



**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

20 May 2005

## **FINAL CRUISE INSTRUCTIONS**

NOAA Ship: *McArthur II*  
Cruise Number: AR-05-06    SWFSC Cruise Number: 1627  
Cruise Dates: 05 to 24 July 2005  
Cruise Title: Collaborative Survey of Cetacean Abundance and the Pelagic Ecosystem (CSCAPE)  
Study Area: United States West Coast waters

Itinerary: Leg 1 of the cruise will be conducted aboard the NOAA Ship *McArthur* (AR-05-06). Legs 2 through 7 will be conducted aboard the NOAA Ship *David Starr Jordan*. Separate instructions are available specific to the *David Starr Jordan*. Tracklines are included at the end of this document in Appendix 1 and 2.

Sponsoring Institutions: Protected Resources Division, Southwest Fisheries Science Center, (NMFS, NOAA); Olympic Coast National Marine Sanctuary, Cordell Banks National Marine Sanctuary, Gulf of the Farallones National Marine Sanctuary and Monterey Bay National Marine Sanctuary (NOS, NOAA).

Cruise Description and Objectives: The CSCAPE 2005 cruise is a collaboration between the National Marine Fisheries Service and the National Marine Sanctuary Program to assess the abundance and distribution of marine mammals and to characterize the pelagic ecosystem off the U.S. West Coast. The primary objective is to conduct a marine mammal assessment survey out to a distance of approximately 300 nautical miles, with additional fine-scale surveys within the NMS boundaries. A secondary objective is to characterize the pelagic ecosystem within the study area, through the collection of underway and station-based physical and biological oceanographic sampling, studies of mid-trophic level organisms (using net sampling and acoustic backscatter methods) and research on non-protected apex predators (seabirds). A final objective is to conduct biopsy sampling and photo-identification studies of cetacean species of special interest.



Itinerary: The principal study area includes the U.S. West Coast Exclusive Economic Zone (EEZ) – Washington, Oregon, and California coastal waters out to a distance of approximately 300 nautical miles. The survey will be divided into two sampling strata: 1) a grid of predetermined tracklines to obtain coarse coverage of the entire study area, 2) a separate set of parallel or zigzag lines to obtain finer-scale coverage within waters of the West Coast National Marine Sanctuaries. Sample tracklines are given in Figure 1; specific waypoints will be provided. Tracklines may need to be modified prior to or during the cruise due to weather or other considerations.

Chief Scientist: Dr. Karin Forney, SWFSC (831) 420-3908

## **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.

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 5 nm 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.

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). Again, 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 or photography. 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. 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 cetaceans 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.

1.7 Collection of Jellyfish Samples - Jellyfish and other gelatinous plankton will be collected opportunistically for leatherback turtle dietary studies. Jellyfish will be collected during scheduled bongo tows or from the small boat. Samples will be frozen for future stable isotopic analysis.

1.8 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 needed 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.

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.

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.

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 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. 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.

## 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 oceanographer and Survey Technician. The crew of the vessel will operate all 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. The ship shall provide a complete backup system, consisting of a frame with weights, 12-place rosette with bottles, a deck unit, and a SeaBird 9/11+ CTD with conductivity and temperature sensors. 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).

2.1 CTD Stations - Weather permitting, between one and two CTD stations will be occupied each night: an evening cast after the end of effort (unless the ship will resume effort within 10 nm the next morning), and a pre-dawn cast. 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 1000 m, 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 200 m) and salinity samples (2 to 6 samples per cast, at least 500 and 1000 m 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 - 500 m) will be collected, frozen, and stored on board. Both the Survey Technician and oceanographer will participate in sample collection (chlorophylls and nutrients) and analysis of chlorophyll samples. The Survey Technician will collect and analyze salts and record them in the log provided, when one case of 24 bottles is full and has been temperature stabilized in the location of the salinometer. Primary productivity will be measured by radioactively labeled carbon uptake methods performed by the oceanographer. Seven samples taken from Niskin bottles #1 through #7 will be spiked with  $^{14}\text{C}$ , 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 radioactive material prior to departure. A copy of the SWFSC's 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 radioactive materials at sea).

2.1.2 Post Effort Cast - An evening CTD cast, to 1000m, may be conducted, after effort, if the ship will move >10 nm overnight. 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 of 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 Bongo Tow - An oblique bongo tow will be conducted after the post-effort CTD in darkness. If no evening CTD is conducted, the tow will occur a minimum of one-hour after sunset. Both nets will be 505 micron mesh and will be towed for 15 minutes (45 minute station time), to a depth of 200m (wire out 300m on starboard hydro winch). The samples will be preserved in formalin or frozen (isotope analysis), labeled and stored in containers provided

by the SWFSC until the vessel returns to San Diego. The second cod end of the bongo (port side) will only be attached once per week for isotope samples (see section 2.2.1.1).

2.2.1.1 Samples for Leatherback Turtle Diet Isotope Project - The gelatinous contents of the second cod end of the bongo will be placed in whirl-paks, labeled, and stored frozen for later stable isotopic analysis. J. Seminoff (SWFSC) will provide supplies to label and store these samples.

2.3 Sediment Samplings – At the discretion of the Cruise Leader, a Van Veen sampler will be deployed at designated stations. These samples will generally be taken after the evening CTD and net tow stations by two members of the scientific party and a winch operator. Surficial sediment material will be removed with scoops from one sampler, homogenized, and apportioned to jars for chemical and physical testing at laboratories ashore. Chemical samples will be frozen until the end of the cruise. Samples for physical testing will be kept refrigerated and shipped on ice. It is essential that ship position be maintained as close as possible to target coordinates during deployment as many sites will be within steep canyon walls where target areas are narrow and entanglement with outcrops is possible. Waypoints for sampling are found in Appendix IV; these waypoints may be modified at the discretion of the Cruise Leader.

2.4 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. 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. Karin A. Forney, SWFSC, at phone (831) 420-3908. 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. Two to three laptop computers for scientific party e-mail use, one for the Cruise Leader, One for the photo-ID team, and one for the biopsy team
10. Two desktop computers mounted in the SIC room with CAT5 KVM extension units at CPUs and at remote console units on the flying bridge
11. Portable GPS component
12. Crossbows, biopsy darts and tips, sample vials and storage solution (EtOH) with MSDS
13. Two liquid nitrogen tanks (one 70 l and one 34 l) for biopsy sample preservation with MSDS
14. Additional -80° freezer for storage (29.5w x 35h x 73-1/4l)
15. Rifles, 9mm and .22 caliber blank charges
16. One notebook computer for biopsy data entry and two printers: a small deskjet and a thermal label printer
17. Two long-handled dip nets and sample containers
18. 2 gimbaled 20 gal aquarium tanks (for inside use)
19. 2 50-gallon aquarium tanks (for outside use)
20. Formalin and sodium borate
21. Manta net frame and net (including spare nets)
22. Bongo frame and nets (including spare frame and nets)
23. Glass sample containers with lids for net tow samples, pint (22 boxes), quart (2 boxes) and gallon (1 box/4ea)
24. XBT probes (Deep Blues) - 41 cases to be stored in 2 fish boxes, Oceo van and lab spaces (38 cases to arrive in Seattle between June 28 and July 1)
25. Two computers for oceanographic data processing, 0acoustic (EK60) data acquisition, and 1 spare
26. Fluorometer (TD10AU) and one backup (TD10) for discrete chlorophyll *a* analysis
27. Lab apparatus, logs and supplies for discrete chlorophyll *a* analysis

28. Wormley standard seawater vials for salinometer calibration (55 vials)
29. SBE38, remote temperature sensor (already installed)
30. Salinometer (Portasal 8410) to use as primary salinometer
31. Salinity sample bottles, square w/plastic insert beneath screw cap (100 ea. -4 cases of 24 plus 4 spares)
32. Acetone, B-phenethylamine (mixed in cocktail), scintillation cocktail, hydrochloric acid, Triton x-100
33. 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 security to boat deck by ship's personnel
34. <sup>14</sup>C-bicarbonate (14 mCi total) and copy of NRC Materials License 04-29022-01
35. Primary productivity incubator (approx. 2' x 2' box, 48" high) with 2 hoses (25') for saltwater input and drainage overboard
36. Nutrient and productivity sample vials
37. Small refrigerator for <sup>14</sup>C stock solution (located in Oceo. 'Rad. lab')
38. Bucket thermometer holder and thermometer (and 2 spares)
39. Safety (MSDS's) and clean up materials for <sup>14</sup>C and all chemicals, incl. a Geiger counter
40. Oceanographic data logs and log books
41. Fish boxes, ten for storage including two for XBTs
42. Box of approximately 10 sonobuoys
43. One sonobuoy receiver
44. DAT recorder and two laptop computers for acoustic monitoring
45. Permits for specimen collection
46. Computer data storage media (diskettes, CDs, etc.)
47. 5 reams of paper
48. Keel-mounted hydrophone
49. -80° freezer (36" x 48" footprint)
50. Van Veen sampler
51. Acetone, 250 ml glass jars and whirlpaks for processing of bottom grab samples
52. 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 (for PICEAS)
53. Small winch for acoustics, 2' x 3' footprint (for PICEAS)
54. "RESEARCH" Banner for prominent display in the State Waters of Washington

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. Insulated CAT5 cable running from location site for CPUs to the flying bridge consoles.
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. Deck lighting for dipnetting
7. Freezer space for water (45 cu. ft./standard chest freezer) and biological samples (-80°)
8. Seabird 9/11+ CTD system including deck unit rosette with Niskin bottles (2.5L, 12 each)
9. Back-up SeaBird CTD, rosette, sensors, frame with weights and 12 Niskin bottles (any size)
10. Oceanographic winch with minimum 1500m of .322" conducting wire, terminated to CTD
11. Hydrographic winch with minimum 400m cable (1/4" to 3/8" dia.) for net tows
12. Bottom depth checking during CTD casts and net tows in depths less than 2000m.
13. SeaBird thermosalinograph (SBE45) and connection to SCS
14. Connection of SBE38 to SCS (secondary temperature sensor for TSG)
15. Sippican XBT launcher (prefer aft deck location) and connection to SEAS/Sippican software
16. Fume Hood (located in aft lab, aft counter, left side)
17. Refrigerator, small, for chlorophyll sample extraction (aft lab)
18. Storage space for 4 XBT cases inside the ship (main or aft laboratories)
19. Scientific Computing System for data collection
20. Simrad EK60 echo sounder and input cables
21. Autosal salinometer (model 8400) to use as spare (must be operational/tested prior to departure)
22. Clean rust-free seawater for primary productivity incubator on boat deck
23. Space for primary productivity incubator (2'x2') and fish tanks (25 sq feet) on boat deck
24. Counter space for SWFSC-supplied oceanographic computers and connections to network
25. Deck space for one manta and two bongo net frames (primary with nets attached and one spare frame)
26. Marine Operations and Deck Log (electronic)/Weather Observation sheets, filled out by Deck Officers
27. Installation of SWFSC-supplied sonobuoy antenna and coax cable
28. Copy Machine
29. Additional email computer for scientific email use in dry Lab
30. Network access to a printer for biopsy sampling computer
31. Space in dry lab area for -80° freezer (36" x 48" footprint)
32. Hansen Coupling Division female LL6-HKP/LL8-HKP ends to quick connect style connectors on hose from hydraulic power supply for acoustic winch
33. Space of the aft deck for the acoustic winch (5' x 6' footprint)

4.3 Installation and Maintenance - Prior to departure from San Diego 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.

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 Scientific Collecting Permit for the State of Washington requires that vessels engaged in collection activities display a sign "RESEARCH," readable at 100 feet to the unaided vision. The scientific party will provide the banner and requests ship personnel to assist in the proper placement of the sign.

4.4 Radioisotopes - Small amounts of  $^{14}\text{C}$  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. Valerie Andreassi and Melinda Kelly are Authorized Users 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  $^{14}\text{C}$  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 (SCS) - 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 her, 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](mailto: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 her 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 \$3.00 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-P21 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](mailto: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/CSCAPE/default.htm>

Prepared by: \_\_\_\_\_ Dated: \_\_\_\_\_  
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\_\_\_\_\_ Dated: \_\_\_\_\_  
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Approved by: \_\_\_\_\_ Dated: \_\_\_\_\_  
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Science Director, F/SWR

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

Appendix I: Waypoints for Primary transects (See Appendix II, Figure 1).

Transect	East Endpoint				West Endpoint			
	Lat-Deg	Lat-Min	Long-Deg	Long-Min	Lat-Deg	Lat-Min	Long-Deg	Long-Min
C1	35	33.28	121	07.97	35	40.47	121	42.34
C2	35	45.16	121	17.54	35	50.63	121	42.93
C3	35	57.34	121	27.50	36	09.53	122	24.92
C4	36	09.69	121	38.83	36	22.50	122	39.57
C5	36	22.81	121	52.89	36	33.91	122	46.02
C6	36	33.28	121	54.84	36	44.38	122	48.55
C7	36	41.87	121	48.01	36	54.53	122	48.55
C8	36	51.56	121	47.42	37	06.88	123	00.08
C9	37	08.44	122	19.45	37	18.44	123	07.30
C10	37	19.06	122	22.97	37	28.59	123	08.09
C11a	37	30.62	122	29.80	37	32.50	122	38.98
C11b	37	33.59	122	44.45	37	42.03	123	23.71
C12a	37	40.23	122	28.73	37	41.56	122	35.08
C12b	37	44.53	122	48.95	37	53.59	123	31.72
C13	37	51.41	122	33.52	38	04.84	123	36.99
C14	38	06.41	122	56.95	38	12.03	123	24.49

Note: Inshore Waypoints should end as close to land as possible for safe navigation.

Secondary transects, to be completed if time and weather conditions permit, will be selected from the large-scale transect grid in Appendix II, Figure 2, defined by the following lines.

Transect	East Endpoint				West Endpoint			
	Lat-Deg	Lat-Min	Long-Deg	Long-Min	Lat-Deg	Lat-Min	Long-Deg	Long-Min
13	30	43.0	121	06.5	31	46.0	125	40.0
14	31	37.0	118	26.0	33	29.0	126	54.0
15	32	52.0	117	16.0	35	15.0	128	02.0
16	35	12.0	120	50.0	36	56.0	129	04.0
17	37	01.0	122	11.0	38	40.0	130	08.0
18	38	46.0	123	30.0	40	19.0	131	00.0
19	40	27.0	124	26.0	41	46.0	131	00.0
20	41	55.0	124	13.0	43	16.0	131	00.0
21	43	27.0	124	17.0	44	43.0	131	00.0
22	44	56.0	124	02.0	46	05.0	130	18.5
23	46	26.0	124	03.0	47	08.5	128	00.5
24	48	02.0	124	41.0	48	12.0	125	41.0
l	34	00.0	118	30.0	31	08.0	119	24.0
m	34	27.0	120	00.0	30	43.0	121	07.0
n	35	40.0	121	15.0	30	12.0	123	02.0
o	37	11.0	122	25.0	30	51.0	124	29.0
p	38	46.0	123	30.0	31	50.0	125	47.0
q	41	41.0	124	10.0	33	29.0	126	54.0
r	46	26.0	124	03.0	35	15.0	128	02.0
s	48	28.0	124	55.0	36	56.0	129	04.0
t	47	38.0	126	55.5	38	40.0	130	08.0
u	46	40.5	129	00.5	40	58.0	131	00.0
v	45	51.0	130	50.0	45	28.0	131	00.0

Appendix II: Tracklines for CSCAPE Leg 1b.

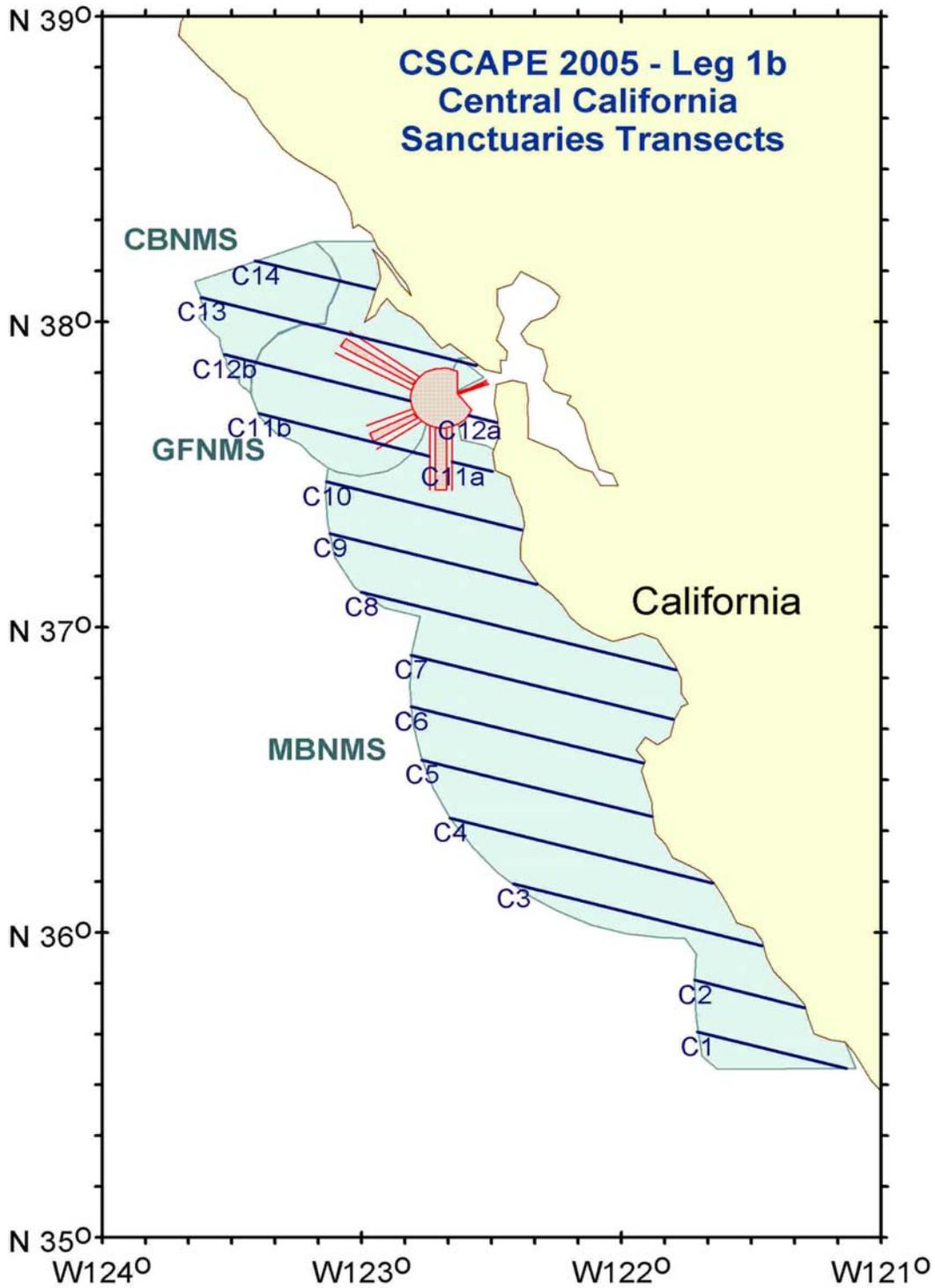


Figure 1. Primary Transect Lines, C1-C14.

Appendix II continued.

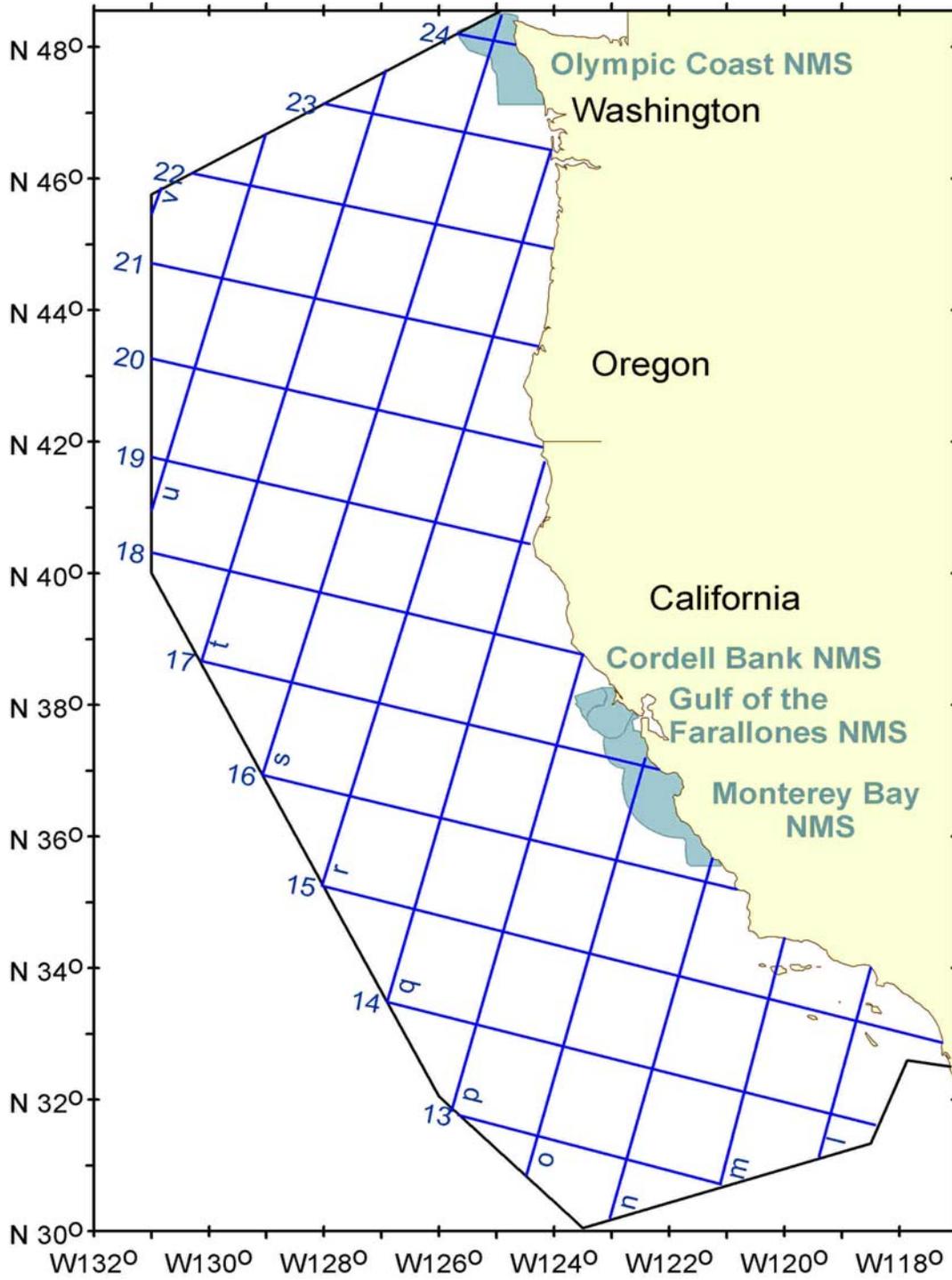


Figure 2. Secondary, large-scale transect lines, 13 through 24 and l through v.

Appendix III: Personnel

McArthur II - Leg 1b: Seattle, WA to San Francisco, CA

<b>Position</b>	<b>Name</b>	<b>Affiliation</b>	<b>Berth</b>
Chief Scientist	Karin Forney	SWFSC	02-35-1
Senior Mammal Observer	Cornelia Oedekoven	AFL	01-21-2
Senior Mammal Observer	Jim Cotton	SWFSC	01-27-2
Senior Mammal Observer	Juan Carlos Salinas	AFL	01-27-2
Mammal Observer	Holly Fearnbach	AFL	01-43-2
Mammal Observer	Ernesto Vasquez	AFL	1-22-3
Mammal Observer	Tim O'Toole	AFL	1-22-3
Independent Observer	Jan Roletto	NMS	01-29-1
Seabird Observer	Rich Pagen	AFL	1-22-3
Seabird Observer	Sophie Webb	AFL	01-21-2
Oceanographer	Liz Zele	AFL	01-34-2
Oceanographer	Mindy Kelly	AFL	01-34-2
NMS Visiting Scientist/Third Birder	Peter Pyle	NMS	1-22-3
Teacher-at-sea	Kimberly Pratt	NMS	01-29-1
Visiting Scientist/Other	TBD	NMS	01-43-2

Appendix IV: Van Veen Sampling Stations

<b>ID</b>	<b>Longitude (DD)</b>	<b>Latitude (DD)</b>	<b>Depth(M)</b>	<b>priority</b>
5MC4	-121.8443	36.7938	250	1
5MC4D	-121.8872	36.7835	250	1
5SO4	-121.9653	36.8438	250	1
5SO4D	-122.0070	36.8146	250	1
SOC-2	-121.9652	36.8602	105	2
MC-2	-121.8479	36.8172	114	2
304	-121.9083	36.8417	68	2
5AC4	-122.4087	37.0178	250	3
5AC4D	-122.4206	36.9667	250	3



**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

27 May 2005

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

FROM: Annette E. Henry  
Survey Coordinator, SWFSC

THROUGH: Karin A. Forney  
Chief Scientist, CSCAPE Cruise 2005

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

During the CSCAPE 2005 cruise, small boats will be necessary for the biopsy sampling and photography research projects while at sea. There are no island stops or surf zone landings 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) Cold water operations
  - The CSCAPE 2005 cruise will include the waters off the coasts of California, Oregon and Washington, where water temperatures are cold. To increase the safety of those deploying in the small boats, the scientific party will provide Mustang suits to scientific crew, to be used at the discretion of the Command.
- 2) Launch and retrieval
  - The greatest risks are likely to be during launching and retrieval. To mitigate this risk we are taking extensive time before the cruise to drill crew and scientists on safe launching and retrieval techniques. Training will occur dockside and in calm waters of Astoria and Puget Sound until all parties are satisfied that operations are as safe as possible.



3) 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 we are hiring a scientist with extensive experience handling small boats around large whales. This scientist will be the primary vessel operator for whale biopsy and photo-ID missions on Leg 1b. This person will train ship's crew on safe methods for approaching large whales.

4) 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.

5) 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.