U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
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FINAL Project Instructions

Date Submitted:	July 9, 2013
Platform:	NOAA Ship *Hi'ialakai*
Project Number:	HA-13-04 (OMAO)
Project Title:	MHI RAMP (Main Hawaiian Islands RAMP)
Project Dates:	August 1, 2013 to August 23, 2013

Prepared by: Russell Reardon Dated: 7/9/2013
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(For Bernardo Vargas-Ángel, Ph.D., Chief Scientist)
Coral Reef Ecosystem Division
Pacific Islands Fisheries Science Center

Approved by: Dated: 7/10/2013
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Coral Reef Conservation Program
Jennifer Koss for John Christensen

Approved by: Dated: 7/18/2013
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Commanding Officer
Marine Operations Center – Pacific Islands Area Command

I. Overview

A. Brief Summary and Project Period

NOAA Ship *Hi'ialakai* will be engaged as support for the Main Hawaiian Islands Reef Assessment and Monitoring Program (MHI RAMP) from August 1 through August 23, 2013, for a total of 23 days at sea (DAS).

MHI RAMP is a component of an integrated coral reef ecosystem assessment led by the Coral Reef Ecosystem Division (CRED) of the Pacific Island Fisheries Science Center in some 50 U.S.-affiliated Pacific Islands. This comprehensive, multi-agency research and education effort is sponsored by NOAA's Coral Reef Conservation Program (CRCP), a partnership between the National Marine Fisheries Service, National Ocean Service, and other NOAA agencies with the objective of improving understanding and management of coral reef ecosystems.

Small boats will be deployed from *Hi'ialakai* to reach dive survey areas around the islands of Hawai'i, Maui, Lāna'i, Moloka'i, Kaua'i, Ni'ihau and O'ahu, including those along windward coasts and near channels between the islands. Teams of scuba divers will conduct fine-scale, rapid ecological assessment (REA) surveys of reef fishes, corals, other invertebrates, and algae. Taxonomic diversity of coral reefs will be evaluated by retrieving autonomous reef monitoring structures (ARMS) previously placed on the seafloor.

Scientists will collect data to monitor nearshore physical and ecological factors associated with ocean acidification and general water quality, including data on water temperature, salinity, and other physical and biological characteristics of the coral reef environment using an assortment of oceanographic sampling and monitoring instruments, including systems deployed from the ship, underwater moored instruments, and sensors on the ship.

Data collected during this mission are pivotal to long-term biological and oceanographic monitoring of coral reef ecosystems in the Hawaiian Archipelago. The 2013 expedition will add to information collected during monitoring and mapping surveys conducted in 2005, 2006, 2008, and 2010. Data on the abundance and spatial distribution of reef fishes, invertebrates, corals, and algae will allow scientists to evaluate potential changes in the condition and integrity of coral reef ecosystems in the Hawaiian Archipelago and enable federal and state resource managers to more effectively conserve coral reefs ecosystems of the MHI and manage ecosystem services. Data collected during the project also support monitoring components of the CRCP Coral Reef Ecosystem Integrated Observing System (CREIOS) in the Pacific.

B. Service Level Agreements

Of the 23 DAS scheduled for this project, three DAS are funded by the program and 20 DAS are funded by OMAO. This project is estimated to exhibit a "High" Operational Tempo.

C. Operating Area

The Operating Area for HA-13-04 (*Appendix 1*) encompasses the waters among and between the Main Hawaiian Islands, specifically:

- Hawai'i Island (*Appendix 2*)
- Maui County – Maui, Lāna'i, Moloka'i (*Appendix 3*)
- Kaua'i County – Kaua'i, Ni'ihau (*Appendix 4*)
- O'ahu (*Appendix 5*)

The Station/Waypoint List for the project is presented as an attached file (*Appendix 6*).

D. Summary of Objectives

The ship will support assessment and monitoring operations in the waters surrounding Hawai'i Island, Maui County, Kaua'i County, and O'ahu. The scientific objectives of this project are to:

1. Conduct ecosystem monitoring of the species composition, abundance, percent cover, size distribution, recruitment and general health of the fishes, corals, other invertebrates, and algae of the shallow water (< 35 m) coral reef ecosystems of the MHI.

2. Deploy and/or service an array of Subsurface Temperature Recorders (STRs), Ecological Acoustic Recorders (EARs), Acoustic Doppler Current Profilers (ADCPs), Autonomous Reef Monitoring Structures (ARMS), Calcification Accretion Units (CAUs), and Bioerosion Monitoring Units (BMUs) to allow remote long-term monitoring of oceanographic and environmental conditions affecting the coral reef ecosystem of the MHI. This effort is in support of the Coral Reef Ecosystem Integrated Observing Systems (CREIOS).

3. Monitor nearshore physical and ecological factors associated with ocean acidification and general water quality, including analysis of seawater for nutrients, chlorophyll concentration, salinity, temperature, dissolved oxygen, transmissivity, total alkalinity and dissolved inorganic carbon. The water used to measure these parameters will be collected via Niskin bottle grab samples and conductivity-temperature-depth (CTD) casts.

Shallow-water CTDs will be conducted from small boats to a depth of ~ 30 m.

4. Collect shallow water coral cores to examine calcification/growth rates in recent decades and assess potential early impacts of ocean acidification.

5. Conduct shipboard CTD measurements to a depth of 500 m and shipboard ADCP surveys around reef ecosystems to examine physical and biological linkages supporting and maintaining the island ecosystems.

6. Collect oceanographic data utilizing ship-based measurement systems (ADCP, ThermoSalinoGraph - TSG, Partial Pressure of Carbon Dioxide - pCO2, and the Scientific Computer System - SCS) during all transits for the duration of the project.

7. Conduct investigations of marine microbial communities, including the collection of specimens via water sampling, plankton tows, and benthic grab samples.

8. Determine the existence of threats to the health of these coral reef resources from anthropogenic sources, including marine debris.

E. Participating Institutions

- Joint Institute for Marine and Atmospheric Research (JIMAR)
- NOAA Pacific Islands Fisheries Science Center:
  - Coral Reef Ecosystem Division (CRED)
  - Fisheries Research and Monitoring Division (FRMD)
- NOAA Diving Program (NDP)
- San Diego State University (SDSU)

F. Personnel / Science Party

Name (Last, First)	Title	Embark	Disembark	Gender	Affiliation	Nationality
Asher, Jacob	Benthic REA Diver	8/1/13	8/12/13	Male	CRED/JIMAR	USA
Ayotte, Paula	Fish REA Diver	8/1/13	8/23/13	Female	CRED/JIMAR	USA
Bailey, Hatsue	Benthic REA Diver	8/1/13	8/23/13	Female	CRED/JIMAR	JPN (USA Perm. Resident)
Bostick, James	Chamber Operator / Dive Master	8/1/13	8/23/13	Male	NDP	USA
Dunlap, Matthew	Benthic REA Diver	8/1/13	8/23/13	Male	CRED/JIMAR	USA
George, Emma	Microbial Diver	8/1/13	8/23/13	female	SDSU	USA
Gray, Andrew	Fish REA Diver	8/1/13	8/23/13	Male	CRED/JIMAR	USA
Heenan, Adel	Fish REA Diver	8/12/13	8/23/13	Female	CRED/JIMAR	ENG
Lino, Kevin	Fish REA Diver	8/1/13	8/23/13	Male	CRED/JIMAR	USA
Mark Manuel	Fish REA Diver	8/1/13	8/12/13	Male	CRED/JIMAR	USA
McCoy, Kaylyn	Fish REA Diver	8/1/13	8/12/13	Female	CRED/JIMAR	USA
Nadon, Marc	Fish REA Diver	8/12/13	8/23/13	Male	FRMD/JIMAR	CAN
Pomeroy, Noah	Instrumentation Diver	8/1/13	8/23/13	Male	CRED/JIMAR	USA
Reardon, Kerry	ARMS/Instrument Diver	8/1/13	8/23/13	Female	CRED/JIMAR	USA
Reardon, Russell	Operations Lead / ARMS/Instrument Diver	8/1/13	8/23/13	Male	CRED/JIMAR	USA
Swanson, Dione	Benthic REA Diver	8/1/13	8/23/13	Female	CRED/JIMAR	USA
TBN	CTD Specialist	8/1/13	8/23/13			
Timmers, Molly	ARMS/Instrument Diver	8/1/13	8/23/13	Female	CRED/JIMAR	USA
Trick, Kevin	Data Manager	8/1/13	8/23/13	Male	CRED/JIMAR	USA
Vargas-Ángel, Bernardo	Chief Scientist / Benthic REA Diver	8/1/13	8/23/13	Male	CRED/JIMAR	COL (USA Perm. Resident)
Vetter, Oliver	Instrumentation Diver	8/1/13	8/23/13	Male	CRED/JIMAR	WLS
Willams, Ivor	Fish REA Diver	8/12/13	8/23/13	Male	CRED	USA
Young, Charles	Instrumentation Diver	8/1/13	8/23/13	Male	CRED/JIMAR	USA
Zamzow, Jill	Fish REA Diver	8/1/13	8/23/13	Female	CRED/JIMAR	USA

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 United States. Diplomatic clearance is not applicable.

3. Licenses and Permits

Activities to be conducted during HA-13-04 have been authorized under the following:

a. State of Hawaii Department of Land and Natural Resources, Division of Aquatic Resources, Special Activity Permit No. 2014-6 issued for 2013-2014 MHI operations. Permittee: Dr. Russell Brainard (Division Chief, NOAA PIFSC CRED).

b. Department of the Army Nationwide Permit Verification File No: POH-2008-00093 (04 April 2011). The installation and maintenance of scientific measurement devices associated with the Pacific RAMP project is currently authorized under U.S. Army Corps of Engineers (USACE) Nationwide Permit No. 5, Scientific Measurement Devices (authorization date: 30 April 2009) and is authorized until modified, revoked, or reissued by USACE. (Permit renewal in progress. Updated permits will be provided to the Command prior to sailing.)

c. National Environmental Policy Act (NEPA), Programmatic Environmental Assessment for Research Activities Conducted by the Coral Reef Ecosystem Division, PIFSC, 2010-2015. Finding of No Significant Impact (FONSI) signed May 7, 2010. (http://www.pifsc.noaa.gov/nepa/CRED_Programmatic%20Environmental%20Assessment_Final.pdf).

d. Endangered Species Act: A concurrence with a "may affect, but not likely to adversely affect" determination for the CRED Marine Debris Removal Activities and Pacific RAMP was issued by NOAA Pacific Islands Regional Office – Protected Resources Division on March 28, 2011.

II. Operations

A. Project Itinerary

The following operational plans can be considered only a guide as to how the Chief Scientist expects the surveys to progress without being able to predict the weather, operational and scheduling problems, and equipment failures. In particular, the order in which survey areas are worked within a single island group (e.g. Hawai'i Island, Maui County or Kaua'i County), may be altered as appropriate based on weather, sea conditions, or the progress of the survey. Transit estimates have been calculated based on a ship's speed of nine knots.

July 25 — **Pre-project**: Conduct diver neurological examinations, small boat familiarization, and emergency procedures orientation with the ship's Medical Officer, deck personnel, and scientific complement.

August 1 — **Depart Pearl Harbor**: Embark all scientific personnel at Ford Island, Pearl Harbor no later than (NLT) 0700. Depart home pier ~0900 and transit to fuel pier. Depart fuel pier (NLT 1330) and begin transit to survey locations in the vicinity of North Kohala, Hawai'i Island (~145 nmi, ~17h). Complete remaining operational briefings, pre-dive assessments, and safety drills.

August 2 - 7 — **Hawai'i Island**: Arrive at Hawai'i Island (NLT 0700) for a full day of scientific operations. Operations to be conducted while at Hawai'i Island include: fish and benthic rapid ecological assessment (REA) surveys, moored instrument deployments and retrievals (deploy: 16 STRs, 50 CAUs, 20 BMUs, 12 ARMS; retrieve: six STRs, six ARMS, two EAR anchors with instruments), collection of up to six 20-40-cm coral cores, collection of carbonate chemistry water samples at all CAU and coral coring sites, and microbial collections at one to two sites per day. Night operations during this period include ADCP transects (~25 km in length) radiating in each of the four cardinal directions from Hawai'i Island, with ~10 CTD casts (depth: 500 m; Lat/Lon: TBD) and water samples obtained on the reciprocal course of each transect. Anticipated order of survey polygons: HAW_A, HAW_C, HAW_D,

HAW_E, HAW_F, HAW_G (*Appendix 2)*. Depart Hawai‘i Island (~1800) on August 7th and transit to the vicinity of Kahului, Maui (~85 nmi, 9.5h).

(August 8 – 11) ***Maui County (Phase 1)****: Maui County (Maui, Lāna‘i, and Moloka‘i) survey sites may be worked in any order to take advantage of favorable weather conditions.*

August 8 - 10 **Maui**: Arrive at the island of Maui (NLT 0700) for a full day of scientific operations. Operations to be conducted while at the island of Maui include: fish and benthic REA surveys, moored instrument deployments and retrievals (deploy: eight STRs, 25 CAUs; retrieve: five STRs; 15 CAUs, 15 BMUs, three ARMS, one EAR anchor with instrument), collection of up to six 20-40-cm coral cores, collection of carbonate chemistry water samples at all CAU and coral coring sites, and microbial collections at one to two sites per day. Night operations during this period include ADCP transects (~25 km in length) radiating in each of the four cardinal directions from Maui County, with ~10 CTD casts (depth: 500 m; Lat/Lon: TBD) and water samples obtained on the reciprocal course of each transect. Anticipated order of Maui survey polygons: MAI_A, MAI_B, MAI_D (*Appendix 3)*.

August 11 **Lāna‘i**: Arrive at Lāna‘i (NLT ~0700) for a full day of scientific operations. Lāna‘i operations include: fish and benthic REA surveys, moored instrument deployments and retrievals (deploy: four STRs, 10 CAUs; retrieve: two STRs), collection of up to six 20-40-cm coral cores, collection of carbonate chemistry water samples at all CAU and coral coring sites, and microbial collections at one to two sites per day. Night operations during this period include ADCP transects (~25 km in length) radiating in each of the four cardinal directions from Maui County, with ~10 CTD casts (depth: 500 m; Lat/Lon: TBD) and water samples obtained on the reciprocal course of each transect. Anticipated order of Lāna‘i survey polygons: LAN_A, LAN_B (*Appendix 4)*. Depart Lāna‘i en route to Pearl Harbor (~80 nmi, 9h).

August 12 **Ford Island**, **Pearl Harbor**: No dive operations; mandatory ‘off-gas’/rest day. Return to Ford Island, Pearl Harbor home pier for personnel swap (refer to Section F) and small boat fuel replenishment. Gasoline will most likely be transferred to the ship in pre-staged 55-gal drums (initial estimate ~300 gal; exact quantity TBD). The Program will coordinate fuel

delivery and staging with the Marine Operations Center – Pacific Islands Area Command.

Routine small boat maintenance (e.g. oil change) scheduled to occur on this day will likely necessitate the brief launch and recovery of one or both program-provided SAFE Boats in order to swap their cradle positions for servicing lower units. A boat trailer may be staged on the pier to facilitate this swap.

Depart Ford Island, Pearl Harbor (NLT 1530) and transit to eastern Kauaʻi (~105 nmi, 12h).

Depending upon actual departure and arrival times, night operations may include a Kauaʻi ADCP transect with CTDs and water samples on the reciprocal course.

(August 13 - 17) ***Kauaʻi County****: Kauaʻi County (Kauaʻi and Niʻihau) operations are anticipated to alternate daily between the two islands in order to facilitate shipboard ARMS processing after each Kauaʻi retrieval.*

August 13 **Kauaʻi**: Kauaʻi operations include: fish and benthic REA surveys, moored instrument deployments and retrievals (deploy: 12 STRs; 15 CAUs; retrieve: two STRs, six ARMS, one EAR anchor with instrument), collection of up to six 20-40-cm coral cores, collection of carbonate chemistry water samples at all CAU and coral coring sites, and microbial collections at one to two sites per day. Night operations during this period include ADCP transects (~25 km in length) radiating in each of the four cardinal directions from Kauaʻi County, with ~10 CTD casts (depth: 500 m; Lat/Lon: TBD) and water samples obtained on the reciprocal course of each transect. Anticipated order of Kauaʻi survey polygons: KAU_B, KAU_D, KAU_C (*Appendix 4)*.

August 14 **Niʻihau**: Niʻihau operations include: fish and benthic REA surveys, moored instrument deployments and retrievals (deploy: 4 STRs; 10 CAUs; retrieve: two STRs), collection of up to six 20-40-cm coral cores, collection of carbonate chemistry water samples at all CAU and coral coring sites, and microbial collections at one to two sites per day. Night operations during this period include ADCP transects (~25 km in length) radiating in each of the four cardinal directions from Kauaʻi County, with ~10 CTD casts (depth: 500 m; Lat/Lon: TBD) and water samples obtained on the reciprocal course of

each transect. Anticipated order of Niʻihau survey polygons: NII_B, NII_A (*Appendix 4)*.

August 15 **Kauaʻi**: Continue Kauaʻi operations (detailed above, August 13).

August 16 **Niʻihau**: Continue Niʻihau operations (detailed above, August 14).

August 17 **Kauaʻi**: Continue Kauaʻi operations (detailed above, August 13). Depart Kauaʻi (~1800) en route to western Oʻahu in the primary vicinity of Kahuku Point (~105 nmi, 12h) or the secondary vicinity of Kaʻena Point (~85 nmi, 9.5h).

August 18 **Oʻahu (Kahuku Point)**: Oʻahu operations in the vicinity of Khuku Point and along the northeast windward coast (OAH_A) include: fish and benthic REA surveys, moored instrument deployments and retrievals, collection of carbonate chemistry water samples, and microbial collections. *Should weather prohibit operations on the windward coast, operations may occur along the north shore (OAH_E) or in the vicinity of Kaʻena Point, along the west coast of Oʻahu (OAH_D).* Prioritization of Oʻahu survey polygons: OAH_A, OAH_E, OAH_D, OAH_B, OAH_C (*Appendix 5)*. Depart Kahuku Point (~1800) en route to Lānaʻi (~80 nmi, 9h).

(August 19 - 22) ***Maui County (Phase 2)****: The remaining sites at Maui, Lānaʻi, and Molokaʻi may be worked in any order to take advantage of favorable weather conditions.*

August 19 **Lānaʻi (continued)**: Arrive Lānaʻi (NLT 0700) to complete Lānaʻi operations (detailed above, August 11).

August 20 - 22 **Molokaʻi:** Molokaʻi operations include: fish and benthic REA surveys, moored instrument deployments and retrievals (deploy: four STRs, 15 CAUs; retrieve: two STRs), collection of up to six 20-40-cm coral cores, collection of carbonate chemistry water samples at all CAU and coral coring sites, and microbial collections at one to two sites per day. Night operations during this period include ADCP transects (~25 km in length) radiating in each of the four cardinal directions from Maui County, with ~10 CTD casts (depth: 500 m; Lat/Lon: TBD) and water samples obtained on the reciprocal course of each transect. Anticipated order of Molokaʻi survey polygons: MOL_A, MOL_B, MOL_C (*Appendix 3)*.

August 23 **O‘ahu (Makapu‘u Point - Pearl Harbor)**: Arrive in the vicinity of Makapu‘u Point (NLT 0700) on the east side of O‘ahu. ARMS Team will be deployed in a Program boat to conduct one ARMS retrieval dive. (Note: These individuals will not exceed 10 consecutive dive days.) Transit to Ford Island, Pearl Harbor (~30 nmi, 3.5h). End of project.

B. Staging and Destaging

Staging: Staging of large scientific gear and equipment will begin the week of July 22, or as otherwise coordinated with the Command. Assistance from the ship’s personnel for crane services for large gear, as well as for loading small boat fuel (pumped from truck to ship), will be necessary. Ethyl alcohol will be delivered in drums to be transferred to the ship’s stainless steel tank. Hand carried items will be loaded throughout the week prior to departure. All scientists anticipate embarking the vessel at Ford Island, Pearl Harbor, by 0700, on August 1, 2013.

Mid-project Refueling: Unleaded gasoline will be delivered to the NOAA pier, Ford Island, Pearl Harbor, for the ship’s August 12 return to port. The fuel may be delivered by truck to be pumped directly into the ship’s deck tank; alternatively, gasoline fuel drums may be pre-staged to expedite in-port turnaround time. Fuel delivery date and time will be coordinated with the Marine Operations Center – Pacific Islands Area Command.

Destaging: Upon completion of the project, limited off-load of program-provided gear is anticipated. Most of the program-provided equipment will remain on board for the subsequent project, HA-13-05 NWHI RAMP. However, both program SAFE Boats may need to be offloaded for maintenance and servicing. (Note: Small boat fuel supply will need to be replenished under HA-13-05 as well.)

C. Operations to be Conducted

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

Scientific Operations

The ship will support assessment and monitoring operations within the project Operations Area. Specifically, the ship will support Rapid Ecological Assessments and the continuation of long-term monitoring operations of reef fish, corals, other invertebrates, and algae, and oceanographic monitoring of the coral reef ecosystems of the region.

Research and monitoring efforts will require extensive diving operations (both scuba and snorkeling) to be supported by *Hi'ialakai*. Up to five small boats will be operating simultaneously during daylight hours to maximize productivity. *Hi'ialakai*'s 30-ft Northwind (HI-1A), 26-ft Ambar (HI-2), and 17-ft Northwind (HI-3), two CRED-provided 19-ft SAFE Boats, and either CRED-provided 17-ft Avon inflatable or *Hi'ialakai*'s 17-ft Zodiac inflatable (HI-7) will be required to support the REA, instrumentation, and microbial survey teams. Both HI-7 and the program Avon are anticipated to be carried deflated and palletized, serving as redundant back-up platforms.

REA surveys will include monitoring of species composition, abundance, size distribution, and spatial distribution of reef fishes, corals, other invertebrates, and algae of the region. Benthic community structure and demography parameters, including percent cover, taxonomic richness, density, size-class distribution, and health condition, will be assessed along line and belt transects to provide spatial-temporal appraisals of coral reef dynamics in the region. The REA Benthic Team may also collect limited samples of algae, corals, and other invertebrates. Benthic deployments, retrievals, and voucher specimen collections will be conducted as stipulated, following the pertinent Agency-approved Special Activity Permit guidelines.

The Instrumentation Team will replace, remove or relocate a variety of moored instruments during the project. Approximately 48 STRs will be deployed, and four STRs and four EARs with associated anchors will be retrieved. Retrieved anchors will be secured on stackable aluminum pallets for transport back to Honolulu.

A number of Autonomous Reef Monitoring Structures (ARMS) will be recovered and replaced or newly installed at select locations by the Instrumentation Team. These small units are designed to mimic the complexity of the coral reef structure and to attract small invertebrates to recruit within them. ARMS samples will be processed onboard in a program-provided lab space, preserved in ethanol, and stored in the scientific freezer.

Calcification Accretion Units (CAUs) will be recovered and replaced or newly installed at select locations. The CAUs serve as a mechanism to quantify accretion rates of calcifying coralline algae and scleractinian corals; this information will allow for comparisons to determine possible consequences of

increased ocean acidity and lowered aragonite saturation states. Additionally, a Bioerosion Monitoring Unit (BMU) will be installed on CAUs at select locations. Each BMU is made of a 1cm x 2cm x 5cm block of calcium carbonate rock mounted on a similarly sized piece of polyvinylchloride plate. The BMUs rest flush on the seafloor and serve as a mechanism to quantify bioerosion rates across coral reefs experiencing different physical oceanography and local human impacts. Retrieved BMUs will be measured for changes in weight and density, using a CT scan, back on shore.

As part of CRED's effort to investigate ocean acidification and carbonate chemistry, the Instrumentation Team may obtain coral cores at several locations, if time and operational conditions allow. Up to six 20-40 cm long by 3.8 cm diameter cores will be collected with a diver-held pneumatic drill at each island visited.

Small boat and shipboard CTD casts will be conducted around/over each of the islands/banks to examine oceanographic conditions and water quality. Shipboard CTDs will be conducted to a depth of 500 m at several sites around each island and/or atoll, including but not limited to all of the permanent shipboard CTD sites that can be reached reasonably. Underway shipboard oceanographic measurements (ADCP, TSG, pCO2 with ancillary sensors, and SCS) will be recorded throughout the duration of the project. During both small boat and shipboard CTD casts, water samples may be collected for nutrient, chlorophyll, salinity and carbonate chemistry analyses.

As part of the ongoing effort to understand the microbial community, two types of water samples will be collected at each REA site using diver-deployable Niskin bottles (four bottles; two liters per bottle). Two of the Niskin bottles will be filled with water collected from approximately one meter above the benthos, and two will be filled with water from within the reef (pore-water). The pore-water samples will be collected using Niskin bottles with a flexible stainless-steel hose attachment. These water samples will be returned to the ship and processed for dissolved organic carbon (DOC), particulate organic matter (POM), nutrients, microbial (Bacteria and Archaea) and viral abundance (fluorescent microscopy), FACS (heterotrophs vs. autotrophs), and microbial and viral community composition (coarse analysis: 16s rRNA). At two REA sites per island, approximately 60-80 L of reef water will be collected from reef crevices and surfaces for metagenomic analysis of the microbial and viral community associated with the reef benthos. All water samples will be collected at select REA sites (locations with supporting fish and benthic data).

In addition to understanding water-column microbial dynamics, investigating shifts in the microbial community associated with benthic composition is important as it can serve as an indicator of reef-ecosystem health. If time permits, six fist-sized samples of rubble (three of these will also contain a handful of the first 5-10 cm of sediment from different sand pockets), and six pieces of the most

dominant algae-type will be collected in zip-top bags. Both the algae and the rubble/sediment samples will be frozen at -20°C. These samples will remain on the ship until it returns to Honolulu. The 16s bacterial rRNA genes associated with these samples will be sequenced to characterize the microbial communities associated with the benthos (rubble and algae). The sediment samples will be used to characterize the live/dead assemblage of benthic foraminifera, which can serve as a proxy for changes in water quality related to human impacts. These samples will be saturated with Rose Bengal/EtOH solution, rinsed, and stored dry onboard the ship for microscopic analysis.

Snorkeling

All snorkeling shall be conducted in accordance with the NOAA Scientific Diving Manual (Section 4.13).

Small Boat

Per OMAO Supplement to the NOAA Small Boat Standards and Procedures Manual, March 2010, Section 4.03a2, a program certified Operator in Charge (OIC) must "earn the full confidence of both the Commanding Officer (CO) and Designated Examiner (DE) and has successfully completed the shipboard training requirements." As part of any OIC evaluation, it is understood that a small boat OIC will be designated to accompany and evaluate an OIC-in-training. This may limit the number of small boats the ship can deploy during this evaluation period, but every effort will be made to limit any impact to operations. An OIC-in-training is not guaranteed to be qualified by the CO and DE during a project.

Small boat deployment and recovery operations from a ship at sea are inherently dangerous. Experience levels of all personnel involved and environmental conditions are limiting factors regarding the decision to proceed with said operations. Proficiency levels of deck officers, deck department, or small boat crews may impact operations. All small boat crewmembers must have the full confidence of the CO and DE. At any time, the CO may call for a halt to boat deployment and recovery operations. If indicated, a Safety Stand Down, extra training or practice may be required to begin operations again. This is especially true when the ship has been in port or when program personnel have not been aboard for an extended period of time, as well as when boat operations are called for within 48 hours of departure.

While minimizing impact to science operations, ship's diver/coxswain training and proficiency regulations may require the use of a ship's small boat during an extended project. The CO will work with the Chief Scientist to plan and minimize impacts to fulfill such requirements.

CTD

When planning CTD operations, time must be allotted for cable maintenance as required in EEOI-017 which states that the cable shall be sprayed with fresh water

during the reeling-in at the end of use each day and the cable shall be pressure lubed at the end of a project, or portion of a project, at least once each week during frequent use.

D. Dive Plan

All dives are to be conducted in accordance with the requirements and regulations of the NOAA Diving Program (http://www.ndc.noaa.gov/dr.html) and require the approval of the ship's Commanding Officer.

The Dive Plans for HA-13-04 are presented in *Appendix 7* (attached file).

E. Applicable Restrictions

Conditions which preclude normal operations: Poor weather and sea conditions, equipment failure, safety concerns, and/or unforeseen circumstances, may alter or prohibit operations as planned. At these times, the Chief Scientist and Commanding Officer will determine the appropriate plan of action.

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 project, 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.

    c. PIFSC has developed mitigation measures for our fisheries and ecosystem research projects to avoid take and comply with the Lecky, Murawski, and Merrick guidance. A copy of these documents is 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. Activities in the Hawaiian Islands Humpback Whale National Marine Sanctuary

    a. The humpback whale season in Hawaii is November through May.

    b. Unless otherwise authorized under the MMPA and ESA, it is unlawful to approach, or cause a vessel or other object to approach, within 100 yards of any humpback whale within the Sanctuary. Please reference the complete list of prohibited activities and boundary maps at https://sites.google.com/a/noaa.gov/pifsc-science-operations/home/nepa-permits/protected-species-mitigation-measures. A copy of these materials will also be available on the ship's bridge.

III. Equipment

A. Equipment and Capabilities Provided by the Ship

1. **Equipment**: To successfully meet the project objectives, the scientific compliment aboard will need the ship to provide the items listed below. Prior to sailing, the ship's crew will inspect these items to ensure they are in proper working order for the project:

    J-frame
    A-frame
    Aft deck crane
    30-ft Northwind launch, HI-1A
    26-ft Ambar launch, HI-2
    17-ft Northwind launch, HI-3
    17-ft Zodiac inflatable and 50hp motor, HI-7 (deflated)
    SCUBA compressor (Nitrox and Air)
    Recompression chamber
    Dive lockers
    Scientific freezer
    Wet Lab faucets and drains
    Acoustic Doppler Current Profiler (ADCP)
    Scientific Computer System (SCS)
    ThermoSalinoGraph (TSG)
    Sea Surface Sound Velocity (SSSV)
    pCO2 measurement system
    CTD and rosette
    Adequate fresh water for gear and small boat wash-down
    Iridium phone
    VHF radios for ship's small boats
    Global Positioning System (GPS) for ship's small boats
    Depth sounders for ship's small boats

Ethanol and gasoline storage tanks
Rack space for up to three standard (55-gal) drums

2. **Capabilities**: It is requested that the ship provide the following:

    a. Permission for Scientists to ready scientific work spaces (e.g., set up computer server) during the week prior to departure.

    b. Permission for Scientists to complete Dive Neurological Assessments with the Ship's Medical Officer, small boat orientations with Deck Department, dive gear checks with the Dive Master, and/or other pre-operations tasks in advance of the project (anticipated completion July 25). With a late departure from Pearl Harbor expected as a result of ship fueling operations, completion of all the required briefings, safety drills, and scientific equipment preparations during the brief transit may otherwise be difficult to accomplish.

    c. Assistance from the ship's Deck Department in craning and staging large gear during loading and off-loading.

    d. Support from the Engineering and Deck departments prior to sailing to transfer 2.84 kL (750 gallons) of program-provided gasoline into the ship's stainless steel fuel tank to be used as outboard engine fuel. The gasoline will be delivered by truck and may be pumped directly into the deck tank. Mid-project support will be necessary to transfer additional fuel delivered to the ship in barrels or by tank truck (TBD). *Hi'ialakai* will be responsible for providing diesel fuel for HI-1A and HI-2.

    e. Support from the Engineering and Deck departments to transfer five drums (950 L / 250 gal) of program-provided ethyl alcohol into the ship's stainless steel deck tank to support scientific operations. Additional storage capacity for ~200 L (53 gal) of waste ethanol generated during the project is necessary.

    f. *Hi'ialakai*'s HI-1A, HI-2, and HI-3 will be required to support the program's dive teams on a daily basis. The ship's HI-7 or program's tiller-Avon may be required as a backup should one of the other boats become inoperable or to mitigate unforeseen events. The ship should plan to provide coxswains for the HI-1A, HI-2, and HI-3 during all days of diving operations. Should one of these vessels become inoperable, a ship coxswain will be needed for the replacement platform, HI-7 or tiller-Avon (program provided).

g. An experienced survey technician is requested to conduct nighttime CTDs and shipboard pCO_2 sampling operations and to assist the science party with water filtration and sampling operations, including chlorophyll filtration and the fixing of carbonate chemistry samples. Operable Wet Lab facilities are necessary to support water sampling and the cleaning of field equipment. Approximately eight to ten 0.9 m x 0.6 m totes of the program's glass sample bottles and plastic sample bags filled with seawater will need to be stored onboard in an air conditioned space.

h. To support the ARMS Lab (10-ft container box), power, freshwater, saltwater and compressed air sources and connections on the fantail will be necessary.

i. To support CAU processing, power connections on deck for one chest freezer (~ 6 ft x 3 ft x 3 ft) will be necessary. Note: Similar program freezers were carried previously on the bridge deck (starboard rail) and on the boat deck (port side).

j. To be consistent with the mission objectives, the ship and its compliment of small boats will employ all methods feasible to minimize damage to coral reef habitats during any anchoring operations that may be required.

B. Equipment and Capabilities Provided by the Scientists

1. **Equipment**: The program's full equipment list is presented in *Appendix 8* (attached file).

2. **Capabilities**: In addition to scientific expertise, the program will provide the following capabilities:

    a. Coxswains and routine maintenance for program-provided SAFE Boats.

    b. A scientist to assist on deck with deployment and recovery of the CTD rosette and to perform water filtration and sampling activities.

IV. Hazardous Materials

A. Policy and Compliance

The Chief Scientist is responsible for complying with Fleet Environmental Compliance 07 (FEC 07) Hazardous Material 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 the anticipated quantity brought aboard, MSDS and appropriate neutralizing agents, buffers, or absorbents in amounts adequate to address spills of a size equal to the amount of chemical brought aboard, and a chemical hygiene plan. Documentation regarding those requirements will be provided by the Chief of Operations, Marine Operations Center, upon request.

Per FEC 07, the scientific party will include with their project instructions and provide to the CO of the respective ship 60 to 90 days before departure:

- A list of hazardous materials by name and anticipated quantity
- Include a chemical spill plan that addresses all of the chemicals the program is bringing aboard. This shall include:
  - Procedures on how the spilled chemicals will be contained and cleaned up.
  - A complete inventory (including volumes/amounts) of the chemical spill supplies and equipment brought aboard by the program. This must be sufficient to clean and neutralize all of the chemicals brought aboard by the program.
  - A list of the trained personnel that will be accompanying the project and the training they've completed.

Inventory of Hazardous Materials

Common Name	Quantity	Notes	Trained Individual	Spill Control*
10,000X SYBR Gold (nucleic acid stain)	1 ml	Stored in sealed container in Scientific refrigerator	Emma George	NT
5% Hydrochloric Acid	5 L	Stored in sealed plastic bucket in Wet Lab	Emma George	A
Chloroform	10 ml	Stored in Hazmat cabinet in Wet Lab within sealed metal secondary container and padding	Emma George	F
Commercial Bleach	7.5 L	Stored in ARMS labs in secondary containment	Molly Timmers and Kerry Reardon	F

Common Name	Quantity	Notes	Trained Individual	Spill Control*
DAPI Nucleic Acid Stain	500 µg	Stored in sealed plastic container in Scientific fridge	Emma George	NT
DMSO Buffer	12 L	Stored in Hazmat cabinet in Wet Lab	Molly Timmers and Kerry Reardon	F
Dynamic Descaler	76 L	Biodegradable; neutralize with copious amounts of water. Inventory stored in ½ pallet tote on fantail. In-use quantity held in ½ pallet tote behind ARMS lab.	Molly Timmers and Kerry Reardon	A
95% Ethyl Alcohol (190 proof, Non-denatured)	950 L	Highly Volatile, Flammable Bulk stored in ship's fantail tank. Daily use quantity (19 L carboy) stored in ARMS lab in secondary containment. Preserved samples stored in secondary containment in Scientific freezer.	Ship's Chief Engineer (Bulk) Molly Timmers and Kerry Reardon (Daily use and sample quantities)	Ship SOP (bulk) AL (Daily use)
Gasoline, unleaded	2.84 kL	Volatile, Flammable Stored in ship's fantail tank.	Ship's Chief Engineer	Ship SOP

Common Name	Quantity	Notes	Trained Individual	Spill Control*
25% Glutaraldehyde (disinfectant/fixative)	10 ml	Stored in sealed plastic container in Scientific refrigerator	Emma George	F
Liquid Nitrogen	12 L	Stored in Wet Lab Scientific dewar	Emma George	LN
Mercuric Chloride (Saturated solution, 7g $HgCl_2$ in 60 ml of deionized water)	60 ml	Scientific samples consist of 200 µl $HgCl_2$ solution in 500 ml of seawater	Charles Young	M
32% Paraformaldehyde (disinfectant/fixative)	10 ml	Stored in Hazmat cabinet in Wet Lab	Emma George	F
Pool Time Shock XtraBlue 6 in 1 Pool Shock	2.3 kg	Corrosive Contained in five 1-lb bags within lidded 5-gal bucket on Grated Deck	Kerry Reardon	P
Sodium Hydroxide (NaOH) pellets	500 g	Highly caustic Stored in Hazmat cabinet in Wet Lab	Emma George	B
TRIzol Reagent	500 ml	Toxic, corrosive Stored in Hazmat cabinet in Wet Lab	Bernardo Vargas-Ángel	F
Z Fix (buffered zinc formalin fixative)	8.6 L	Toxic Stored in Hazmat cabinet in Wet Lab	Bernardo Vargas-Ángel	F

***Spill Control Key**

A: Acids

- Wear appropriate personal protective equipment (PPE) and clothing during clean-up.
- Keep upwind. Keep out of low areas.
- Ventilate closed spaces before entering them.
- Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible.

- **Large Spills**: Dike ahead of spill for containment. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal.
- **Small Spills**: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.
- Never return spills to original containers for re-use.
- Neutralize spill area and washings with soda ash or lime. Collect in a non-combustible container for disposal.
- J. T. Baker NEUTRASORB® acid neutralizers are recommended for spills of this type.

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.

B: Bases

- Wear appropriate PPE (gloves, etc) and clothing during clean-up.
- Keep upwind. Keep out of low areas.
- Ventilate closed spaces before entering them.
- Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible.
- **Large Spills**: Sweep or scoop all spilled material, contaminated soil or other materials and place into plastic waste containers for disposal. Clean up any residual powder with damp paper towels, using Base Eater as necessary. Place the towel in the same sealed container.
- **Small Spills**: Clean up any residual powder with damp paper towels, using Base Eater as necessary. Clean surface thoroughly to remove residual contamination.
- Never return spills to original containers for re-use.
- Neutralize spill area and washings with product such as Grainger Base Eater Spill Kit. Collect in a non-combustible container for prompt disposal.

F: Fixatives/Formalin/Formaldehyde

- Wear appropriate PPE (gloves, goggles, breathing mask).
- Ventilate area of leak or spill. Remove all sources of ignition.

- 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, kitty litter, absorbent pads), and place in a chemical waste container. A dust pan and plastic bags are available to aid in cleanup and disposal.
- Do not use combustible materials, such as saw dust.

LN: Liquid Nitrogen

- Wear appropriate PPE (close-toed shoes, cryogloves, goggles, long-sleeved and long-legged clothes are of particular importance).
- Ventilate area.
- Contain spill where safe to do so.
- Nitrogen is more harmful in its liquid state than in its gaseous state, in a well-ventilated area. Minimally handle or interfere with the spilled LN, and allow it to sublimate off after restricting personnel access to the contained spill area under well maintained ventilation.

M: Mercury

- Wear appropriate PPE and clothing during clean-up (a minimum of nitrile gloves, shoes and eyewear).
- Stop the flow of fluid by using absorbent material (e.g. cloth, fleece, paper) to dike and soak up the spilled solution.
- Contaminated area should be wiped with water dampened absorbent material, until one feels the area is sufficiently clean.
- If all the $HgCl_2$ solution from a spill is not wiped up, then potential exists for the $HgCl_2$ to come out of solution, and $HgCl_2$ crystals are more problematic (from a health perspective) than $HgCl_2$ in solution.
- Pick up used absorbents and place in a suitable container for reclamation or disposal in a method that does not generate dust
- All PPE and absorbent material contaminated with $HgCl_2$ should be contained in a zip-top bag labeled "$HgCl_2$ Waste," kept within the ship's HAZMAT locker, and properly disposed of once the ship returns to port.
- The concentration of $HgCl_2$ in solution, once mixed with copious amounts of fresh/salt water, will rapidly dilute the concentration of $HgCl_2$ relieving concern for further contamination by effluent, as concentrations will be below environmental toxicity, see MSDS for toxicological information.
- Areas of skin contact should be thoroughly rinsed under fresh/salt water for a minimum of 15 minutes.
- $HgCl_2$ solution contact with eyes/ingestion should be immediately addressed by the ship's doctor, rinse eyes for a minimum of 15 minutes, do not induce vomiting.

NT: Non-toxic

- Wear appropriate PPE and clothing during clean-up.

- Ventilate area.
- Contain spill where safe to do so.
- Absorb liquid with paper towel while wearing gloves; place waste in sealed plastic container until processed on land.

P: Powdered Chlorine Salts

- Wear appropriate PPE (gloves, eyewear, dust mask, etc.) and clothing during clean-up.
- Ventilate area.
- Keep upwind. Avoid inhalation of salts, granules or dust.
- **Large Spills**: Sweep or scoop all spilled material, contaminated soil or other materials and place into clean, dry containers for disposal. Do not close containers containing wet or damp material. If wet or damp, container should be left open in a well-ventilated area to disperse any hazardous gases that may form. Once cleaned, neutralize/flood the spill area with large amounts of water as appropriate.
- **Small Spills**: Sweep or scoop up spilled material and add it to dive gear "disinfectant" rinse tote if available and full of water. If dive gear "disinfectant" rinse tote is not available, dispose of collected material into a clean, dry container. Once cleaned, neutralize/flood spill area with large amounts of water as appropriate.
- Never return spills to original containers for re-use.

Inventory of Spill Kit Supplies

Product Name	Amount	Chemicals useful against	Amount of clean up possible
Absorbent pads	20	A, AL, F	~4 L
Base Eater	Large Kit	B	~19 L
Dust pan	1 set	A, F, P	n/a
Goggles	1 pair	A, F	n/a
Kitty litter	5.4 kg	A, AL,F	~4 L
Nitrile gloves	6 pairs	A, F	n/a
NEUTRASORB®	3.2 kg	A	Varies with acid concentration
Plastic bags	5	A, AL, F, P	~4 L (each)
Vermiculite	16 kg	AL, F, NT	~38 L of chemical spilled
Vinyl gloves	20 pairs	A, F	n/a

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.

Upon departure from the ship, scientific parties will provide the CO or their designee an inventory of hazardous material indicating all materials have been used or 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 and scientific hazardous materials. Overboard discharge of scientific chemicals is not permitted during projects aboard NOAA ships.

B. Radioactive Isotopes

Not applicable.

V. Additional Projects

Supplementary (piggyback) and ancillary projects are secondary to the objectives of the project and should be treated as additional investigations. The difference between the two types of secondary projects is that an ancillary project does not have representation aboard and is accomplished by the ship's force.

A. Supplementary ("Piggyback") Projects

No supplementary projects are planned.

B. NOAA Fleet Ancillary Projects

Ancillary tasks will be accomplished in accordance with the NOAA Fleet Standing Ancillary Instructions.

VI. Disposition of Data and Reports

A. Data Responsibilities

Integrated ecosystem observations of coral reefs are collected to characterize the spatial and temporal variability of the distribution, abundance, and diversity of corals, algae, other macroinvertebrates, and fishes in the context of their benthic habitats and oceanographic environments. All data are quality assured, processed, and made available to region managers and stakeholders.

B. Pre and Post Project Meeting

Pre-Project Meeting: Prior to departure, a meeting between the Chief Scientist, the Commanding Officer and their respective staffs will be held to identify operational and logistic requirements and concerns.

Post-Project Meeting: Upon completion of the project, a meeting will normally be held at 0830 (unless prior alternate arrangements are made) and attended by the ship's officers, the Chief Scientist and members of the scientific party to review the project. Concerns regarding safety, efficiency, and suggestions for improvements for future projects should be discussed. Minutes of the post-project meeting will be distributed to all participants by email, and to the Commanding Officer and Chief of Operations, Marine Operations Center, Pacific Islands.

C. Ship Operation Evaluation Report

Within seven days of the completion of the project, a Ship Operation Evaluation form is to be completed by the Chief Scientist. The preferred method of transmittal of this form is via email to OMAO.Customer.Satisfation@noaa.gov. If email is not an option, a hard copy may be forwarded to:

Director, NOAA Marine and Aviation Operations
NOAA Office of Marine and Aviation Operations
8403 Colesville Road, Suite 500
Silver Spring, MD 20910

VII. Miscellaneous

A. Meals and Berthing

The ship will provide meals for the scientists listed above. Meals will be served three times daily beginning one hour before scheduled departure, extending throughout the project, and ending two hours after the termination of the project. Packed lunches will be required for scientists on all full-day operations. 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 survey.

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 7, 1999, 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, Revised: 02 JAN 2012) must be completed in advance by each participating scientist. The NHSQ can be obtained from the Chief Scientist or the NOAA website at http://www.corporateservices.noaa.gov/~noaaforms/eforms/nf57-10-01.pdf. The completed form should be sent to the Regional Director of Health Services at Marine Operations Center. The participant can mail, fax, or scan the form into an email using the contact information below. The NHSQ should reach the Health Services Office no later than four weeks prior to the project to allow time for the participant to obtain and submit additional information that health services might require before clearance to sail can be granted. Please contact MOC Health Services with any questions regarding eligibility or completion of the NHSQ. Be sure to include proof of tuberculosis (TB) testing, sign and date the 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.

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

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. Steel-toed shoes are required to participate in any work dealing with suspended loads, including CTD deployments and recovery. The ship does not provide steel-toed boots. Hard hats with chin straps are also 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 program when required.

All scientists will comply with standing safety regulations of PIFSC and that of the vessel's standing orders from the Commanding Officer.

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 *NMAO 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.

4. Provide the Electronics Technician with a spreadsheet of the following information:

Device	Name	Operating System	LAN MAC Address	WAN MAC Address
Iphone	*Scientist*	*MAC OS*	*21:34:6K:P8:W6:77*	*21:34:6K:P8:W6:78*
Laptop	*Scientist*	*Windows XP*	*23:34:6K:P8:M6:77*	*23:34:6K:P8:M6:78*

Completion of these requirements prior to boarding the ship is required. Clearance for non-NOAA computers should be coordinated with PIFSC ITS.

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 prior to boarding the ship. Arrangements to take the Course should be coordinated with PIFSC/CRED administration.

F. Foreign National Guests Access to OMAO Facilities and Platforms

The foreign national participants for project HA-13-04 are Adel Heenan, Marc Nadon, Oliver Vetter, and no others. Chamber Operator Jim Bostick will serve as the onboard foreign national sponsor for these participants.

All foreign national access to the vessel shall be in accordance with NAO 207-12 and RADM DeBow's March 16, 2006 memo (http://deemedexports.noaa.gov). National Marine Fisheries Service personnel will use the Foreign National Registration System (FRNS) 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 NMFS Deemed Exports point of contact to assist with the process.

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

Responsibilities of the Chief Scientist:

1. Provide the Commanding Officer with the e-mail generated by the FRNS granting approval for the foreign national guest's visit. This e-mail will identify the guest's DSN and will serve as evidence that the requirements of NAO 207-12 have been complied with.

2. Escorts – The Chief Scientist is responsible for providing escorts to comply with NAO 207-12 Section 5.10, or as required by the vessel's DOC/OSY Regional Security Officer.

3. Ensure all non-foreign national members of the scientific party receive the briefing on Espionage Indicators (NAO 207-12 Appendix A) at least annually or as required by the servicing Regional Security Officer.

4. Export Control – Ensure that approved controls are in place for any technologies that are subject to Export Administration Regulations (EAR).

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

Responsibilities of the Commanding Officer:

1. Ensure only those foreign nationals with DOC/OSY clearance are granted access.

2. Deny access to OMAO platforms and facilities by foreign nationals from countries controlled for anti-terrorism (AT) reasons and individuals from Cuba or Iran without written NMAO approval and compliance with export and sanction regulations.

3. Ensure foreign national access is permitted only if unlicensed deemed export is not likely to occur.

4. Ensure receipt from the Chief Scientist or the DSN of the FRNS e-mail 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 – Eight weeks in advance of the project, provide the Chief Scientist with a current inventory of OMAO controlled technology onboard the vessel and a copy of the vessel Technology Access Control Plan (TACP). Also notify the Chief Scientist of any OMAO-sponsored foreign nationals that will be onboard while program equipment is aboard so that the Chief Scientist can take steps to prevent unlicensed export of program controlled technology. The Commanding Officer and the Chief Scientist will work together to implement any access controls necessary to ensure no unlicensed export occurs of any controlled technology onboard regardless of ownership.

7. Ensure all OMAO personnel onboard receive the briefing on Espionage Indicators (NAO 207-12 Appendix A) at least annually or as required by the servicing Regional Security Officer.

Responsibilities of the Foreign National Sponsor:

1. Export Control – The foreign national's sponsor is responsible for obtaining any required export licenses and complying with any conditions of those licenses prior to the foreign national being provided access to the controlled technology onboard regardless of the technology's ownership.

2. The 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, NOAA (or DOC) employee. According to DOC/OSY, this requirement cannot be altered.

3. Ensure completion and submission of Appendix C (Certification of Conditions and Responsibilities for a Foreign National Guest) as required by NAO 207-12 Section 5.03.h.

APPENDICES

Appendix 1: Operating Area for HA-13-04 MHI RAMP

Appendix 2: Hawai‘i Island

Appendix 3: Maui County – Maui, Lāna‘i, Moloka‘i

Appendix 4: Kaua‘i County – Kaua‘i, Ni‘ihau

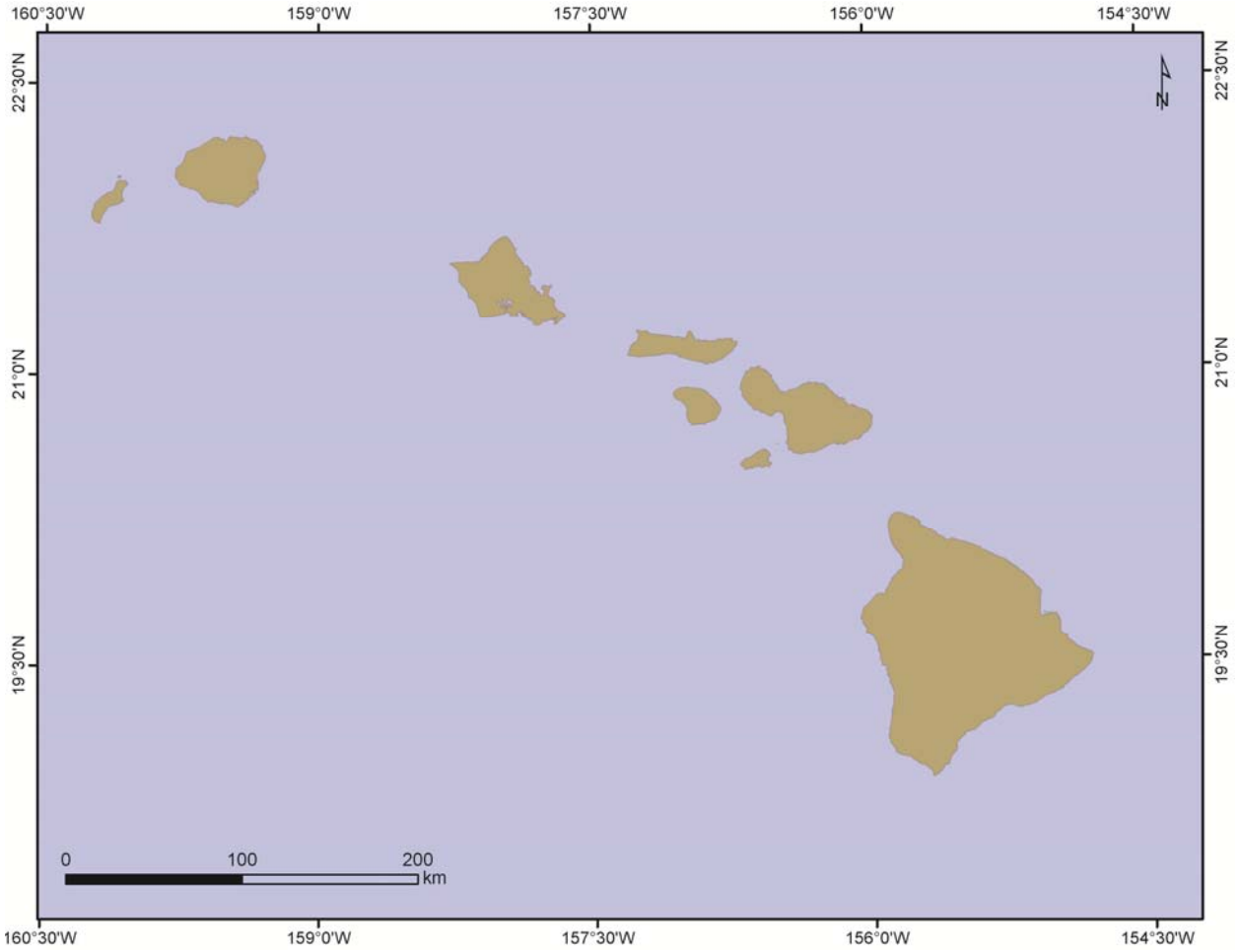
Appendix 5: O‘ahu

Appendix 6: Station/Waypoint List (coordinates in Latitude, Longitude: degree-minutes) (attached file)

Appendix 7: Dive Plans (attached file)

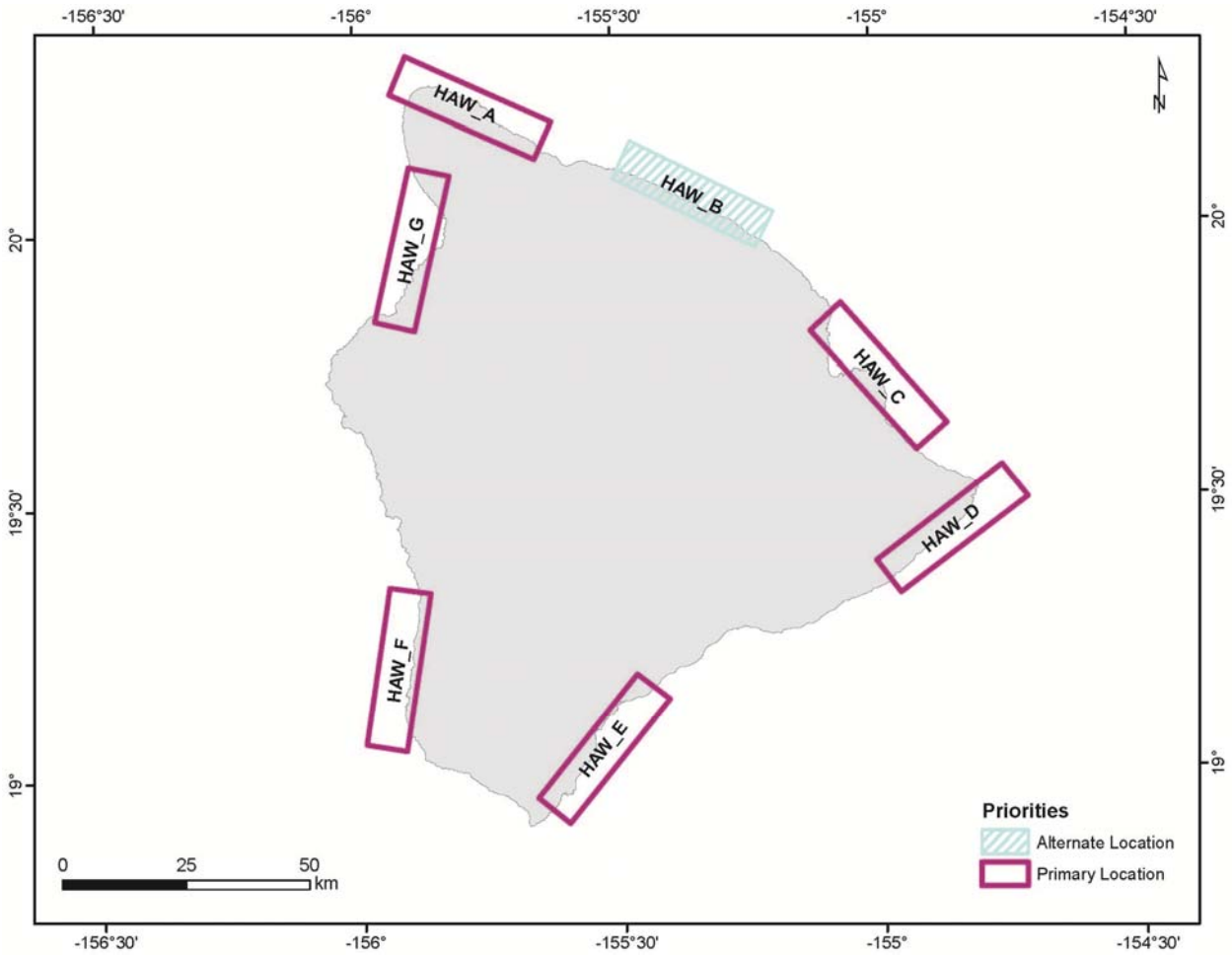
Appendix 8: Program Equipment List (attached file)

Appendix 1: Operating Area for HA-13-04 MHI RAMP



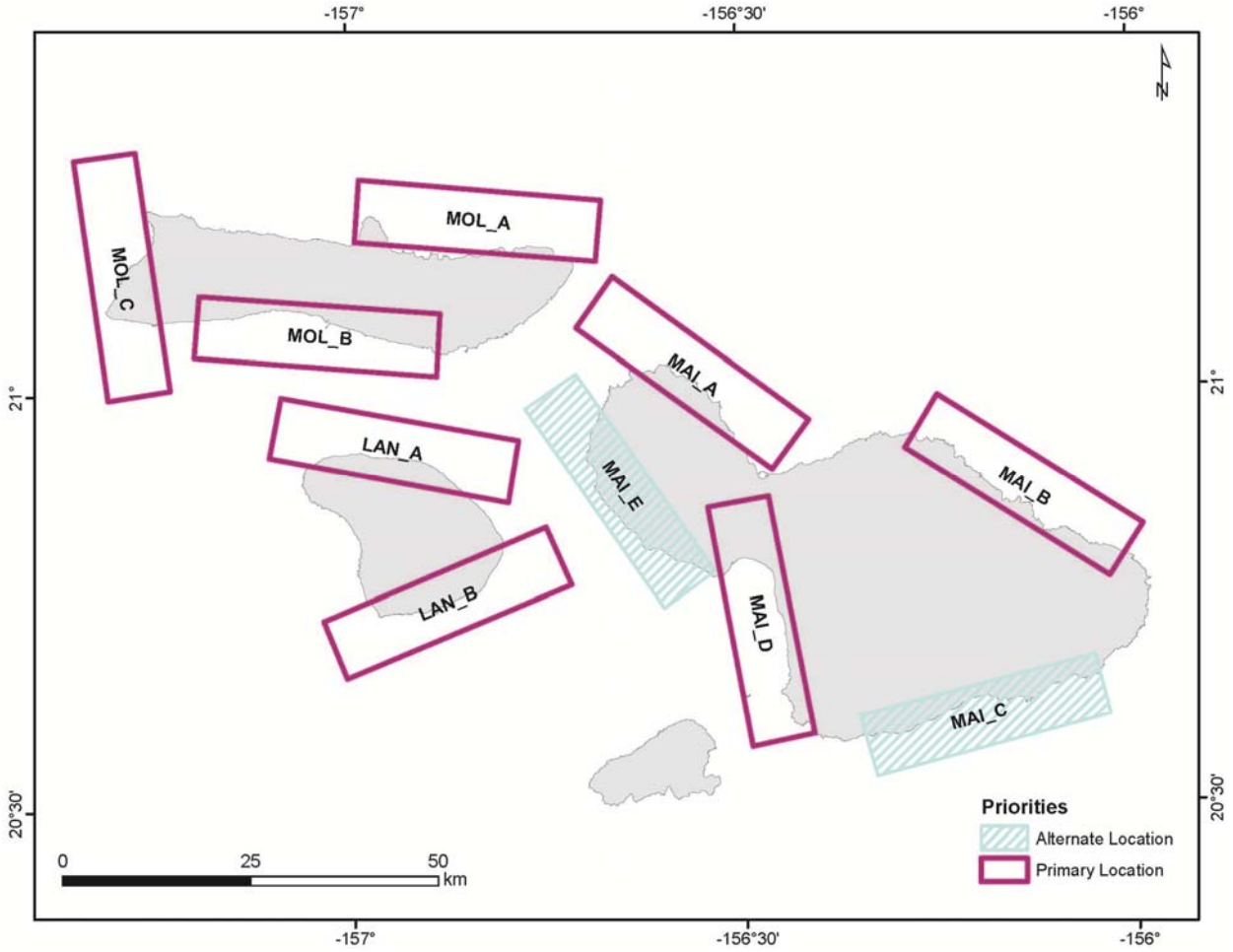
Operating Area for HA-13-04 MHI RAMP Encompasses the Waters of the Main Hawaiian Islands

Appendix 2: Hawai‘i Island



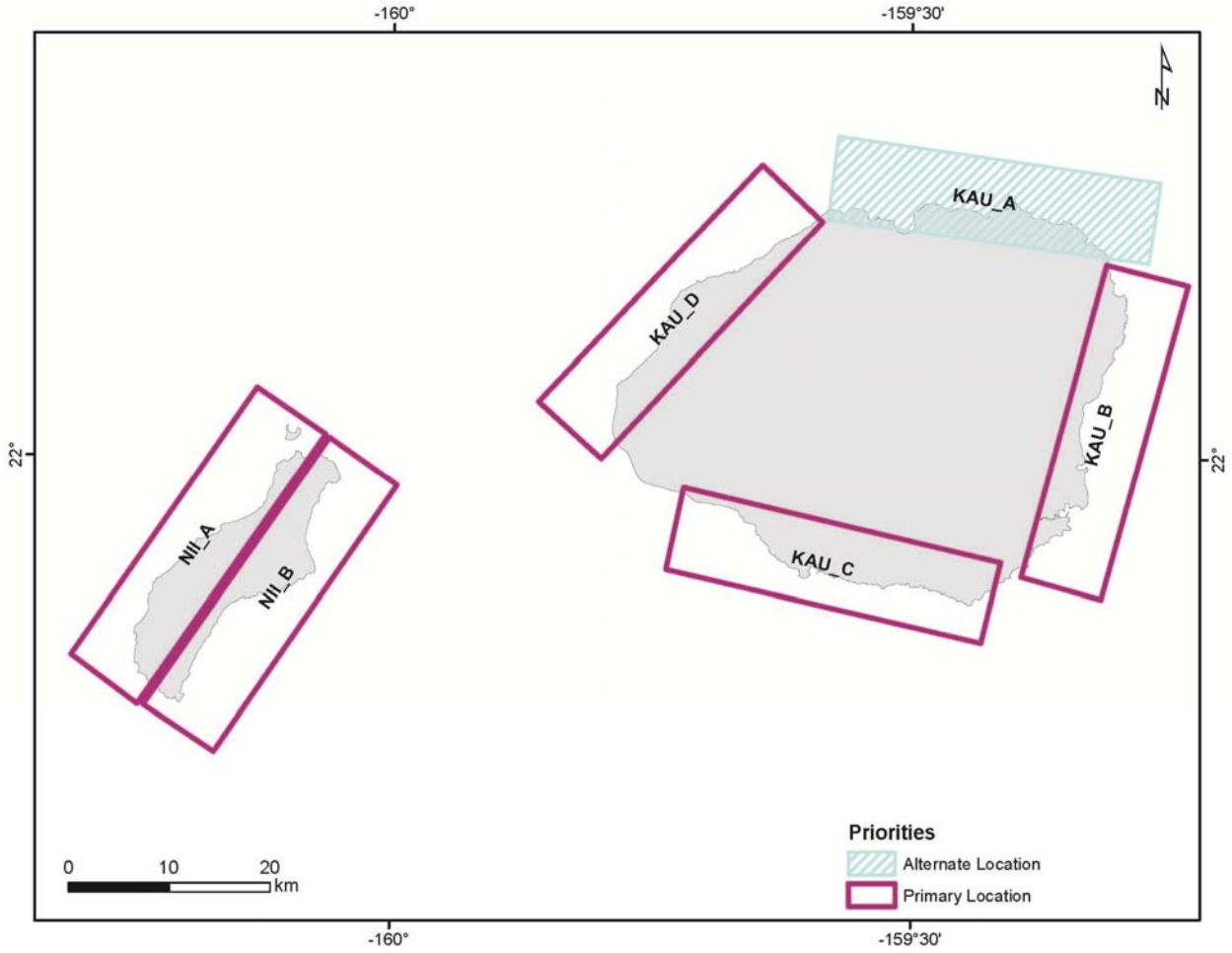
Generalized Survey Areas for Hawai‘i Island

Appendix 3: Maui County – Maui, Lāna‘i, Moloka‘i



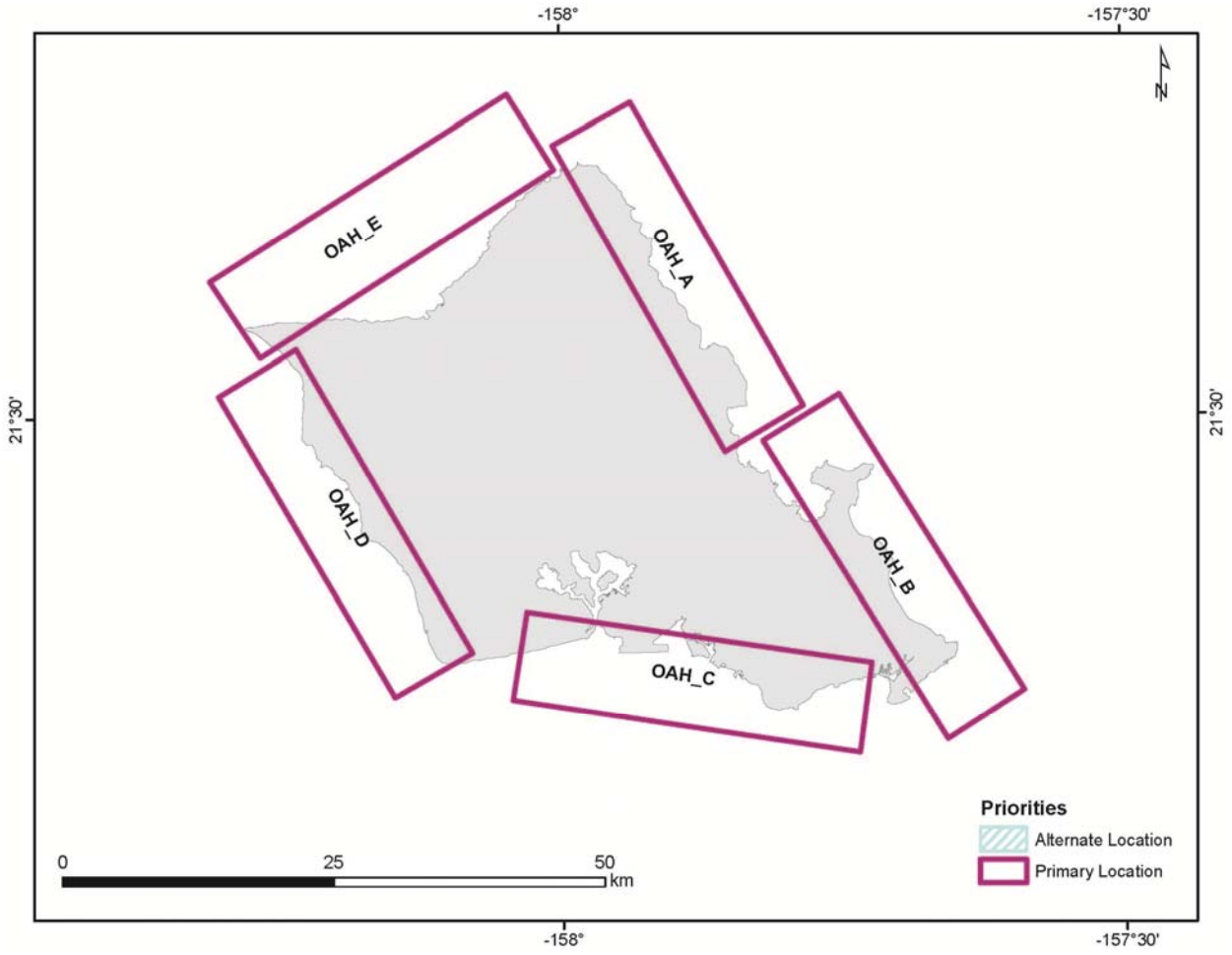
Generalized Survey Areas for the islands of Maui, Lāna‘i, and Moloka‘i

Appendix 4: Kauaʻi County – Kauaʻi, Niʻihau



Generalized Survey Areas for the islands of Kauaʻi and Niʻihau

Appendix 5: O‘ahu



Generalized Survey Areas for the island of O‘ahu

Appendix 6: Station/Waypoint List (coordinates in Latitude, Longitude: degree-minutes)

(Attached File)

(Waypoints fall within the survey boxes identified in Appendices 2 – 5.)

Appendix 7: **Dive Plans**

(Attached File)

Appendix 8: Program Provided Equipment List

(Attached File)