UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southwest Fisheries Science Center
8604 La Jolla Shores Drive
La Jolla, CA 92037

23 June 2005

FINAL CRUISE INSTRUCTIONS

NOAA Ship: *McArthur II*

Cruise Number: AR-05-07 SWFSC Cruise Number: 1629

Cruise Title: Pacific Islands Cetacean Ecosystem Assessment Survey (PICEAS)

Study Area: The US EEZs of Palmyra and Johnston Atoll and adjacent areas where Hawaiian long-line by-catch occurs.

Itinerary:
Tracklines are included at the end of this document in Appendix1 and 2; they will be provided electronically, in Nobeltec format to the *NOAA ship McArthur II*. A circumnavigation of islands at a distance of 1 nm from the 10 fathom depth is planned. The circumnavigation is included in tracklines sent to the ship; however SWFSC does not have depth charts for this area and requests that the Navigation Officer correct the circumnavigation tracklines.

Sponsoring Institutions: Protected Resources Division, Southwest Fisheries Science Center, (SWFSC, NMFS, NOAA);

Cruise Description and Objectives: The PICEAS 2005 cruise will be an ecosystem survey in the US EEZ waters of Palmyra and Johnston Atoll and adjacent waters south of Hawaii where Hawaiian long-line fishing occurs. We will collect line-transect data on cetacean abundance and density to estimate abundance for all cetacean species present in the study area; photo-ID data on false killer whales, spinner dolphins, and other key species for population structure; and biopsy samples for genetic studies of population structure. In addition we will conduct oceanographic sampling (sea surface salinity and temperature, CTDs to 1000m, XBTs, chlorophyll samples, primary productivity), net sampling (bongo, manta and dipnet), record acoustic backscatter measure of mid-water prey, and seabird distribution and abundance, to allow for quantification of cetacean and sea turtle habitats and allow geo-spatial modeling of cetacean density.

Chief Scientist: Dr. Jay Barlow, SWFSC (858) 546-7178, Jay.Barlow@noaa.gov.

PLAN OF OPERATIONS

1.0 DAYLIGHT OPERATIONS

Weather permitting, visual watches for marine mammals and seabirds will be conducted by observer teams on the flying bridge 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. Smokers will be courteous to ensure their smoke does not affect personnel on the flying bridge.

1.1 Cetacean Survey - Line-transect survey methods will be used to collect abundance data. At the beginning of each day search effort should start on the trackline. The *McArthur II* should travel at 10 knots (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 one knot, the bridge personnel will notify the mammal team on watch or the Cruise Leader. A daily watch for cetaceans will be maintained on the flying bridge during daylight hours (approximately 0600 to 1900) by 6 mammal observers. Each observer will work in 2-hour rotations, manning each of the following 3 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.

1.1.1 Logging of Data - A log of observation conditions, watch effort, sightings and other required information will be entered into a computer, hooked up 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’s GPS. Also, if the SCS goes down for any reason, the ship must manually restart the WINDACS_MAC event in addition to the other events.

1.1.2 Breaking Trackline - 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 photographic 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, photographic or other operations (see 1.3).

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 5 nm from the trackline, at which point the ship should turn back toward the trackline.

1.1.3 Dive-Interval Studies - Sightings of deep-diving whales will prompt dive-interval studies, at the discretion of the Cruise Leader. The collection of dive-interval data is necessary to produce sightability correction factors for those species that spend a considerable amount of time diving. This will help determine how long these species of whales stay under water, for more accurate population estimates. The observer team on watch will start the dive-

interval computer program, and will request that the vessel approach the whales targeted for this experiment.

1.1.4 Resuming Effort - 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 10nm 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.

1.2 Seabird Survey - Visual surveys of seabirds will be conducted from the flying bridge during daylight hours by two seabird observers. A log of sighting conditions, effort, sightings and other required information will be entered into a computer interfaced with 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's GPS. Seabird observers will use handheld and 25x150 binoculars.

1.3 Small Boat Work - A small boat may be necessary for biopsy sampling, photography, seabird collection, island surveys or marine turtle work. Deployment will be requested by the Cruise Leader on an opportunistic basis, 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 must remain within sight and radio contact at all times while deployed. With the exception of the small boat and required safety gear, all necessary gear will be furnished by the scientific party.

1.4 Biopsy Sampling – Biopsy samples for genetic analyses of marine mammals will be collected on an opportunistic basis. Necessary permits will be present on the vessel. 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 30 m of the bow of the vessel, using a dart fired from a crossbow or rifle. With the exception of the small boat and safety gear, all necessary gear will be furnished and operated by the scientific party.

1.5 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. The animals to be photographed 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. With the exception of the small boat and safety apparel, all necessary gear will be furnished by the scientific party.

1.6 Collection of Fish - Fish 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 will 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. No recreational fishing is permitted within the Naval Defensive Sea Areas of Johnston Island, Sand Island and Kingman Reef, and the Territorial Waters of the Palmyra Atoll National Wildlife Refuge. The Naval Defensive Sea Area extends approximately 3 nm from the extreme high water marks. The Territorial Waters of Palmyra are 12 nm from the high water mark.

1.6.1 Collection for Food-web Isotope Project - Samples from the same fish collected under 1.6 will be taken for the Food-web Isotope Project. The date, location, time of day, species, length, and sex of each fish will be recorded by scientific personnel. The stomach will be removed and frozen, with stomach contents intact, after being examined under section 1.6. A piece of the liver and a core of white muscle will also be removed and frozen. Approximately 10 cu ft of freezer space is required to store the samples. R. Olson, Inter-American Tropical Tuna Commission (IATTC), will provide supplies, instructions and data forms.

1.7 Collection of Jellyfish samples – Jellyfish and other gelatinous plankton will be collected opportunistically for leatherback turtle dietary studies. Jellyfish will be collected using dip nets, during scheduled bongo and manta tows, or from the small boat. Samples will be frozen for future stable isotope analysis.

1.8 Salvage of Marine Mammals - Marine mammal body parts may be salvaged on an opportunistic basis at the discretion of the Cruise Leader. This includes whale and dolphin ivory and carcasses. In the event that this occurs, scientific freezer space will be needed to store the mammal body parts. Permits to salvage and import marine mammal parts 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.

1.9 Acoustics - The scientific EK-60 depth sounder will be operated continuously, at 38, 120 and 200 KHz and will be interfaced to a data acquisition system to estimate micronekton biomass between 0 and 500 m. 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. If any of the ship's navigational depth sounders are found to interfere with the EK-60 scientific sounder, the command will inform the Cruise Leader at any time those navigational depth sounders are used.

1.9.1 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. With the exception of the small boat and safety apparel, all of the necessary equipment will be supplied and operated by scientific personnel. Sonobuoys will not be deployed in the waters of the Pacific Remote Islands National Wildlife Refuge Complex.

1.9.2 Towed Hydrophone Array - A hydrophone array will be towed during

daylight hours to collect data on cetacean vocalizations and assess the acoustic characteristics of the vessel for future Protected Resources Division projects. The array will be deployed each morning prior to the start of visual observations and retrieved each evening after search effort ends (and whenever increased maneuverability is required). The array will be wound onto a hydraulic-powered winch supplied by the SWFSC. Hookup to a ship-powered hydraulic system will be required. A team of two acoustic technicians will monitor the array, record sounds made by cetaceans and localize their positions. The team may request that the vessel be turned and visual observers search for acoustically detected cetaceans. During the first leg of the cruise, the cruise leader will work with the Commanding Officer to assess the maneuvering limits of the ship for this array.

We are planning an experiment to calibrate the sensitivity of the hydrophone array and to measure the propagation of sound at varying distances from the ship. An underwater transducer will be lowered from a small boat as it remains at a stationary location, initially 4 km in front of the McArthur II. It will broadcast a sound at 160 dB source level. The McArthur and its towed hydrophone array will approach the boat, passing it approximately 50 meters to 1 km abeam. This experiment will be repeated several times at different beam distances and in different locations during the survey. The NMFS permit office has evaluated our experimental design and have agree that if we follow our mitigation plan, this activity does not require an MMPA permit.

1.9.3 Hull Mounted Hydrophone - SWFSC will provide a hydrophone to be mounted under the hull of the McArthur II for listening to and recording cetacean vocalizations at any time, day or night. It will be installed in a hole in the ship's acoustic transducer dome that was designed for that purpose. The ship's designated NOAA divers will need to install the hydrophone in Honolulu, HI by removing the dummy mounting plate, plugging in the underwater-pluggable connectors, and attaching the hydrophone mounting plate. The ship's divers will also need to remove the hydrophone at the end of the cruise (removal in Seattle would be fine).

1.9.4 High-frequency Acoustic Recording Package (HARP) - SWFSC will bring one high-frequency acoustic recording package (HARP) for deployment at Palmyra Atoll. The HARP dimensions are 44"W x 47"D x 32"H, and it weighs approximately 450 lbs. It would be best to store it on the deck until it is deployed; it will take up a 44"x47" footprint. Deployments are relatively simple: they require ship speed of about 1 knot; an A-frame, J-frame or crane to lift the instrument over the side or off the fantail and four to five deck crew. Deck crew jobs: 2 on tag lines, 1-2 for crane or A-frame or J-frame operations, and 1 to monitor floats, hydrophone, and instrument release. The instrument is hooked with a pelican hook, and tag lines set to stabilize the instrument during operations. Floats and hydrophone are gently lowered into the water. The A-frame or crane lifts the instrument overboard and lowers into water. Frame and tag lines are released. After release, the instrument sinks at approximately 40m/min. Once it reaches the seafloor, an operator on board will acoustically communicate with it to ensure proper location and functioning. The entire procedure takes approximately 30-60 min.

1.10 Oceanography - Oceanographic sampling will be done by the oceanographer, ship’s

Survey Technician, and other designated scientists, while underway during the day.

1.10.1 XBT Drops - There will be three XBT drops per day, at 0900, 1200 and 1500 hours local ship time, or as requested by the Cruise Leader. The XBTs will be provided by SWFSC, and the launcher/computer will be provided by the ship. XBTs will be conducted by one person per drop (either by a member of the scientific party or by the Survey Technician). At least one drop per day will be conducted by the ship's Survey Technician. If the vessel is stopped at the scheduled launch time, the drop will be delayed until the ship is again underway. 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. XBTs will not be deployed in the waters of the Pacific Remote Islands National Wildlife Refuge Complex.

1.10.2 Surface Water Samples - A surface water sample for chlorophyll a analysis and a bucket temperature will be taken at 0900, 1200, 1500 and 1800 hours local ship time daily. These samples will be taken by either a member of the scientific party or the Survey Technician (schedule to be determined).

1.10.3 Filtering Water Samples - On all five legs, small samples of particulate organic matter (POM) will be filtered from seawater collected near the sea surface for the Food-web Isotope Project. At a convenient hour in the morning, water will be collected from the ship's thermosalinograph outflow, placed in a pressurized carboy filtration system, and left for several hours (up to about 6 h) to filter on to 25-mm glass fiber filters. After filtration is complete, the glass fiber filters will be placed in pre-baked aluminum foil, and stored frozen. R. Olson, IATTC, will provide the sampling equipment and instructions.

1.10.4 Thermosalinograph Sampling - 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 Scientific Computing System (SCS) will serve as the main data collection system. The oceanographer will provide the ship's Operations Officer and Electronics Technician with detailed SCS acquisition information before departure and a member of the scientific party sailing on the initial transit will provide additional technical support. All SCS data will be provided to the SWFSC oceanographer following each leg of the cruise.

2.0 NIGHT 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. The main SeaBird CTD system will be provided, maintained, and operated by the Survey Technician. The collection of oceanographic samples and their processing will be conducted by the scientific party and Survey Technician. The crew of the

vessel will operate all deck equipment and be responsible for the termination (and any necessary reterminations) of the CTD cable pigtail to the conducting cable of the winch. The ship shall provide a complete backup system, consisting of a frame with weights, deck unit, and SeaBird 9/11+ CTD with conductivity and temperature sensors (note: the ship does not have a spare firing rosette). All instruments, their spares, and spare parts provided by the ship must be maintained in working order and, if applicable, have current calibrations (within previous 12 months).

2.1 CTD Stations - Weather permitting, one or two CTD stations will be occupied each night: an evening cast at the end-of-effort location (unless the ship will resume effort within 10 miles the next morning), and a pre-dawn CTD. CTD data and seawater samples will be collected using a SeaBird 9/11+ CTD with rosette and Niskin bottles fitted with silicone tubing and o-rings (supplied by oceanographer). All casts are to 1000m, with the descent rate at 30m/min for the first 100m of the cast, then 60m/min after that, including the upcast between bottles. Cast times are subject to change since sunrise and sunset will vary during the cruise. Additional CTD stations may be requested by the Cruise Leader in areas of special interest.

2.1.1 Pre-daylight Cast - The morning cast (1000m) will begin approximately one and one-half hours prior to sunrise. This exact starting time will be determined the evening before, by the FOO or Deck Officer. The time should not be changed more than 15 min. from the previous day, even if sunrise changes more than this. This schedule may be modified by the oceanographer. Niskin bottle water samples will be collected at seven light depths and five additional standard depths, between the surface and 1000m. These depths will be determined just prior to each cast by entering the ship's position into a computer program. From each cast, chlorophyll samples (to 200m) and salinity samples (2 to 6 samples per cast, at least 500 and 1000m or bottom) will be collected and processed on board. 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. Nutrient samples (0 - 500m) will be collected, frozen, and stored on board. Salinity calibration samples will be collected, recorded in the log provided, then analyzed when one case of 24 bottles is full and has been temperature stabilized in the location of the salinometer. Both the Survey Technician and oceanographer will participate in sample collection (chlorophylls, nutrients and salts) and analysis of chlorophyll and salinity samples. Primary productivity will be measured by radioactively labeled carbon uptake methods performed by the oceanographer. Seven samples taken by the oceanographer will be spiked with ^{14}C, incubated on deck for 24 hours, filtered and stored for later analysis at the SWFSC. The Niskin bottles (#1-7) will be rinsed after each cast and acid-washed at the end of each leg. In San Diego, the oceanographer will be trained by SWFSC personnel in the use of radioactivity prior to departure. A copy of the SWFSCs NRC license for the use of radioisotopes will be kept on board. All radioactive waste will be stored in secured drums and boxes, and returned to San Diego (i.e. no disposal of radioactivity at sea).

2.1.2 Post Effort Cast - An evening CTD cast, to 1000m, will be conducted a minimum of one hour after sunset. The exact time will be determined by the Deck Officer (by 1800 local ship time that day). Bottle samples will be collected from 12 standard depths (0, 20,

40, 60, 80, 100, 120, 140, 170, 200, 500, 1000 meters). Samples for chlorophyll, nutrients and salts will be taken as listed above (except for the addition of four salinity samples taken from every other evening cast).

2.2 Net Sampling - Net tows will be conducted by the scientific party as assigned by the cruise leader, with the assistance the Survey Technician and a winch operator from the vessel. The schedule for these tows may vary by leg and may need to be modified by the Cruise Leader.

2.2.1 Dipnetting - Concurrent with the evening CTD station on legs 2, 3 and 4, dipnetting for surface fauna may be conducted by scientific personnel, at the discretion of the cruise leader, for one full hour, from the starboard side of the ship. This station is to begin no sooner than one full hour after sunset. One or more deck lights will be necessary to illuminate the water surface in the area of dipnet sampling. Samples will be preserved, labeled, and stored in the vessel's freezer. Scientists may also collect surface fauna for aquaria on board. All live organisms will be donated to the Birch Aquarium upon return to San Diego.

2.2.1.1 Dipnetting for Food-web Isotope Project - Surface fauna collected under 2.2.1 may be shared with the Food-web Isotope Project, at the discretion of the Cruise Leader and the scientist directing this activity. Samples will be labeled and stored in the vessel's freezer.

2.2.2 Manta Tow - A surface manta net tow will be conducted for fifteen minutes immediately following the post-sunset bongo tow and dipnetting. The manta tow is done in the dark and deck lights need to be turned off for the 15-minute duration of the tow. Estimated completion time for the entire procedure is 30 minutes. The net should be deployed from the starboard hydro winch. Samples will be preserved in formalin, labeled and stored in containers provided by the SWFSC until the vessel returns to San Diego.

2.2.3 Bongo Tow - An oblique bongo tow (45 minute station time) will be conducted for fifteen minutes immediately following the post-sunset CTD station and dipnetting, to a depth of 200m (wire out 300m on starboard hydro winch). The Bongo has 505 micron mesh on the starboard side, and 333 micron mesh on the port side. The sample from the starboard, metered net will be preserved in formalin, labeled and stored in containers provided by the SWFSC until the vessel returns to San Diego (post-cruise analysis by FRD). The second cod end of the bongo (port side, unmetered) will be frozen for the food web-isotope project (B. Olson/ IATTC)

2.2.3.2 Samples for Food-web Isotope Project (Bob Olson) and the Leatherback Turtle Diet Isotope Project (Jeff Seminoff) - The contents of the second cod end of the bongo will be placed in plastic Ziploc bags, labeled, and stored frozen. R. Olson, (IATTC), will provide supplies to label and store these samples. The samples will be used by both Bob Olson and Jeff Seminoff following the cruise.

2.3 Transit – When scientific operations are complete for the night, the ship will resume

course and proceed along the trackline, until it is necessary to stop and position the ship for the morning (pre-daylight) CTD station. It is estimated that the ship will need to transit between five and 100 nm per night, Based on the length of time for conducting CTD and net tows at night, the ship estimates an average transit between 50-70NM per night. The Cruise Leader must have the flexibility to determine the transit speed on a daily basis, depending on planned scientific operations.

3.0 SCIENTIFIC PERSONNEL

3.1 Chief Scientist - The Chief Scientist is Dr. Jay Barlow, SWFSC, at phone (858) 546-7178. The Cruise Leader is the authorized representative of the Chief Scientist, with all the designated powers and responsibilities of the Chief Scientist.

The Chief Scientist is authorized to alter the scientific portion of this cruise plan with the concurrence of the Commanding Officer, provided that the proposed changes will not: (1) jeopardize the safety of personnel or the ship, (2) exceed the time allotted for the cruise, (3) result in undue additional expense, or (4) change the general intent of the project.

3.2 Participating Scientists - Please see Appendix 3.

3.3 Personnel Switches - For all legs, the incoming scientific personnel will board the ship on the day of its arrival in port and the outgoing personnel will stay in a hotel or make other plans.

3.4 Government Identification - Each member of the scientific party will have a government identification card.

3.5 Medical Forms - All scientific personnel will complete a NOAA Health Services Questionnaire (NHSQ) prior to embarking, as per NC Instruction 6000. This form will be routed through MOP Health Services for approval 30 days prior to the cruise.

4.0 EQUIPMENT

4.1 Supplied by scientific party:

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. Wooden decking for flying bridge
6. Video camera and tapes
7. Two Digital SLR cameras, and one 35mm camera with lenses and 35mm film
8. Three handheld radios

9. Four laptop computers for scientific party: two for e-mail use. one for the Cruise Leader, one for the photo-ID team
10. Two desktop computers mounted below decks (Chief Scientist's stateroom) with CAT5 KVM extension units at CPUs and remote console units on the flying bridge
11. Spare tower for data computer
12. Spare KVM extension system
13. Portable GPS component
14. Additional freezer for storage (29.5w x 35h x 73-1/4l)
15. Crossbows, biopsy darts and tips, sample vials and storage solution (EtOH) with MSDS
16. Rifles, 9mm and .22 caliber blank charges; 1 notebook computer for biopsy data entry and thermal label printer
17. Two long-handled dip nets and sample containers
18. Formalin and sodium borate
19. Manta tow frame, net, and net spares only
20. Bongo frame and nets (505 µm and 333µm, including a spare frame and nets)
21. Glass sample containers with lids for net tow samples, pint (22 boxes), quart (2 boxes) and gallon (1 box/4 each)
22. XBT probes (Deep Blues) - 31 cases to be stored in two fish boxes, oceanographic "rad lab" and lab spaces (to arrive in Seattle between 28 June and 01 July)
23. Two computers for oceanographic data processing, acoustic EK60 data acquisition, and one spare
24. Fluorometer (TD10AU) and one backup (TD10) for discrete chlorophyll *a* analysis
25. Lab apparatus, logs, and supplies for discrete chlorophyll *a* analysis
26. Wormley standard seawater vials for salinometer calibration (55 vials)
27. SBE38, remote temperature sensor (already installed)
28. Salinometer (Portosal 8410) to use as primary salinometer
29. Salinity sample bottles, square w/plastic insert beneath screw cap (100 ea.; 2 cases of 24 plus 6 spares)
30. Acetone, B-phenethylamine (mixed in cocktail), scintillation cocktail, hydrochloric acid, Triton x-100
31. Converted shipping container, Oceanographic "Rad lab," with hoses (25') for fresh water connection and drainage overboard and 30' cord for power supply connection (110V); 8' x 10' footprint; van to be secured to boatdeck by ship's personnel
32. ^{14}C-bicarbonate (14 mCi total) and copy of NRC Materials License 04-29022-01
33. Primary productivity incubator (approx. 2' x 2' box, 48" high) with two hoses (25') for saltwater input and drainage overboard
34. Nutrient and productivity sample vials
35. Small refrigerator for ^{14}C stock solution (located in Oceanographic "rad lab"
36. Bucket thermometer holder and thermometer (and 2 spares)
37. Safety (MSDSs) and clean up materials for ^{14}C and all chemicals, incl. a Geiger counter
38. Oceanographic data logs and log books
39. Four crates of sonobuoys
40. DAT recorder and laptop computer for sonobuoys
41. Hydrophone array and directional hydrophone

42. Aluminum hydraulic winch for hydrophone array, 5’ x 7’ footprint, Hansen Coupling Division male LL6-HKP/LL8-HKP ends to quick connect style connectors on 50’ hose to hydraulic power supply for acoustic winch
43. Small winch for acoustics, 2’ x 3’ footprint
44. Ten fish boxes for storage (48"x44"x30")
45. Permits for specimen collection
46. Computer data storage media (diskettes, CDs, etc.)
47. One case of photocopy paper
48. Water filtration equipment and supplies (Food-web Isotope Project): pressure/vacuum pump; 10L carboy with tabulation, fittings; GF/F filters and holder; graduated container to measure filtered water
49. Whirl-paks and labels for Leatherback Turtle Diet Isotopic Project
50. Plastic bags, jars, labels, recording sheets (plastic) and forms (Food-web Isotope Project)
51. -80 Freezer for biopsy samples
52. High-frequency Acoustic Recording Package (HARP)

4.2 Supplied by 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. One CAT5 cable running from location site for CPUs to the flying bridge consoles
2. Email setup and network printer setup for six stations in the scientific space and two computers in the Chief Scientist’s stateroom
3. Power, ship's GPS, and ship’s SCS connections to CPUs running the flying bridge console (mammal and seabird computers); please note that it is very important that all science computers be connected to the same ship’s GPS.
4. Two network connections to the Chief Scientist’s stateroom (mammal data computer and Cruise Leader’s laptop)
5. Canopy on flying bridge
6. Three handheld radios (as spares)
7. Small boat for biopsy sampling, photography, seabird collection and sea turtle research
8. Deck lighting for dipnetting
9. Freezer space for water biological samples (45 cu. ft./standard chest freezer) and biological samples (-80 freezer will be brought aboard and stored in dry lab area)
10. Seabird 9/11+ CTD system including rosette with Niskin bottles (2.5L, 2 each)
11. Backup SeaBird CTD frame and rosette, frame with weights, and Niskin bottles (any size, 12 each).
12. Oceanographic winch with minimum 1500m of .322" conducting wire, terminated to CTD
13. Hydrographic winch with minimum 400m cable (1/4" to 3/8" diameter) for net tows
14. Bottom depth checking during CTD casts and net tows in depths less than 2000m)
15. SeaBird thermosalinograph (SBE45)and connection to SCS
16. Connection of SBE38 to SCS (secondary temperature sensor to TSG)
17. Sippican XBT launcher (prefer aft deck location) and connection to SEAS/Sippican software
18. Fume hood (located in aft lab, aft counter, left side)

19. Small refrigerator for chlorophyll samples extraction (aft lab)
20. Storage space on aft deck for 32 boxes of XBTs (in 2 fish boxes 48"x44"x30") in two fish boxes and 16 boxes inside the ship (main or aft laboratories)
21. Scientific Computing System (SCS) for data collection
22. Simrad EK60 echo sounder, computer, software and input cables
23. Autosal salinometer (model 8400) to use as spare (must be operation/tested prior to departure)
24. Clean rust-free seawater for primary productivity incubator on boat deck
25. Space for primary productivity incubator (2' x 2') and fish tanks (25 sq feet) on boat deck
26. Counter space for SWFSC-supplied oceanographic computers and connections to network
27. Deck space for one manta and two bongo net frames (primary with nets attached and one spare frame)
28. Marine Operations and Deck Log/Weather Observation, filled out by Deck Officers
29. Installation of SWFSC-supplied sonobuoy antenna and coax cable to the scientific lab
30. Two ship's GPS connections to the aft port bulkhead of the dry lab area for acoustics computers
31. Storage space for eight fish boxes on flying bridge and bridge deck (48"x44"x30", see item 44 in previous section)
32. Exterior storage space for four pallets of sonobuoys (see item 46 in previous section)
33. Hansen Coupling Division female LL6-HKP/LL8-HKP ends to quick connect style connectors on hose from hydraulic power supply for acoustic winch
34. Space of the aft deck for the acoustic winch (5' x 6' footprint)
35. Copy machine
36. Additional email computer for scientific email use in dry lab
37. Network access to a printer for biopsy sampling computer
38. Connection of Micro Thermosalinograph to the SBE interface box, including GPS input (append to data string with raw temperature, conductivity and calculated salinity)
39. Marine Operations and Deck Log (electronic)/Weather Observation sheets, filled out by Deck Officers
40. Deck space for High-frequency Acoustic Recording Package (HARP) (44"x47" footprint)

4.3 Installation and Maintenance - Prior to departure from San Francisco the Chief Scientist and members of the scientific party may board the vessel, with permission of the Commanding Officer, to test survey equipment and environmental sensors, set up equipment and assemble and modify wooden decking on flying bridge.

A freezer alarm system purchased by SWFSC will be installed by the ship for the two scientific freezers and one refrigerator. The system will monitor temperature and sound a warning bell on the bridge computer in case of malfunction. The bridge watch must immediately notify the cruise leader

A hull-mounted hydrophone needs to be installed in a hole in the ship's acoustic transducer dome that was designed for that purpose. The ship's designated NOAA divers will need to install the hydrophone prior to the cruise by removing the dummy mounting plate,

plugging in the underwater-pluggable connectors, and attaching the hydrophone mounting plate. The ship's divers will also need to remove the hydrophone at the end of the cruise (removal in Seattle would be fine).

The large hydraulic winch, supplied by SWFSC, will need to be attached to the ship's hydraulic system and secured to the deck by ship's personnel. This will likely involve welding by ship's personnel.

The oceanographic radioactive material container ("rad van") needs to be mounted on the boat deck and secured by ship's personnel to the 01 deck.

4.4 Radioisotopes - Small amounts of ^{14}C radioisotope will be used in the primary productivity experiments to be conducted within the oceanographic laboratory of *McArthur II* and in a labeled tank on the aft deck. The use of these radioisotopes is authorized by, and will be in accordance with, the conditions of U.S. Nuclear Regulatory Commission, under the State of California Radioactive Materials License number 04-29022-01, issued to SWFSC. The Application for Authorization to use Radioactive Material on NOAA Ships will be provided to the Pacific Marine Center according to the current NOAA Radioactive Material policy. Melinda Kelley is an Authorized User for radioisotopes. In accordance with this license, these radioactive materials are authorized for use at sea without geographic restriction. A copy of the license will be carried aboard the ship.

The Cruise Leader will ensure that a wipe test of all areas and surfaces exposed to chemicals that contain ^{14}C is conducted by oceanographic personnel at the end of each leg, after any spillage, and after the cruise. The results of this wipe test shall be forwarded to the Director, Marine Operations Center - Pacific and Commanding Officer, NOAA Ship *McArthur II*.

The Chief Scientist shall submit operating and emergency procedures prior to commencing the project. These should include instructions on handling, controlling access to the material, monitoring laboratory contamination, providing notification requirements, keeping records and decontaminating facilities and personnel.

4.5 Hazardous Materials - The Chief Scientist shall be responsible for complying with MOCDOC 15, Fleet Environmental Compliance #07, Hazardous Material and Hazardous Waste Management Requirements for Visiting Scientists, released July 2002. The MOCDOC web site address is: http://205.156.48.106/.

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 chemicals brought aboard and a chemical hygiene plan. The amount of hazardous material arriving and leaving the vessel shall be accounted for by the Chief Scientist.

4.6 Scientific Computing System - If the SCS goes down for any reason, the ship must manually restart the WINDACS_MAC event in addition to the other events.

5.0 DATA RESPONSIBILITIES

5.1 Collection of Data - 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.

5.2 Dissemination of Data - The Chief Scientist is responsible for the quality assurance, disposition and archiving of data and specimens collected aboard the ship. The Chief Scientist is also responsible for the dissemination of copies of these data to cruise participants and to any other requesters. The SWFSC cruise report will be submitted according to SWFSC procedures to appropriate persons and groups.

5.3 Evaluation Form - The Chief Scientist will complete the Ship Operations Evaluation Form and forward it to the Office of Marine and Aviation Operations. The Commanding Officer will provide this form.

6.0 ADDITIONAL INVESTIGATIONS AND PROJECTS

6.1 Ancillary Projects - Ancillary projects are secondary to the objectives of the cruise, should be treated as additional investigations, do not have representation aboard, and are accomplished by the ship's force. Ancillary tasks will be accomplished in accordance with the NOAA Fleet Standing Ancillary Instructions. Any additional work will be conducted so as not to interfere with operations as outlined in these instructions. The Chief Scientist will be responsible for determining the priority of additional work relative to the primary project with approval from the Commanding Officer.

7.0 COMMUNICATIONS

7.1 Radios - The Cruise Leader or designee may request, from the Commanding Officer, the use of radio transceivers aboard the ship to communicate with other vessels and aircraft, if necessary.

SWFSC will supply their own handheld radios for intra-ship communication and communication with the small boats. However, the Cruise Leader may request the use of the ship's handheld radios if the supplied radios should fail.

7.2 Telephone - The Cruise Leader or designee may require access to the ship's INMARSAT or cellular telephone systems with permission from the Commanding Officer. The Commanding Officer will provide the Cruise Leader with a log of all INMARSAT calls made from the ship for SWFSC business at the end of each leg. In accordance with the Communications Reimbursement Policy, SWFSC will pay these charges via a transfer of funds from SWFSC to the ship.

7.3 Electronic Mail - All members of the scientific party will have access to e-mail for communications with persons not aboard the ship. The amount of such communication traffic will be determined by the Chief Scientist.

7.4 Routine Reports - The Cruise Leader will submit a weekly cruise report, along with time and attendance for the scientific party, to the Survey Coordinator each Thursday during the cruise via e-mail or, if e-mail is not functioning properly, via fax. The Survey Coordinator at SWFSC (Surveycoordinator.SWFSC@noaa.gov) will be on the distribution list for the ship's noon position reports.

8.0 MISCELLANEOUS

8.1 Pre-cruise Meeting - A pre-cruise meeting between the Chief Scientist (and his staff) and the Commanding Officer (and his staff) will be held prior to the start of the cruise to identify operational requirements (*i.e.*, overtime, modifications, repairs or procurements). The date and time for this meeting is yet to be scheduled.

8.2 Underway Meetings - Meetings between the Commanding Officer (and other officers) and the Cruise Leader should occur at the beginning and end of each leg to discuss and solve any problems or changes that may arise. Additional meetings should occur as needed.

8.3 Debrief - A post-cruise debriefing will be held between the Chief Scientist and the Commanding Officer. If serious problems are identified, the Commanding Officer shall notify the Marine Operations Center, Pacific, in the most direct means available. The Chief Scientist shall document identified problems in the Ship Operations Evaluation Form. The time and date for the debriefing meeting will be determined toward the end of the cruise.

8.4 Time and Attendance - Time and Attendance for scientific personnel will be filled out by the SWFSC timekeeper while the ship is at sea, based on information transmitted by the Cruise Leader to the Survey Coordinator. Scheduled overtime is authorized for Saturdays, Sundays and holidays. Irregular overtime will be authorized by the Cruise Leader as required. SWFSC personnel are authorized Per Diem at the rate of $3.50 per day to be paid via a travel voucher at the termination of the cruise. Task Number 30-51-0002-00-00-00-00-C8LAM54-P23 will pay for per diem and overtime for any SWFSC permanent, term or temporary employees: Cruise Leaders, Marine Mammal and Seabird Observers, and Oceanographers. Regular salary

for these personnel will be paid by the CYOP task from which they are normally paid.

Time and Attendance for Aquatic Farms contract employees will be based upon a predetermined schedule. If events of the cruise alter the planned schedule, the Cruise Leader will notify the Survey Coordinator, and appropriate changes will be brought to the attention of Aquatic Farms.

8.5 Navigation - Primary control will be GPS, also dead reckoning based on visual bearings and radar ranges when possible.

8.6 Scientific Spaces - The Cruise Leader shall be responsible for the proper upkeep and cleaning of all spaces assigned to the scientific party, both laboratory and living spaces, throughout the cruise. The Cruise Leader or Chief Scientist will make berthing assignments for scientific personnel on a per-leg basis, with approval of the Commanding Officer.

For further information contact the Survey Coordinator, Southwest Fisheries Science Center, National Marine Fisheries Service, NOAA, 8604 La Jolla Shores Drive, La Jolla, CA 92037; SurveyCoordinator.SWFSC@noaa.gov, phone (858) 546-5672. More information about the cruise and project can be found at the project's website http://swfsc.nmfs.noaa.gov/PRD/PROJECTS/PICEAS/default.htm

Prepared by: _____ Dated: 23 July 05
Annette Henry
Survey Coordinator, SWFSC

_____ Dated: 23 July '05
Dr. Jay Barlow
Chief Scientist, SWFSC

Approved by: _____ Dated: 7/25/5
Dr. William W. Fox, Jr.
Science Director, F/SWR

Approved by: _____ Dated: _____
Captain John C. Clary
Commanding Officer of the Marine Operations Center - Pacific

Appendix I: Waypoints by leg.

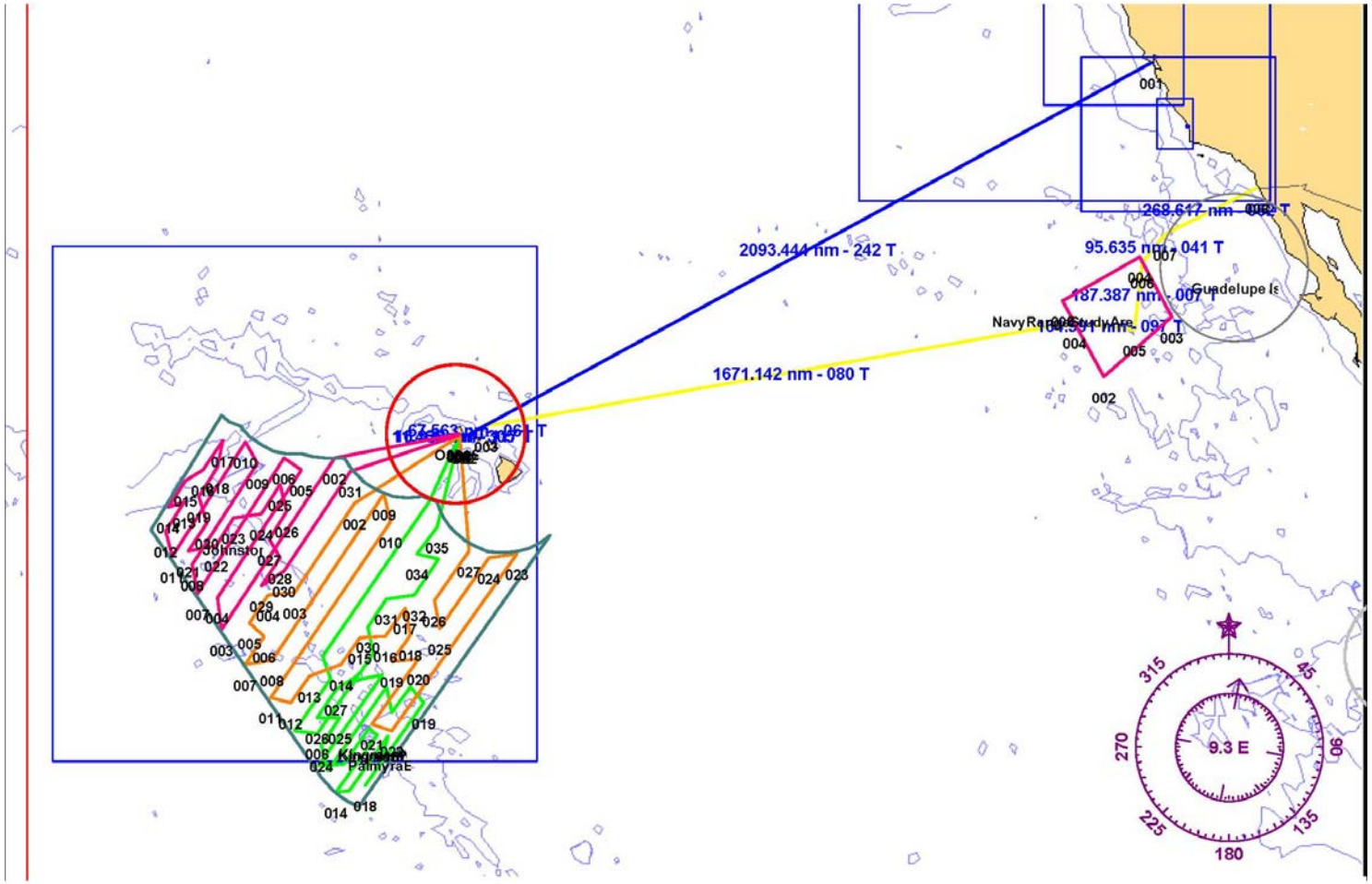
Description	Longitude	Latitude	Distance
Leg 1: San Francisco to Honolulu, HI			
Departure 6/28/2005	37 48.288 N	122 34.293 W	N/A
	21 08.949 N	157 47.788 W	2,093.445
Arrival 8/8/2005	21 15.539 N	157 57.853 W	11.467
Leg 1 Total Distance			**2,104.911**
Leg 2:Includes Island Stop at Palmyra			
Departure 8/11/2005	21 13.332 N	157 56.575 W	N/A
	18 02.585 N	159 29.133 W	209.725
	10 21.465 N	164 54.840 W	558.867
	09 11.204 N	164 29.858 W	74.450
	06 32.298 N	166 20.219 W	192.880
	06 25.972 N	165 10.967 W	69.100
	09 08.690 N	163 16.811 W	198.165
	09 23.342 N	161 52.958 W	84.046
	04 45.229 N	165 08.437 W	339.087
	04 51.256 N	163 50.015 W	78.380
	06 41.152 N	162 32.857 W	134.054
	06 33.126 N	162 24.685 W	11.416
	06 22.176 N	162 09.457 W	18.679
	06 03.104 N	162 22.933 W	23.308
	05 54.288 N	162 10.874 W	14.885
	05 54.645 N	162 09.308 W	1.599
	05 54.506 N	162 06.650 W	2.648
	05 54.149 N	162 03.239 W	3.412
	05 53.454 N	161 59.966 W	3.329
	05 52.937 N	161 59.391 W	0.771
	05 51.984 N	161 59.054 W	1.011
	05 51.229 N	161 59.173 W	0.764
	05 50.375 N	161 59.708 W	1.007
	05 50.097 N	161 59.927 W	0.353
	05 49.918 N	162 00.779 W	0.868
	05 50.018 N	162 01.612 W	0.835
	05 50.196 N	162 03.040 W	1.432
	05 50.256 N	162 07.126 W	4.065
	05 50.673 N	162 09.764 W	2.658
	05 51.249 N	162 10.815 W	1.194
	05 51.567 N	162 11.132 W	0.448
	05 53.215 N	162 11.707 W	1.745
	05 53.970 N	162 11.489 W	0.786
	05 54.288 N	162 10.894 W	0.672
	06 03.104 N	162 22.933 W	14.869
	05 58.974 N	162 25.789 W	5.013
	03 25.942 N	164 13.418 W	186.883
	03 28.073 N	163 35.468 W	37.941
	06 17.747 N	161 35.621 W	207.482

Description	Longitude	Latitude	Distance
	04 55.062 N	161 57.440 W	85.489
	03 46.500 N	162 45.506 W	83.653
	07 59.319 N	159 46.527 W	309.217
	08 49.241 N	160 25.224 W	62.911
	07 28.378 N	161 22.408 W	98.709
	08 46.592 N	161 40.895 W	80.328
	04 30.950 N	164 40.610 W	311.798
	05 48.624 N	165 01.164 W	80.326
	07 13.381 N	164 01.398 W	103.488
	07 15.276 N	165 13.180 W	71.236
	08 41.333 N	164 13.099 W	104.624
	09 23.769 N	163 06.060 W	78.639
	10 29.917 N	162 20.208 W	80.096
	11 50.785 N	162 37.916 W	82.713
	13 14.349 N	161 38.467 W	101.738
	13 25.496 N	160 16.250 W	80.775
	15 10.949 N	159 00.357 W	128.564
	15 27.828 N	160 04.866 W	64.465
	16 48.823 N	159 06.049 W	98.754
Arrival 9/9/2005	21 14.926 N	157 55.473 W	274.341
Leg 2 Total Distance			**4,870.662**
Leg 3: Includes Island Stop at Johnston			
Departure 9/13/2005	21 17.867 N	157 59.773 W	N/A
	20 09.625 N	164 19.905 W	362.014
	11 42.739 N	170 05.772 W	606.251
	13 15.616 N	170 17.050 W	93.528
	19 35.584 N	166 00.067 W	452.919
	20 08.103 N	166 52.699 W	59.227
	13 30.864 N	171 20.155 W	472.588
	14 57.039 N	171 36.267 W	87.579
	19 55.922 N	168 15.943 W	354.762
	20 56.668 N	168 50.852 W	68.995
	15 20.253 N	172 34.806 W	398.082
	16 36.364 N	172 57.900 W	79.284
	18 02.251 N	172 02.046 W	101.093
	17 46.055 N	172 49.844 W	48.282
	19 04.996 N	171 58.018 W	93.003
	19 34.566 N	171 01.089 W	61.321
	21 01.460 N	170 03.355 W	102.385
	19 44.487 N	170 17.856 W	78.164
	18 18.423 N	171 14.516 W	101.373
	17 01.194 N	170 51.154 W	80.374
	15 37.179 N	171 47.277 W	99.798
	15 52.263 N	170 23.764 W	81.783
	16 41.092 N	169 50.957 W	58.104
	16 39.609 N	169 47.264 W	3.836
	16 41.135 N	169 46.341 W	1.764
	16 48.548 N	169 38.384 W	10.631
	16 49.437 N	169 37.461 W	1.254
	16 50.580 N	169 35.439 W	2.248

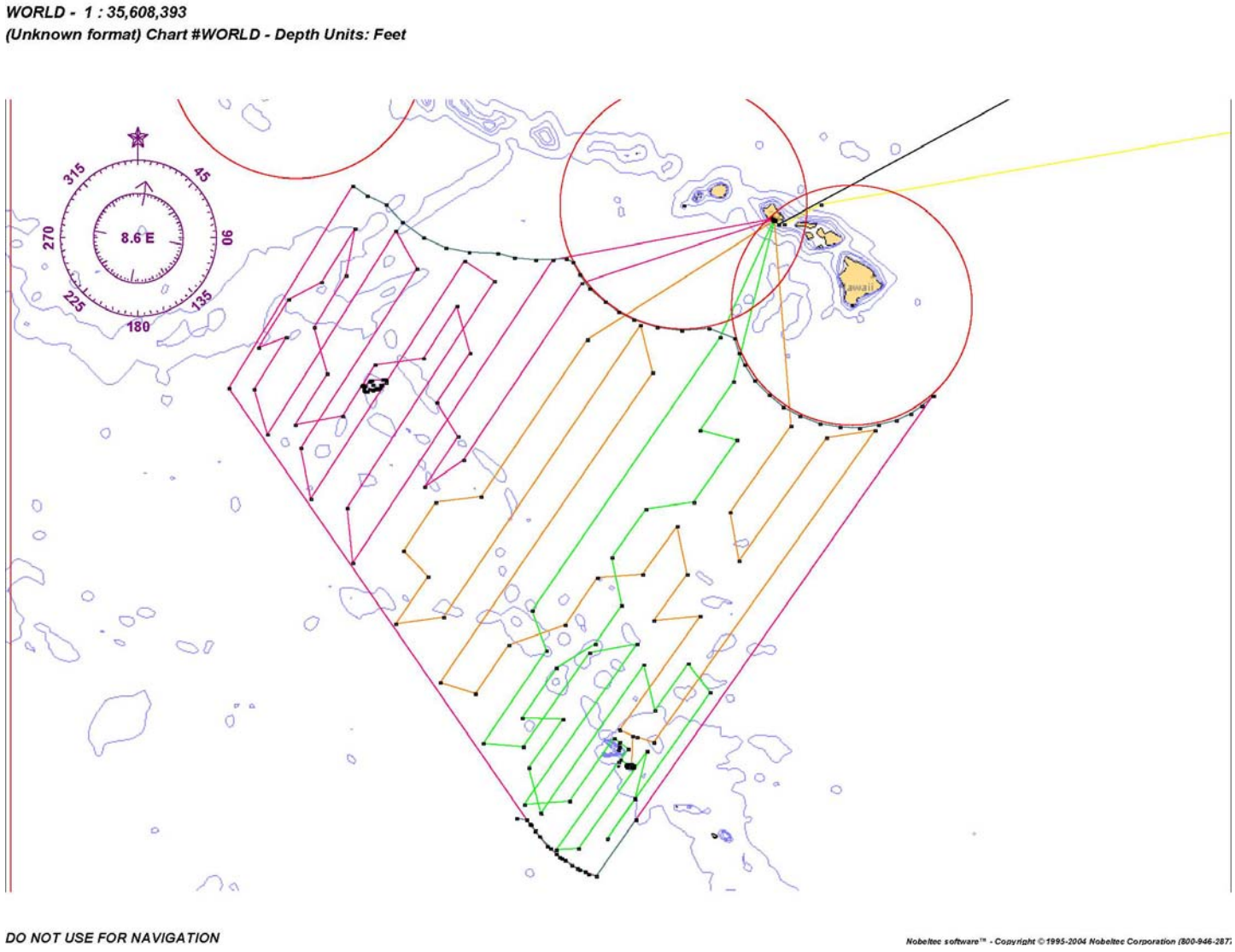
Description	Longitude	Latitude	Distance
	16 51.130 N	169 33.416 W	2.013
	16 53.331 N	169 15.611 W	17.181
	16 53.247 N	169 12.666 W	2.82
	16 52.612 N	169 10.028 W	2.603
	16 51.088 N	169 08.138 W	2.366
	16 50.411 N	169 08.094 W	0.679
	16 46.303 N	169 09.940 W	4.472
	16 43.635 N	169 17.326 W	7.56
	16 42.872 N	169 18.205 W	1.137
	16 41.135 N	169 19.436 W	2.1
	16 37.660 N	169 21.107 W	3.826
	16 36.812 N	169 21.986 W	1.196
	16 36.515 N	169 22.997 W	1.014
	16 36.982 N	169 24.580 W	1.587
	16 37.066 N	169 26.734 W	2.066
	16 36.007 N	169 30.163 W	3.453
	16 35.074 N	169 31.350 W	1.472
	16 34.862 N	169 32.581 W	1.199
	16 36.176 N	169 37.725 W	5.102
	16 35.922 N	169 38.384 W	0.682
	16 33.166 N	169 41.330 W	3.946
	16 32.700 N	169 42.692 W	1.388
	16 32.318 N	169 43.660 W	1.003
	16 32.318 N	169 45.286 W	1.56
	16 34.099 N	169 47.528 W	2.792
	16 37.999 N	169 47.704 W	3.904
	16 38.847 N	169 47.660 W	0.849
	16 39.620 N	169 47.253 W	0.867
	16 41.103 N	169 50.957 W	3.846
	16 44.185 N	169 48.935 W	3.641
	17 16.168 N	169 27.372 W	38.054
	17 27.514 N	168 04.665 W	79.75
	18 54.267 N	167 05.588 W	103.327
	17 36.273 N	166 44.106 W	80.619
	16 13.556 N	167 39.960 W	98.477
	15 16.343 N	167 04.782 W	66.481
	13 52.394 N	168 01.979 W	100.558
	14 37.970 N	166 53.896 W	80.197
	19 32.529 N	163 30.227 W	353.08
Arrival 10/12/2005	21 16.114 N	158 00.007 W	326.373
Leg 3 Total Distance			**5,375.847**
Leg 4: Includes Island Stop at Palmyra			
Departure 10/17/2005	21 12.948 N	157 57.772 W	N/A
	17 58.744 N	163 19.895 W	360.285
	13 34.780 N	166 23.065 W	317.408
	13 25.806 N	167 43.385 W	78.613
	12 02.928 N	168 38.723 W	98.906
	11 19.919 N	167 55.401 W	60.412
	09 57.655 N	168 51.056 W	98.789
	10 09.250 N	167 30.104 W	80.548

Description	Longitude	Latitude	Distance
	18 23.551 N	161 46.842 W	595.819
	17 03.737 N	161 27.399 W	81.935
	08 16.147 N	167 34.531 W	637.697
	07 58.500 N	166 33.816 W	62.643
	09 21.256 N	165 36.581 W	100.251
	09 55.460 N	163 58.552 W	102.519
	11 17.734 N	163 01.633 W	99.494
	11 22.415 N	161 42.894 W	77.345
	12 45.200 N	160 44.710 W	100.454
	11 23.351 N	160 27.634 W	83.535
	10 03.287 N	161 24.758 W	97.778
	10 11.514 N	160 03.761 W	80.160
	06 53.479 N	162 24.319 W	241.948
	06 45.553 N	162 00.833 W	24.631
	05 51.205 N	162 02.666 W	54.380
	06 45.553 N	162 00.833 W	54.380
	06 43.236 N	161 53.327 W	7.807
	06 32.931 N	161 24.553 W	30.382
	15 27.477 N	155 01.391 W	653.609
	15 15.011 N	156 25.992 W	82.529
	11 46.248 N	158 56.393 W	254.889
	13 09.076 N	159 12.687 W	84.343
	15 35.072 N	157 27.092 W	178.265
Arrival 11/15/2005	21 14.395 N	157 54.433 W	340.314
Leg 4 Total Distance			**5,222.052**
Leg 5: Honolulu, HI to San Diego, CA			
Departure 11/19/2005	21 15.539 N	157 53.865 W	N/A
	21 08.058 N	157 38.293 W	16.333
	21 40.677 N	156 34.742 W	67.563
	26 32.444 N	126 32.010 W	1,671.143
	26 12.085 N	123 29.263 W	164.991
	29 18.148 N	123 04.134 W	187.388
	30 30.604 N	121 52.127 W	95.635
Arrival 11/30/2005	32 35.302 N	117 12.941 W	268.618
Leg 5 Total Distance			**2,471.668**
Total Distance: PICEAS			**20,045.140**

Appendix II: Full PICEAS tracklines



Appendix III: PICEAS tracklines



Appendix III – Scientific Personnel

Leg 1:

Position	Name	Affiliation
Chief Scientist	Jay Barlow	SWFSC
Senior Mammal Observer	Jim Cotton	SWFSC
Senior Mammal Observer	Richard Rowlett	SWFSC
Biopsy/Mammal Observer	Juan Carlos Salinas	AFL
Mammal Observer	Christopher Cutler	AFL
Mammal Observer	Suzanne Yin	AFL
Mammal Observer	empty	
Seabird Observer	Michael Force	AFL
Seabird Observer	Sophie Webb	AFL
Oceanographer	Melinda Kelley	AFL
Acoustician	Shannon Rankin	SWFSC
Acoustic Technician	Julie Oswald	AFL
Visiting Scientist	Melissa Soldevilla	AFL/SIO
Visiting Scientist	Alyssa Campbell	Marine Mammal Commission
Teacher-at-sea	Katie Roberts	ARMADA

Leg 2:

Position	Name	Affiliation
Chief Scientist	Jay Barlow	SWFSC
Senior Mammal Observer	Jim Cotton	SWFSC
Senior Mammal Observer	Richard Rowlett	SWFSC
Biopsy/Mammal Observer	Juan Carlos Salinas	AFL
Mammal Observer	Christopher Cutler	AFL
Mammal Observer	Suzanne Yin	AFL
Mammal Observer	Beth Goodwin	AFL
Seabird Observer	Michael Force	AFL
Seabird Observer	Sophie Webb	AFL
Oceanographer	Melinda Kelley	AFL
Acoustician	Shannon Rankin	SWFSC
Acoustic Technician	Julie Oswald	AFL
Visiting Scientist	Kerri Danil	SWFSC
Visiting Scientist	Stephanie Grassia	Visiting Scientist
Teacher-at-sea		

Leg 3:

Position	Name	Affiliation
Chief Scientist	Lisa Ballance	SWFSC
Senior Mammal Observer	Jim Cotton	SWFSC
Senior Mammal Observer	Richard Rowlett	SWFSC
Biopsy/Mammal Observer	Lilian Carswell	AFL
Mammal Observer	Christopher Cutler	AFL
Mammal Observer	Suzanne Yin	AFL
Mammal Observer	Beth Goodwin	AFL
Seabird Observer	Michael Force	AFL
Seabird Observer	Sophie Webb	AFL
Oceanographer	Melinda Kelley	AFL
Acoustician	Shannon Rankin	SWFSC
Acoustic Technician	Sara Heimlich	OSU
Visiting Scientist	Robert Pitman	SWFSC
Visiting Scientist	Luis Vilchis	AFL/SIO
Visiting Scientist		

Leg 4:

Position	Name	Affiliation
Chief Scientist	Karin Forney	SWFSC
Senior Mammal Observer	Jim Cotton	SWFSC
Senior Mammal Observer	Richard Rowlett	SWFSC
Biopsy/Mammal Observer	Suzanne Yin	AFL
Mammal Observer	Christopher Cutler	AFL
Mammal Observer	Mark Deakos	HAMER
Mammal Observer	Beth Goodwin	AFL
Seabird Observer	Michael Force	AFL
Seabird Observer	Sophie Webb	AFL
Oceanographer	Melinda Kelley	AFL
Acoustician	Shannon Rankin	SWFSC
Acoustic Technician	Jen Pettis	AFL
Visiting Scientist	Dave Johnson	PIFSC
Visiting Scientist	Scott Benson	SWFSC
Visiting Scientist	Alex Wegmann	USFWS

Leg 5:

Position	Name	Affiliation
Chief Scientist	Dave Johnson	PIFSC
Senior Mammal Observer	Jim Cotton	SWFSC
Senior Mammal Observer	Richard Rowlett	SWFSC
Biopsy/Mammal Observer	Juan Carlos Salinas	AFL
Mammal Observer	Christopher Cutler	AFL
Mammal Observer	Suzanne Yin	AFL
Mammal Observer	Beth Goodwin	AFL
Seabird Observer	Michael Force	AFL
Seabird Observer	Sophie Webb	AFL
Oceanographer	Melinda Kelley	AFL
Acoustician	Shannon Rankin	SWFSC
Acoustic Technician	Jen Pettis	AFL
Visiting Scientist		
Visiting Scientist		
Teacher-at-sea	Lorayne Meltzer	Prescott College

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 92038

08 June 2005

MEMORANDUM FOR: Commanding Officer, NOAA Ship *McArthur II*

FROM: Annette E. Henry
Survey Coordinator, SWFSC

THROUGH: Jay Barlow
Chief Scientist, PICEAS Cruise 2005

SUBJECT: Statement of Intent to Use Small Boats, and Assessment of Risk for small boat missions during the Pacific Islands Cetacean Ecosystem Assessment Survey (PICEAS) Cruise aboard NOAA Ship *McArthur II*

During the PICEAS 2005 cruise, small boats will be necessary for the biopsy sampling and photography research projects while at sea. Island stops or surf zone landings are planned for this cruise.

Assessment of Risk:

In addition to the general risks inherent in all small boat operations at sea, the greatest risks with small boat operations on this survey are likely to be:

1) Launch and retrieval
   - The greatest risks are likely to be during launching and retrieval. To mitigate this risk, scientists will be instructed by the ship's crew on safe launching and retrieval techniques.

2) Operations around whales
   - Although no whale researchers have been harmed by baleen whales, they are powerful animals and their potential to cause damage should not be ignored. To mitigate this risk, the ship's cox'n will be required to show due caution when maneuvering the small boats around large whales. The Chief Scientist and experienced marine mammal biologists will work with the ship's cox'n regarding safe methods for approaching large whales.

3) Cross-bow/firearm use
   - Crossbows and rifle-powered dart guns will be used to biopsy whales. To mitigate this risk, we have hired one of the most experienced whale biopsy

experts in the world to be the primary biopsy biologist. He will train others on safe use of these instruments.

4) Falls within the small boat
    - Falls are generally caused by an unexpected movement of the boat caused by wave action or by a sudden acceleration or deceleration by the cox'n. To mitigate this risk, we will require the cox'n to notify all occupants prior to a rapid change in course or speed. Prior to accelerating from a stop, the cox'n will ask all occupants if they are ready and will wait for a reply before proceeding. The cox'n will also be responsible for watching for rouge waves and for notifying occupants if the vessel is expected to take a sudden lurch.

5) Island landings
    - Island landings and departures are required on this expedition. Landings will be required at the Palmyra Atoll and the Islands of the Johnston Atoll (number and which islands will be decided by Cruise Leader). Landings at Palmyra will occur from within a protected lagoon. Landings at Johnston may be in more exposed locations. Landings and departures are not expected to be problematic but the cox'n should exercise due caution in choosing a landing location, timing the waves, and potentially deciding not to land at a requested time.