afternoon (targeted 1730) Open ocean site; conduct a 1000-meter depth CTD cast; Once CTD is secure, Cobb trawl operations shall begin. COBB trawl deployment will target 175m, 100m and 25m for 1-hour at each depth.
7 August	Conduct 2nd Cobb trawl at same site as previous 1st Cobb trawl (targeted 0000) No other daytime operations, resume transit to Ford Island.
8 August	No daytime operations. Afternoon (targeted 1730): Open ocean site; conduct a 1000-meter depth CTD cast; Once CTD is secure, Cobb trawl operations shall begin. COBB trawl deployment will target 175m, 100m and 25m for 1-hour at each depth.
9 August	Conduct 2nd Cobb trawl at same site as previous 1st Cobb trawl (targeted 0000) No other daytime operations, resume transit to Ford Island.
10 August	No daytime operations. Afternoon (targeted 1730): Open ocean site; conduct a 1000-meter depth CTD cast; Once CTD is secure, Cobb trawl operations shall begin. COBB trawl deployment will target 175m, 100m and 25m for 1-hour at each depth.
11 August	Conduct 2nd Cobb trawl at same site as previous 1st Cobb trawl (targeted 0000): No other daytime operations, resume transit to Ford Island.
12 August	Arrive at Ford Island; end of project, disembark scientific party.

B. Staging and Destaging:

1. Staging

Prior to sailing from Ford Island on 20 July 2015, the ship's crew will inspect the port- and starboard- side J-frames, install pot-hauler and block for the Isaacs-Kidd trawl on the port J-frame, and inspect associated oceanographic winches, install right angle baffle for port side A/C water outflow, conducting cable and DESH5 winch for CTD operations, the trawl net reel and stern trawl winches, the Netmind net mensuration system, the RD Instruments ADCP and associated computer and software, the thermosalinograph, the flowthrough Turner 10AU fluorometer, the Simrad EK60 echosounder, the Scientific Computing System (SCS), the Global Positioning System (GPS) navigational systems, and the Wet Lab scientific walk-in freezer to ensure that they are in proper working order. The SeaBird 9/11+CTD system and frame, and the SEACAT portable CTD will be installed and inspected

ensuring that they are fully operational. Electrical continuity of the J-frame conducting cable, the winch's slip ring assembly, and connections to the electronic laboratory will be confirmed by the Chief Electronics Technician before sailing. The scientific safeboat and Achilles will be operational and ready to be deployed prior to sailing. The ship should also plan to provide a Survey Technician to participate in CTD & Cobb trawl operations or as needed to augment research duties.

The ship's stern hip-tanks will not be installed on this cruise due to Cobb trawl operations. Instead, six 55 gal barrels of fuel for use by the two NOAA small boats (SE4, SE6 and/or the ships Achilles inflatable) during bottomfishing operations will be stored onboard the Sette for the duration of the cruise. The location of these fuel barrels and the safety jettison racks to which these will be mounted remains to be determined in consultation with the ship's CO and OPS officer. The SE-6 coxswain will be provided by PIFSC.

Prior to departing Ford Island on 20 July 2015, scientists and crew will load the PIFSC SE6 SafeBoat and six 55 gal barrels of fuel for the operation of the two small boats during the cruise.

If removed from previous cruises, three days prior to departing Pearl Harbor on 20 July 2015, the ship's crew will load the Cobb midwater trawl onto the trawl net reel.

Dates and equipment/personnel needed for loading of scientific equipment will be provided to the ship no later than 30 days prior to sailing.

2. Destaging

Dates and equipment/personnel needed for offloading scientific equipment will be provided to the ship no later than 30 days prior to sailing.

C. Operations to be Conducted:

The Chief Scientist has planned the progress of these operations in lieu of any delays due to weather, operational or equipment problems. It should be noted here that the anticipated time for each daily operation may be altered based on weather or operational delays.

The Chief Scientist has the authority to revise or alter the technical portion of the instructions as work progresses, provided that, after consultation with the Commanding Officer, it is ascertained that the proposed changes will not (1) jeopardize the safety of personnel or the ship, (2) exceed the overall time allotted for the project, (3) result in undue additional expenses, and (4) alter the general intent of the project instructions. In addition, the Chief Scientist must notify the Office of the Director of the Pacific Islands Fisheries Science Center at the earliest opportunity prior to making: (1) deviations from the general project track or area of operations noted in the project instructions, (2)

significant changes or additions of research operations to those specified in the project instructions, or (3) port calls not specifically identified in the project instructions.

1. Station Operations
   It is requested that the Survey Technician be available during evenings for the CTD casts and operation of the netminders during midwater Cobb trawl operations.

   a.) Conduct bathymetric bottomfish survey of the 50-400m depth zone from *Sette* to determine target fishing sites for small boat operations.

   Following the survey and safety briefing, conduct deep-slope bottomfish handline bio-sampling from SE-6 SafeBoat and possibly the *Sette* to obtain specimens of eteline snappers and epinepheline groupers for genetic and life history studies. Efforts will be made to document any depredation or other interactions with sharks during these operations using GoPro cameras.

   b.) Conduct shallow water speargun sampling of coral reef fish (*Chlorurus spilurus*) for genetic and life history studies using OMAO SE-4 or SE-2.

   c.) Conduct juvenile fish trapping for specimen collection, traps will be deployed from the stern and retrieved using the pot hauler installed on the J-frame in the longline pit.

   d.) Conduct one CTD cast as the first operation prior to the evening midwater Cobb trawl preferred start at 1730. The CTD will be equipped with both a WetLab profiling and Seapoint flow through fluorometer (for comparison between flowthrough and non-flow through sensors), redundant dissolved oxygen sensors, and a 12 Niskin water bottle carousel rosette sampler. Water samples will be collected for nutrients, chlorophyll a, and chloropigments. All chloropigment samples including discrete chlorophyll a samples will be filtered at sea. Chlorophyll a samples will be analyzed at sea postfiltration while chloropigments and nutrient samples will be stored in the ship's walk-in scientific freezer. CTD casts will go down to a maximum depth of 1000 meters. Current velocity data will be continuously recorded with the shipboard ADCP while surface temperature, salinity, and chlorophyll a will be recorded via the hull mounted thermosalinograph and flow through fluorometer instrumentation throughout the duration of the project.

e.) Conduct nighttime Cobb trawl after the completion of the CTD cast each evening. Cobb trawl tows will target pelagic stage larval and juvenile eteline snappers species. During the Kona Coast leg, one Cobb trawl will be conducted ideally beginning at 1830 and ending at 2230. During the return transit leg, two Cobb trawl hauls will be conducted nightly; the first ideally starting at 1830, regardless of location, and end at 2230. The second Cobb trawl will start at the same position beginning ideally at 0130 and ending at 0530. At each trawl operational site, trawls will be conducted at approximately 3.0 knots SOG. Each Cobb trawl operation will target three depth strata of 170-175 m (500m wire out), 100-125 m (330m wire out) and 20-25 m (100m wire out) with a tow time of 60 minutes at each depth interval following net equilibration. During each Cobb trawl haul, net depth will be monitored using the Northstar Electronics Netmind mensuration system. Additionally, two time depth recorder (TDR) units will be attached to the net mouth; one on the headrope and the other on the footrope.

f.) When weather permits, conduct drifting night-light operations from the long line pit. A drifting nightlight station will be conducted (weather and time permitting) in between the two nightly Cobb trawls or after each trawl haul on the return leg.

g.) Conduct 0-25m depth tows of the 6-ft. Isaacs-Kidd (IK) trawl hauls from the mid-port side J-frame targeting larval stages of pelagic and insular fishes.

Ship Personnel Requirements: Ships personnel will be required to assist with launch and recovery of the small boats. A ship coxswain and crew member will be required if the scientific party's coxswain is unavailable."

2. Underway Operations

Current velocity will be continuously monitored with an ADCP, while surface temperature, salinity, and chlorophyll-a will be monitored with a hull-mounted thermosalinograph and flow through fluorometer throughout the duration of the project.

3. Mitigation measures for Protected Species during Scientific Operations

3.1. Monitoring methods

Chief Scientist (CS) (or other designated member of the Scientific Party), and small boat crew will visually scan for marine mammals, sea turtles, and other ESA-listed species (protected species) during all fishing and over-the-side operations. The member of the crew designated to stand watch for marine mammals is dedicated to that function and visually scans the waters surrounding the vessel prior to the planned start of putting bottomfishing lines, CTD, Cobb trawl, or night-light into the water.

3.2. Operational procedures

"Move-On" Rule. If any marine mammals or sea turtles are sighted anywhere around the vessel in the 30 minutes before setting any 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 officer on watch in consultation with the CS. Small moves within the sampling area can be accomplished without leaving the sample station. After moving on, if marine mammals or sea turtles are still visible from the vessel and appear to be at risk, the officer on watch may decide, in consultation with the CS, to move again or to skip the station. The officer on watch will first consult with the CS or other designated scientist and other experienced crew as necessary to determine the best strategy to avoid potential takes of these species based on those encountered, their numbers and behavior, position and vector relative to the vessel, and other factors. For instance, a whale transiting through the area and heading away from the vessel might not require any move or only require a short move from the initial sampling site while a pod of dolphins gathered around the vessel may require a longer move from the initial sampling site or possibly cancellation of the station if they follow the vessel. In most cases, trawl gear is not deployed if marine mammals have been sighted from the ship in the previous 30 minutes unless those animals do not appear to be in danger of interactions with the trawl, as determined by the judgment of the CS and officer on watch. The efficacy of the "move-on" rule is limited during nighttime or other periods of limited visibility; although operational lighting from the vessel illuminates the water in the immediate vicinity of the vessel during gear setting and retrieval.

D. Dive Plan

Dives are not planned for this project. Free-diving (snorkel) spear-fish sampling activities will be conducted during this project.

E. Applicable Restrictions

1. "Take" of Protected Species

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

b. In the event of an incidental take of a marine mammal or federally listed threatened or endangered species during the cruise, the Chief Scientist will report the incident to the PIFSC Director and Deputy Director IMMEDIATELY via IRIDIUM, INMARSAT, and email. Samples should not be collected from any incidentally taken marine mammals, sea

turtles, or seabirds. Photos of the incidentally caught animal should be taken to properly identify the species, but the process of taking the photos must not contribute to the further injury of the animal. These photos are for the purposes of internal NMFS verification only, and must not be shared outside of PIFSC or the Office of Protected Resources (i.e., do not post the photos on the internet).

c. As described at II. C. 3. (above), PIFSC has developed mitigation measures for our fisheries and ecosystem research cruises to avoid take and comply with the Lecky, Murawski, and Merrick guidance. A copy of these documents is also available at https://sites.google.com/a/noaa.gov/pifsc-science-operations/home/nepa-permits/protected- species-mitigation-measures and on the ship's bridge.

2. Poor weather conditions.
Small boat operations will be dictated by weather. Operations will take place on the windward (east) side of the island during periods of light winds and on the leeward (west) side of the island during periods of trade winds.

III. Equipment

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

· CTD system and heavy duty cage assembly

· 12 complete Niskin bottles, with at least enough spare parts to replace 4 bottles

· Port J-frame and pot hauler block for fish trap recovery

· Starboard J-frame and block for CTD

· Stern trawl winches

· Oceanographic winches and cables (port and starboard)

· SEACAT portable CTD with backup

· Deck cranes with 600lb static lift block

· Thermosalinograph

· RD Instruments ADCP and associated computer and software

· EK60 and ES60 echosounder system at the frequencies of 38 kHz, 70 kHz, 120 kHz, and 200 kHz

· GPS navigational system

· Depth sounders and recorders

· Scientific freezer, kept between -30° and -20°C at all times

· Two-way radios for communication from the electronics lab to the winch operator

· Operational Scientific Computing System (SCS)

· Navigational equipment and course plotter

· Supplies necessary for at least two re-terminations of the J-frame conducting cable

· Adequate fresh water for gear wash down

· Iridium phone

· A minimum of 2 terabyte shared network space

· Sette hydraulic handline fishing gurdies (3) for bottomfish sampling along the port side

· SE-4 and/or SE-2 and coxswain

1,000-watt night-light with rheostat

Fuel racks for 55-gal containers

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

· Weight scales and measuring calipers
· Water filtration equipment (vacuum pump, filtering ring, filters, forceps, etc.)
· WetLabs profiling and SeaPoint flow-through fluorometers
· Redundant dissolved oxygen sensors
· Sample collection jars
· Turner 10-AU Fluorometer
· Two laboratory dissecting microscopes
· Laboratory glassware (e.g., Erlenmeyer flasks, graduated cylinders)
· External hard drives (at least 1-2 TB) for data common storage and backup capabilities.
· PIFSC SafeBoat with spare parts and cradle
· Electric handline gurdies for SafeBoats
· Hooks, line, weights, and other fishing supplies for SafeBoat handline bottomfishing
· Frozen squid and fish bait
· Fuel (12-55 gal barrels) for small boats
· IK trawl paravane, nets, and bridles
· Knives and other tools for processing and measuring fish
· Fish tags

Chest freezer (stored on stern deck)

IV. Hazardous Materials

A. Policy and Compliance

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

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

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

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

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

Upon departure from the ship, scientific parties will provide the CO or their designee an inventory showing that all chemicals were removed from the vessel. The CO's designee will maintain a log to track scientific party hazardous materials. MSDS will be made available to the ship's complement, in compliance with Hazard Communication Laws.

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

B. Inventory

Common Name of Material	**Qty**	**Notes**	**Trained Individual**	**Spill control**

Formaldehyde solution (3.7%)	5-gal	Stored in Wet Lab Chem locker	Meagan Luers	F
Ethanol (95%)	20-gal	Stored in Wet lab Chem locker	Meagan Luers	AL

C. Chemical safety and spill response procedures

AL: Alcohols (daily use quantities)

- Extinguish smoking lamp. Remove all sources of ignition.
- Wear appropriate PPE and clothing during clean-up.
- Ventilate closed spaces before entering them.
- Use absorbent socks to surround spills or to divert fluid flow.
- Use vermiculite or kitty litter to soak up and absorb fluid.
- Do not use combustible materials, such as saw dust.
- Use absorbent pads/diapers to wipe up the spill or a dust pan to sweep up vermiculite/kitty litter.
- Place used absorbents in plastic bag or pail.
- Clean surface thoroughly to remove residual contamination.
- Bags containing used absorbents will be properly disposed of once the ship returns to port.

F: Formalin/Formaldehyde/Ethanol

- Ventilate area of leak or spill. Remove all sources of ignition.
- Wear appropriate personal protective equipment.
- Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible.
- Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container.
- Do not use combustible materials, such as saw dust.
  Inventory of Spill Kit Supplies

Product Name	**Amount**	**Chemicals useful against**	**Amount of clean up possible**
Absorbent pads	20	AL, F	~5 gal
Dust pan	1 set	AL	n/a
Goggles	2 pair	AL, F	n/a

Kitty litter	5.4 kg	AL	~2 gal
Plastic bags	5	AL, F	~4 L (each)
Rubber gloves	4 pairs	AL, F	n/a

D. Radioactive Materials

No Radioactive Isotopes are planned for this project.

V. Additional Projects

A. Supplementary ("Piggyback") Projects

The PIFSC bird, aquatic marine mammal and fish school sighting logs, per Chief Scientist instructions. No take is associated with any of the above operations

B. NOAA Fleet Ancillary Projects

Ancillary tasks will be accomplished in accordance with the NOAA Fleet Standing Ancillary instructions as long as they do not interfere with primary mission objectives.

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.

The bridge will keep track of all scientific operations (each fish operation boat launch and retrieval, IK tow, Cobb trawl, CTD cast, trap sets, and drifting nightlight). Each of these station operations will be assigned a unique station number using a sequential number sequence starting with Station #1 for the first scientific operation. Each station will have a start and end position, date, time, and depth over water. The Bridge will use the SCS system to event mark the start and end time of each station operation. For small boat fish sampling operations, the same station number will be used for both launch and recovery. The Survey Tech and scientists will collect the more detailed primary data associated with each of the station operations.

Data Disposition: The Chief Scientist shall be considered to be the representative of the NMFS PIFSC Science Director for purposes of data disposition. A single copy of all data gathered by the vessel will be

delivered to the Chief Scientist upon request who will be responsible for checking in a complete copy of this data to the PIFSC Scientific Information Services (SIS) Data Services group.

VII. Meetings, Vessel Familiarization, and Project Evaluations

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

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

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

D. Project Evaluation Report: Within seven days of the completion of the project, a Customer Satisfaction Survey is to be completed by the Chief Scientist. The form is available at http://www.omao.noaa.gov/fleeteval.html and provides a "Submit" button at the end.

The Customer Satisfaction Survey is one of the primary methods OMAO and Marine Operations (MO) utilize to improve ship customer service. Information submitted through the form is automatically input into a spreadsheet accessible to OMAO and MO management for use in preparing quarterly briefings. Marine Operations Centers (MOC) address concerns and praise with the applicable ship. Following the quarterly briefings the data are briefed to the Deputy Director of OMAO.

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.

The Chief Scientist requests that lunches be provided for small boat crews. Two boats of 2-3 personnel in each boat.

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

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

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

B. Medical Forms and Emergency Contacts

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

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

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

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

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

Contact information:

Regional Director of Health Services
Marine Operations Center – Pacific
2002 SE Marine Science Dr.
Newport, OR 97365
Telephone 541-867-8822
Fax 541-867-8856
Email MOP.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 e-mail 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 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.

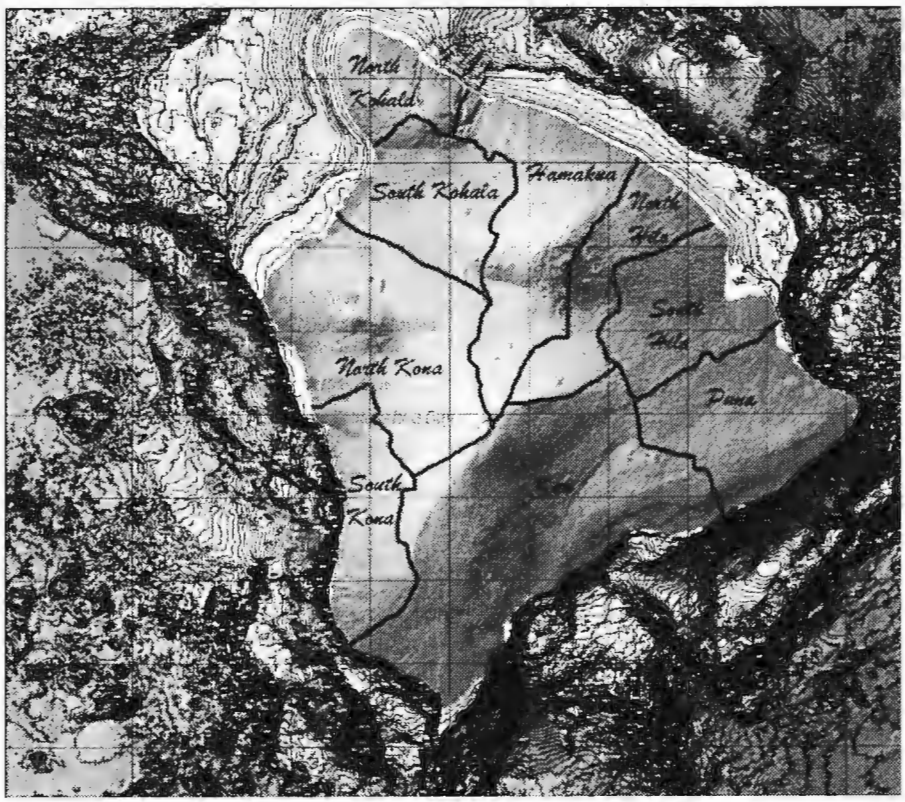
Non-NOAA personnel using the ship's computers or connecting their own computers to the ship's network must complete NOAA's IT Security Awareness Course within 3 days of embarking.

F. Foreign National Guests Access to OMAO Facilities and Platforms

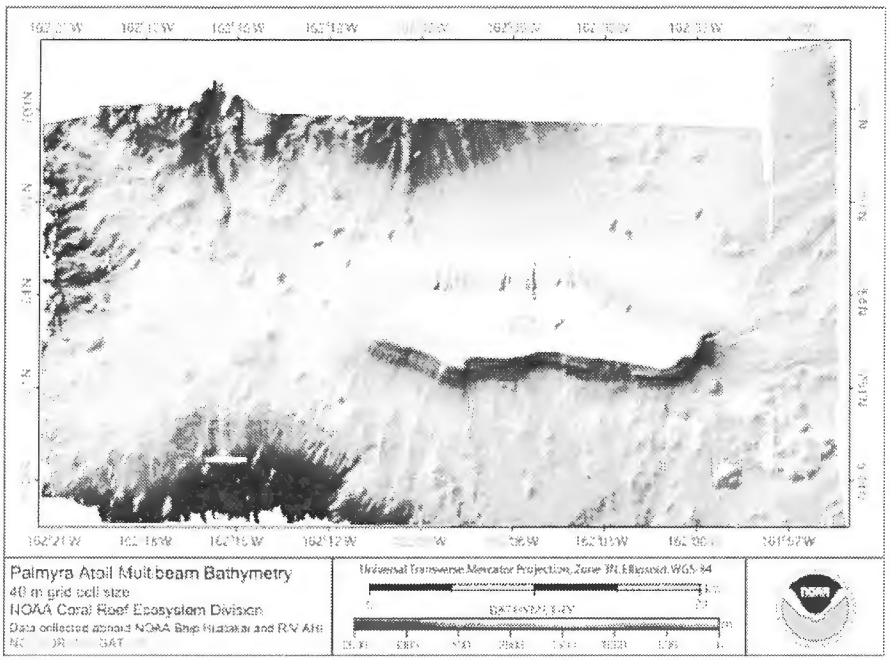
Foreign National access to the NOAA ship or Federal Facilities is not required for this project.

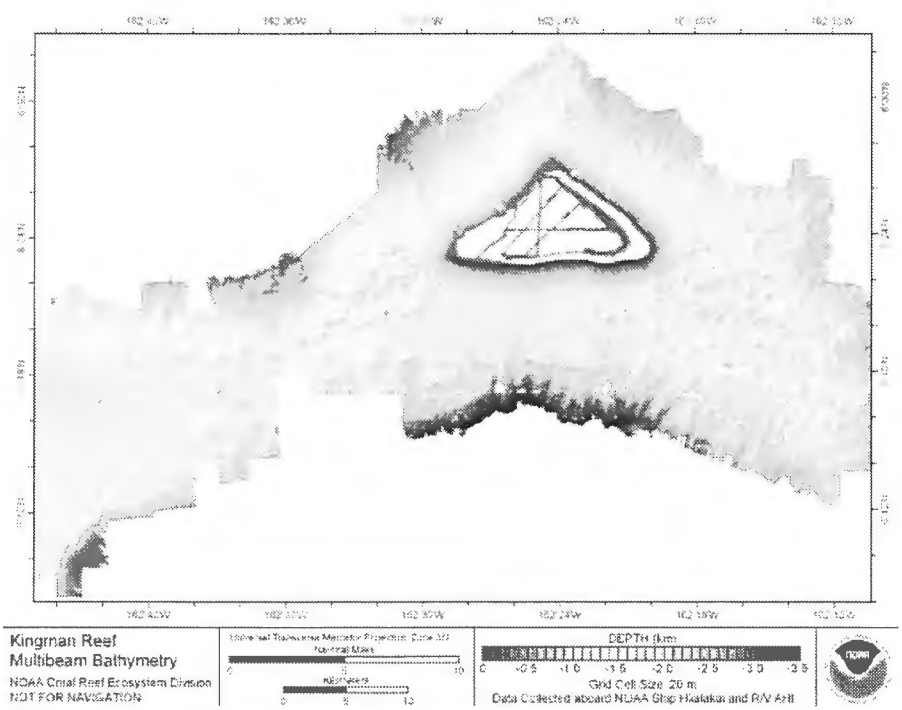
VIII. Appendices

1. Hawai'i island



2. Kingman Reef- Palmyra Atoll


Palmyra Atoll Multibeam Bathymetry
40 m grid cell size
NOAA Coral Reef Ecosystem Division
Data collected aboard NOAA Ship Hiialakai and R/V Ahi
Universal Transverse Mercator Projection, Zone 5N, Ellipsoid: WGS 84


Kingman Reef
Multibeam Bathymetry
NOAA Coral Reef Ecosystem Division
NOT FOR NAVIGATION
DEPTH (km)
Grid Cell Size: 20 m
Data Collected aboard NOAA Ship Hiialakai and R/V Ahi