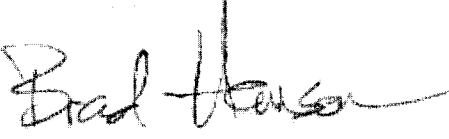
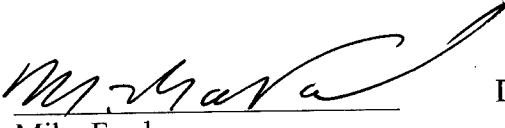



## Final Project Instructions for Bell M. Shimada

Date submitted: 15 February 2013  
Platform: NOAA Ship *Bell M. Shimada*  
Project #: SH-13-02  
Project Title: Killer Whale Distribution Survey 2013  
Project Dates: 27 February - 19 March 2013

Prepared by:  Dated: 2/15/13  
Brad Hanson  
Chief Scientist  
Northwest Fisheries Science Center

Approved by:  Dated: 2/21/13  
Mike Ford  
Division Director  
Conservation Biology Division,  
Northwest Fisheries Science Center

Approved by:  Dated: 2/21/13  
John Stein  
Center Director  
Northwest Fisheries Science Center

Approved by: \_\_\_\_\_ Dated: \_\_\_\_\_  
Captain Wade J. Blake, NOAA  
Commanding Officer  
Marine Operations Center - Pacific

I. **Overview**

A. Project Period:

27 February - 19 March 2013

B. Service Level Agreements

Of the 21 DAS scheduled for this project, 21 DAS are funded by OMAO. This project is estimated to exhibit a Medium Operational Tempo.

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

The operating area will include the coastal waters of the continental United States from northern Washington to potentially as far south as central California (37 degrees North) and in Canada on the continental shelf waters of Vancouver Island north to approximately Tofino (49 degrees north) as well as the inland waters as far north as the northern Strait of Georgia (Figures 1-3).

D. Summary of Objectives

NWFSC will conduct acoustic and visual surveys of marine mammals and seabird from 27 February - 19 March 2013 along the Washington, Oregon, California, and Canadian coasts in order to determine Critical Habitat in the coastal portion of the range of Southern Resident killer whales.

While aboard Shimada we will work on established track lines using both visual and acoustic means to locate killer whales. Upon a potential or confirmed detection of whales of interest, the ship will break from the track line to the location of the whales and follow the pod. If conditions permit we will launch one of the small boats to collect photo-IDs, biopsy samples, predation and fecal samples, and deploy satellite tags. If the whales are southern resident killer whales we will continue to follow them until we lose visual and acoustic contact. At that time a search plan will be devised and executed, we will recommence surveying, or we will return to port, depending on weather conditions, current location and remaining duration of the Project.

The mission is successful if we are able to locate and track any of the southern resident killer pods. The collection of predation, fecal, and biopsy samples will be of significant additional value. Secondary objectives include locating and documenting other cetacean species, in particular the collection of photographs and audio recordings of other killer whale pods, as well as sea bird counts and oceanographic data by CTD, TSG, surface water samples, XBT, and bongo tows.

E. Participating Institutions

NWFSC  
Biowaves, Inc.  
Cascadia Research Collective

F. Personnel (Science Party)

Name	Sex	Nationality	Affiliation
Brad Hanson	M	U.S.	NWFSC
Candice Emmons	F	U.S.	Cascadia
Brenda Rone	F	U.S.	NWFSC
Jeff Foster	F	U.S.	Cascadia
Tina Yack	F	U.S.	Biowaves
Kerry Dunleavy	F	U.S.	Biowaves
Talia Dominello	F	U.S.	Biowaves
Eliza Ives	F	U.S.	NWFSC
David Haas	M	U.S.	NWFSC
Scott Mills	M	U.S.	NWFSC
Ryan Merrill	M	U.S.	NWFSC
Tracy Shaw	F	U.S.	NWFSC

Emergency contact information for personnel

Please provide emergency contact information via the NHSQs and when arriving at the vessel to the Operations Officer.

G. Administrative

1. Points of Contact :Chief Scientist/alternate

a. Primary Point of Contact (POC):

Brad Hanson (206) 860-3220 [brad.hanson@noaa.gov](mailto:brad.hanson@noaa.gov)

b. Alternative land based POC

Mike Ford (206) 860-5612 [mike.ford@noaa.gov](mailto:mike.ford@noaa.gov)

Ops Officer/alternate, agent if needed/selected (name, address, phone number, and email for all)

Ship POC – Shimada Operations Officer

**I. F. 2. Project Overview – Diplomatic Clearances**

This Project involves Marine Scientific Research in waters under the jurisdiction of Canada. Diplomatic clearance has been requested and will be provided upon approval.

**I. F. 3. Project Overview – Licenses and Permits**

This Project will be conducted under the Scientific Research Permits:

U.S. NMFS Marine Mammal License No. 16163-01 issued to Dr. Brad Hanson, expires on June 6, 2017.

U.S. NOS National Marine Sanctuaries Research permit No. – to be issued

Canadian DFO Marine Mammal and Sara License No. MML 2012-03SARA-84 issued to Dr. Dawn Noren, expires on December 31, 2014.

## Operations

### H. Project Plan Itinerary

27 January – Final project instructions due

11 February – 0900 – Pre-Project meeting

26 February – 0900 – Equipment loading

1100 – Familiarization and Safety briefing

27 February – 1400 – Depart Newport

27 February - 19 March

0600 – Surface water sample

0700 – Begin visual survey

0750 – Safety Meeting

0900 – XBT/Surface water sample

1200 – XBT/Surface water sample

1500 – XBT/Surface water sample

1800 – End visual and acoustic surveys, Surface water sample (and XBT if CTD is cancelled)

~2000 – CTD cast

2100 – Bongo tows

19 March 13

1900 – Arrive Newport – Subject to tides and weather

0800 3/20– Begin off load equipment

a. Speed, order of operations - During surveys the ship will maintain 8-10 knots, The ship will slow to 3 knots mid-line for acoustic monitoring as well as during turns. Turns will not exceed 30 degrees and in shore turns will be initiated if water depth is less than 30 fathoms. The ship will slow to 2-3knt for night-time bongo deployments.

b. Crane, winch, a-frame operations– STBD deck crane will be needed for equipment loading and unloading, STBD Oceanographic Winch will be needed for CTD casts. Aft A-frame will be needed for deployment of small boat during mammal small boat ops. Second Oceanographic winch will be needed for Bongo Tows. One or both arrays will be out except for CTD and inclement weather. One array (two-element is typically out) both day and night while

the larger array (five element) is typically out at night. The acoustic arrays will be deployed sequentially so the power to the winches for deployment does not need to be simultaneous. Sonobuoys are typically deployed manually off the stern of the ship. Their use will be opportunistic and subject to certain conditions. For example, if we cannot have the arrays out because of weather or location (shallow water, crab pots), we may deploy sonobuoys for passive acoustic operations instead.

c. Ship personnel requirements (numbers on deck, survey, etc, and the time they are required) Survey technician will be needed at 0900, 1200 and 1500 for XBT launches. If a CTD cast is cancelled, a survey technician will be needed at 1800 for an XBT launch. Survey tech and two deck crew will be needed for CTD cast. Three deck crew and Small Boat OIC will be needed for small boat ops. A Survey tech and a winch operator (AB) will be needed for night time Bongo deployments.

#### I. Staging and Destaging

##### Staging:

26 February 13 – Morning - STBD deck crane to load winches, sonobuoy totes and other gear.

##### Destaging:

19 March 13 – Morning - Aft deck crane to unload winches and sonobuoy totes and other gear

#### J. Operations to be conducted (Detailed breakdown of each type of proposed operation, i.e., in-situ, station, observing...)

***Execution:*** We will conduct 24 hour operations by maintaining an acoustics listening watch in the dry lab. During day light hours observers will use Big Eye binoculars located at stations on the flying bridge. Observers will be on the flying bridge from sunrise to sunset. After sunset we will conduct CTD casts not to exceed 1000m or 50 m above charted depth at the time of the cast and bongo tows.

1.1 Cetacean Survey - Line-transect survey methods will be used to collect sighting data. At the beginning of each day (sunrise) search effort will begin on the track line that had been continued on from the previous evening. The Shimada should travel at 9-10 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 Chief Scientist. A daily watch for marine mammals will be maintained during daylight hours by scientific observers on the flying bridge (approximately 0700 to 1800), except when the ship has stopped to conduct other sampling operations, or when precluded by weather. A team of three observers will search with 25x150 binoculars, 7X binoculars, and unaided eye on the flying bridge. The flying bridge will need to be in VHF radio contact with the bridge and acoustics (dry lab). If weather conditions (rain, fog, wind) preclude use of the 25x binos, a one or two observer monitoring effort will be maintained with 7x50 binos or unaided eye on the bridge with the permission of the OOD. Sighting 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). Draft waypoints are shown in Figures 1-3. Final waypoints will be provided as a Nobeltec compatible file at the pre-Project meeting. Route and waypoint selection will be subject to recent killer whale sighting reports and weather conditions and adjusted relative to these circumstances and time remaining in the Project. Points near the coast are approximate, but the actual survey tracklines will end at the 10-fathom isobath (or at the shallowest safe navigation depth as determined by the Commanding Officer). Tracklines into and out of ports are not shown. It is not intended that the entire grid of tracklines be covered during the course of the 10 day survey, but the order in which they are covered will be determined by weather and other contingencies. If weather precludes survey, the Chief Scientist may decide to wait at that position for better weather or may request the ship be moved to another location on the transect based on weather forecasts. The Chief Scientist will be responsible for working with the Command to ensure that the vessel arrives at designated ports at designated times. The Chief Scientist will be responsible for ensuring that the entire survey area is adequately covered. The Chief Scientist may adjust the scientific activities and length of the nighttime travel to meet scientific and scheduling objectives.

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. We also need a file with the ship's track while underway (not just during ops).

1.1.2 Breaking Trackline - On sighting a marine mammal or other feature of biological interest, the Chief Scientist or marine mammal observer team on watch will request that the vessel be maneuvered to approach the school or feature for investigation. When the ship approaches a group of marine mammals, the observers will make independent estimates of group size. Behavioral data collection and photographic operations may commence from the bow, based on directions from the Chief Scientist or identification specialists. In some instances, the Chief Scientist will request the deployment of a small boat for biopsy, behavioral data collection, prey remains and fecal sample collection, and photographic or other operations (see 1.1.6).

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

1.1.3 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 Chief Scientist or identification specialists 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 Southern Resident killer whale studies – In the event that any members of the pods of southern resident killer whale population, or other whales of interest, are located, every effort will be made to remain with these animals for the duration of the Project. Visual sightings as well as acoustic data from the towed acoustic array or sonobuoys will be used to track the whales. Behavioral data will be collected during visual observations. Weather permitting, small boat operations will commence in order collect, behavioral data, predation event remains, and photographs.

### 1.3 Acoustics

1.3.1 Towed Array – A small hydrophone array will be towed during all hours the ship is underway on the survey tracklines. The array will be monitored 24/7 weather permitting as the ship proceeds on tracklines. The vessel will slow from survey speed to approximately 3 knots at the midpoint and end of each line in order to provide improved acoustic monitoring conditions. The array will be wound onto a ship-powered hydro-electric winch supplied by the NWFSC. Hook-ups to a ship power system will be required for each winch. This array will be towed at a distance of 200 or 300 m behind the ship depending on conditions (including obstacles such as crab pots and the amount of ship noise that the SHIMADA generates). The deployment depth of this array can vary from 5 to 65 m depending on ship speed. For example, the deployment depth will be between 40-65 m at 3 knots while the depth will be between 5-15 m at 10 kts. A second towed array on a separate hydro-electric powered winch also may be deployed to more efficiently track marine mammals, especially at night. This array will be towed at a distance of 660 m behind the ship. The deployment depth of this array can vary from 3 to 45 m depending on ship speed. For example, the deployment depth will be between 10-25 m at 3 knots while the depth will be between 5-10 m at 10 kts. While both arrays will be towed simultaneously, power to each winch can be provided sequentially for deployment. A team of 3 or 4 acousticians will monitor the array, record sound made by cetaceans, and localize their positions.

1.3.2 Sonobuoys - Sonobuoys may be deployed on an opportunistic basis, at the discretion of the Chief Scientist or Acoustics team. No ship equipment will be required. All of the necessary equipment will be supplied and operated by scientists. A VHF antenna mounted at a high point on the ship and cabled to the acoustics lab will be used to monitor these.

1.3.3 Depth Sounder - The scientific ME-70 depth sounder will be operated continuously, at between 70 and 120KHz 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 Chief Scientist at any time those navigational depth sounders are used.

1.3.4 Acoustic Echosounder - EK60 echosounder data at 70, 120, and 200 kHz data will be recorded to monitor the winter distribution of some important fish species off the US west coast, such as Pacific hake, sardine, myctophids, etc. The EK60 transducers are mounted on the vessel centerboard and all necessary software has been installed on the ship computer and used by the



Acoustics Team of the NWFSC for the 2011 Joint US and Canada integrated acoustic and trawl hake survey. The recording depth will be from 0 to 750 m.

1.4 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.

1.5 Small Boat Work - A small boat will often be necessary for biopsy sampling, behavioral data collection, predation and fecal sampling, and photography. Deployment will be requested by the Chief Scientist on an opportunistic basis, providing the Commanding Officer concurs that operating conditions are safe. The small boat should remain within radar range and radio contact at all times while deployed.

1.5.1 Biopsy Sampling - Biopsies for genetic analyses of killer whales will be collected on an opportunistic basis. Necessary permits will be aboard the vessel. The animals sampled will be approached by a small boat. Samples will be collected from animals within 10m of the small boat using a dart fired from a crossbow or a dart rifle. With the exception of the small boat it's requisite safety equipment, and a freezer for samples, all gear will be furnished and deployed by the scientific party.

1.5.2 Behavioral Observations – Behavioral observations of marine mammals will be taken on an opportunistic basis. Necessary permits will be present on the vessel. The animals to be observed will either 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, all necessary gear will be furnished by the scientific party.

1.5.3 Prey remains collection – Collection of prey remains from predation events of marine mammals will be collected on an opportunistic basis. Necessary permits will be present on the vessel. The animals to be followed will be approached by the small boat. With the exception of the small boat and freezer to store samples, all necessary gear will be furnished by the scientific party.

1.5.4 Photography - Photographs of marine mammals will be taken on an opportunistic basis. Necessary permits will be present on the vessel. The animals to be photographed will either 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, all necessary gear will be furnished by the scientific party.

1.6 Conditions Which Preclude Normal Operations – At times during the Project visual survey operations will not be possible due to high winds, seas, or fog. Usually, survey operations are suspended at Beaufort Sea State 6 or higher. Also, if fog makes the visibility one nautical mile or less, visual observations are suspended until visibility increases. During these times, the Chief Scientist will decide which task to pursue, if any other operations are possible. The weather

conditions that would prevent regular survey operations vary somewhat so the Chief Scientist will inform the bridge when survey effort is suspended.

1.7 Collection of Marine Mammals - Marine mammal body parts may be collected on an opportunistic basis at the discretion of the Chief Scientist. 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 collect and import marine mammal parts will be present on the vessel. All marine mammal ivory collected will be stored at the NWFSC but may be released on extended loan to recognized research institutions according to existing guidelines.

1.8 Oceanography - Oceanographic sampling will be done by the oceanographer and other designated scientists while underway during the day.

1.8.1 Oceanographic Records – A chronological record of oceanographic stations will be kept by the ship (Electronic Marine Operations Log) with dates and times in GMT. The ship will provide a digital copy of the electronic marine operations log and Project weather log to the NWFSC oceanographer at the completion of the Project. The main CTD system will be provided by the ship and operated by the survey department. The collection of oceanographic data, samples, and their processing will be conducted by the scientific party. The oceanographer will maintain a log book which lists the dates and times that samples were taken, sampling locations (longitude and latitude), which samples were taken (salinity, temperature, nutrients, chlorophyll a, plankton, etc.), and how the samples were taken (bucket, CTD, XBT, thermosalinograph, and/or dip net)

1.8.2 XBT Drops - There will be 3 XBT drops per day at 0900, 1200 and 1500 hours local ship time, or at the discretion of the Chief Scientist. If the vessel is stopped, the drop will be done when the vessel is again underway. If the vessel is not going to move within half an hour, the scientist performing the drop should be notified and the drop will be delayed or canceled, at the discretion of the Chief Scientist. If a CTD cast (described below) is cancelled due to inclement weather or because the ship is tracking killer whales, an XBT will be launched at 1800 hours when the surface water sample (see below) is collected.

1.8.3 Surface Water Samples - A surface water sample for chlorophyll a analysis and sea surface temperature will be taken at 0600, 0900, 1200, 1500, and 1800 hours local ship time daily. Surface water samples will also be taken every hour when in the presence of Southern Resident killer whales. Permission to conduct bucket/surface sampling will be requested by the sampler to the OOD on the bridge prior to any sampling.

1.8.3. a. chlorophyll a analysis – immediately following bucket sampling, a 50 ml sample of the bucket water will be filtered onto GF/F filters following the chlorophyll a analysis protocol. Using forceps, the filter will be folded in half (particulate matter on the inside), placed in a glass culture tube that is labeled with the date, time of sample, and GPS location of sample), and stored frozen in a tube rack within a box until the sample is analyzed for chlorophyll a analysis.

1.8.3. b. temperature – the temperature and salinity reading from the ship’s thermosalinograph, the date, the time of sample, and the GPS location will be recorded by the oceanographer in the oceanography log book at the time of surface water collection.

1.8.4 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 ship's Scientific Computing System (SCS) shall collect this information from the TSG and a GPS. The oceanographer will provide the ship's Operations Officer and Electronics Technician with detailed acquisition information before departure. The SCS data acquisition will be stopped and restarted weekly so the data files can be backed up and checked for errors. All SCS data will be provided to the NWFSC oceanographer following the Project.

1.8.4. a. thermosalinograph samples – thermosalinograph data will be recorded with date, time, and GPS location throughout the Project at all times.

#### 1.8.5. SeaBird Ecology Team flow-thru system for temperature and salinity

The following system requirements for set up totally independent of ship's SCS system:

- 1) unaltered seawater via a garden-hose type connector, which comes from same source as sampled by ship's sensors; as close to the ocean source as possible in order minimize heating occurs in the pipes before reaching the instrument
- 2) ability to set up laptop, GPS, and NMEA box (3 items) in a dry lab within 50-100 ft of the sampling instrument which will require bulk-head pass-thru for data, GPS cables
- 3) outdoor location for mounting GPS antenna, close enough that GPS antenna wire can get to GPS unit
- 4) location to put the flow-thru instrument - two choices: (1) indoor w/sink for an outflow for our newer, more compact instrument that fits into a cooler; or (2) on deck protected location for the old-style instrument in the water bath.

## 2.0 NIGHT OPERATIONS

A chronological record of oceanographic stations will be kept by the ship (Electronic Marine Operations Log) with dates and times in GMT. The ship will provide a digital copy of the electronic marine operations log and Project weather log to the NWFSC oceanographer at the completion of the Project. The main SeaBird CTD system will be operated by the scientific party. The collection of oceanographic data, samples, and their processing will be conducted by the scientific party. The crew of the vessel will operate all deck equipment and be responsible for the proper termination (and any necessary re-terminations) of the CTD cable pigtail to the conducting cable of the winch. The ship shall provide a complete system, consisting of frame with weights, 12-place rosette and deck unit, and 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 previous 12 months).

2.1. CTD Stations - One CTD (conductivity-temperature-depth) station will be occupied each evening after sunset. Cast times are subject to change since sunset will vary during the Project. Additional CTD stations may be requested by the Chief Scientist in areas of special interest. 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. All casts are to 1000m (depth permitting) with the descent rate at 30m/min. for the first 100m of the cast, then 60m/min after that, including the upcast between bottles.

2.1. a. CTD Samples - The evening cast (1000 m or to within 10 m of the bottom) will begin approximately one hour after sunset. This exact starting time will be determined in advance, by the FOO or Deck Officer. Niskin bottle water samples will be collected at 12 standard depths (0, 10, 20, 30, 40, 50, 75, 100, 150, 200, 500, 1000) between the surface and 1000 meters, or to within 10 m of the bottom. From each cast, chlorophyll samples (to 200 m) and salinity samples (100, 500, and 1000 m or bottom) will be collected and processed on board. Additional salt samples will be collected every other day (3 depths < 500m), so that the depths sampled are 30 m, 100m, 150m, 200 m, 500 m, and 1000 m.

2.1. a1. salinity samples – samples of water from 100m, 500 m and 1000 m (or bottom) on each day as well as 3 additional depths (30 m, 150 m, and 200 m) on every other day will be stored in salinity bottles that have been pre-rinsed 3X or more with the water collected at the same depth as the sample.

2.1. a2. chlorophyll a samples – 50 ml of water from each of the 10 depths up to 200 m will be filtered onto GF/F filters following the chlorophyll a analysis protocol. The filter will be folded in half (particulate matter on the inside), placed in a glass culture tube that is labeled with the date, time of sample, and GPS location of sample), and stored frozen in a tube rack within a box until the sample is analyzed for chlorophyll a analysis.

2.1. a3. Nutrient samples – approximately 40 ml of water from each of the 11 depths up to 500 m will be collected, frozen, and stored in upright pre-rinsed (10% HCl) vials that have been rinsed 3X with the water collected at the same depth as the sample. The vials are to be labeled with the date, depth of sample, time of sample, and GPS location of sample.

2.1b. Bongo tows - Perform up to 5 bongo tows/ night at opportunistic locations. Towards the end of each day a "plan of work" for that evening and station locations will be provided. The only specific location request (as before) will be to get samples along the Newport Line as time permits (and of course if we are in the area). Ship will slow to 2-3 knots and net will be deployed to 100m for approximately 30 minutes.

Dive Plan - None

Applicable Restrictions – None

## Equipment

### Equipment and capabilities provided by the ship

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

1. 3 insulated CAT5 cables running from location site for CPUs to the flying bridge consoles
2. Power, ship's GPS, and ship's SCS connections to CPU running the flying bridge consoles
3. Space inside for CPUs, keyboards, and monitors referred to in Item #2
4. Three handheld radios (as spares)
5. Freezer space for water and biological samples (chest)
6. Bottom depth checking during CTD casts (consult charts)
7. CTD system (including rosette with Niskin bottles (2.5L, 12 ea.)
8. Oceanographic winch with 5/16" conducting wire, terminated to CTD
9. Micro thermosalinograph (SBE45) and connection
10. SEAS system w/ XBT launcher
11. Storage space in wet lab for 8 boxes of XBTs
12. Scientific Computing System for data collection
13. Hook-up (CTD) and counter space for NWFSC-supplied oceanographic computer
14. Marine Operations and Deck Log (electronic)/Weather Observation sheets, filled out by Deck Officers
15. Installation of NWFSC-supplied sonobuoy antenna and coax cable
16. Deck space storage space for 2 fish boxes of sonobuoys
17. Ship's GPS connection to dry lab for acoustics computers
18. Deck space, Power hookup, and installation of winches for acoustics
19. Designated work space in drylab for 1-3 scientists
20. Copy Machine
21. Small standard freezer (-80 not required) for storage of chlorophyll samples
22. Connection of Micro thermosalinograph to the SBE interface box, including GPS input (append to data string with raw temp, conductivity, and calculated salinity). LAN connection to main lab (4) and 1 to flying bridge (to be used for time server
23. VHF antenna and cabling to the acoustics lab for sonobuoy monitoring
24. Cold room for live animal culture

### Equipment and capabilities provided by the scientists

1. Three 7x50 hand-held binoculars
2. Two 25x150 binoculars and stands
3. Two 14x45 hand-held stabilized binoculars
4. Two observer chairs for flying bridge
5. Video camera and tapes
6. Three digital Canon EOS D series cameras with lenses and extra batteries
7. Three handheld radios
8. Laptop computers (1-2) for scientific party email, digital photo management

9. Portable GPS component as backup to ship's system
10. Rifles, biopsy darts and tips, sample vials and storage solution
11. Predation event sampling nets
12. Desktop PC with RJ45 KVM extender for remote set up in SIC room
13. Monitor and keyboard for flying bridge to be used in conjunction with SIC remote PC
14. XBT probes (Deep Blues) – 5 cases
15. Oceanographic data logs and log books
16. Computers for environmental and acoustic (ADA) data acquisition
17. Fluorometer for discrete chlorophyll a analysis
18. Lab apparatus, logs and supplies for discrete chlorophyll a analysis
19. Wormley standard seawater vials for salinometer calibration (6 vials)
20. Salinity sample bottles (96 bottles), caps, and thimble inserts
21. Bucket for surface water sampling
22. Nutrient sample vials
23. Oceanographic sample nets – bongo nets
24. DI water, formalin, and DMSO, 90% Acetone – 4.5L
25. Safety sheets (MSDS's) and clean up materials for all chemicals
26. Acoustics recording equipment, including: mixer and recording equipment, laptop computers, CDs, accessory equipment
27. 2 Fish boxes of sonobouys
28. Two sonobuoy receivers
29. DAT recorder for sonobuoys
30. 2 hydrophone arrays
31. 2 Aluminum Hydraulic winches for hydrophone arrays, 3x4 foot print, approx. 400 lbs ea
32. Hansen Coupling Division male LL6-HKP/LL8-HKP ends to quick connect style connectors on 50' hose to hydraulic power supply for acoustic winch
33. Computer data storage media (CDs, etc.)
34. Permits for specimen collection and foreign research (copies will be provided to Commanding Officer)
35. 10 reams of paper
36. 2 8x50 hand-held binoculars
37. 1 waterproof laptop with power supply
38. 1 non-waterproof laptop with power supply
39. 1 Back-up GPS unit and antenna in the event of ship GPS feed failure
40. 2-4 hand-help FRS type radios
41. 1 marine VHF hand-held radio
42. One Canon EOS D10, cameras with lenses and extra batteries
43. Digital video camera and tapes
44. Batteries and power supply cords
45. Outdoor extension cords
46. Waterproof tables
47. Anti -fatigue matting for observers
48. Bongo net frame
49. Crate of nets
50. 6 crates of sample jars
51. Microscope

- 52. 3 crates of misc. supplies
- 53. 2 coolers
- 54. Small boat and trailer for biopsy sampling, satellite tag deployment, biological sampling, photography
- 55. fluorometer
- 56. sonicator
- 57. plate mixer
- 58. plate reader
- 59. vortex mixer
- 60. mini -80 freezer

3.2.a Include a break down of weight by item-include L x W x H and weight of each item. The ship requires these calculations for stability purposes.

Item	Length (ft)	Width (ft)	Height (ft)	Total Weight (lbs)
Two 25x150 binoculars and cases	4.0	2.0	1.5	160
Two binoculars stands and yolks	2.0	2.0	5.0	140
Three 7x50 hand-held binoculars in Pelican case	2.5	1.5	1.0	25
Two 15x45 hand-held stabilized binoculars in Pelican case	2.0	1.5	1.0	20
Two observer chairs for flying bridge	2.65	2.5	3.0	75
Water proof housing for monitor and keyboard for flying bridge to be used in conjunction with SIC remote PC	2.0	2.0	2.0	30
Wooden table for flybridge monitor box	2.0	2.0	4.0	20
Desktop PC and monitor with RJ45 KVM extender for remote set up in SIC room	2.0	1.0	2.0	
3 Laptop computers and cases for survey, digital photo management	2.0	1.5	0.5	60
Portable GPS component as backup to ship's system	0.5	0.5	0.5	10
Four digital Canon EOS D series cameras with lenses and extra batteries in 2 Pelican cases	2.0	1.5	1.0	50
Video camera and tapes in Pelican case	2.0	1.5	1.0	25
4 Predation event sampling nets and handles	8.0	2.0	0.5	20
2 - Biopsy rifles in Pelican cases	4.0	2.0	0.5	60
Biopsy darts and tips, sample vials and storage solution	2.0	1.5	1.5	20
Three handheld radios				

Small Aluminum Hydraulic with towed array	4.0	4.0	3.0	400
Large Aluminum Hydraulic with towed array	4.0	4.0	4.5	684
Acoustics recording equipment case, including: mixer and recording equipment	3.0	3.0	4.0	60
3 laptop computers	2.0	1.5	0.5	45
Acoustics accessory equipment (5 Bins)	1.0	2.5	2.0	80
4 hard drives	1.5	1.0	1.0	30
Two sonobuoy receivers	0.5	0.5	0.1	10
Tool Box	1	0.5	1.5	30
2 Fish boxes of sonobouys	4.0	4.0	3.0	1840
Permits for specimen collection and foreign research (copies will be provided to Commanding Officer)				
10 reams of paper	2.0	1.5	1.5	40
XBT probes (Deep Blues) – 5 cases	2.0	2.0	2.0	180
Vacuum Pumps (2)	1.0	1.0	1.0	20
Acetone (4.5 L Bottle)	1.0	1.0	1.0	10
Fluorometer for discrete chlorophyll a analysis	3.0	2.0	1.75	50
Lab apparatus, logs and supplies for discrete chlorophyll a analysis ( 6 Totes)	2	1.25	1.25	120
3 Plastic carboys for water (2 L)	1.0	1.0	1.0	24
2 crates of salinity sample bottles (96 bottles), caps, and thimble inserts	1.5	1.5	1.5	30
SeaBird flow thru CTD recorder	0.42	0.42	1.67	15
PVC pipe for CTD water bath	0.75	0.75	2.92	10
Tote for CTD hoses, GPS, manuals...etc	1.25	1.83	1.08	< 75
Observer chair w/ pedestal	2.17	1.83	3.33	25
Tote with 3 laptop computers, GPS, and associated electronic equipment, manuals	1.25	1.83	1.08	<75
Tote with hardware and tools for securing equipment	1.25	1.83	1.08	<75
Tote for small binoculars, camera, radios, survey manuals, office equipment	1.25	1.83	1.08	<75
Bongo net frame	5	.5	1.5	75
Crate of nets	1.5	1.08	.90	20
6 crates sample jars – after filling with sea water	1.5	3.24	1.8	180
One microscope – in crate	1.5	1.08	.9	30
3 crates of miscellaneous supplies	1.5	3.24	.9	100
Two coolers	2	3	1.5	10
22ft work boat and trailer	24	9	8	5000



## II. Hazardous Materials

### A. Policy and Compliance

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

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

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

<b>Common Name of Material</b>	<b>Qty</b>	<b>Notes</b>	<b>Trained Individual</b>	<b>Spill control</b>
Formaldehyde solution (37%)	1 x 6L	Alkalinity, Stored in ship chem. lkr	Tracy Shaw	F

### SPILL CONTROL

#### A: ACID

- Wear appropriate protective equipment and clothing during clean-up. Keep upwind. Keep out of low areas.
- Ventilate closed spaces before entering them.
- Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible.
- **Large Spills:** Dike far ahead of spill for later disposal. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal.
- **Small Spills:** Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.
- Never return spills in original containers for re-use.
- Neutralize spill area and washings with soda ash or lime. Collect in a non-combustible container for prompt disposal.
- J. T. Baker NEUTRASORB® acid neutralizers are recommended for spills of this product.

#### M: Mercury

- Spills: Pick up and place in a suitable container for reclamation or disposal in a method that does not generate dust. Sprinkle area with sulfur or calcium polysulfide to suppress mercury. Use Mercury Spill Kit if need be.

**F: Formalin/Formaldehyde**

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

Inventory of Spill Kit supplies

Product Name	Amount	Chemicals it is useful against	Amount it can clean up
Spilfyter Formaldehyde Solidifier	6 lbs,	Formaldehyde solution (37%)	18 liters

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

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

Upon departure from the ship, scientific parties will provide the CO or their designee an inventory of hazardous material indicating all materials have been used or removed from the vessel. The CO’s designee will maintain a log to track scientific party hazardous materials. MSDS will be made available to the ship’s complement, in compliance with Hazard Communication Laws.

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

**B. Radioactive Isotopes**

The Chief Scientist is responsible for complying with OMAO 0701-10 Radioactive Material aboard NOAA Ships. Documentation regarding those requirements will be provided by the Chief of Operations, Marine Operations Center, upon request.

At least three months in advance of a domestic project and eight months in advance of a foreign project start date the shall submit required documentation to MOC-CO, including:

1. NOAA Form 57-07-02, Request to Use Radioactive Material aboard a NOAA Ship
2. Draft Project Instructions
3. Nuclear Regulatory Commission (NRC) Materials License (NRC Form 374) or a state license for each state the ship will operate in with RAM on board the ship.

4. Report of Proposed Activities in Non-Agreement States, Areas of Exclusive Federal Jurisdiction, or Offshore Waters (NRC Form 241), if only state license(s) are submitted).
5. MSDS
6. Experiment or usage protocols, including spill cleanup procedures.

Scientific parties will follow responsibilities as outlined in the procedure, including requirements for storage and use, routine wipe tests, signage, and material disposal as outline in OMAO 0701-10.

All radioisotope work will be conducted by NRC or State licensed investigators only, and copies of these licenses shall be provided per OMAO 0701-10 at least three months prior to the start date of domestic projects and eight months in advance of foreign project start dates.

C. Inventory (itemized) of Radioactive Materials

Sort the completed table by common name (in WORD: Click in the table, select Tab “Layout”, select “Sort” (upper right), select “Common Name” and ensure “has header row” is checked .

Common Name Radioactive Material	Concentration	Amount	Notes
None			

III. **Additional Projects**

- A. Supplementary ("Piggyback") Projects - None
- B. NOAA Fleet Ancillary Projects - None

VI. **Disposition of Data and Reports**

- A. Data Responsibilities
- B. Pre and Post Project Meeting

Prior to departure, the Chief Scientist will conduct a meeting of the scientific party to train them in sample collection and inform them of project objectives. Some vessel protocols, e.g., meals, watches, etiquette, etc. will be presented by the ship’s Operations Officer.

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

C. Ship Operation Evaluation Report

Within seven days of the completion of the project, a Ship Operation Evaluation form is to be completed by the Chief Scientist. The preferred method of transmittal of this form is

via email to [omao.customer.satisfaction@noaa.gov](mailto:omao.customer.satisfaction@noaa.gov). If email is not an option, a hard copy may be forwarded to:

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

## **VII. Miscellaneous**

### **A. Meals and Berthing**

The ship will provide meals for the scientists listed above. Meals will be served 3 times daily beginning one hour before scheduled departure, extending throughout the project, and ending two hours after the termination of the project. Since the watch schedule is split between day and night, the night watch may often miss daytime meals and will require adequate food and beverages (for example a variety of sandwich items, cheeses, fruit, milk, juices) during what are not typically meal hours. Special dietary requirements for scientific participants will be made available to the ship's command at least seven days prior to the survey.

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

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

All persons boarding NOAA vessels give implied consent to comply with all safety and security policies and regulations which are administered by the Commanding Officer. All spaces and equipment on the vessel are subject to inspection or search at any time. All personnel must comply with OMAO's Drug and Alcohol Policy dated May 7, 1999 which forbids the possession and/or use of illegal drugs and alcohol aboard NOAA Vessels.

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

The NOAA Health Services Questionnaire (NHSQ, Revised: 02 JAN 2012) must be completed in advance by each participating scientist. The NHSQ can be obtained from the Chief Scientist or the NOAA website

<http://www.corporateservices.noaa.gov/~noaaforms/eforms/nf57-10-01.pdf>. The completed form should be sent to the Regional Director of Health Services at Marine Operations Center. The participant can mail, fax, or scan the form into an email using the contact information below. The NHSQ should reach the Health Services Office no later than 4 weeks prior to the project to allow time for the participant to obtain and submit additional information that health services might require before clearance to sail can be granted. Please contact MOC Health Services with any questions regarding eligibility or completion of the NHSQ. Be sure to include proof of tuberculosis (TB) testing, sign and date the form, and indicate the ship or ships the participant will be sailing on. The participant will receive an email notice when medically cleared to sail if a legible email address is provided on the NHSQ.

Contact information: Include only the Pacific OR Atlantic Office as applicable.

Regional Director of Health Services  
Marine Operations Center – Pacific  
2002 SE Marine Science Dr.  
Newport, OR 97365  
Telephone 541-867-8822  
Fax 541-867-8856  
Email [MOP.Health-Services@noaa.gov](mailto:MOP.Health-Services@noaa.gov)

Prior to departure, the Chief Scientist must provide an electronic listing of emergency contacts to the Executive Officer for all members of the scientific party, with the following information: contact name, address, relationship to member, and telephone number.

#### C. Shipboard Safety

Wearing open-toed footwear or shoes that do not completely enclose the foot (such as sandals or clogs) outside of private berthing areas is not permitted. Steel-toed shoes are required to participate in any work dealing with suspended loads, including CTD deployments and recovery. The ship does not provide steel-toed boots. Hard hats are also required when working with suspended loads. Work vests are required when working near open railings and during small boat launch and recovery operations. Hard hats and work vests will be provided by the ship when required.

#### D. Communications

A progress report on operations prepared by the Chief Scientist may be relayed to the program office. Sometimes it is necessary for the Chief Scientist to communicate with another vessel, aircraft, or shore facility. Through various means of communications, the ship can usually accommodate the Chief Scientist. Special radio voice communications requirements should be listed in the project instructions. The ship's primary means of communication with the Marine Operations Center is via e-mail and the Very Small Aperture Terminal (VSAT) link. Standard VSAT bandwidth at 128kbs is shared by all vessels staff and the science team at no charge. Increased bandwidth in 30 day increments is available on the VSAT systems at increased cost to the scientific party. If increased

bandwidth is being considered, program accounting is required it must be arranged at least 30 days in advance.

#### E. IT Security

Any computer that will be hooked into the ship's network must comply with the *NMAO Fleet IT Security Policy* 1.1 (November 4, 2005) prior to establishing a direct connection to the NOAA WAN. Requirements include, but are not limited to:

- (1) Installation of the latest virus definition (.DAT) file on all systems and performance of a virus scan on each system.
- (2) Installation of the latest critical operating system security patches.
- (3) No external public Internet Service Provider (ISP) connections.

Completion of these requirements prior to boarding the ship is required.

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

#### F. Foreign National Guests Access to OMAO Facilities and Platforms

All foreign national access to the vessel shall be in accordance with NAO 207-12 and RADM De Bow's March 16, 2006 memo (<http://deemedexports.noaa.gov>). National Marine Fisheries Service personnel will use the Foreign National Registration System (FRNS) to submit requests for access to NOAA facilities and ships. The Departmental Sponsor/NOAA (DSN) is responsible for obtaining clearances and export licenses and for providing escorts required by the NAO. DSNs should consult with their designated NMFS Deemed Exports point of contact to assist with the process.

Foreign National access must be sought not only for access to the ship involved in the project, it must also be sought and approved for the dates of any DOC facilities (marine centers or port offices) that foreign nationals might have to traverse to access to and from the ship.

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

Responsibilities of the Chief Scientist:

1. Provide the Commanding Officer with the e-mail generated by the FRNS granting approval for the foreign national guest's visit. This e-mail will identify the guest's DSN and will serve as evidence that the requirements of NAO 207-12 have been complied with.
2. Escorts – The Chief Scientist is responsible to provide escorts to comply with NAO 207-12 Section 5.10, or as required by the vessel's DOC/OSY Regional Security Officer.
3. Ensure all non-foreign national members of the scientific party receive the briefing on Espionage Indicators (NAO 207-12 Appendix A) at least annually or as required by the servicing Regional Security Officer.
4. Export Control - Ensure that approved controls are in place for any technologies that are subject to Export Administration Regulations (EAR).

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

Responsibilities of the Commanding Officer:

1. Ensure only those foreign nationals with DOC/OSY clearance are granted access.
2. Deny access to OMAO platforms and facilities by foreign nationals from countries controlled for anti-terrorism (AT) reasons and individuals from Cuba or Iran without written NMAO approval and compliance with export and sanction regulations.
3. Ensure foreign national access is permitted only if unlicensed deemed export is not likely to occur.
4. Ensure receipt from the Chief Scientist or the DSN of the FRNS e-mail granting approval for the foreign national guest's visit.
5. Ensure Foreign Port Officials, e.g., Pilots, immigration officials, receive escorted access in accordance with maritime custom to facilitate the vessel's visit to foreign ports.
6. Export Control - 8 weeks in advance of the project, provide the Chief Scientist with a current inventory of OMAO controlled technology onboard the vessel and a copy of the vessel Technology Access Control Plan (TACP). Also notify the Chief Scientist of any OMAO-sponsored foreign nationals that will be onboard while program equipment is aboard so that the Chief Scientist can take steps to prevent unlicensed export of Program controlled technology. The Commanding Officer and the Chief Scientist will work together to implement any access controls necessary to ensure no unlicensed export occurs of any controlled technology onboard regardless of ownership.
7. Ensure all OMAO personnel onboard receive the briefing on Espionage Indicators (NAO 207-12 Appendix A) at least annually or as required by the servicing Regional Security Officer.

Responsibilities of the Foreign National Sponsor:

1. Export Control - The foreign national's sponsor is responsible for obtaining any required export licenses and complying with any conditions of those licenses prior to the foreign national being provided access to the controlled technology onboard regardless of the technology's ownership.
2. The DSN of the foreign national shall assign an on-board Program individual, who will be responsible for the foreign national while on board. The identified individual must be a U.S. citizen, NOAA (or DOC) employee. According to DOC/OSY, this requirement cannot be altered.

Ensure completion and submission of Appendix C (Certification of Conditions and Responsibilities for a Foreign National).

## Appendices

1. Figure 1. Generalized killer whale distribution survey, Leg 1, Cape Flattery to central California.
2. Figure 2. Generalized route of killer whale distribution survey, Leg 2, Cape Flattery to Brooks Peninsula.
3. Figure 3. Generalized route of killer whale distribution survey, Leg 3, Cape Flattery to northern Strait of Georgia.
4. Station/Waypoint List



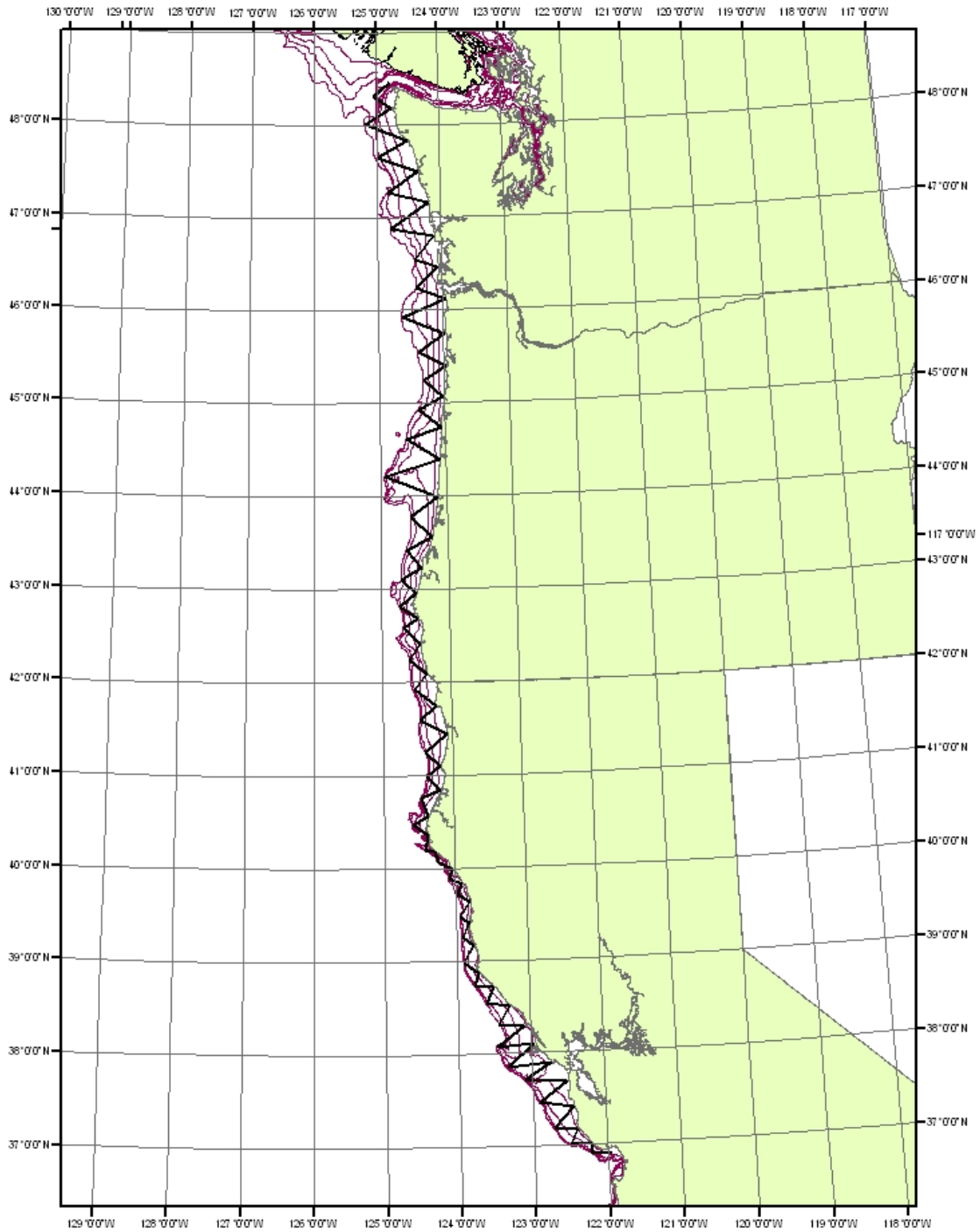


Figure 1. Generalized killer whale distribution survey, Leg 1, Cape Flattery to central California.

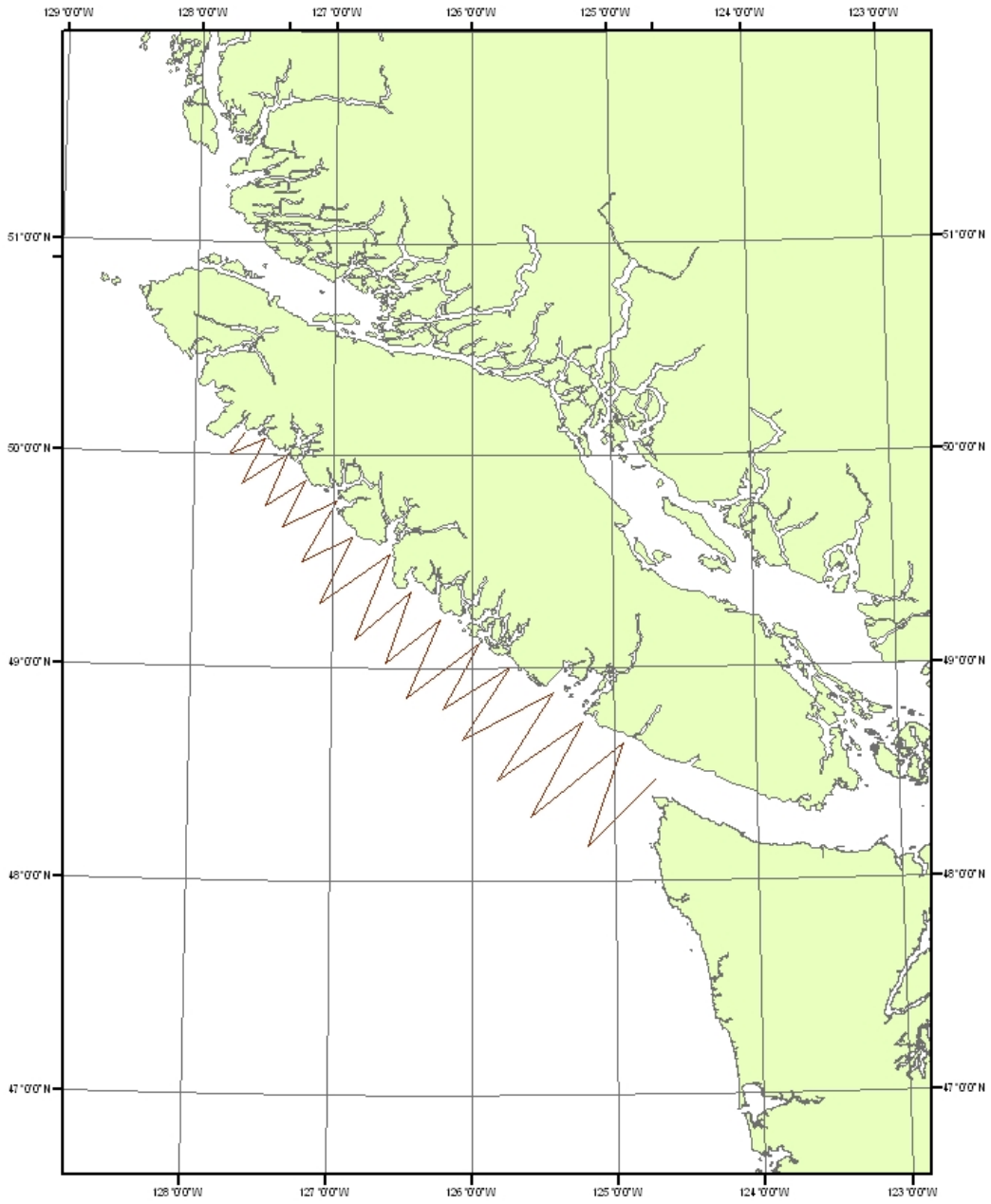


Figure 2. Generalized route of killer whale distribution survey, Leg 2, Cape Flattery to Brooks Peninsula

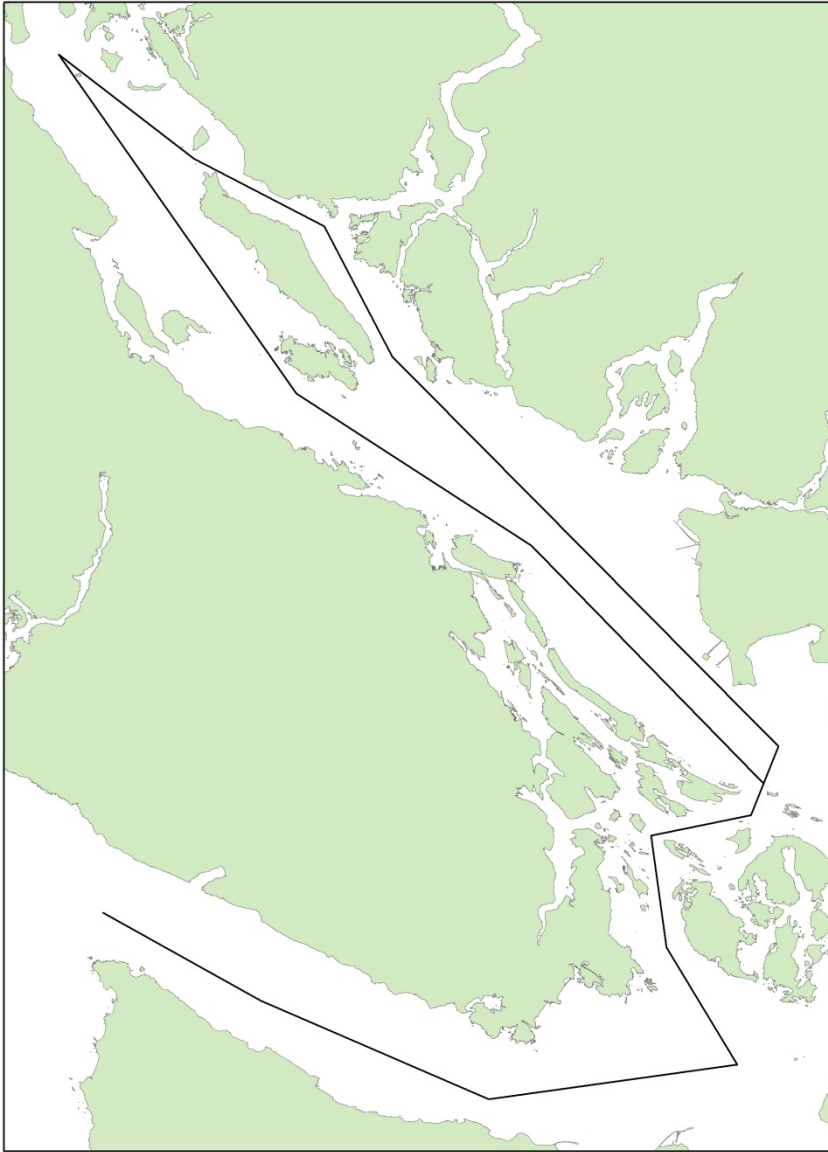


Figure 3. Generalized route of killer whale distribution survey, Leg 3, Cape Flattery to northern Strait of Georgia.

Station/Waypoint List (Coordinates in Latitude, Longitude: degree-minutes  
To be provided prior to sailing