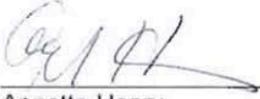




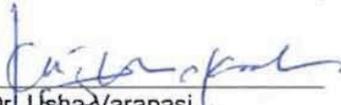
UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL MARINE FISHERIES SERVICE  
Southwest Fisheries Center  
8604 La Jolla Shores Drive  
La Jolla, California 92037

## Cruise Instructions

Date Submitted: 04 July 2010  
Platform: NOAA Ship McArthur II  
Cruise Number: M2-10-03 / SWFSC Cruise No 1641  
Project Title: Hawaiian Islands Cetacean and Ecosystem Assessment Survey (HICEAS)  
Cruise Dates: 04 August to 11 December 2010

Prepared by:  Dated: 09 July 10  
Annette Henry  
Survey Coordinator,  
Protected Resources Division, SWFSC

 Dated: 9 July '10  
Dr. Jay P. Barlow  
Chief Scientist, HICEAS  
Protected Resources Division, SWFSC

Approved by:  Dated: 7/9/10  
Dr. Usha Varanasi  
Research and Science Director  
Southwest Fisheries Science Center

Approved by:  Michele Bullock Captain, NOAA  
2010.07.22 18:48:14 -07'00'  
Dated: \_\_\_\_\_  
Captain Michelle G. Bullock, NOAA  
Commanding Officer  
Marine Operations Center - Pacific



## I. Cruise Overview

### I.A Cruise Period

*McArthur II*: 04 August 2010 – 11 December 2010

*Sette*: 01 September 2010 – 29 October 2010

### I.B Operating Area

Waters of the Hawaiian Island Chain extending off shore to the limits of the U.S. EEZ. The study area for this project covers waters from 15°N and 151°W to 32°N and 178°E. A geographic map of the tracklines to be accomplished is shown in Appendix VIII.A. In addition to the tracklines shown in the appendix, a circumnavigation of islands is planned between the 500 m and 1000 m isobaths.

### I.C Summary of Objectives

The project is a cetacean and ecosystem assessment survey with two vessels. The activities of the other vessel, NOAA Ship *Oscar Elton Sette*, are covered separately.

The HICEAS 2010 cruise is a marine mammal assessment survey of the waters of the Hawaiian Island Chain extending off shore to the limits of the U.S. Exclusive Economic Zone. The overall objective of the HICEAS cruise is to estimate the abundance and understand the distribution of dolphins and whales which are commonly found in the waters around the Hawaiian Islands. In addition, biological and oceanographic data will be collected to better characterize their environment. Other objectives include biopsy sampling, photo-identification, and acoustic study of sounds produced by Hawaiian cetaceans. The project takes a multidisciplinary approach.

- I.C.1 Data on cetacean distribution, school size, and school composition are collected to determine abundance.
- I.C.2 Oceanographic data are collected to characterize habitat and its variation over time.
- I.C.3 Data on distribution and abundance of seabirds, prey fishes, and squids will further characterize the ecosystem in which these cetaceans live.
- I.C.4 Skin biopsies of cetaceans provide a database for investigations of stock structure and phylogenetic relationships.
- I.C.5 Photographs document geographic variation in dolphin morphology and pigment patterns and distribution of individual large whales.

### I.D Participating Institutions:

NOAA/NMFS, Southwest Fisheries Science Center (SWFSC) Protected Resources Division (PRD) and NOAA/NMFS, Pacific Islands Fisheries Science Center (PIFSC) Protected Resources Division (PRD)

### I.E Personnel: Science Party, 14 berths:

Acoustic calibration staff (03 Aug only, no berthing required)

Position	Name	Affiliation	Citizenship
Acoustics	TBD	SWFSC	USA
Acoustics	TBD	SWFSC	USA

### Leg 1:

04 August – Depart San Diego, CA 09:00 h

Position	Name	Affiliation	Citizenship
Cruise Leader	Jay Barlow	SFWSC	United States
Sr. Mammal Observer	James Cotton	SWFSC	United States
Sr. Mammal Observer	Richard Rowlett	SWFSC	United States
Mammal Observer	Juan Carlos Salinas	Ocean Associates, Inc.	Mexico

Mammal Observer	Suzanne Yin	SWFSC	United States
Mammal Observer	Desray Reeb	SWFSC	United States
Mammal Observer	TBD	SWFSC	United States
Seabird Observer	Michael Force	Ocean Associates, Inc.	Canada
Seabird Observer	Sophia Webb	SWFSC	United States
Acoustician	Cornelia Oedekoven	Ocean Associates, Inc.	Germany
Acoustician	Yvonne Barkley	Ocean Associates, Inc.	United States
Acoustician	Anne Simonis	Scripps Institution of Oceanography	United States
Oceanographer	TBD	SWFSC	United States
Visiting Scientist	TBD	SWFSC	United States

**Leg2:**

<b>Position</b>	<b>Name</b>	<b>Affiliation</b>	<b>Citizenship</b>
Cruise Leader	Karin Forney	SFWSC	United States
Sr. Mammal Observer	James Cotton	SWFSC	United States
Sr. Mammal Observer	Richard Rowlett	SWFSC	United States
Mammal Observer	Suzanne Yin	SWFSC	United States
Mammal Observer	Desray Reeb	SWFSC	United States
Mammal Observer	TBD	SWFSC	United States
Mammal Observer	TBD	SWFSC	United States
Seabird Observer	Michael Force	Ocean Associates, Inc.	Canada
Seabird Observer	Sophia Webb	SWFSC	United States
Acoustician	Cornelia Oedekoven	Ocean Associates, Inc.	Germany
Acoustician	Eiren Jacobson	SWFSC	United States
Acoustician	Anne Simonis	Scripps Institution of Oceanography	United States
Oceanographer	Candice Hall	Ocean Associates, Inc.	United Kingdom
Visiting Scientist	Cotton Rockwood	Scripps Institution of Oceanography	United States

**Leg 3:**

<b>Position</b>	<b>Name</b>	<b>Affiliation</b>	<b>Citizenship</b>
Cruise Leader	Lisa Ballance	SFWSC	United States
Sr. Mammal Observer	James Cotton	SWFSC	United States
Sr. Mammal Observer	Richard Rowlett	SWFSC	United States
Mammal Observer	Suzanne Yin	SWFSC	United States
Mammal Observer	Desray Reeb	SWFSC	United States
Mammal Observer	TBD	SWFSC	United States
Mammal Observer	TBD	SWFSC	United States
Seabird Observer	Michael Force	Ocean Associates, Inc.	Canada
Seabird Observer	Sophia Webb	SWFSC	United States
Acoustician	Cornelia Oedekoven	Ocean Associates, Inc.	Germany
Acoustician	Danielle Cholewiak	Woods Hole Oceanographic Institution	United States
Acoustician	Tina Yack	Ocean Associates, Inc.	United States
Oceanographer	TBD	United States	United States
Visiting Scientist	Robert Pitman	SWFSC	United States

**Leg 4:**

<b>Position</b>	<b>Name</b>	<b>Affiliation</b>	<b>Citizenship</b>
Cruise Leader	Barbara Taylor	SFWSC	United States
Sr. Mammal Observer	James Cotton	SWFSC	United States
Sr. Mammal Observer	Richard Rowlett	SWFSC	United States
Mammal Observer	Suzanne Yin	SWFSC	United States

Mammal Observer	Desray Reeb	SWFSC	United States
Mammal Observer	TBD	SWFSC	United States
Mammal Observer	TBD	SWFSC	United States
Seabird Observer	Michael Force	Ocean Associates, Inc.	Canada
Seabird Observer	Sophia Webb	SWFSC	United States
Acoustician	Cornelia Oedekoven	Ocean Associates, Inc.	Germany
Acoustician	Joy Stanistreet	Woods Hole Oceanographic Institution	United States
Acoustician	Amanda Cummins	Scripps Institution of Oceanography	United States
Oceanographer	TBD	United States	United States
Visiting Scientist	Matt Leslie	Scripps Institution of Oceanography	United States

**Leg 5:**

<b>Position</b>	<b>Name</b>	<b>Affiliation</b>	<b>Citizenship</b>
Cruise Leader	Jeremy Rusin	SFWSC	United States
Sr. Mammal Observer	James Cotton	SWFSC	United States
Sr. Mammal Observer	Richard Rowlett	SWFSC	United States
Mammal Observer	Suzanne Yin	SWFSC	United States
Mammal Observer	Desray Reeb	SWFSC	United States
Mammal Observer	TBD	SWFSC	United States
Mammal Observer	TBD	SWFSC	United States
Seabird Observer	Michael Force	Ocean Associates, Inc.	Canada
Seabird Observer	Sophia Webb	SWFSC	United States
Acoustician	Cornelia Oedekoven	Ocean Associates, Inc.	Germany
Acoustician	Joy Stanistreet	Woods Hole Oceanographic Institution	United States
Acoustician	Amanda Cummins	Scripps Institution of Oceanography	United States
Oceanographer	TBD	United States	United States
Visiting Scientist	TBD	PIFSC Scientist	United States

**I.F Administrative**

**I.F.1 Points of Contact:**

Annette Henry, Survey Coordinator, SWFSC  
8604 La Jolla Shores Drive  
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Cell: (760) 920-1546  
SurveyCoordinator.SWFSC@noaa.gov

Co-Chief Scientist  
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(858) 546-7173  
Jay.Barlow@noaa.gov

Co-Chief Scientist  
Erin Oleson HICEAS Co-Chief Scientist  
Pacific Islands Fisheries Science Center  
1601 Kapiolani Blvd, Suite 1110

Honolulu, HI 96814  
(808) 944-2172  
Erin.Oleson@noaa.gov

Alternative land based POC  
Jeremy Rusin, PRD Deputy Director  
Southwest Fisheries Science Center  
8604 La Jolla Shores Drive  
La Jolla, CA 92037  
(858) 546-7101  
Jeremy.Rusin@noaa.gov

Ship POC – M2 Operations Officer  
LT J/G John Peterson  
NOAA Ship McArthur II  
(808) 659-5292  
Ops.McArthur@noaa.gov

Agent if needed: N/A

**I.F.2 Diplomatic Clearances:** N/A

**I.F.3 Licenses and Permits:**

This cruise will be conducted under the Scientific Research Permit (U.S.) 774-1714-10 issued by US Department of Commerce / National Oceanic and Atmospheric Administration. There are multiple permits/licenses for the survey and the Chief Scientist or Cruise Leader will maintain a file of all permits while aboard the ship. A copy of all permits will be provided to the Operations Officer prior to sail.

## II. Operations

### II.A Cruise Plan Itinerary

Ship Loading: 01-03 Aug – San Diego, CA

Leg 1: 04 Aug – Depart San Diego, CA

11 Dec – Arrive San Diego, CA

**Total 120 DAS**

### II.B Staging and Destaging

Ship will tie up in San Diego at the 10<sup>th</sup> Avenue Marine Terminal

#### II.B.1 Staging

Staging will take place on 02-03 August and will require ship's assistance as follows:

Deck Department: Crane operations and location of equipment storage; acoustic winch will need to be chained to aft deck

Engineering: Logistics and equipment for welder to weld acoustic winch to aft deck

Electronics Technician: Assistance with computer connections; SCS and oceanographic equipment

Survey Technician: Assistance with CTD, SCS, and oceanographic equipment

Acoustic calibration will occur on 03 August and requires Deck Department to have strung a weighted, non-polypropylene line under the bow prior to docking

Pier-side crane services will be contracted by SWFSC to transport scientific equipment to flying bridge; all other equipment needing to be craned will require the use of the ship's crane. When docking the ship at the Tenth Avenue Marine

Terminal pier, fenders, camels, and booms should be positioned such that there are unobstructed paths for the tethers between the dockside downrigger(s) and the calibration sphere. Within the constraints, the vessel should be moored in the deepest-possible water. In advance of the calibration, approximately one week prior, the Chief ET will send copies of the Simrad transducer-calibration reports for each transducer to the Survey Coordinator (surveycoordinator.swfsc@noaa.gov).

#### **II.B.2 Destaging**

Destaging will take place at the Port of San Diego 10<sup>th</sup> Avenue Terminal on 11 December 2010 in order that the ship may leave on 12 December. The scientific party will offload their equipment as soon as the ship has been cleared by the US Fish and Wildlife Service (USFWS). Because a substantial quantity of samples are expected to be collected during the survey, the US Fish and Wildlife Service (USFWS) inspection may take several hours. During this time, officers, crew, and scientists will be required to remain aboard the ship until the USFWS allows departures.

Acoustic calibration will occur on 11 December and requires Deck Department to have strung a weighted, non-polypropylene line under the bow prior to docking. . . When docking the ship at the Tenth Avenue Marine Terminal pier, fenders, camels, and booms should be positioned such that there are unobstructed paths for the tethers between the dockside downrigger(s) and the calibration sphere. Within the constraints, the vessel should be moored in the deepest-possible water.

Pier-side crane services will be contracted by SWFSC in order to transport scientific equipment down from the flying bridge. All other equipment needing to be craned will require the use of the ship's crane.

#### **II.B.3 Equipment transfer from NOAA Ship McArthur II to NOAA Ship Sette:**

At the end of Leg 1, scientific gear will need to be transferred from NOAA ship McArthur II to NOAA Ship Sette. The equipment transfer will need to occur at Ford Island because of crane availability and should take place upon arrival to Hawaii, 21 August 2010. Equipment will be stored at Ford Island until transferred to NOAA Ship Sette. The Deck Department will be needed to assist with craning.

#### **II.B.4. Biological samples and SWFSC equipment transfer to NOAA Ship McArthur II:**

At the end of Leg 4, biological samples collected and SWFSC equipment loaned to PIFSC for HICEAS will need to be transferred to NOAA ship McArthur II. The equipment transfer will need to occur at Ford Island because of crane availability and should take place upon arrival to Hawaii, 27 November 2010. The Deck Department will be needed to assist with craning.

### **II.C Operations to be Conducted**

**II.C.1 Visual Surveys:** Line-transect survey methods will be used to collect cetacean abundance data. A daily watch for cetaceans will be maintained on the flying bridge during daylight hours (approximately 0600 to 1900) by six (6) mammal observers. Each observer will work in 2-hour rotations, manning each of the following three stations on the flying bridge for 40 minutes: a port side 25x150 binocular station, a center-line data recorder position, and a starboard 25x150 binocular station. An "independent observer" may keep a separate watch of animals sighted during the cetacean survey operations, to be compared later with the observer team's data.

Visual surveys of seabirds will be conducted from the flying bridge during daylight hours by

two seabird observers. Seabird observers will use handheld and 25x150 binoculars.

Ship Speed, Order of Operations: At the beginning of each day search effort should start on the trackline. The *McArthur II* should travel at 10kt (through the water) along the designated trackline. While on search effort, if the ship's speed through the water should deviate from this by more than 1kt, the bridge personnel will notify the mammal team on watch or the Cruise Leader.

On sighting a marine mammal school or other feature of biological interest, the Cruise Leader or marine mammal observer team on watch may request that the vessel be maneuvered to approach the school or feature for investigation. When the ship approaches a school of dolphins, the observers will make independent estimates of school size. Biopsy and photography operations may commence from the bow, based on directions from the Cruise Leader or Senior Marine Mammal Observers. In some instances, the Cruise Leader will request the deployment of a small boat for biopsy, photography, or other operations.

It may occasionally be necessary to divert the ship's course from the established trackline during regular effort due to glare or adverse sea conditions. Under these circumstances, the ship may divert up to 30 degrees from the established course. This deviation may continue until the ship is 5nm from the trackline, at which point the ship should turn back toward the trackline.

When the observers have completed scientific operations for the sighting, the ship will resume the same course and speed as prior to the sighting. If the pursuit of the sighting has taken the ship more than 5nm from the trackline, the observers should be notified. The Cruise Leader or Senior Marine Mammal Observers may request that, rather than proceed directly toward the next waypoint, the ship take a heading of 20 degrees back toward the trackline or return to the position at which the ship diverted before resuming effort.

At the end of effort, the ship will continue along the trackline until time to conduct the CTD; this additional transit time is necessary to complete all tracklines.

Ship Equipment Required: Observation computers (mammal and seabirds) will be hooked up to the ship's GPS (for course, speed and position information) and SCS (for weather and heading information). If the SCS goes down for any reason, the ship's Electronics Technician must manually restart the WINDACS\_MAC event (in addition to the other events). A log of observation conditions, watch effort, sightings and other required information will be entered into a computer which needs to be linked to the ship's GPS (for course, speed and position information) and SCS (for weather and heading information). Please note that it is very important that all science computers be connected to the same ship GPS.

Ship Personnel Requirements: Weather permitting, observer teams on the flying bridge will conduct visual watches for marine mammals and seabirds during all daylight hours (from sunrise to sunset). The Commanding Officer shall ensure that the flying bridge work area is smoke-free at all times when marine mammal or seabird observers are on watch.

**II.C.2 Biopsy Sampling:** Samples for genetic analyses of cetaceans will be collected on an opportunistic basis. Necessary permits will be present on the vessel.

Ship Speed, Order of Operations: The animals to be sampled will be approached by the research vessel during normal survey operations, will approach the vessel on their own or will be approached by a small boat. Samples will be collected, from animals within 10 m to 100 m of the bow of the vessel, using a dart fired from a crossbow or rifle. Small boat deployment will be requested by the Cruise Leader on an opportunistic basis during all

daylight hours, possibly multiple times in a single day, providing the Commanding Officer concurs that operating conditions are safe. Unless the Commanding Officer allows otherwise, the small boat will remain within sight and radio contact at all times while deployed.

Ship Equipment Required: With the exception of the small boat and safety gear, all necessary gear will be furnished and operated by the scientific party.

Ship Personnel Requirements: Ship personnel are required for launching and piloting small boat.

**II.C.3 Photography:** Photographs of marine mammals will be taken on an opportunistic basis. These will be used to study social behavior and movement patterns of identified individuals, and to study geographic variation. Necessary permits will be present on the vessel.

Ship Speed, Order of Operations: The animals to be sampled will be approached by the research vessel during normal survey operations, will approach the vessel on their own or will be approached by a small boat. Small boat deployment will be requested by the Cruise Leader on an opportunistic basis during all daylight hours, possibly multiple times in a single day, providing the Commanding Officer concurs that operating conditions are safe. Unless the Commanding Officer allows otherwise, the small boat will remain within sight and radio contact at all times while deployed.

Ship Equipment Required: With the exception of the small boat and safety gear, all necessary gear will be furnished and operated by the scientific party.

Ship Personnel Requirements: Ship personnel are required for launching and piloting small boat.

**II.C.4 Satellite Tagging:** Satellite tags may be deployed onto certain cetacean species on an opportunistic basis. Necessary permits will be present on the vessel.

Ship Speed, Order of Operations: The animals to be tagged will be approached by a small boat. Tags will be deployed onto animals within 5 m to 10 m of the bow of the vessel, using a dart fired from a pneumatic rifle or crossbow. Small boat deployment will be requested by the Cruise Leader on an opportunistic basis during all daylight hours, possibly multiple times in a single day, providing the Commanding Officer concurs that operating conditions are safe. Unless the Commanding Officer allows otherwise, the small boat will remain within sight and radio contact at all times while deployed.

Ship Equipment Required: With the exception of the small boat and safety gear, all necessary gear will be furnished and operated by the scientific party.

Ship Personnel Requirements: Ship personnel are required for launching and piloting small boat (if ship's small boat).

**II.C.5 Salvage of Marine Mammals and Birds:** Marine mammal body parts and/or birds may be salvaged on an opportunistic basis at the discretion of the Cruise Leader. This includes whale and dolphin ivory and carcasses, and whole bird specimens. In the event that this occurs, scientific freezer space will be used to store the salvaged material. Permits to salvage and import marine mammal parts and birds will be present on the vessel. All marine mammal specimens obtained will be archived at the SWFSC but may be released on extended loan to recognized research institutions according to existing guidelines. All bird specimens will be donated to the San Diego Natural History Museum.

## **II.C.6 Passive Acoustics:**

**II.C.6.a Towed Hydrophone Array:** A towed hydrophone array will be deployed approximately 300m behind the vessel during daylight hours on all legs, weather permitting. The array will be deployed by the acoustics personnel prior to the start of visual observations, and will be retrieved each evening after search effort ends. Acoustics personnel will monitor the array, record sounds made by cetaceans, and localize their positions.

**Ship Speed, Order of Operations:** The array will be retrieved at the end of visual effort, or at other times as requested. To retrieve the array, the ship will first slow down to 5kt and maintain its current heading. During array retrieval and deployment, the ships' course and speed must be maintained. During Leg 1, the cruise leader and acoustic team will work with the Commanding Officer to assess the maneuvering limits of the ship for this array (typically, vessel speed must be within 3 and 10 kts, turning must not exceed 180°, and rudder angle must not exceed 3°). The acoustics team must be informed of potential hazards, such as fishing gear, with the maximum lead time.

**Ship Equipment Required:** The array will be wound onto a hydraulic-powered winch supplied by the SWFSC. The winch and hoses will be provided by SWFSC; the ship will provide hydraulic power and connectors. Hookup to a ship-powered hydraulic system will be required. With the exception of the hydraulic winch hookups and safety apparel, all of the necessary equipment will be supplied and operated by scientific personnel.

**Ship Personnel Requirements:** Ship personnel are needed to secure the acoustic winch to the deck using ship steel plates and then hook-up the winch to ship-powered hydraulic system; SWFSC will provide welder if needed.

**II.C.6.b Sonobuoys:** Sonobuoys may be deployed periodically from either the *McArthur II* or a small boat on an opportunistic basis at the discretion of the Cruise Leader.

**Ship Speed, Order of Operations:** The acoustics personnel will contact the bridge to ask permission to deploy the sonobuoy immediately prior to deployment.

To improve sonobuoy reception, we ask that the bridge minimize unnecessary radio communication and/or use hand-held radios for the duration of the sonobuoy deployment. The ship should not alter its course until 1 minute after deployment of sonobuoy, to reduce the possibility of hitting sonobuoy with array.

**Ship Equipment Required:** The ship will provide sonobuoy antennae and cable run to dry lab. With the exception of the small boat and safety apparel, all of the necessary equipment will be supplied and operated by scientific personnel.

**Ship Personnel Requirements:** N/A

**II.C.6.c BURP Hydrophone:** a self-contained floating hydrophone and recording system (BURP) will be deployed (and retrieved) from the small boat during opportunistic encounters with certain cetacean species, as determined by the cruise leader and acousticians on duty.

**Ship Speed, Order of Operations:** During BURP deployment, both the MAC and the

small boat will be asked to minimize ship noise during the experiment. This will be outlined in specific protocol to be provided during first cruise meeting.

Ship Equipment Required: With the exception of the small boat and safety apparel, all of the necessary equipment will be supplied and operated by scientific personnel.

Ship Personnel Requirements: N/A

**II.C.6.d C-POD Buoy:** An autonomous acoustic recording device (C-POD and associated buoys & satellite tracking device) may be deployed from the *McArthur II* while enroute from San Diego to Hawaii. The buoy package will include one lighted buoy and one flag buoy. If the C-POD is deployed, it will be retrieved during the return trip from Hawaii to San Diego.

Ship Speed, Order of Operations: The cruise leader will contact the bridge to ask permission to deploy the C-POD buoy prior to deployment. The ship should reduce speed to dead slow and orientate the ship with respect to the wind and swell so as to drift away from the deployed buoy.

For retrieval, the ship's navigation officer will be given the GPS location of the buoy prior to leaving Hawaii and plot a return trip to intercept the buoy. The position of the buoy will be updated twice per day with positions accurate to within 100 m. The ship will approach the buoy during daylight hours. Visual observers on the flying bridge will aid relocation of the buoy. If weather conditions permit, a small boat will be launched to retrieve the buoys and recording package. If weather does not permit a small-boat pickup, the *McArthur II* will approach the buoy and snag it using a thrown grappling hook. The package will then be retrieved by hand.

Ship Equipment Required: Small grappling hook and throwing line.

Ship Personnel Requirements: N/A

## **II.C.7 Oceanography:**

Ship Speed, Order of Operations: A chronological record of oceanographic and net tow stations will be kept by the ship (Marine Operations Log) with dates and times in GMT. The ship will provide a copy of the electronic marine operations log (with the cruise Weather Log and SCS data) to the SWFSC oceanographer at the completion of the cruise.

Ship Personnel Requirements: The collection of oceanographic samples and their processing will be conducted by the oceanographer, ship's Survey Technician, and other designated scientists with assistance from the Deck Department as required.

**II.C.7.a XBT Drops:** There will be a minimum of three XBT drops per day. These drops will be conducted primarily at 0900, 1200 and 1500 local ship time, or as requested by the Cruise Leader. XBT drops may also be conducted at 1800, if sunset occurs after 1900. XBTs may be deployed to replace CTD casts.

Ship Speed, Order of Operations: If the vessel is stopped at the scheduled launch time, the drop will be delayed until the ship is again underway at approximately 2 kts or more. If the vessel is not going to move within half an hour, the individual performing the drop should be notified and the drop will be delayed or canceled, at the discretion of the Cruise Leader. Fishing lines must be removed for the XBT deployment.

Ship Equipment Required: XBTs will be provided by the Southwest Fisheries Science Center, the Sippican MK-21 system will be provided by the SWFSC and maintained by the ship, and the ship will provide the launcher and computer.

Ship Personnel Requirements: XBTs will be conducted by the oceanographer, ship's Survey Technician, and other designated scientists, while underway during the day.

**II.C.7.b Surface Water Samples:** A minimum of four surface water samples will be taken each day, primarily at sunrise, 0900, 1200, and 1500 hours local ship time daily. Samples may be collected at 1800, if sunset occurs after 1900. The samples will be analyzed for chlorophyll. Surface water samples may also be collected more frequently in pre-determined locations to sample fine scale structure.

Ship Speed, Order of Operations: N/A

Ship Equipment Required: N/A

Ship Personnel Requirements: Oceanographic sampling will be done by the oceanographer, ship's Survey Technician, and other designated scientists, while underway during the day.

**II.C.7.c Thermosalinograph Sampling:** The ship's TSG will continuously collect surface water temperature and salinity.

Ship Speed, Order of Operations: N/A

Ship Equipment Required: The ship will provide and maintain a thermosalinograph (TSG), which is calibrated and in working order, for continuous measurement of surface water temperature and salinity. The TSG needs to be cleaned following Sea-Bird Electronics protocols between each leg of cruise to prevent inaccurate salinity measurements. The Scientific Computing System (SCS) will serve as the main data collection system.

Ship Personnel Requirements: The oceanographer will provide the ship's Operations Officer and Electronics Technician with detailed SCS acquisition information before departure. The SCS data acquisition will be stopped and restarted weekly so the data files can be backed up and checked for errors. All SCS data will be provided to the SWFSC oceanographer following each leg of the cruise. Ship personnel will be responsible for cleaning the TSG following Sea-Bird Electronics protocols between each leg of the cruise.

#### **II.C.7.d CTD Sampling:**

**II.C.7.d.1 Deck Pressure Tests for Each Leg:** A deck pressure test is required at the beginning of each leg (five times throughout cruise) and before any cast where the SBE 9plus has been replaced.

Ship Speed, Order of Operations: The test takes approximately 30 minutes to complete.

Ship Equipment Required: see section II.C.6.e.3

Ship Personnel Requirements: the Oceanographer and the ship's Survey Technician should conduct the test before leaving the dock; the CTD should be in its normal at-sea position on the ship.

**II.C.7.d.2 CTD Bottle-test Cast for Each Leg:** An additional CTD cast is needed on the first evening of oceanographic operations for each leg of the cruise. This cast will be used to test the agreement among salinity samples collected from all CTD bottles.

Ship Speed, Order of Operations: The bottle-test cast will occur prior to first CTD cast on each leg of the cruise. For this cast, a maximum depth of 500m is needed; at this depth, all bottles will be fired. The rate of CTD ascent and descent for this cast can be 60m per minute. The oceanographer will need time to take salinity samples from all bottles before the regular CTD cast can be conducted. The total amount of time needed for this cast is expected to be one hour: 30 minutes for the cast, 15 minutes for the sampling, and 15 minutes to prepare the CTD for the regular evening cast.

Ship Equipment Required: See section II.C.6.e.3

Ship Personnel Requirements: Sampling will be done by the oceanographer, ship's Survey Technician, and other designated scientists.

**II.C.7.d.3 CTD Stations:** Weather permitting, two CTD stations will be occupied each day. A morning CTD will be completed 15 minutes before sunrise. No bottle samples will be collected during the morning cast. A second CTD station will be occupied each night no earlier than one hour after sunset. CTD data and seawater samples will be collected using a SeaBird 9/11*plus* CTD with rosette and Niskin bottles fitted with silicone tubing and o-rings (supplied by the scientific party). Dual Sea-Bird Electronics temperature and conductivity sensors and single pressure and oxygen sensors will be used to collect data from each cast. The ship's survey technician will be responsible for the CTD operations and maintenance.

Niskin bottle samples will be collected from 12 standard depths on all evening stations; the depths will be supplied by the oceanographer. Samples for chlorophyll will be collected from all depths  $\leq 250\text{m}$  and processed onboard. The 265ml chlorophyll samples will be filtered onto GF/F filters, placed in 10ml of 90% acetone, refrigerated for 24 hours, and then analyzed on a Turner Designs model 10AU field fluorometer. The oceanographer and the ship's survey technician will do sample collection and analysis.

Salinity samples will be taken from bottles selected by the oceanographer. The oceanographer and the ship's survey technician will do sample collection and analysis.

Ship Speed, Order of Operations: All casts are to 1000m, where bottom depths permit. When bottom depths are too shallow for the 1000m cast, the oceanographer and ship's survey technician will determine a safe depth for the cast and notify the bridge prior to operations. Cast descent rates will be 30m/min for the first 300m of the cast (to densely sample the thermocline), then 60m/min after that, including the upcast between bottles. The morning CTD cast should take no more than 45 minutes and must be completed 15 minutes before sunrise. The evening CTD cast will be conducted no sooner than one hour after sunset. After visual operations have concluded for the day, the ship will continue transiting until time to conduct the CTD. The

exact times will be determined by the Deck Officer (by 1800 local ship time that day). Cast times are subject to change since sunset will vary during the cruise and the schedule may be modified by the Oceanographer. Additional CTD stations may be requested by the Cruise Leader in areas of special interest.

Ship Equipment Required: The main Sea-Bird CTD system will be provided, maintained, and operated by the ship's survey technician. Scientific personnel will be trained to operate the A-frame; the crew of the vessel will operate winch and other deck equipment, and will be responsible for the termination (and any necessary reterminations) of the CTD cable pigtail to the conducting cable of the winch. All instruments, their spares, and spare parts provided by the ship must be maintained in working order and, if applicable, have current calibrations (within the previous 12 months). The SWFSC will provide a second set of temperature and conductivity sensors to be used on all casts; conducting CTD casts with two temperature and conductivity sensors provides immediate feedback about the performance of the sensors and the validity of the data. SWFSC will also provide an oxygen sensor. To ensure longevity of the CTD and bottles, the CTD must be rinsed completely with fresh water after every cast, and the CTD and rosette must then be covered and secured by the ship's survey technician.

Ship Personnel Requirements: The ship's survey technician will be responsible for the CTD operations and maintenance. The oceanographer and the ship's survey technician will do sample collection and analysis. The Deck Department will provide the needed personnel to assist with deployment.

#### **II.C.7.e Prey Fishes and Squids:**

**II.C.7.e.1 Acoustics:** The scientific EK60 depth sounder will be operated continuously at 38, 70, 120, and 200 KHz.

Ship Speed, Order of Operations: The vessel's navigational depth sounder may be used at the discretion of the Commanding Officer, but will normally remain off while underway in deep waters. The navigational depth sounder aboard NOAA Ship *McArthur II* is known to interfere with the EK60 scientific sounder. Since synchronization is not possible, the navigational sounder should remain off when not in shallow water. The ship's navigational depth sounders will be on when the ship is inshore in depths of 30 fathoms or less. The command will inform the Cruise Leader at any time the navigational depth sounders are used.

Ship Equipment Required: The EK60 will be interfaced to a data acquisition system to estimate micronekton biomass between 0 and 500 m.

Ship Personnel Requirements: N/A

**II.C.7.e.2 Dipnetting:** Concurrent with the evening CTD station, dipnetting or flyingfish may take place at the discretion of the cruise leader. Flyingfish specimens will be processed immediately and then frozen. Frozen samples will be kept at -20°C.

Ship Speed, Order of Operations: Dipnetting, when it occurs, will be concurrent with the evening CTD station

Ship Equipment Required: Attracting lights

Ship Personnel Requirements: N/A

**II.C.7.e.3 Collection of Fish and Cephalopods:** Fish and squid will be collected on an opportunistic basis at the discretion of the Cruise Leader. While underway, trolling gear will be used when conditions permit. While stationary, hook-and-line gear or jigs may be used. Fish will be measured, sexed, and stomach contents will be examined and recorded by scientific personnel. The Cruise Leader will be responsible for the disposition of the catch, in accordance with NOAA Administrative Order 202-735B, dated January 9, 1989.

Ship Speed, Order of Operations: N/A

Ship Equipment Required: N/A

Ship Personnel Requirements: When the hydrophone is being towed, all fishing lines must be manned by a fisherman within 10 feet of the attachment and must be retrieved immediately whenever the ship begins to turn. Fishing lines must be removed during XBT deployment. No fishing will take place in the Papahānaumokuākea Marine National Monument.

**II.C.7.f Underway pCO<sub>2</sub> System:** The Pacific Marine Environmental Laboratory's underway pCO<sub>2</sub> system will measure the partial pressure of CO<sub>2</sub> in the air and surface water while the ship is underway. The pCO<sub>2</sub> values, along with wind data, temperature, and salinity are used to calculate the flux of CO<sub>2</sub> at the air-sea interface.

Ship Speed, Order of Operations: N/A (continuous operations)

Ship Equipment Required: The system requires 3 liters of seawater per minute and determined CO<sub>2</sub> content with a Licor infrared detector.

Ship Personnel Requirements: Equipment maintenance, including: daily verification that the system is operating correctly, e-mail transmission of CO<sub>2</sub> data to PMEL, and replacement of magnesium perchlorate desiccant every 3 days is the responsibility of the ship's Survey Technician.

**II.C.7.g Argo Buoy Deployments:** Argo buoys will be deployed by scientific personnel to improve coverage in the Pacific Ocean; Argo is a major contributor to the WCRPs Climate Variability and Predictability Experiment (CLIVAR) and to the Global Ocean Data Assimilation Experiment (GODAE). The Argo array is part of the Global Climate Observing System/Global Ocean Observing System GCOS/GOOS.

Ship Speed, Order of Operations: The location of the deployments will be in the vicinity of 27° N, 169° W; the times of the deployments will be determined by the Cruise Leader in consultation with the Command. Buoys will be deployed by a member of the scientific party after notifying the Deck Officer. The buoys will be loaded in Seattle and secured in a weather-protected area and stored horizontally at all times.

Ship Equipment Required: N/A

Ship Personnel Required: N/A

**II.C.8 End of Operations (Transit at Night):** When scientific operations are complete for the night, the ship will resume course along the trackline, at a speed determined by the Cruise Leader. It is estimated that the ship will need to transit between 50 and 100 nmi per night. The Cruise Leader will determine the nightly transit length on a daily basis.

**II.D Dive Plan: N/A**

**II.E Applicable Restrictions: N/A**

### **III. Equipment**

#### **III.A Equipment and Capabilities Provided by the Ship:**

We request the following systems and their associated support services, sufficient consumables, back-up units, and on-site spares. All measurement instruments are assumed to have current calibrations and we request that all pertinent calibration information be included in the data package.

1. Insulated cable running from location site for CPUs (CSCI stateroom) to the flying bridge consoles; cabling should have been replaced during winter inport
2. Power, ship's GPS, and ship's SCS connections to CPUs running the flying bridge consoles (Please note that it is very important that all science computers be connected to the same ship's GPS)
3. Canopy on flying bridge
4. Three handheld radios (as spares)
5. Small boat, including spare parts, for biopsy sampling, photography, seabird collection and marine turtle research
6. Freezer space for biological samples (2-45 cu. ft./standard chest freezer and 3 cu. Ft. -80° freezer)
7. Seabird 9/11+ CTD system including rosette with Niskin bottles (2.5L, 12 each)
8. Oceanographic winch with minimum 500m of .375" conducting wire, terminated to CTD
9. Bottom depth checking prior to CTD operations in depths less than 2000m.
10. SeaBird thermosalinograph (SBE45) and connection to SCS
11. Connection of SBE38 to ship's SCS (secondary temperature sensor for TSG)
12. Sippican XBT launcher (prefer aft deck location) and connection to Sippican software
13. Fume Hood (located in aft lab, aft counter, left side)
14. Small refrigerator for chlorophyll sample extraction (aft lab)
15. Storage space on aft deck for 18 boxes of XBTs in 2 fish boxes (48" x 44" x 30") and inside the ship (main or aft laboratories) for 20 boxes
16. Scientific Computing System for data collection
17. Simrad EK60 scientific echo sounder with 38, 70, 120, and 200kHz transducers plus PC with EK60 data logging software and input cables
18. Counter space for SWFSC-supplied oceanographic computers and connections to network, and SCS event logger displays on at least one oceanographic computer in the wet and in the dry labs.
19. Marine Operations and Deck Log/Weather Observation sheets, filled out by Deck Officers
20. Connection of Micro thermosalinograph to the SBE interface box, including GPS input (append to data string with raw temp, conductivity, and calculated salinity)
21. Installation of SWFSC-supplied sonobuoy antenna and coax cable to the dry lab
22. Copy Machine
23. Additional email computer for scientific email use in dry Lab

24. Network access to a printer for biopsy sampling computer
25. Space in dry lab area for -80° freezer (36" x 48" footprint)
26. Hansen Coupling Division female LL6-HKP/LL8-HKP ends to quick connect style connectors on hose from hydraulic power supply for acoustic winch
27. Space on aft deck for the acoustic winch (6' x 6' footprint)
28. Two (2) ship's GPS connection to the dry lab for acoustics computers (Please note that it is very important that all science computers be connected to the same ship's GPS)
29. Sonobuoy antennae, cable to dry lab acoustics station. All connectors (including masthead connectors) on antennae must be cleaned and replaced if necessary
30. Exterior storage space for three (3) pallets of sonobuoys (see item in the Equipment Supplied by SWFSC section)
31. Deck space for 2 fish boxes for acoustics equipment, preferably on winch deck aft of dry lab
32. Space for 1 box of 2 Argo buoys (12" x 15" x 60") – storage area needs to be sheltered from weather (i.e., flying bridge)
33. Space for 4 fish boxes of oceanographic equipment to be transferred to Sette; fish boxes will be returned to NOAA Ship McArthur before transit back to US west coast
34. Grappling hook and line

### **III.B. Equipment and capabilities provided by the scientists:**

1. Nine 7x50 hand-held binoculars
2. Four 25x150 binoculars and stands
3. One 20x60 hand-held gyro-stabilized binoculars
4. Three observer chairs for flying bridge
5. Video camera and tapes
6. Two Digital SLR cameras, and one 35mm camera with lenses and 35mm film
7. Three handheld radios
8. Three laptop computers for scientific party e-mail use, one laptop for the Cruise Leader, and one laptop for the photo-ID team
9. Two desktop computers mounted in the SIC room with CAT5 KVM extension units at CPUs and at remote console units on the flying bridge
10. Portable GPS component
11. Crossbows, biopsy darts and tips, sample vials and storage solution (EtOH) with MSDS
12. Two liquid nitrogen tanks (one 70 l and one 34 l) for biopsy sample preservation with MSDS
13. Rifles, 9mm and .22 caliber blank charges
14. One notebook computer for biopsy data entry and two printers: a small deskjet and a thermal label printer
15. Two long-handled dip nets and sample containers
16. 2 gimbaled 20 gal aquarium tanks (for inside use)
17. 2 50-gallon aquarium tanks (for outside use)
18. XBT probes (Deep Blues) - 38 cases to be stored in 2 fish boxes (18 boxes) and lab spaces (20 boxes)
19. Three computers for oceanographic data processing and 1 spare
20. Fluorometer (TD10AU) and one backup (TD10) for discrete chlorophyll analysis
21. Lab apparatus, logs and supplies for discrete chlorophyll *a* analysis including water filtration equipment and supplies: pressure/vacuum pump; 10L carboy with tabulation, fittings; GF/F filters and holder; graduated container to measure filtered water
22. 10 Wormley standard seawater vials for salinometer calibration (55 vials)
23. SBE38, remote temperature sensor (already installed)
24. Salinometer (Portasal 8410) to use as primary salinometer

25. Salinity sample bottles, square w/plastic insert beneath screw cap (2 cases of 24 plus 4 spares)
26. Chemicals: Acetone, Hydrochloric acid, and Triton x-100 and respective MSDS; a complete inventory of chemicals will be provided to the ship prior to sailing.
27. Bucket thermometer holder and thermometer (and 2 spares)
28. Oceanographic data logs and log books
29. 2 fish boxes for on deck XBT storage
30. Permits for specimen collection
31. Computer data storage media (diskettes, CDs, etc.)
32. Case of copy paper
33. Keel-mounted hydrophone
34. -80° freezer (36" x 48" footprint)
35. Three Pallets of sonobuoys (5'x5'x5', 1200 lbs when full)
36. One sonobuoy receiver
37. DAT recorder and laptop PC for sonobuoys
38. Hydrophone arrays and directional hydrophones
39. Aluminum hydraulic winch for hydrophone array, 6'x6' footprint, approx. 1200 lbs
40. Hansen Coupling Division male LL6-HKP/LL8-HKP ends to quick connect style connectors on 50' hose to hydraulic power supply for acoustic winch
41. Acoustics recording equipment, including mixer and recording rack, laptop computers (3), desktop computers (2), and accessory equipment.
42. Two fishboxes for deck storage of backup acoustic equipment
43. Squid jigging rods, reels, and jigs.
44. Two external hard drives for EK60 data storage
45. C-POD buoy system (autonomous acoustic recorder, satellite locator/transmitter, buoys and lines)

**III.C. NOAA Ship *Sette* Equipment provided by the scientists for transport via NOAA Ship *McArthur II*:**

1. Three computers for oceanographic data processing and 1 spare
2. Fluorometer (TD10AU) and one backup (TD10) for discrete chlorophyll analysis
3. Lab apparatus, logs and supplies for discrete chlorophyll analysis, including water filtration equipment and supplies: pressure/vacuum pump; 10L carboy with tabulation, fittings; GF/F filters and holder; graduated container to measure filtered water
4. 10 x Wormley standard seawater vials for salinometer calibration
5. One Salinometer (Portasal 8410) to use as primary salinometer
6. Salinity sample bottles, square w/plastic insert beneath screw cap (2 x cases of 24 plus 4 spares)
7. Chemicals: Acetone, Hydrochloric acid (chlorophyll analysis), Triton x-100 (CTD maintenance) and respective MSDS; a complete inventory of chemicals will be provided to the ship prior to sailing.
8. Bucket thermometer holder and thermometer (and 2 spares)
9. Oceanographic data logs and log books
10. 4 Fish boxes for storage of ecosystem sampling equipment for transfer to the Oscar *Sette*.
11. Computer data storage media (diskettes, CDs, etc.)
12. Two external hard drives for EK60 data storage

**IV. Hazardous Materials**

**IV.A. Policy and Compliance:**

The Chief Scientist is responsible for complying with MOCDOC 15, Fleet Environmental Compliance #07, Hazardous Material and Hazardous Waste Management Requirements for

Visiting Scientists, released July 2002. Documentation regarding those requirements will be provided by the Chief of Operations, Marine Operations Center, upon request. 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, and/or absorbents in amounts adequate to address spills of a size equal to the amount of chemical brought aboard. The amount of hazardous material arriving and leaving the vessel shall be accounted for by the Chief Scientist.

**IV.B. Radioactive Isotopes: N/A**

**IV.C. Inventory**

A complete inventory of hazardous materials with their respective MSDS sheets will be provided to the ships Operations Officer prior to sailing.

**V. Additional Projects**

**V.A. No additional projects**

**V.B. No NOAA Fleet Ancillary Projects**

**VI. Disposition of Data and Reports**

**VI.A. Data Responsibilities:**

The Chief Scientist will receive all original data related to the project. The Chief Scientist will in turn furnish the Commanding Officer with a complete inventory listing of all data gathered by the scientific party, detailing types of operations and quantities of data prior to departing the ship. All data gathered by the vessel's personnel that are desired by the Chief Scientist will be released to him, including supplementary data specimens and photos gathered by the scientific crew.

**VI.B. Pre- and Post-Cruise Meeting**

Pre-Cruise Meeting: Approximately one month prior to departure, a pre-cruise meeting will take place with the Chief Scientist, Ship's Officers, Department Chiefs and Survey Coordinator.

Post-Cruise Meeting: Upon completion of the cruise, a meeting will held on the day of arrival and attended by the Chief Scientist, Ship's Officers, Department Chiefs, and the Survey Coordinator to review the cruise.

**VI.C. Ship Operation Evaluation Report**

Within seven days of the completion of the cruise, 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.Satisfaction@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**

**VII.A. Meals and Berthing:**

Meals and berthing are required for up to 15 scientists. Meals will be served 3 times daily beginning one hour before scheduled departure, extending throughout the cruise, and ending two hours after the termination of the cruise. 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 (e.g., Chief Scientist is allergic to fin fish).

Berthing requirements, including number and sex 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 cruise 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.

#### **VII.B. Medical Forms and Emergency Contacts:**

The NOAA Health Services Questionnaire (NHSQ, Revised: 08/08) must be completed in advance by each participating scientist. The NHSQ can be obtained from the Chief Scientist or the NOAA website. 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 4 weeks prior to the cruise 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:

Marine Operations Center - Pacific

1801 Fairview Avenue East

Seattle, WA 98102

Telephone 206.553.8704

Fax 206.553.1112

Email: MOP.Health-Services@noaa.gov

Prior to departure, the Survey Coordinator will provide a listing of emergency contacts to the Executive Officer for all members of the scientific party, with the following information: name, address, relationship, and telephone number.

**VII. 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 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 ship when required.

**VII.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 modes of communication, the ship is able to maintain contact with the Marine Operations Center on an as needed basis. These methods will be made available to the Chief Scientist upon request, in order to conduct official business. Due to a new directive from Marine Operations Center, the ship must charge the science party for all calls made on the cell or sky-cell telephone. INMARSAT, Sky Cell and cellular communication costs shall be reimbursed to the ship for telephone calls made by all scientific personnel. Currently, Sky Cell and cellular telephone services are about \$0.89 per minute and INMARSAT Mini M is around \$1.68 per minute for voice. These charges will be assessed against the program after the ship receives the bill. There is generally a three-month delay receiving the bill for review. The Chief Scientist will be required to keep a log of all calls made by the science party.

**VII.E. IT Security:**

Any computer that will be hooked into the ship's network must comply with the NMAO Fleet IT Security Policy 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 these requirements prior to boarding the ship is preferable. 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.

**VII.F. Foreign National Guests Access to OMAO Facilities and Platforms:**

All foreign national access to the vessel shall be in accordance with NAO 207-12 and RADM De Bow's March 16, 2006 memo. 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.

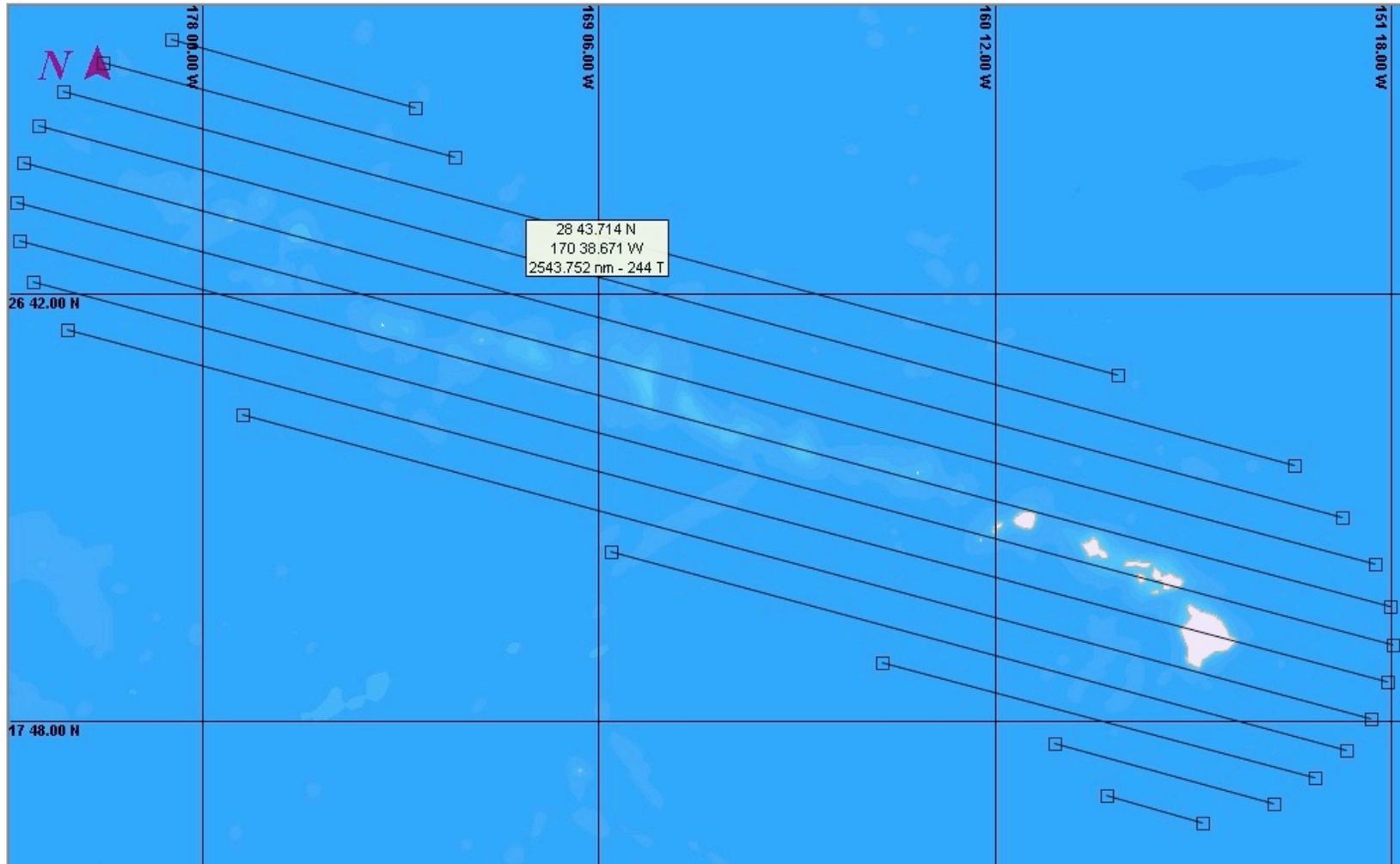
Responsibilities of the Chief Scientist:

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 to provide escorts to comply with NAO 207-12 Section 5.10, or as required by the vessel's DOC/OSY Regional Security Officer.

3. Ensure all non-foreign national members of the scientific party receive the briefing on Espionage Indicators (NAO 207-12 Appendix A) at least annually or as required by the servicing Regional Security Officer.
  4. Export Control - The NEFSC currently neither possesses nor utilizes 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.

VIII. Appendices:

VIII.A. **Geographic map of survey area.** In addition to the tracklines below, a circumnavigation of islands is planned. The circumnavigation will be between the 500 and 1000 m isobaths.



**VIII.B. Table of waypoints** (coordinates in Latitude, Longitude, Degree-minutes). Please note: a circumnavigation of islands is planned. The circumnavigation will be between the 500 and 1000 m isobaths.

Waypoint	Latitude	Longitude	Waypoint	Latitude	Longitude
1E	30 23.983N	173 12.940W	1W	31 43.043N	178 40.966W
2W	29 25.321N	172 20.027W	2E	31 16.379N	179 46.462E
3E	30 42.281N	178 53.265E	3W	25 04.134N	157 27.664W
4W	23 13.018N	153 29.897W	4E	30 02.473N	178 19.947E
5E	22 07.455N	152 25.809W	5W	29 18.625N	177 58.470E
6W	28 32.343N	177 50.518E	6E	21 09.111N	151 41.765W
7E	20 14.863N	151 21.207W	7W	27 46.908N	177 53.792E
8W	26 57.935N	178 11.831E	8E	19 25.575N	151 16.423W
9E	18 38.937N	151 24.375W	9W	25 58.456N	178 58.259E
10W	24 14.564N	177 05.609W	10E	17 51.055N	151 45.596W
11E	17 10.708N	152 18.915W	11W	21 23.297N	168 49.140W
12W	19 02.953N	162 45.178W	12E	16 35.589N	153 02.611W
13E	16 01.742N	153 57.332W	13W	17 18.443N	158 52.222W
14W	16 10.753N	157 41.535W	14E	15 35.398N	155 33.219W