UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Fisheries Science Center
8901 La Jolla Shores Drive.
La Jolla, CA 92037-1508

Shakedown Instructions

Platform: NOAA Ship *Reuben Lasker*, R-228

Project Number: RL-14-1A

Project Title: Shakedown Mission Trials

Project Dates: 14 April through 31 May 2014, 30 DAS over 5 legs

Prepared by: _____ Dated: 4 April 2014
Roger Hewitt, PhD
Chief Scientist
Assistant Director, SWFSC

Approved by: _____ Dated: April 8, 2014
Francisco Werner, PhD
Director, SWFSC

Approved by: _____ Dated: _____
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DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=NOAA, cn=BLAKE.WADE.JAMES.1025936538
Date: 2014.04.09 10:00:00 -07'00'
Captain Wade J. Blake, NOAA
Commanding Officer
Marine Operations Center – Pacific

Brief Summary: These trials are an OMAO/SWFSC team effort intended to test mission equipment, develop operating protocols, identify warranty items, and specify future modifications to improve capabilities for the new NOAA FSV (Fisheries Survey Vessel) *Reuben Lasker.*

Days at Sea: Of the 30 DAS scheduled for this mission, 30 DAS are funded by an OMAO allocation. These shakedown trails are estimated to exhibit a Medium Operational Tempo.

Operating Area: Southern California Bight and north to Piedras Blancas
No diplomatic clearance required.

Objectives: Test mission equipment, develop operating protocols, identify warranty items, and recommend future modifications.

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Participating Institutions:
Southwest Fisheries Science Center (SWFSC)
Northwest Fisheries Science Center (NWFSC)
Rapp-Hydema
The Boeing Company
ECS Federal, Inc.
R/V *Ocean Starr*

Itinerary:
Leg 1: Marine mammals, workboat, hydrophone array, longlining
14 – 20 Apr, 7 DAS, San Diego to San Diego
Leg 2: Mid-water trawling, oceanographic winch
23 – 27 Apr, 5 DAS, San Diego to San Diego
Leg 3: Mid-water trawl comparisons with R/V *Ocean Starr*
8 – 13 May, 6 DAS, San Diego to San Diego
Leg 4: Acoustics, ROV, AUV,
18 – 23 May, 6 DAS, San Diego to San Diego
Leg 5: CalCOFI, mid-water trawling
26 – 31 May, 6 DAS, San Diego to San Diego

Permits: Protected Species Permit 14097-03 held by Lisa Ballance.
Categorical Exclusion Memo for HMS research including longlining, deep-set buoy gear, and trolling within the EEZ held by Suzy Kohin.

Staging and De-staging:

Staging and de-staging will be conducted in the days leading up to and after each of the legs. These activities will be previously coordinated through and agreed upon by the ship's Operations Officer.

Dive Operations: No dive operations will be conducted.

HAZMATS: No hazardous materials will be brought aboard the ship for this project.

Protected Species Mitigation Measures:
Protected species watches (e.g. marine mammals and turtles) are now a standard part of conducting fisheries research activities, particularly those that use gear (e.g., longlines and mid-water trawls) known to interact with protected species or that we believe have a reasonable likelihood of doing so in the future. Observations of protected species are routinely conducted by watch-standers as part of their duties associated with navigation and other vessel operations. In addition, monitoring by dedicated scientists will be conducted for 30 minutes prior to deployment of longline and mid-water trawl gear and will continue until gear is brought back on board.

If protected species are sighted within 1 nautical mile of the planned set location, the Chief Scientist, in consultation with others, will determine if operations can commence without increased likelihood of interaction between the gear and the animals sighted. This determination will be based on the species and number of animals sighted, their behavior, their position and vector relative to the path of the vessel, and the professional judgment of the Chief Scientist. If protected species observed during this period are determined to be at increased risk of interaction with gear, then the vessel will move away from the animals to a new location within the same general area but at least 1 nautical mile away from the last position at which protected animals were sighted. The visual scan for marine mammals and turtles will continue during each subsequent move until it is determined that long-line or trawling operations can safely commence, or until the station is abandoned.

Every effort should be made to deploy and retrieve the trawl net as quickly as possible (following all safety measures) to avoid possible interactions with protected species, which tend to aggregate at the surface. If multiple operations are planned for a station, trawling should be the first operation in order to reduce the opportunity to attract animals to the vessel.

At least two acoustic pingers (STM Products Dolphin Dissuasive Device DDD 03 or equivalent) will be installed on all mid-water trawls. A Marine Mammal Excluder Device (MMED), consisting of a rigid aluminum grid in the intermediate section forward of the cod-end and designed to expel marine mammals and other large animals (e.g. turtles, sharks) before they are swept to the rear of the net, will be installed in the Nordic 264

Mid-Water Trawl. Experiments are planned to quantify the selectivity of the MMED when used with the Modified Cobb Mid-Water Trawl as well as to quantify ship effects between the NOAA Ship *Reuben Lasker* and the R/V *Ocean Starr* (former NOAA Ship *David Starr Jordan*). As such, the MMED will not be consistently used in conjunction with this gear. The Aleutian Wing Trawl is not outfitted with a MMED. However, plans are to deploy it only three times, two of which with an open cod-end. NWFSC personnel will be aboard during its deployment.

If protected species are sighted while the trawl net is in the water, the Chief Scientist, in consultation with others, will determine the best strategy to avoid potential takes. This judgment will take into consideration the species, numbers, and behavior of the animals, the status of the trawl net operation (net opening, depth, and distance from the stern), the time it would take to retrieve the net, and safety considerations for changing speed or course. Consideration is also given to the increase in likelihood of marine mammal interactions during retrieval of the net, especially when the trawl doors have been retrieved and the net is near the surface and no longer under tension. In some situations, risk of adverse interactions may be diminished by delaying haul-back operations and continuing to trawl with the net at depth until the marine mammals and/or sea turtles have left the area. In other situations, swift retrieval of the net may be the best course of action. The appropriate course of action to minimize the risk of incidental take of protected species will be determined by the Chief Scientist even if the decision compromises the value of the data collected at the station.

If a marine mammal or turtle is inadvertently captured in the trawl net or by longline, it should be released back into the water as soon as safely possible. The take shall be documented by noting the status of the animal(s) and other information if possible including species, sex, maturity stage, length, girth, weight and any indications of injury or illness. Photographs should be taken when possible. Additional information should include circumstances of the take and date, time and position of the take. No protected species, dead or alive, shall be retained aboard the vessel. As soon as possible, the Chief Scientist will notify a SWFSC representative on shore via telephone or email and convey all pertinent information regarding the event.

Attached to these Project Instructions are:

Appendix A: Extended mitigation measures for deployment of mid-water trawls and long-line gear extracted from SWFSC Environmental Assessment (Sections 11.1 and 11.2).

Appendix B: Guidance on animal handling and data collection for protected species incidentally taken with mid-water trawl and long-line gear extracted from SWFSC Letter of Authorization under the Marine Mammal Protection Act.

Operations (Leg 1, 14-20 April): Primary objective on this leg is to conduct a trial cetacean assessment and ecosystem survey mission using standard operating procedures. Secondary objective is to test deployment and recovery of longline and other gear for catching highly migratory species (i.e. tunas, billfish, sharks).

Name	Title	Date Aboard	Date Disembark	Sex	Affiliation	Nationality
Roger Hewitt	Ch. Scientist	14 Apr	20 Apr	M	SWFSC	USA
Philip Roots	Naval Architect	14 Apr	20 Apr	M	ECS	USA
Eric Archer	Biologist	14 Apr	20 Apr	M	SWFSC	USA
Annette Henry	Biologist	14 Apr	20 Apr	F	SWFSC	USA
Emily Griffiths	Biologist	14 Apr	20 Apr	F	SWFSC	USA
Shannon Rankin	Biologist	14 Apr	20 Apr	F	SWFSC	USA
Robert Holland	Computer Tech	14 Apr	20 Apr	M	SWFSC	USA
Jennifer Keating	Biologist	14 Apr	20 Apr	F	SWFSC	USA
Nichole Beaulieu	Biologist	14 Apr	20 Apr	F	SWFSC	USA
James Cotton	Biologist	14 Apr	20 Apr	M	SWFSC	USA
Russ Vetter	Fishery Biologist	14 Apr	20 Apr	M	SWFSC	USA
Suzanne Kohin	Fishery Biologist	14 Apr	20 Apr	F	SWFSC	USA
James Wraith	Fishery Biologist	14 Apr	20 Apr	M	SWFSC	USA
John Hyde	Fishery Biologist	14 Apr	20 Apr	M	SWFSC	USA
Mike Kinney	Fishery Biologist	14 Apr	20 Apr	M	SWFSC	USA

Cetacean sampling:

During each day of the leg (except the first day), we will conduct components of our standard marine mammal survey operations to test various capabilities of the vessel and train personnel. Throughout the leg, we would like to ensure that as many vessel handlers as possible are available to maneuver the ship with the array in the water to close on marine mammals or other features of biological interest or recover bolts alongside the ship. Marine mammal biopsy, photography and small boat operations are dependent on animals and activities may occur during various watches, but not on everyone's watch.

Our operations will consist of the following main components:

1) **Visual survey.** Observers will be on effort between 0800 and 1730. While on effort, the ship needs to travel at 10kt (through the water). Upon sighting a marine mammal school or other feature of biological interest, the marine mammal observer team on watch will request that the vessel be maneuvered to approach the school or feature for investigation. While on effort, the observers will evaluate the placement of flying bridge equipment, test computer connections, and evaluate communications between observers, acousticians, and the bridge.

2) **Acoustic survey.** Day 1 will involve setup and deck testing of the hydrophone array onboard the vessel; if time allows, we will conduct an initial deployment/retrieval to test winch operation and measure the distance out (the first deployment will require an extended deployment time). The array is typically deployed at 300m; however, we may want to test it at varying distances to determine if this is the preferred distance for this vessel. After Day 1, the array will be deployed at 0800 and retrieved at 1730. Tests to be conducted include: deployment/retrieval under various conditions, maneuverability of the ship with the array in the water during various operations (normal survey, biopsying of dolphins, biopsying and bolt retrieval of whales, deployment of small boat, etc.), test of the noise associated with different scientific and shipboard equipment (depth sounders and active acoustics). These tests will be initially conducted with our simple linear array; once all systems are running well we will test our volumetric arrays (two different models, both more delicate and more complex). In addition to testing of the hydrophone array, we plan to test deployment of sonobuoys (preferably in the presence of baleen whales) as well as a single deployment and recovery of an acoustic buoy from the small boat (see small boat operations for more information).

3) **Biopsy and photography from large vessel.** The ship will need to practice closing on dolphins and whales to allow bow biopsy and photography operations This will allow the mammal scientists to test the shooter platform, maneuverability on the bow, develop communication with vessel handlers, and evaluate how animals respond to the vessel. Retrieval of crossbow bolts shot from the bow will need to be practiced.

4) **Small boat operations.** Small boat deployment will be requested by the marine mammal scientists during all daylight hours. Practice launches to master boarding, launching, and recovery will take place prior to working with mammals. Practice maneuvering around marine mammals will follow. Once boat operators are comfortable working with marine mammals, small boat biopsy and photograph operations will take place.

   Small boat practice and marine mammal operations will be used to launch a Drifting Acoustic Spar Buoy Recorder (DASBR) system. The buoy will be deployed from the small boat as soon as possible to do safely; the buoy will need to be recovered with the small boat after a minimum of one hour. The DASBR retrieval will use one or more of these methods: GPS, radio-tracking, visual detection of buoy and flag. All retrieval systems can be conducted from either vessel or RHIB, possibly with assistance from visual observers on big-eye binoculars.

5) **XBT Drops**. There will be up to two XBT drops on two days which will be done with the ship's survey technician.

6) **EK60**. The scientific EK60 depth sounder will be operated continuously at 18, 38, 70, 120, 200, 333 KHz. The frequencies will be tested for interference with marine mammal passive acoustic equipment. When mammals are acoustically detected, 18 and 38 KHz frequencies will be turned off.

7) **Dipnetting**. The ability to dipnet off NOAA Ship *Reuben Lasker* will need to be determined. The best place for dipnetting is likely that starboard aft deck which requires working with longline team and deck department to determine when operations can take place.

Highly Migratory Species (HMS) Sampling:

Longline (Daytime and Nightime):

Estimated Time – 2.25 to 5.5 hours: Deployment - 45 min; soak - 0 to 4 hours; Recovery - 45 min to 1.5 hours

Longline operations will be set in deep water with target depths 50 to 75 m below the surface. Vessel will travel at slow speed (~ 5 knots) during deployment and recovery of gear. Longline gear will conform to U.S. regulations including the use of circle hooks and fin-fish bait. The mainline is 4 mm (1200 lb) monofilament and sets will range from 1 to 2 miles in length and be deployed with radio buoys at either end and left to drift during the soak time. Gangions (leaders) are 7 fathoms length, monofilament, with a 45 g weight located 2 fathoms from the terminal end containing the circle hook. Gangions will be spaced approximately 60 feet apart and the number will range between 50 and 200, depending on length of line. The line will be left to soak for up to 4 hours. Animals retrieved during baited longline operations will be leadered to the boat and placed on a cradle. The cradle will be lowered and retrieved using ship's hydraulics. When the cradle is placed in the water, the boat will need to be slowed to a stop. We will test tagging the animals (in the cradle) at the side of the vessel as well as onboard the vessel. Animals will be lowered down to the water after tagging is completed. The tagging process normally takes 2 - 5 minutes per animal. The SWFSC will bring a radio direction finder to locate the radio buoys. The receiver will need to be set up on the bridge and requires power of 12, 24 or 32 V DC. A cable will be run from the receiver to the antenna to be mounted on the flying bridge.

Troll / Rod and Reel (Daytime Only):

Estimated Time – indefinite

Troll gear will consist of monofilament line, up to 30 m length, strung behind the vessel (on rod/reel, or hand lines) with artificial lures used to attract tunas and tuna-like

species. The vessel should travel at slow speed (5 – 7 knots) for troll gear to be effective. Once an animal is hooked, the vessel must stop or slow down to <1 knot in order to pull the fish to the vessel. Animals caught using troll gear will be brought onboard by hand. If a large school is encountered, we request that the vessel alter course to circle the school and slow to minimal cruising speed while rod and reel gear is deployed. Live bait (sardines and/or mackerel if we catch any or can get some from the bait barge) will be put in the water to attract fish to the boat. Artificial and live bait will be used with the rod and reel gear. If a large fish is caught with rod and reel, we will bring the animal onboard with a one of the cradles requiring the overhead lift.

Vertical Longline / Deep-set Buoy Gear (DSBG) (Daytime Only):

Estimated Time - 45 min to 4 hours: Deployment - 20 min; soak from 0 to 4 hours; Recovery 20 min (If animal is captured, recovery time will increase to maximum 45 min)

Swordfish DSBG includes a buoy floatation system (i.e., a strike-indicator float/flag, a large, non-compressible buoy and a float affixed with a radar reflector). A set of "gear" consists of 250-300 m, 500 pound (lb) mainline monofilament rigged with a 1-2 kilogram (kg) drop sinker to orient the mainline and terminal fishing gear vertically in the water column. Unlike longline gear which typically uses a long monofilament mainline suspended horizontally near the surface of the water, deep-set buoy gear does not involve the use of a horizontal mainline. Two monofilament gangions branch from the vertical mainline near the bottom and are fitted with a crimped 14/0 circle hook baited with either mackerel. Gear will be deployed and recovered from the vessel using an electric which that requires 12 V power. Preferred installation of the winch will be on the rail at the forward edge of the side sampling station. This will require holes drilled in the uprights along the rail and 12 V power run form the lab to the winch.

The buoys are deployed in a restricted spatial grid such that all of the indicator buoys can be continuously monitored from the vessel (within a maximum 4 nm grid area). When an indicator flag rises, the buoy set is immediately tended and the animal caught is either released or tagged and released in order to increase post-hooking survivorship of all animals. Animals will be handled and brought on board with the cradle as for longline operations.

A secondary test of the buoy gear will be from the small boat. Gear will be deployed and recovered from the small boat using an electric which that requires 12 V power. This will require mounting the small winch along the side of the boat to reach outboard for deployment of the line. The winch will need to be powered by a 12 volt battery provided by the SWFSC.

Tag and Release from small boat (Daytime or Nighttime)

Estimated Time – Duration of Longline Operation

The small boat will be deployed before longline recovery and will follow the vessel during the longline recovery. A minimum 3 people, but preferably 4 will be onboard the small boat, including the person driving the boat. When a fish is captured, a buoy will be clipped to the leader from the large vessel and the fish released. The small boat will drive alongside the buoy then recover the leader. The fish will be brought to the side of the boat by hand. Animals will be handled by tethered lines around the head and tail. Lines will need to be attached to the small boat to help contain the animal. The tagging process alongside the small boat should take less than a total of 10 minutes before the fish is released.

Acoustic tracking with hydrophone from small boat (Daytime or Nighttime)

Estimated Time – Duration of Longline Operation and an additional 2 hours to track fish

The small boat will be deployed prior to longline recovery and will follow the vessel during the longline recovery. A minimum 2 people, but preferably 3, will be onboard the small boat, including the person driving the boat. A captured mako shark will be tagged and released from the large vessel. Scientist(s) onboard the small boat will pick up the acoustic signal and follow the shark for up to 2 hours using a hydrophone tracking system. Hydrophone equipment is stand-alone using a 12 V battery. The operator of the system will have a receiver in the water and will listen for directional indicators, directing the driver where to go. We would like to try setting up the acoustic tracking hydrophone on the small boat irrespective of whether we catch a mako shark to tag.

The following systems and equipment need to be tested during the shakedown cruise:

- Flying Bridge Operations:
    - Test computer communications from the bridge to the science lab and Chief Scientist Stateroom, communications with Bridge
    - Test placement of chairs, big eyes, and computer stations (desks) for best sighting location
    - Evaluate mammal observers' view from flying bridge for obstructions
    - Evaluate flying bridge for vibrations when ship is underway at 10kt survey speed to determine best way to mount big eye stands to deck
    - Run ship through sighting procedures: turning on schools to obtain school size estimates followed by lining up ship for biopsy and photography from bow
    - Evaluate response of large whales and dolphins to the ship
    - Ensure gyro repeater is working
    - Confirm that the canopy covers recording chairs and desks, and observers
    - Install and test radio direction antenna and receiver used to locate electronic buoys.

    - Install and test radio direction antenna and receiver used to locate electronic tags
- Bow Operations:
    - Evaluate work order for shooter platform and note any changes needed
    - Evaluate ability to take vertical bow photographs using mock-up platform
    - Evaluate ability to take cetacean photographs (large and small whales and bow riding animals
    - Run ship through retrieval of biopsy bolts for cetaceans
    - Evaluate ability to collect biopsy specimens from bow using shooter platform
- Miranda Davit:
    - Test davit system for successful launching and retrieval of small boat in open ocean with scientists aboard
- Small Boat Operations:
    - Ability to collect biopsy samples from small boat in open ocean
    - Ability to collect photographic images of cetaceans from small boat in open ocean
    - Ability to bring live animals alongside the workboat for biopsy, attachment of tags and subsequent release.
    - Ability to track acoustically tagged animals from small boat with a hydrophone.
    - Deploy and retrieve DASBR buoy
- Passive Acoustics:
    - Test hydraulic system to operate acoustic winch
    - Test “A” frame for launching acoustic array
    - Assess the maneuvering limits of the ship when acoustic array is in water
- Antennas for Acoustics Systems:
    - Deploy sonobuoys to test acoustic receiver antennas
    - Test UHF vs VHF radios for interference
- Dipnet Station:
    - Assess dipnet station for ability to catch flyingfish from deck
- Expendable Bathythermograph (XBT) System
    - Deploy XBTs in open ocean test ships XBT system
- Chlorophyll Side Station Sampling:
    - Assess side sampling station for ability to collect surface chlorophyll surface samples while underway
- EK60 Acoustics:
    - Test EK60 acoustic echosounder to estimate micronekton biomass
- Jackstaff:
    - Test jackstaff’s ability to lower and raise at sea
    - Evaluate jackstaff’s obstruction to bow operations as compared with its obstruction from the flying bridge
- Lab Spaces:
    - Evaluate constant temperature room

- Test operation of freezers, especially -80°C(?) and flash freezer for preservation of biopsy sample

Day 1

- Test radio buoy deployment and recovery.
- Test longline deployment and recovery procedures without baited hooks during daylight hours.
- Test deep set buoy gear deployment and recovery during daylight hours.
- Test procedures for bringing live animals up to the rail and on deck for biopsy, attachment of tags and subsequent release.
- Test tracking acoustically tagged animals from small boat with a hydrophone.

Day 2

- Head north toward the northern Channel Islands
- Test computer communications from the bridge to the science lab and Chief Scientist Stateroom, communications with Bridge
- Test placement of chairs, big eyes and computer stations (desks) for best sighting location (should be completed on transit)
- Zero bigeyes
- Evaluate mammal observers view from flying bridge for obstruction
- Evaluate flying bridge for vibrations when ship is underway at 10kts to determine best way to mount big eye stands to deck
- Run ship through sighting procedures: turning on schools to obtain school size estimates followed by lining up ship for biopsy and photography from bow
- Ensure gyro repeater is working
- Confirm that the canopy covers recording chairs and desks, and observers
- Test acoustic winch deployment in open seas
- Test hydraulic system to operate acoustic winch
- Test “A” frame for launching acoustic array
- Assess the maneuvering limits of the ship when acoustic array is in water
- Test trolling during daylight hours and procedures for bringing live animals up to the rail for biopsy, attachment of tags and subsequent release.
- Deploy and retrieve deep set buoy gear.
- Test tracking acoustically tagged animals from small boat with a hydrophone.
- Test longline deployment and recovery procedures with baited hooks during night hours. Test procedures for bringing live animals up to the rail for biopsy, attachment of tags and subsequent release.

Day 3-7: Some combination of the previously listed operations based on successes or needs for retrials to meet objectives.

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.

- Insulated cable running from location site for CPUs (dry labs) to the flying bridge consoles (location to be determined)
- 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)
- Canopy on flying bridge
- Small boat, including spare parts, for biopsy sampling and photography
- Sippican XBT launcher (prefer aft deck location) and connection to Sippican software
- Storage space on aft deck for 6 fish boxes (48" x 44" x 30") with marine mammal gear.
- Storage space and seawater plumbing on back deck for bait tank.
- Storage space in freezer for 8 x 50-lb boxes of frozen bait.
- Storage space on back deck for two fish boxes with longline gear.
- Storage space on back deck for 2 shark cradles (7'x4'x5' each)
- Scientific Computing System for data collection
- Simrad EK60 scientific echo sounder with 38, 70, 120, and 200kHz transducers plus PC with EK60 data logging software and input cables
- Installation of SWFSC-supplied sonobuoy antenna and coax cable to the dry lab
- Copy Machine
- Additional email computer for scientific email use in dry Lab
- Network access to a printer for biopsy sampling computer
- -80^{o} freezer
- Hansen Coupling Division female LL6-HKP/LL8-HKP ends to quick connect style connectors on hose from hydraulic power supply for acoustic winch
- Space on aft deck for the acoustic winch (6' x 6' footprint)
- Two (2) ship's GPS connection to the acoustics lab for passive acoustic computers (Please note that it is very important that all science computers be connected to the same ship's GPS)
- Sonobuoy antennae cable to passive acoustics lab station. All connectors (including masthead connectors) on antennae must be cleaned and replaced if necessary
- Exterior storage space for one pallet of sonobuoys
- Grappling hook and line
- Three observer chairs and three computer desks on flying bridge

Equipment and capabilities provided by the scientists:

- Four 7x50 hand-held binoculars
- Four 25x150 binoculars and stands
- Video camera and tapes
- Two Digital SLR cameras with lenses
- Six handheld radios

- Two laptop computers: one laptop for the Cruise Leader, and one laptop for the photo-ID team
- Two desktop computers mounted in the SIC room with CAT5 KVM extension units at CPUs and at remote console units on the flying bridge
- Portable GPS component
- Crossbows, biopsy darts and tips, sample vials and storage solution (EtOH) with MSDS
- One notebook computer for biopsy data entry and two printers: a small deskjet and a thermal label printer
- Two long-handled dip nets and sample containers
- XBT probes (Deep Blues) - 1 case maximum
- Bucket thermometer holder and thermometer (and 2 spares)
- Permits for specimen collection
- Computer data storage media (diskettes, CDs, etc.)
- One pallet of sonobuoys (5'x5'x5', 1200 lbs when full)
- One sonobuoy receiver and antenna
- DAT recorder and laptop PC for sonobuoys
- Hydrophone arrays and directional hydrophones
- Aluminum hydraulic winch for hydrophone array, 6'x6' footprint, approx. 1200 lbs
- Hansen Coupling Division male LL6-HKP/LL8-HKP ends to quick connect style connectors on 50' hose to hydraulic power supply for acoustic winch
- Acoustics recording equipment, including mixer and recording rack, laptop computers (3), desktop computers (2), and accessory equipment.
- Two fishboxes for deck storage of backup acoustic equipment
- Two external hard drives for EK60 data storage
- Standard monofilament commercial longline gear 1 mile in length with monofilament leaders, hooks and buoys
- Deep set buoy gear with leaders and buoys
- Electric winch for retrieval of deep set buoy gear (needs to be mounted with power available at the rail).
- Radio buoys (x2) and radio direction finder
- 8 cases frozen bait
- Sampling and tagging supplies
- Fish tagging platforms/slings (x3)
- Radio direction finder for recovering tags (antenna and receiver)
- Small hydrophone and receiver for tracking acoustically tagged fish

Operations (Leg 2, 23-27 April): Primary objective on this leg is to test and adjust deck winch controls including trawl winches. Secondary objectives are to develop deployment and recovery procedures for Nordic 264 trawl, and to confirm that ship can change nets and doors at sea and subsequently deploy and recover Aleutian Wing Trawl.

Name	Title	Date Aboard	Date Disembark	Sex	Affiliation	Nationality
Roger Hewitt	Ch. Scientist	23 Apr	27 Apr	M	SWFSC	USA
Philip Roots	Naval Architect	23 Apr	27 Apr	M	ECS	USA
John Pohl	Fishery Biologist	22 Apr	28 Apr	M	NWFSC	USA
Steve de Blois	Fishery Biologist	22 Apr	28 Apr	M	NWFSC	USA
Julia Clemons	Fishery Biologist	22 Apr	28 Apr	F	NWFSC	USA
Rapp-Hydema rep	Engineer	22 Apr	28 Apr	M	Rapp-Hydema	USA
Rapp-Hydema Rep	Engineer	22 Apr	28 Apr	M	Rapp-Hydema	USA

Operations will be dictated by the needs of the Rapp-Hydema representatives working with the ships officers, deck crew and survey technicians in order to adjust the winch controls and develop routine procedures for deploying and recovering nets. The primary net for this purpose will be the Nordic 264 Mid-Water Trawl, doors and rigging supplied as part of the Initial Outfitting List for the ship.

The NWFSC will ship an Aleutian Wing Trawl, 4m^2 NET system Fishbuster doors and rigging. The net will be loaded and stowed on the back deck and the doors hung in the forward portion of the door pockets. Once gear tests are finished with the Nordic 264 trawl, the nets will be swapped and the doors moved while at sea. The NWFSC has requested three deployments all with the cod end open:

- Deployment #1 - The trawl gear should be deployed with the cod end open and the netsounde system activated. Deploy gear and have the headrope stabilized at 300m. Tow the trawl for at least 15 minutes maintaining a ships speed over the bottom of 3.5Kts. Successfully retrieve the gear to the net reel and doors in the stowed position.
- Deployment #2 - The trawl gear should be deployed with the cod end open and the netsounde system activated. Deploy gear and have the headrope stabilized at 300m / 150Fathoms. Tow the trawl for at least 10 minutes maintaining a ships speed over the bottom of 3.5Kts. Deploy warp and adjust ship speed to stabilize the headrope at 350m. Establish a towing speed of 3.5kts for at least 10 minutes. Retrieve gear to reestablish a headrope depth of 300m while maintaining a speed over the ground of 3.5 kts. Once the gear is stabilized, tow for 10 minutes maintaining 3.5kts over the bottom. Retrieve the gear maintaining a ship speed of 3.5kts.

- Deployment #3 - The trawl gear should be deployed with the cod end open and the netsounde system activated. Deploy gear and have the headrope stabilized where there is some fish sign in the 200 to 400 m depth range. Tow the trawl for the time determined by the lead scientist based on fish sign (not to exceed 30 minutes) maintaining a ships speed over the bottom of 3.5Kts through the sign. Retrieve the trawl maintaining 3.5k over the bottom. Retrieve the gear to the net reel and use the ships crane to position the cod end over the sorting bin.

Operations (Leg 3, 8-13 May): Primary objectives on this leg are to deploy the modified Cobb midwater trawl that has been utilized on this survey since 1983, conducting midwater trawls to target young-of-the-year (YOY) rockfish and other groundfish during hours of darkness. Ideally, this will be done as paired trawls with the R/V *Ocean Starr* (formerly the NOAA ship *David Starr Jordan*), the ship upon which most historical (1983-2008 as the *David Starr Jordan*) and recent (2013 and 2014 as the *Ocean Starr*) have been conducted. Conducting the shakedown during the time period in which we will be conducting the survey on the *Ocean Starr* provides a unique opportunity to compare and calibrate catch rates between the two vessels, so that "vessel effects" on catch rates can be integrated into the analysis of catches when developing time series to ensure minimal bias as a consequence of slight differences in vessel performance. Such comparison is a high research priority. We would anticipate 5 nights of fishing (likely representing 6 sea days depending on departure and return times) as ideal for conducting sufficient shakedown and paired trawl operations, and we would anticipate 3-4 nights of fishing operations to represent a minimum required to ensure success. As we have a set of standard stations in the southern California region (both south and immediately north of Point Conception), conducting operations south of Conception is not problematic. If possible, we would request the ship consider the possibility of conducting some operations immediately north of Conceptions (if weather and other conditions allow) but this is not a requirement for success.

Secondary objectives and activities during the shakedown trial could mimic those typically conducted during our survey, including deployment of CTDs and bongo nets. Secondary objectives also include the conduct of marine mammal surveys during daylight hours using the same protocols developed on Leg 1

Throughout this leg of the shakedown (during sampling and transits) we would also anticipate collection of data with the shipboard TS sensor and the hydroacoustics, and exploration of the computer connectivity, data collection integration, facility layout, and overall ease of operations.

Name	Title	Date Aboard	Date Disembark	Sex	Affiliation	Nationality
Roger Hewitt	Ch. Scientist	8 May	13 May	M	SWFSC	USA
Philip Roots	Naval Architect	8 May	13 May	M	ECS	USA
Kristen Koch	Deputy Director	8 May	13 May	F	SWFSC	USA
John Field	Fishery Biologist	7 May	14 May	M	SWFSC	USA
Amber Payne	LTJG, NOAA Corps	7 May	14 May	F	SWFSC	USA
Steve Lindley	Fishery Biologist	7 May	14 May	M	SWFSC	USA
Brian Wells	Fishery Biologist	7 May	14 May	M	SWFSC	USA
Lyndsey Lefebvre	Fishery Biologist	7 May	14 May	F	SWFSC	USA

Jarrod Santora	Fishery Biologist	7 May	14 May	M	SWFSC	USA
Jason Phillips	Fishery Biologist	7 May	14 May	M	NWFSC	USA
Ric Brodeur	Fishery Biologist	7 May	14 May	M	NWFSC	USA
Annette Henry	Biologist	8 May	13 May	F	SWFSC	USA
TBD	Biologist	8 May	13 May	?	SWFSC	USA
TBD	Biologist	8 May	13 May	?	SWFSC	USA

Details regarding Modified Cobb Midwater Trawl Deployment:
Although tows are routinely done at night, when first deploying the gear it may be reasonable to deploy test trawls during daylight hours, in order to ensure correct setup and function of the gear. The modified-Cobb midwater trawl with a 26-m headrope and a 9.5 mm cod-end liner will be used; a document detailing the specifications of this gear and it's deployment will be provided. Importantly, target tow speed for this net is 2 kt, to be adjusted while trawling to maintain target headrope depth. If a shipboard acoustic net monitoring system is available, this should be installed on the net prior to operations. The first trawl to be made with 85 m of wire out to target 30 m headrope depth, with adjustments if target depths are not obtained based on depth recordings collected from a Vemco time-depth recorder (TDR) and the acoustic trawl net monitoring system. Subsequent tows will target 7 m headrope depth starting with 25 m of wire out and likely 100 m headrope depths with an anticipated 215 meters of wire out. Two marine mammal pingers (DDD model 03H) will be attached to the footrope bridles as well. Fish and certain invertebrates from each trawl will be sorted, identified and enumerated by FED science party, with additional data (length, biological samples) taken for select species.

Our intent will be to fish our routinely sampled stations in the Southern California Bight (See map and station locations, Table 1). However, in order to best calibrate catch rates, we may opportunistically repeat numerous stations where high catches of juvenile rockfish (or other target species) are found. Additionally, we may abandon typically scheduled CTD casts during nighttime operations (on both vessels) in order to conduct additional trawls during hours of darkness. Details with respect to the minimum distance between the two ships will be based on discussions with the Captains of both vessels, and these operations will require considerable communication and coordination among the two vessels.

As time allows, CTD casts may be conducted utilizing the *Reuben Lasker*'s CTD and rosette water sampler, and bongo nets may be used to collect krill and ichthyoplankton samples. We may also conduct Humboldt squid rod and reel fishing to support research efforts (squid collection and research has been part of the rockfish survey since 2005). However the focus of the shakedown will be on trawl deployment and recovery, with most if not all operations (following an initial round of trial trawls, ideally during the daytime) being conducted as paired trawl efforts with the R/V Ocean Starr.

Supplied by the Scientists from FED/SWFSC/NMFS/NOAA Santa Cruz, CA:

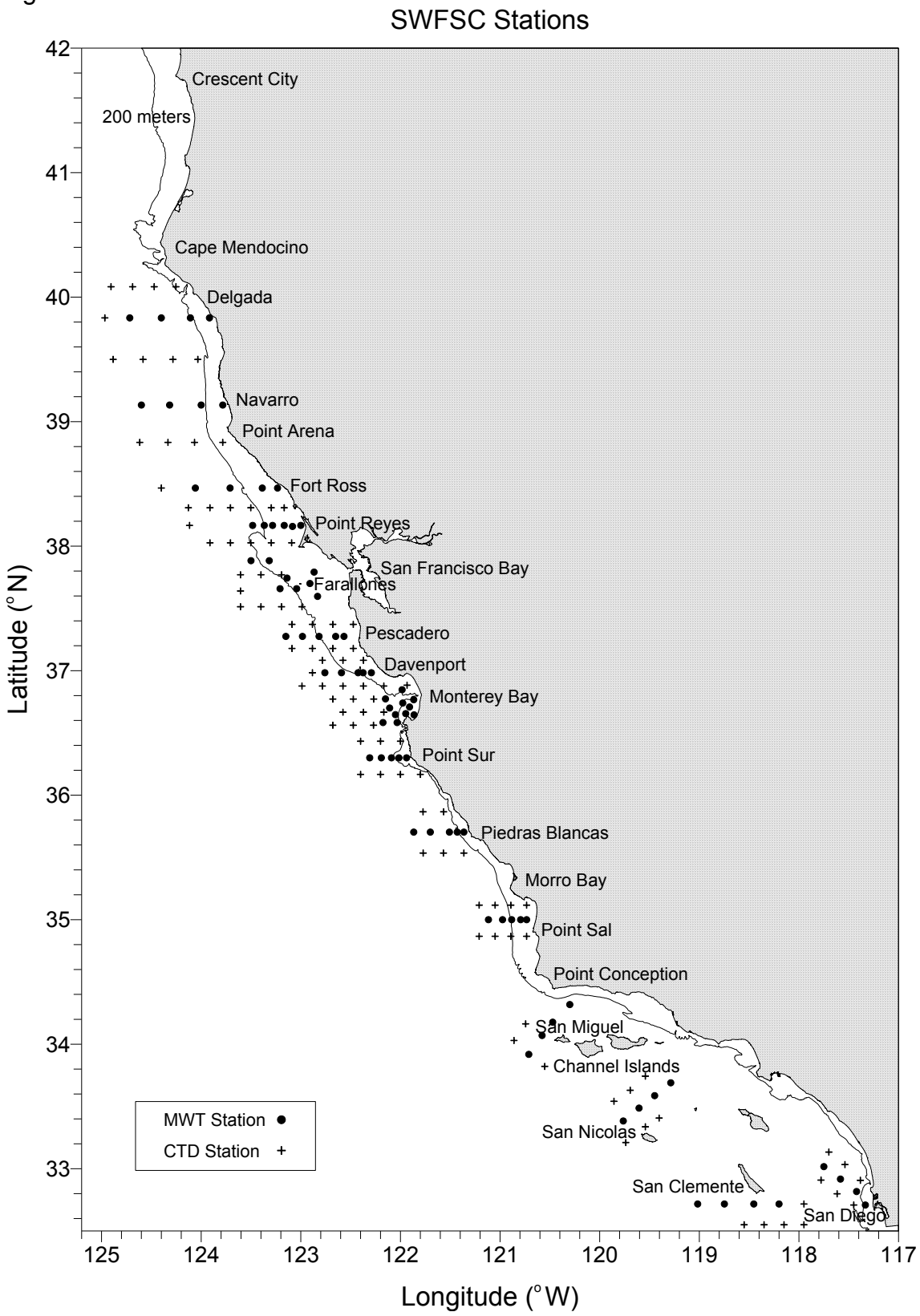
- Bongo net, plankton nets, and codends
- Specimen sorting, enumeration, and preservation equipment
- Vemco TDRs
- PC laptop computers running Windows OS and LAN hubs
- Microscopes, dissecting equipment, and field guides
- Krill sorting and enumeration equipment
- Fishing poles, tackle, and jigs
- Humboldt squid processing/preservation gear
- Mustang float coats and foul weather gear

Table 1: Station location details for Southern California Stations

SAN DIEGO				
Latitude (N)	Longitude (W)	Depth(m)	Wire out	Station#
33° 01'	117° 45'	798	85	481
32° 55'	117° 35'	865	85	482
32° 49'	117° 25.3'	555	85	483
32° 42.5'	117° 20'	94	85	484
SAN CLEMENTE				
Latitude	Longitude	Depth(m)	Wire out	Station#
32° 43'	118° 12'	1586	85	401
32° 43'	118° 27.2'	222	85	402
32° 43'	118° 44.9'	1253	85	403
32° 43'	119° 01'	777	85	404
SAN NICOLAS				
Latitude	Longitude	Depth(m)	Wire out	Station#
33° 41.4'	119° 17.2'	892	85	411
33° 35.2'	119° 26.9'	1874	85	412
33° 29.2'	119° 36.3'	775	85	413
33° 23'	119° 45.8'	103	85	414
SAN MIGUEL				
Latitude	Longitude	Depth(m)	Wire out	Station#
33° 55.1'	120° 42.7'	1848	85	425
34° 04.2'	120° 34.7'	190	85	424
34° 10.6'	120° 28.3'	122	85	423
34° 19.1'	120° 18'	380	85	422
POINT SAL				
Latitude	Longitude	Depth(m)	Wire out	Station#
35° 00'	120° 44'	55	25	491
35° 00'	120° 47.6'	94	85	492
35° 00'	120° 53'	192	85	493
35° 00'	120° 58.5'	374	85	494
35° 00'	121° 07'	532	85	495

PIEDRAS BLANCAS				
Latitude	Longitude	Depth(m)	Wire out	Station#
35° 42.2'	121° 21.8'	60	85	441
35° 42.2'	121° 25.8'	167	85	442
35° 42.2'	121° 30.5'	557	85	443
35° 42.2'	121° 42'	885	85	444
35° 42.2'	121° 52'	1050	85	445

Figure 1.


SWFSC Stations
Crescent City
200 meters
Cape Mendocino
Delgada
Navarro
Point Arena
Fort Ross
Point Reyes
San Francisco Bay
Farallones
Pescadero
Davenport
Monterey Bay
Point Sur
Piedras Blancas
Morro Bay
Point Sal
Point Conception
San Miguel
Channel Islands
San Nicolas
San Clemente
San Diego
MWT Station
CTD Station
Latitude (°N)
Longitude (°W)
42
41
40
39
38
37
36
35
34
33
125
124
123
122
121
120
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117

Operations (Leg 4, 18-23 May): Primary objective is to test all acoustic instrumentation and develop operational protocols. Secondary objectives include mapping 43-Fathom Bank using shipboard acoustics and cameras mounted on an ROV. Operations will also be coordinated with the Boeing AUV, which will be deployed and recovered from Santa Catalina Island.

Name	Title	Date Aboard	Date Disembark	Sex	Affiliation	Nationality
Roger Hewitt	Ch. Scientist	18 May	23 May	M	SWFSC	USA
Philip Roots	Naval Architect	18 May	23 May	M	ECS	USA
David Demer	Engineer	18 May	23 May	M	SWFSC	USA
George Cutter	Engineer	18 May	23 May	M	SWFSC	USA
David Murfin	Engineer	18 May	23 May	M	SWFSC	USA
Scott Mau	Fishery Biologist	18 May	23 May	M	SWFSC	USA
Kevin Steirhoff	Fishery Biologist	18 May	23 May	M	SWFSC	USA
Josiah Renfree	Engineer	18 May	23 May	M	SWFSC	USA
Juan Zwolonsky	Fishery Biologist	18 May	23 May	M	SWFSC	Portugual
John Pohl	Fishery Biologist	17 May	24 May	M	NWFSC	USA
Steve de Blois	Fishery Biologist	17 May	24 May	M	NWFSC	USA
Chris Beaverson	Oceanographer	17 May	24 May	M	PMEL	USA
Paul Hillman	Videographer	17 May	24 May	M	NMFS-HQ	USA
Simrad rep	Engineer	17 May	24 May	M	Simrad	USA or Norway
Simrad rep	Engineer	17 May	24 May	M	Simrad	USA or Norway
Ross Peterson*	Engineer	19-20 May	19-20 May	M	Boeing	USA
Brian Phelps*	Engineer	19-20 May	19-20 May	M	Boeing	USA

* Daytime only. Will board and disembark via small boat from USC Wrigley Marine Science Center at Twin Harbors, Santa Catalina Island.

Pre-departure. Equipment will be loaded aboard the vessel on 15-16 May 2014. The SWFSC ROV and tether reel will be loaded on the main deck near the starboard sampling station. The ROV navigation screen will be cloned on the bridge. SWFSC will supply the VGA to Ethernet converter to transmit the signal to the bridge. The directional hydrophone used to track the ROV will be installed in the transducer well and the cable will be run to the Chem Lab on the starboard side.

Day 1. Depart San Diego Bay. Calibrate scientific acoustic instrumentation west of San Diego in a deep (> 40 m), sheltered area. *Specific location is TO BE DETERMINED*. After calibrations are complete, transit to the northwest Catalina Island study area to conduct acoustic-optical and AUV survey operations for rockfishes and their habitats.

Day 2 – 3. Conduct acoustic-optical rockfish survey, ROV operations, and AUV operations of northwest Santa Catalina Island area (approximately 33° 28' N, 118° 38' W, Figure 2). Upon arrival at the site, we will begin conducting an acoustic survey using all six frequencies of EK60 transducers, 18, 38, 70, 120, 200, and 333 kHz. Any other system using frequencies at or near these frequencies will be secured during acoustic surveys.

This initial acoustic survey will take approximately 3 to 4 hours to complete. Upon completion of the acoustic survey, the SWFSC Remotely Operated Vehicle (ROV) will be deployed to identify and measure acoustic targets (fish). During the ROV deployment, the Dynamic Position System of the *Reuben Lasker* will be used to control speed (0.3 kt) and course over ground.

AUV operations using Boeing's Echo Ranger AUV will be conducted simultaneously, controlled by a small vessel operated by Boeing in the vicinity. Boeing engineers will board *Reuben Lasker* in the morning by small boat transfer, and will disembark in the evening, enabling real-time monitoring of the AUV and remote access to AUV image and data from *Reuben Lasker*. Night time hours will be devoted to acoustic survey work and experimentation with MS70 and SX92.

Day 4. Conduct acoustic-optical survey of 43-Fathom Bank (approximately 32° 40'N, 117° 58'W, Figure 2). The first 3 hours will be devoted to an acoustic survey using the ship's EK60, ME70, MS70 and SX92 sonars (waypoints will be provided to the Operations Officer by AST personnel prior to departure). A CTD will be cast prior to the acoustic survey. The remaining daylight hours will be devoted to an ROV survey. The position and direction of the ROV transects on the bank will be determined after plotting the locations of acoustically detected fish schools.

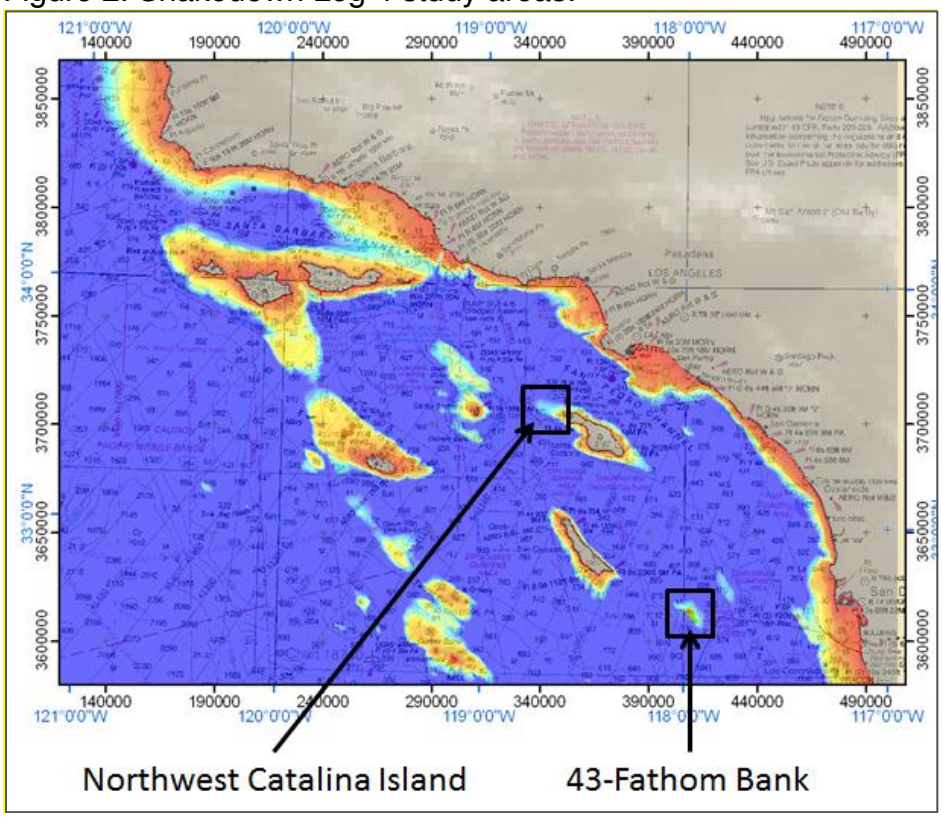
Day 5. Acoustic operations for detecting, tracking, and imaging coastal pelagic species in southern California Bight. Follow survey tracklines (waypoints will be provided to the Operations Officer by AST personnel prior to departure) in southern California Bight area, conducting acoustic CPS survey. Continuously deploy FasTowCam, and periodically (30-minute interval, or in response to fish school detections) deploy the underway-CTD stereo-camera system. Attempt to track (using SX93) and follow a CPS school from daytime into nighttime.

Day 6 (23 May 2014): Conduct acoustic survey and underway camera operations for coastal pelagic species (CPS). Follow survey tracklines in southern California Bight area, conducting acoustic CPS survey. Continuously deploy FasTowCam, and periodically (30-minute interval, or in response to fish school detections) deploy the underway-CTD stereo-camera system.

Equipment and Capabilities Provided by Science Party:

- Remotely Operated Vehicle (ROV)
- ROV Tether Reel
- ROV operating Console
- Linkquest USBL acoustic tracking system
- FasTowCam
- Underway-CTD camera system
- Boeing AUV (Deployed from shore and not scheduled for bringing aboard *Reuben Lasker*)

Figure 2. Shakedown Leg 4 study areas.



Operations (Leg 5, 26-31 May): Primary objective will be to develop CalCOFI operational protocols. Secondary objective will be to deploy the Nordic 264 Mid-water Trawl.

Name	Title	Date Aboard	Date Disembark	Sex	Affiliation	Nationality
Roger Hewitt	Ch. Scientist	26 May	31 May	M	SWFSC	USA
Philip Roots	Naval Architect	26 May	31 May	M	ECS	USA
Dave Griffith	Fishery Biologist	26 May	31 May	M	SWFSC	USA
Amy Hays	Fishery Biologist	26 May	31 May	F	SWFSC	USA
Sue Manion	Fishery Biologist	26 May	31 May	F	SWFSC	USA
Bryan Overcash	Fishery Biologist	26 May	31 May	M	SWFSC	USA
Elaine Acuna	Fishery Biologist	26 May	31 May	F	SWFSC	USA
Sam McClatchie	Oceanographer	26 May	31 May	M	SWFSC	USA
James Wilkinson	Oceanographer	26 May	31 May	M	SIO	USA
Dave Faber	Oceanographer	26 May	31 May	M	SIO	USA
TBD	Oceanographer	26 May	31 May		SIO	USA

The intent during this shakedown is to sample across the Ensenda Front using CalCOFI techniques and equipment. The sampling area will be determined from information gained during the Spring survey and satellite sea surface temperature images. The area of sampling will most likely be in the Southern California Bight.

Operations include:

- Continuously sample pelagic fish eggs using the Continuous Underway Fish Egg Sampler (CUFES). The data will be used to estimate the distributions and abundances of spawning hake, anchovy, mackerel, and early spawning Pacific sardine.
- Continuously sample multi-frequency acoustic backscatter using the Simrad EK60. The data will be used to estimate the distributions and abundances of coastal pelagic fishes (e.g., sardine, anchovy, and mackerel), and krill species.
- Continuously sample sea-surface temperature, salinity, and chlorophyll-a using a thermosalinometer and fluorometer. These data will be used to estimate the physical oceanographic habitats for target species.
- Continuously sample air temperature, barometric pressure, and wind speed and direction using an integrated weather station.
- Sample profiles of seawater temperature, salinity, and chlorophyll-a, using a CTD with water-sampling rosette and other instruments at prescribed stations. Measurements of extracted chlorophyll and phaeophytin will be obtained with a fluorometer.
- Sample plankton using a CalBOBL (CalCOFI Bongo Oblique) at prescribed stations. These data will be used to estimate the distributions and abundances of ichthyoplankton and zooplankton species.

- Sample plankton using a Manta (neuston) net at prescribed stations. These data will be used to estimate the distributions and abundances of ichthyoplankton species.
- Sample the vertically integrated abundance of fish eggs using a Pairovet net at prescribed stations. These data will be used to quantify the abundances and distributions of fish eggs.
- Sample larval and juvenile sardine using a six foot IKMT net from the side sampling station.
- Sample fish near the surface at nighttime by conducting 2-5 surface trawls at stations or at random sites each night. The data will be used to estimate the reproductive parameters, distributions and demographics of sardine, anchovy and mackerel.

Additional details:

- Thermosalinometer sampling - The ship will provide and maintain a thermosalinometer (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. All SCS data will be provided to SWFSC personnel at the completion of the cruise.
- The EK60 echosounder will be operated at 18, 38, 70, 120, 200 and 333 kHz and interfaced to a data acquisition system to estimate small pelagic fish and krill biomasses between 10 and 250 m. The instrumented keel will be extended to mid-depth (ca. transducers at 7.5 m), during all survey operations. Any changes to this depth should be avoided, and reported to the acoustic-system operator(s). The vessel's Simrad ES60 depth sounder and Doppler current meter may be used minimally at the discretion of the Commanding Officer, but will normally remain off while underway. The ship shall inform the Cruise Leader of any use of the vessel's sounders, as it interferes with the signals received on the EK60s that will be used continuously.
- CUFES: The egg pump will be mounted inside the ship's hull drawing water from a depth of three meters. During leg I, the pump will run continuously between stations to sample any pelagic fish eggs. Approximately 640 liters/minute is sent through a concentrator which filters all material larger than 505μm. The sieved material is then collected and identified. All fish eggs are identified to lowest taxa, counted and entered into the data acquisition software. Each sample entry is coupled with sea surface temperature, geographical position, wind speed and direction, date and time, and surface salinity. Sampling intervals will vary in length, depending on the number of fish eggs seen, from five to 30 minutes.

Station Operations:

- Each standard station will include the following:
- CTD/Rosette consisting of 24 10-liter hydrographic bottles will be lowered to approximately 500 meters (depth permitting) at each station to measure physical

parameters and collect water at discrete depths for analysis of: salinity, oxygen, chlorophyll, etc.

- NOTE: SIO will provide their own CTD sensor and 24 bottle (10 liter) rosette unit for use during the shakedown.
- CalBOBL (CalCOFI Bongo): standard oblique plankton tow with 300 meters of wire out, depth permitting, using paired 505 μm mesh nets with 71 cm diameter openings. The technical requirements for this tow are: Descent wire rate of 50 meters per minute and an ascent wire rate of 20 meters per minute. All tows with ascending wire angles lower than 38° or higher than 51° in the final 100 meters of wire will be repeated. Additionally, a 45° wire angle should be closely maintained during the ascent and descent of the net frame.
- Manta net (neuston) tow: using a 505 μm mesh net on a frame with a mouth area of 0.1333 m². Tows are 15 minutes in duration at towing speed of approximately 1.5 - 2.0 knots. Wire angles should be kept between 15° and 25°.
- Pairovet net: will be fished from 70 meters to the surface (depth permitting) using paired 25 cm diameter 150 μm mesh nets. The technical requirements for Pairovet tows are: Descent rate of 70 meters per minute, a terminal depth time of 10 seconds and an ascent rate of 70 meters per minute. All tows with wire angles exceeding 15° during the ascent will be repeated.
- IKMT: will be fished at or near the surface for 15 minutes at a speed of 1.5 – 2.0 knots.
- A surface tow using a 264 Nordic Rope Trawl fitted with a marine mammal exclusion device (MMED) will be conducted during nighttime operations. Each tow will be fished on the surface for a 30 minute duration at a towing speed of approximately 3.5 – 4.5 knots. The catch of each tow will be processed in the following manner: Sardines collected in each trawl will be randomly subsampled. Standard length and body weight will be measured, otoliths will be collected, and ovaries preserved in buffered formalin. These fish are assigned a maturity code based on a four stage system developed during a previous Trinational Sardine Forum. An attempt will be made to target fish schools using the SX90 scanning sonar.

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.
- Starboard hydro winches with 0.375” cable for standard CTD casts, Bongo, Pairovet, IKMT, and Manta tows
- J-frame w/blocks to accommodate 0.375" cable
- Constant temperature room set at 22oC ± 1oC (71.5oF ± 2oF)
- Winch monitoring system
- Knudsen 12 kHz depth recorder or comparable
- Acoustic Doppler Current Profiler

- Multifrequency EK60 transducers (ES18-11, ES38B, ES120-7C, ES200-7C, ES333).
- Simrad SX90 scanning sonar.
- 24-bottle rosette frame capable of carrying 10-liter niskin bottles, fitted with SBE911+ CTD unit.
- Pump, collector and concentrator unit for CUFES water sampling.

Additional Projects

A. Supplementary ("Piggyback") Projects

No Supplementary Projects are planned.

B. NOAA Fleet Ancillary Projects

No NOAA Fleet Ancillary Projects are planned.

Disposition of Data and Reports

Disposition of data gathered aboard NOAA ships will conform to NAO 216-101 *Ocean Data Acquisitions* and NAO 212-15 *Management of Environmental Data and Information.* To guide the implementation of these NAOs, NOAA's Environmental Data Management Committee (EDMC) provides the *NOAA Data Documentation Procedural Directive* (data documentation) and *NOAA Data Management Planning Procedural Directive* (preparation of Data Management Plans). OMAO is developing procedures and allocating resources to manage OMAO data and Programs are encouraged to do the same for their Project data.

Meetings, Vessel Familiarization, and Project Evaluations

A. Pre-Project Meeting: The Chief Scientist and Commanding Officer will conduct a meeting of pertinent members of the scientific party and ship's crew to discuss required equipment, planned operations, concerns, and establish mitigation strategies for all concerns. This meeting shall be conducted before the beginning of the project with sufficient time to allow for preparation of the ship and project personnel. The ship's Operations Officer usually is delegated to assist the Chief Scientist in arranging this meeting.

B. Vessel Familiarization Meeting: The Commanding Officer is responsible for ensuring scientific personnel are familiarized with applicable sections of the standing orders and vessel protocols, e.g., meals, watches, etiquette, drills, etc. A vessel familiarization meeting shall be conducted in the first 24 hours of the project's start and is normally presented by the ship's Operations Officer.

C. Post-Project Meeting: The Commanding Officer is responsible for conducted a meeting no earlier than 24 hrs before or 7 days after the completion of a project to discuss the overall success and short comings of the project. Concerns regarding safety, efficiency, and suggestions for future improvements shall be discussed and mitigations for future projects

will be documented for future use. This meeting shall be attended by the ship's officers, applicable crew, the Chief Scientist, and members of the scientific party and is normally arranged by the Operations Officer and Chief Scientist.

D. Project Evaluation Report: Within seven days of the completion of the project, a Customer Satisfaction Survey is to be completed by the Chief Scientist. The form is available at http://www.omao.noaa.gov/fleeteval.html and provides a "Submit" button at the end of the form. Submitted form data is deposited into a spreadsheet used by OMAO management to analyze the information. Though the complete form is not shared with the ships, specific concerns and praises are followed up on while not divulging the identity of the evaluator.

Miscellaneous

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 project.

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 17, 2000 which forbids the possession and/or use of illegal drugs and alcohol aboard NOAA Vessels.

Medical Forms and Emergency Contacts

The NOAA Health Services Questionnaire (NHSQ, NF 57-10-01 (3-14)) 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.

All NHSQs submitted after March 1, 2014 must be accompanied by NOAA Form (NF) 57-10-02 - Tuberculosis Screening Document in compliance with OMAO Policy 1008 (Tuberculosis Protection Program).l

The completed forms should be sent to the Regional Director of Health Services at the applicable Marine Operations Center. The NHSQ and Tuberculosis Screening Document should reach the Health Services Office no later than 4 weeks prior to the start of the project to allow time for the participant to obtain and submit additional information should health services require it, before clearance to sail can be granted. Please contact MOC Health Services with any questions regarding eligibility or completion of either form. Ensure to fully complete each 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.

The participant can mail, fax, or email the forms to the contact information below. Participants should take precautions to protect their Personally Identifiable Information (PII) and medical information and ensure all correspondence adheres to DOC guidance:
http://ocio.os.doc.gov/ITPolicyandPrograms/IT_Privacy/PROD01_008240.

The only secure email process approved by NOAA is Accellion Secure File Transfer which requires the sender to setup an account. Accellion's Web Users Guide is a valuable aid in using this service, however to reduce cost the DOC contract doesn't provide for automatically issuing full functioning accounts. To receive access to a "Send Tab", after your Accellion account has been established send an email from the associated email account to accellionAlerts@doc.gov requesting access to the "Send Tab" function. They will notify you via email usually within 1 business day of your approval. The 'Send Tab" function will be accessible for 30 days.

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

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

Shipboard Safety:

Hard hats are 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.

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. At the discretion of the ship CO, safety shoes (i.e. steel or composite toe protection) may be required to participate in any work dealing with suspended loads, including CTD deployment and recovery. The ship does not provide safety-toed shoes/boots. The ship's Operations Officer should be consulted by the Chief Scientist to ensure members of the scientific party report aboard with the proper attire.

Communications:

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

IT Security:

Any computer that will be hooked into the ship's network must comply with the *OMAO 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 the above 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.

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 (FNRS) 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 Line Office Deemed Export point of contact to assist with the process.

Responsibilities of the Chief Scientist:

1. Provide the Commanding Officer with the e-mail generated by the Servicing Security Office granting approval for the foreign national guest's visit. (For NMFS-sponsored guests, this e-mail will be transmitted by FNRS.) 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 Security Office.
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 approval from the Director of the Office of Marine and Aviation Operations 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 FNRS or Servicing Security Office 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 Security Office.

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 and a NOAA or DOC employee. According to DOC/OSY, this requirement cannot be altered.
3. Ensure completion and submission of Appendix C (Certification of Conditions and Responsibilities for a Foreign National

Appendix A: Mitigation measures for deployment of mid-water trawls and long-line gear extracted from SWFSC Environmental Assessment (Sections 11.1 and 11.2).

11.1 Trawl Surveys

11.1.1 Monitoring methods

If marine mammal observers are not present and already conducting watches, marine mammal watches will be initiated 30 minutes prior to arrival on station to determine if these species are near the proposed trawl set location. When observers are not present the Officer on Deck (OOD), Chief Scientist (CS), and crew standing watch will visually scan for marine mammals during all daytime operations. Marine mammal watches will be conducted using any binocular or monocular sighting instrument, with a means to estimate distance to infringing protected species during daytime, and the best available means of observation during nighttime observations. This typically occurs during transit leading up to arrival at the sampling station because of another mitigation measure intended to reduce the risk of attracting curious marine mammals, immediate deployment of trawl gear upon arriving at station. However, in some cases it may be necessary to conduct a bongo plankton tow prior to deploying trawl gear. In these cases, the visual watch will continue until trawl gear is ready to be deployed.

11.1.2 Operational procedures

"Move-On" Rule. If marine mammals or other protected species are sighted within 1 nm of the planned set location in the 30 minutes before setting the gear, the vessel will transit to a different section of the sampling area to maintain a minimum set distance of 1 nm. If, after moving on, protected species remain within the 1 nm exclusion zone, the CS or watch leader may decide to move again or to skip the station. However, SWFSC acknowledges that the effectiveness of visual monitoring may be limited depending on weather and lighting conditions, and it may not always be possible to conduct visual observations out to 1nm. CS or watch leader will determine the best strategy to avoid potential takes of marine mammals based on the species encountered, their numbers and behavior, position and vector relative to the vessel, and other factors. For instance, a whale transiting through the area off in the distance might only require a short move from the designated station while a pod of dolphins gathered around the vessel may require a longer move from the station or possibly cancellation if they follow the vessel. In any case, no gear will be deployed if marine mammals or other protected species have been sighted within 1 nm of the planned set location during the 30-minute watch period.

In many cases, trawl operations will be the first activity undertaken upon arrival at a new station, in order to reduce the opportunity to attract marine mammals to the vessel. However, in some cases it will be necessary to conduct plankton tows prior to deploying trawl gear in order to avoid trawling through extremely high densities of jellies and similar taxa that are numerous enough to severely damage trawl gear.

Once the trawl net is in the water, the OOD, CS, and/or crew standing watch will continue to monitor the waters around the vessel and maintain a lookout for marine mammal presence as far away as environmental conditions allow. If marine mammals are sighted before the gear is fully retrieved, the most appropriate response to avoid incidental take will be determined by the professional judgment of the CS, watch leader, OOD and other experienced crew as necessary. This judgment will be based on his/her past experience operating gears around marine mammals and SWFSC training sessions that will facilitate dissemination of Chief Scientist / Captain expertise operating in these situations (e.g., factors that contribute to marine mammal gear interactions and those that aid in successfully avoiding these events). These judgments take into consideration the species, numbers, and behavior of the animals, the status of the trawl net operation (net opening, depth, and distance from the stern), the time it would take to retrieve the net, and safety considerations for changing speed or course.

If trawling operations have been suspended because of the presence of protected species, the vessel will resume trawl operations (when practicable) only when these taxa have not been sighted within 1 nm of the planned set location. This decision is at the discretion of the officer on watch and is dependent on the situation.

Care will be taken when emptying the trawl to avoid damage to protected species that may be caught in the gear but are not visible upon retrieval. The gear will be emptied as quickly as possible after retrieval in order to determine whether or not protected species are present.

11.1.3 Tow duration

Standard tow durations of not more than 30 minutes at the target depth have been implemented, excluding deployment and retrieval time (which may require an additional 30 minutes depending on depth), to reduce the likelihood of attracting and incidentally taking marine mammals and other protected species. These short tow durations decrease the opportunity for curious marine mammals to find the vessel and investigate.

Trawl tow distances are less than 3nm, which should reduce the likelihood of attracting and incidentally taking marine mammals. Typical tow distances are 1-2 nm, depending on the survey and trawl speed.

11.1.4 Marine mammal excluder devices

Whenever possible, trawl nets will be fitted with marine mammal excluder devices (see Appendix A for detailed description) to allow marine mammals caught during trawling operations an opportunity to escape. These devices enable target species to pass through a grid or mesh barrier and into the codend while preventing the passage of marine mammals, which are ejected out through an escape opening or swim back out of the mouth of the net.

Two types of trawls are used in SWFSC surveys: the Nordic 264 and the Modified Cobb trawl. Currently, all Nordic 264 nets are outfitted with excluder devices developed for the SWFSC (Appendix A). Most marine mammals caught during SWFSC operations have been caught in surveys using this type of net before the excluder devices were installed.

Modified Cobb trawls are considerably smaller than Nordic rope trawls, are fished at slower speeds, and have a different shape and functionality than the Nordic 264. Due to the smaller size of the modified Cobb, this gear does not yet have marine mammal excluder devices but research and design work are currently being performed to develop effective excluders that will not appreciably affect the catchability of the net and therefore maintain continuity of the fisheries research data set. Successful development and implementation of excluder devices for Modified Cobb trawls is expected to occur within the 5 year timeframe of this EA and is therefore included as part of the Preferred Alternative.

A reduction in target salmon catch rates is an issue that has arisen from preliminary analyses conducted by NWFSC when the MMED is used in Nordic 264 gear. Although NWFSC sample sizes are small, the preliminary results have cast some doubt as to whether the MMED would be suitable for surveys with a primary objective of estimating abundance (whether they use the Nordic 264 or the Modified Cobb gears). If data collected by NWFSC and SWFSC during testing of the MMED in Modified Cobb trawl gear continues to indicate reduce catch rates SWFSC would expect to continue testing to explore whether it is possible to calculate reliable conversion factors to equate catches when using the MMED to surveys when it was not. If this is not possible, then implementation of the MMED in these surveys may also not be possible without compromising one of their primary objectives.

11.1.5 Acoustic pinger devices

Pingers will be deployed during all trawl operations and all types of trawl nets. Two to four pingers will be placed along the footrope and/or headrope to discourage marine mammal interactions.

Acoustic pingers are underwater sound emitting devices that decrease the probability of entanglement or unintended capture of marine mammals (see Appendix A). Acoustic pingers have been shown to effectively deter several species of small cetaceans from becoming entangled in gillnets and driftnets (e.g., no observed catches of beaked whales after pingers implemented reported in Carretta and Barlow 2011; 50% reduction in common dolphin entanglement reported in Cameron and Barlow 2003; 60% reduction in harbor porpoise bycatch reported in Palka et al. 2008). While their effectiveness has not been tested on trawls, pingers are believed to represent a mitigation measure worth pursuing given their effectiveness in other gears.

Pingers are manufactured by STM Products, model DDD-03H. Pingers remain operational at depths between 10 meters (m) and 200 m. Tones range from 100

microseconds to seconds in duration, with variable frequency of 5-500 kilohertz (kHz). Maximum sound pressure level of 176 decibels (dB) root mean squared referenced to 1 micropascal at 1 m at 30-80 kHz.

11.1.6 Gear maintenance

The vessel's crew will clean trawl nets prior to deployment to remove prey items that might attract marine mammals. Catch volumes are typically small, with every attempt made to collect all organisms caught in the trawl.

11.1.7 Speed limits and course alterations

The vessel's speed during active sampling will rarely exceed 5 knots. Typical speeds during trawling are 2-4 knots. Transit speeds vary from 6-14 knots, but average 10 knots.

As noted above, if marine mammals are sighted within 30 minutes prior to deployment of the trawl net, the vessel will be moved away from the animals to a new station.

At any time during a survey or in transit, any crew member standing watch or dedicated marine mammal observer that sights marine mammals that may intersect with the vessel course will immediately communicate their presence to the bridge for appropriate course alteration or speed reduction as possible to avoid incidental collisions.

11.2 Longline Gear

11.2.1 Visual surveillance by OOD, CS, and crew

Longline surveys are conducted aboard smaller vessels and with fewer crew than trawl surveys but the pre-set monitoring procedures for longline gear are the same as described for trawling gear. No longline sets are made if marine mammals or other protected species have been seen within 1nm of the planned set location during the past 30 minutes, the move-on rule is implemented if these taxa are present, and the CS, watch leader, and OOD uses professional judgment to minimize the risk to protected species from potential gear interactions.

The only exception is when California sea lions are sighted during the watch period prior to setting longline gear. For this species only, longline gear may be set if a group of 5 or fewer animals is sighted within 1 nm of the planned set location; when groups of more than 5 sea lions are sighted within 1 nm deployment of gear would be suspended. This exception has been defined considering the rarity of past interactions between this gear and CA sea lions and in order to make this mitigation measure practicable to implement. Without it, given the density of CA sea lions in the areas where longline surveys are conducted, SWFSC believes implementing the move-on rule for a single animal would preclude sampling in some areas and introduce significant bias into survey results. Groups of 5 California sea lions or greater is believed to represent a trigger for the move-on rule that would allow sampling in areas where target species can be caught

without increasing the number of interactions between marine mammals and research longline gear.

11.2.2 Operational procedures

SWFSC longline sets are conducted with drifting pelagic or anchored gear marked at both ends with buoys (Appendix A). Typical soak times are 2-4 hours, but may be as long as 8 hours when targeting swordfish (measured from the time the last hook is in the water to when the first hook is brought out of the water).

SWFSC longline protocols specifically prohibit chumming (releasing additional bait to attract target species to the gear). However, spent bait may be discarded during gear retrieval while gear is still in the water. In the experience of SWFSC, this practice increases survey efficiency and has not resulted in interactions with marine mammals. Scientist observations indicate pinnipeds do not gather immediately aft of the survey vessel as a result of discarding spent bait. However, if protected species interactions with longline gear increase or if SWFSC staff observe that this practices is contributing to protected species interactions it will revisit this practice and consider the need to retain spent bait until no gear remains in the water.

If protected species are detected while longline gear is in the water, the CS, watch leader and OOD exercise similar judgments and discretion to avoid incidental take of these taxa with longline gear as described for trawl gear. The species, number, and behavior of the marine mammals are considered along with the status of the ship and gear, weather and sea conditions, and crew safety factors. The CS, watch leader and OOD will use professional judgment and discretion to minimize risk of potentially adverse interactions with protected species during all aspects of longline survey activities.

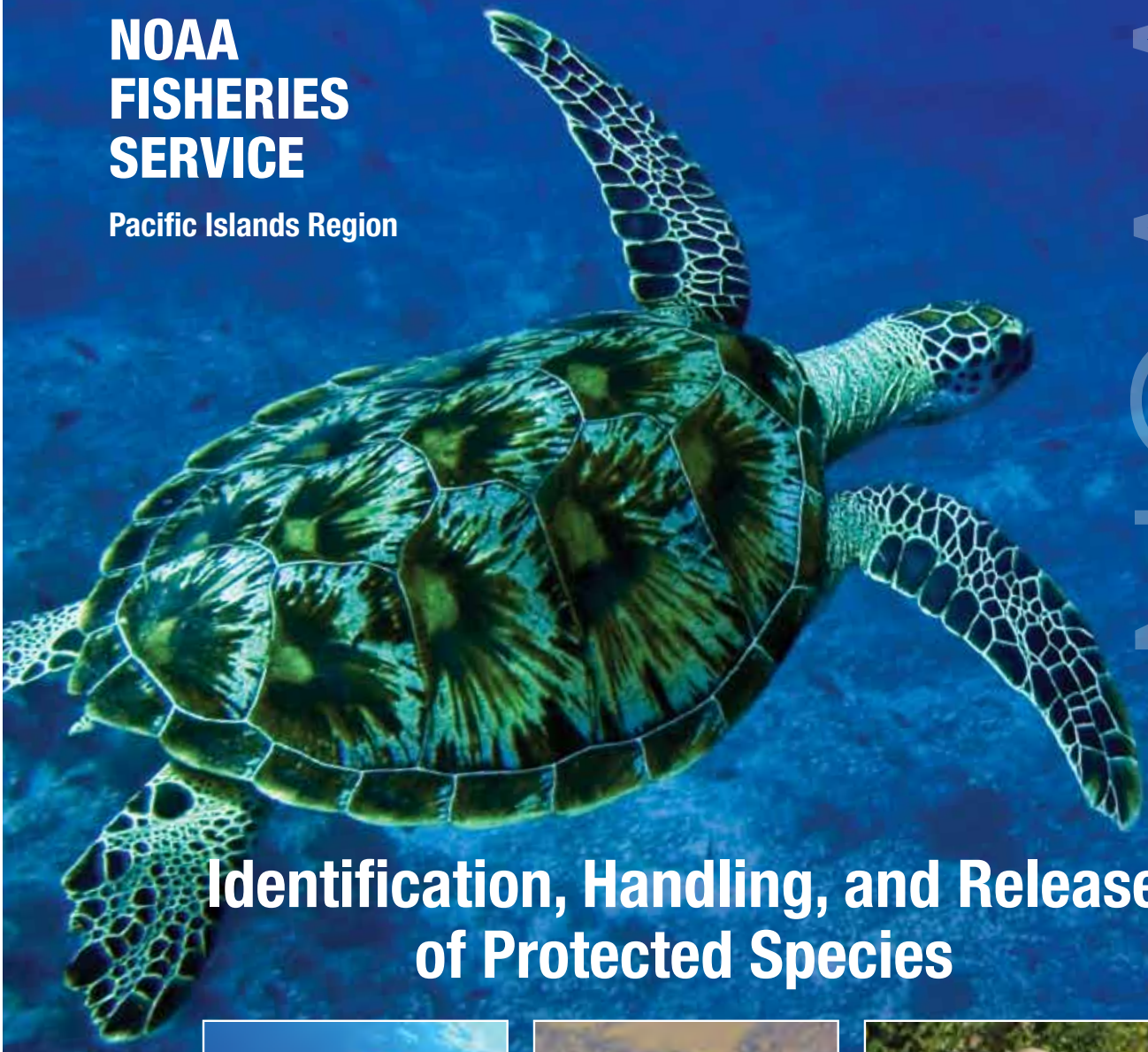
If protected species are detected during setting operations and are considered to be at risk, immediate retrieval or halting the setting operations may be warranted. If setting operations have been halted due to the presence of protected species, resumption of setting will not begin until they have not been observed within 1 nm of the set location.

If marine mammals are detected during retrieval operations and are considered to be at risk, haul-back may be postponed until the CS, watch leader or OOD determines that it is safe to proceed. SWFSC anticipates that additional information on practices to avoid marine mammal – longline gear interactions can be gleaned from protected species training sessions and more systematic data collection standards being implemented by SWFSC.

Science, Service, Stewardship

NOAA FISHERIES SERVICE

Pacific Islands Region



Identification, Handling, and Release of Protected Species

Sea Turtles

Marine Mammals

Seabirds

U.S. Department of Commerce | National Oceanic and Atmospheric Administration | National Marine Fisheries Service

Sea Turtle Handling Guidelines

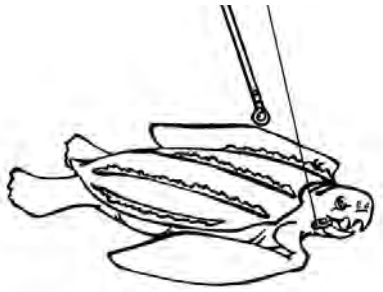
STEP 1:

Determine if the turtle is small enough to bring aboard.

Remember to use gaffs only on fishing gear, not on turtles

IF TURTLE IS TOO BIG TO BRING ABOARD:

- Bring turtle close to boat by pulling gently on the line.
- Determine if turtle is hooked or entangled, and choose the proper tools to remove as much fishing gear as possible from the turtle – including the hook.
- If turtle is hooked and the hook is visible just inside the mouth or on the body, use long handled dehooker to remove hook. See **Step 3** for instructions.
- If turtle is entangled or the hook is deep inside mouth or throat and cannot be removed, use a long-handled line cutter to cut all lines.
- Skip to **Step 5**.



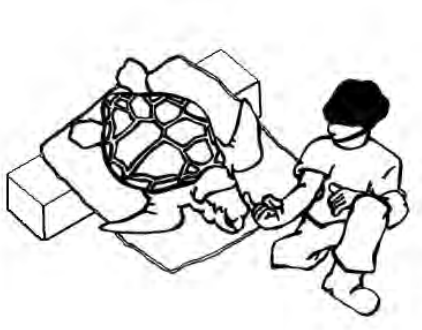
IF TURTLE IS SMALL ENOUGH TO BRING ABOARD:

- Use dip net to bring turtle aboard.
- Do not bring turtle aboard by pulling on fishing line or by grabbing the eye sockets.
- It may be helpful to grab the front flippers close to the turtle's body when using the net to help bring it aboard.
- Go to **Step 2**.

STEP 2:

After the turtle has been brought aboard, determine if it is alive or appears dead.

A turtle that looks dead may just be very tired, and can regain strength with your help.



UNCONSCIOUS TURTLE - inactive and appears dead

- Keep the turtle on a tire in a secure, shaded place away from activity.
- Remove fishing gear using instructions in **Step 3**.
- Place turtle on its belly and elevate back flippers at least 6 inches for at least 4 hours to help remove water from its lungs while recovering.
- Place a wet towel on turtle. Do not cover nostrils. Occasionally wet turtle with a deck hose. Avoid spraying turtle's head.
- Perform a reflex test every 3 hours, by gently touching corner of eye and lightly pulling on tail. Movement may indicate the turtle is recovering.
- If there is no movement from reflex tests after at least 4 hours, but no more than 24 hours, release the turtle to the ocean using methods in **Step 4**.

CONSCIOUS TURTLE - active or awake

- Keep the turtle on a tire in a secure, shaded place away from activity.
- Remove fishing gear using instructions in **Step 3**.
- Release the turtle using methods in **Step 4**. You do not have to wait 4 or more hours before release.

Questions? Call Pacific Islands Regional Office, Sustainable Fisheries Division at (808) 944-2200

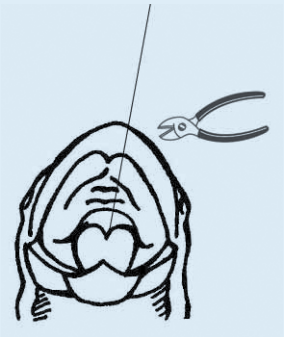
Sea Turtle Handling Guidelines

When to Leave Hooks in Place.

It is normally best to remove all fishing gear from the turtle, but there are situations when the gear should not be removed. Leave hook in place and cut line as close as possible to hook if:

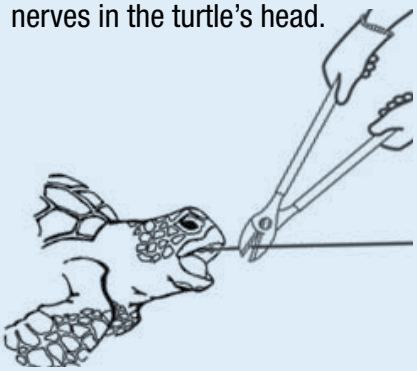
The hook has been swallowed.

Forcing a dehooking device down a turtle's throat may worsen its injuries or cause an infection.



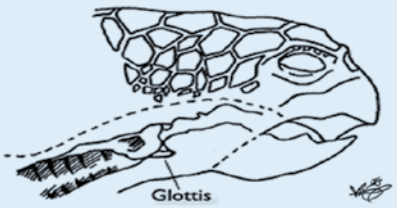
The hook has penetrated the roof of the mouth.

Trying to remove this hook may cause damage to the organs and nerves in the turtle's head.



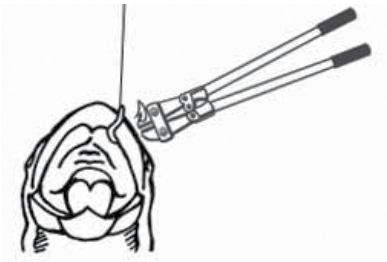
The hook is in the glottis.

The glottis is located at the back of the mouth and covers the airway. Attempting to remove hooks from the glottis may cause further damage and prevent the turtle from covering its airway during dives.



STEP 3:

Methods for removing fishing gear from a hooked turtle.



TURTLE HOOKED WITH BARB EXPOSED

1. Using bolt cutters, remove the barb of the hook.
2. Once barb has been clipped off, back the hook out to remove it.

TURTLE HOOKED WITH BARB EMBEDDED

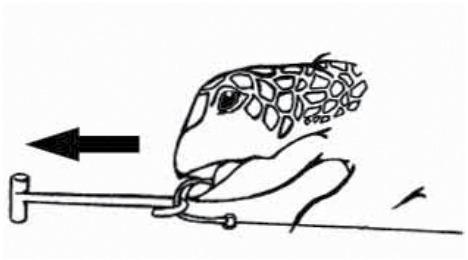
1. Follow instructions on using a pig-tail dehooker.
2. If hook cannot be removed, cut line as close as possible to hook.

TURTLE IS HOOKED, BUT YOU CANNOT SEE HOOK

- Cut fishing line as close as possible to hook without pulling hard on line.

TURTLE ENTANGLED IN FISHING LINE

- Use monofilament or wire cutters to remove all fishing line from turtle.



IF BOLT CUTTERS ARE NOT AVAILABLE

1. Place a J-style dehooker or similar hand-held tool on the leader to cut hook. A short handled pig-tail dehooker can also be used. To get dehooker on the line, refer to pig-tail dehooker instructions.
2. Slide device down the leader to the bottom of the hook.
3. Pull the line so it is opposite from the handle of the dehooker.
4. Keep the line tight, then pull and twist dehooker to remove hook.

Sea Turtle Handling Guidelines

Dehooking a turtle using a pig-tail dehooker with your right hand:

Place the dehooker at 90^0 to the line with the end of the pig-tail facing up.

Draw the dehooker back towards you like a bow and arrow until loop pulls on line, maintaining contact between the dehooker and the line.

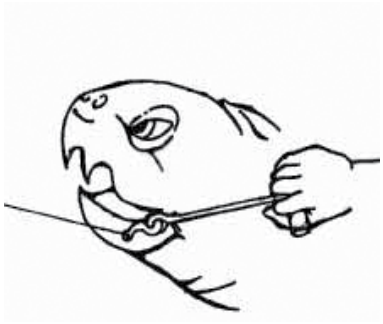
Rotate the dehooker 1/4 turn clockwise. (The line should be inside the curl of dehooker)

Run the dehooker down the line until it engages the bottom bend of the hook.

Pull the line tight and parallel to the dehooker. Give quick thrusts to remove the hook.

Keep line tight, so the hook remains inside the curl of dehooker, until hook is clear of the turtle.

Circle Hooks



When using the long-handled pig-tail dehooker on a turtle in the water, it may be easier to remove circle hooks if the line is not parallel to the dehooker's handle once the dehooker is on the line.

- While keeping the line tight, separate the line and dehooker, then try to push and twist the dehooker to dislodge the hook. This may work better than quick thrusts.
- If you cannot remove the hook, cut line as close as possible to the hook.
- If turtle is aboard, try to rotate the hook back out by using the line or pliers before using the dehooker. This may help remove the hook.

STEP 4:

Carefully return turtle to water.

1. Stop vessel, and take engine out of gear.
2. Release the turtle away from any fishing gear in the water.
3. Gently put turtle in the water, head-first.
4. Make sure turtle is clear of vessel before motoring away.

Photo courtesy of Steve Beverly

STEP 5:

Record the interaction in your logbook.

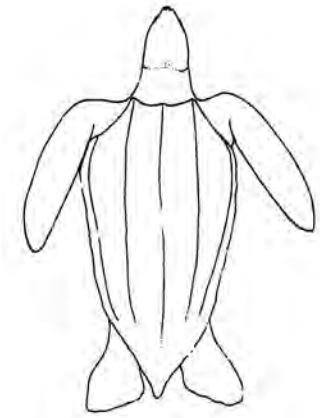
1. Record the identified species.
2. Write down how much fishing gear remained on turtle after release.
3. Record any tag numbers observed on turtle.

Questions? Call Pacific Islands Regional Office, Sustainable Fisheries Division at (808) 944-2200

Sea Turtle Identification

LEATHERBACK

- Dark, leathery skin covers body and shell
- No scutes or scales like other turtles
- 5-7 head to tail ridges on back
- Adults are much larger than other turtles



Hard Shell Turtles

GREEN

- 1 pair of prefrontal scales
- 5 central scutes
- 4 pairs of lateral scutes
- 4 inframarginal scutes on each side

TOP VIEW OF HEAD

TOP VIEW

LOGGERHEAD

- 2 pairs of prefrontal scales
- 5 central scutes
- 5 pairs of lateral scutes
- 3 inframarginal scutes on each side

HAWKSBILL

- 2 pairs of prefrontal scales
- 5 central scutes
- 4 pairs of overlapping lateral scutes
- 4 inframarginal scutes on each side

BOTTOM VIEW OF TURTLE

Prefrontal Scales
Central Scutes
Lateral Scutes
Inframarginal Scutes

OLIVE RIDLEY

- 2 pairs of prefrontal scales
- 5 central scutes
- 5-9 pairs of lateral scutes
- 4 inframarginal scutes on each side with pores

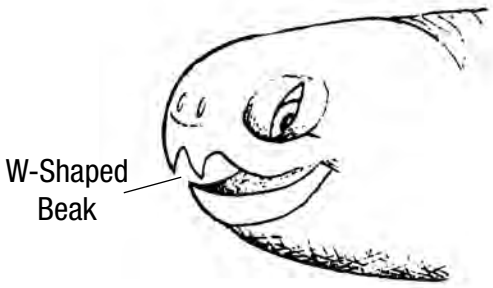
Sea Turtle Identification

Leatherback Sea Turtle

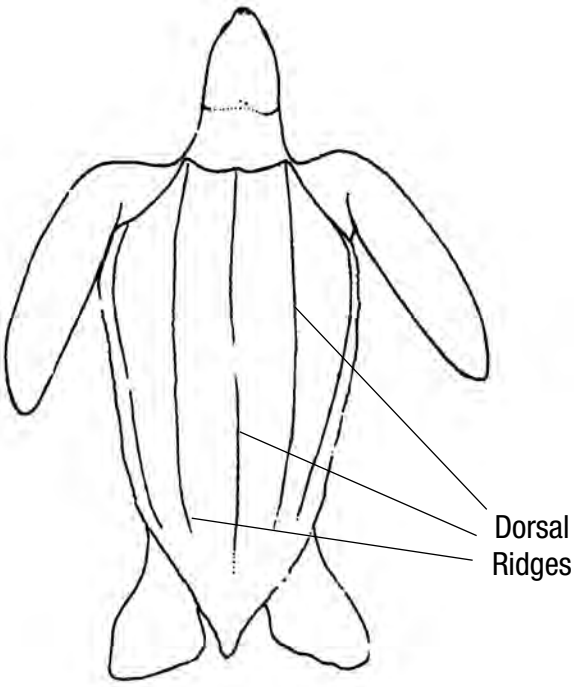
(Dermochelys coriacea)

- Only soft-shelled species
- Dark gray or black with variable white spotting
- 5-7 head-to-tail ridges on back
- Leathery shell
- No scales
- W-shaped upper jaw or beak
- May attain great size

Approximate range



SIDE VIEW
OF HEAD



TOP VIEW

TURTLE FACTS:

Leatherback turtles interact with both the Hawaii swordfish (shallow-set) and tuna (deep-set) longline fisheries. They are usually hooked or entangled externally, rather than in the mouth. This turtle has a firm, leathery skin covering the shell and body, instead of a hard shell and scales like other turtles. They are highly migratory, swimming long distances across the Pacific from nesting to foraging areas. Leatherbacks are the largest of all sea turtles with adults reaching 6½ feet (2 meters) in length and over 1,500 pounds (681 kg).

Questions? Call Pacific Islands Regional Office,
Sustainable Fisheries Division at (808) 944-2200

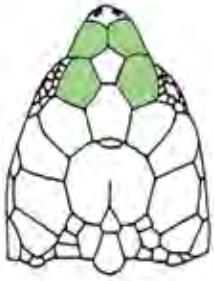
Sea Turtle Identification

Loggerhead Sea Turtle

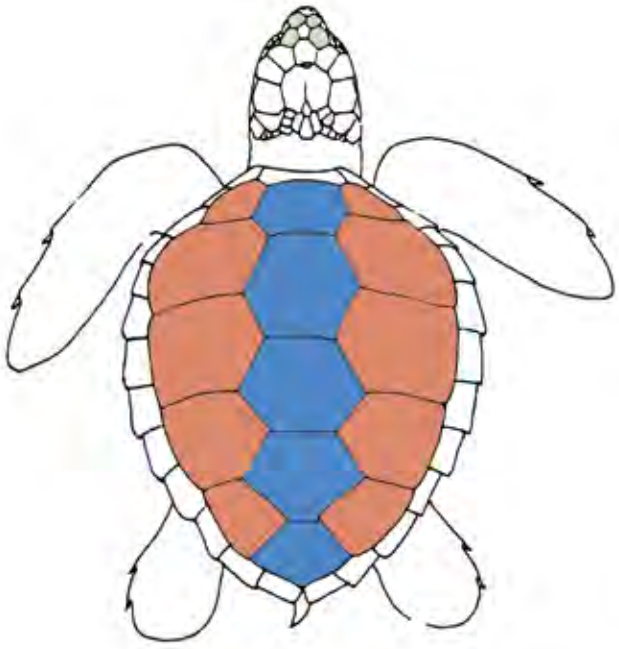
(Caretta caretta)

- 2 pairs of prefrontal scales
- 5 central scutes
- 5 pairs of lateral scutes
- 3 pairs of inframarginal scutes

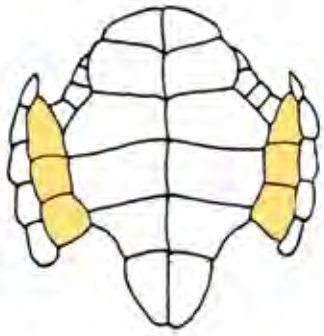
Approximate range



TOP VIEW
OF HEAD



TOP VIEW



BOTTOM VIEW
OF TURTLE

TURTLE FACTS:

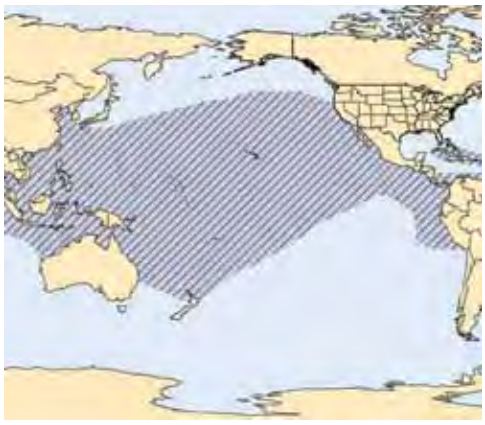
Loggerhead turtles interact with both the Hawaii swordfish (shallow-set) and tuna (deep-set) longline fisheries. In the North Pacific, juveniles hatched from nests in Japan swim across the ocean to feed and grow near the Mexican coast. They can spend decades in migratory and developmental habitats in Mexico and the central Pacific until maturity, when they return to Japan. Loggerheads can grow to over 36 inches (92 cm) in shell length and 250 pounds (113 kg). They have large heads, strong jaws, and typically have shells that are reddish-brown with a yellow underside.

Sea Turtle Identification

Olive Ridley Sea Turtle

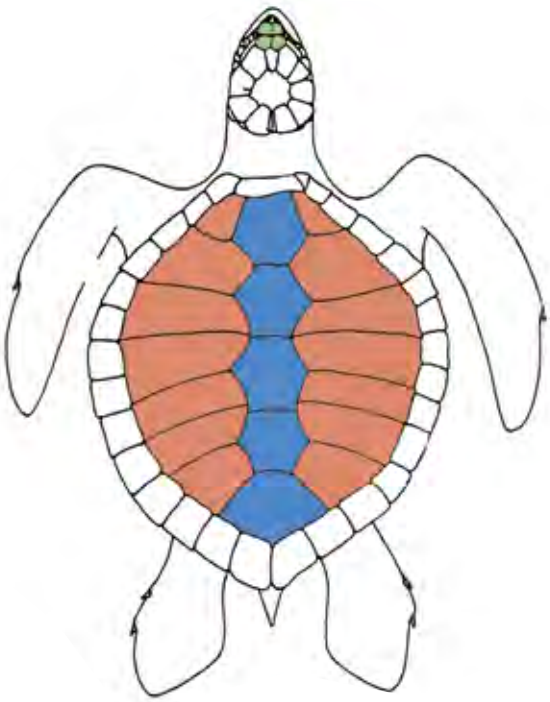
(Lepidochelys olivacea)

- 2 pairs of prefrontal scales
- 5 central scutes
- 5-9 pairs of lateral scutes
- 4 pairs of inframarginal scutes with one pore on each scute

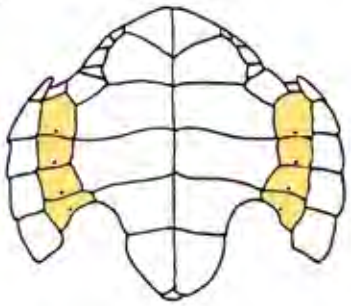


Approximate range

TOP VIEW OF HEAD



TOP VIEW



BOTTOM VIEW OF TURTLE

TURTLE FACTS:

Olive ridley turtles interact primarily with the Hawaii tuna (deep-set) longline fishery, and occasionally with the swordfish (shallow-set) fishery. These turtles are highly migratory and usually live in warm, tropical waters, but may also occur in cooler waters north of Hawaii. Olive ridley turtles are the smallest sea turtles, averaging 25 inches (61 cm) in shell length and 100 pounds (45 kg). Their shell is generally olive green with a light yellow underside. They sometimes have more lateral scutes on one side of their shell than the other. They are the only turtles in the Pacific with a pore on each inframarginal scute.

Sea Turtle Identification

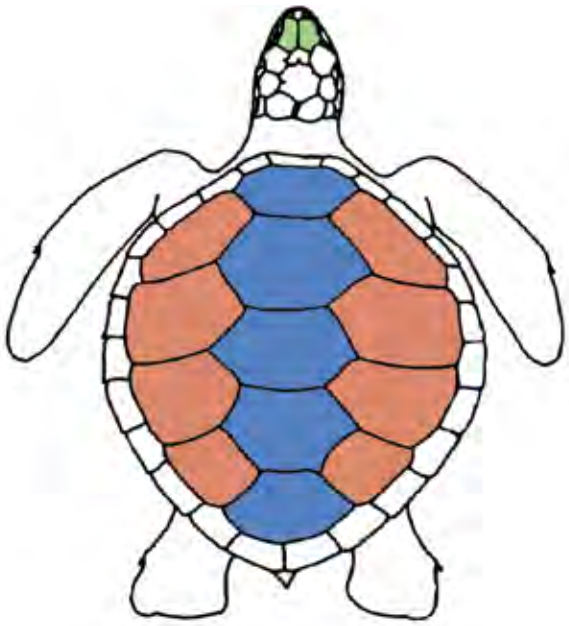
Green Sea Turtle

(Chelonia mydas)

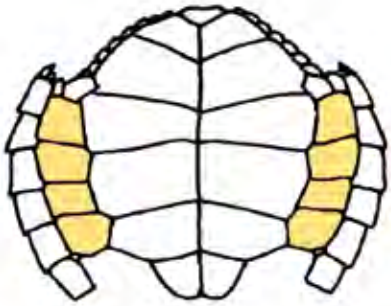
- 1 pair of prefrontal scales
- 5 central scutes
- 4 pairs of lateral scutes
- 4 pairs of inframarginal scutes

Approximate range

TOP VIEW OF HEAD



TOP VIEW



BOTTOM VIEW OF TURTLE

TURTLE FACTS:

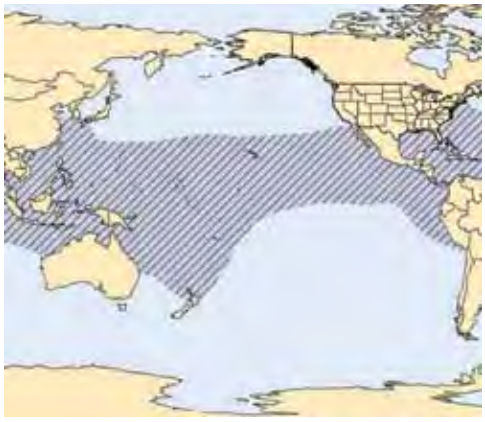
The green turtle is the most widespread and commonly-known sea turtle in tropical and sub tropical waters. Green turtles are not usually caught in longline fisheries, but interactions can occur in the Hawaii and American Samoa fisheries. Green turtles are the largest of the hard-shell turtle species and can grow up to 47 inches (120 cm) in shell length and weigh over 300 pounds (136 kg). They get their name from the color of their fat. The shell color can range from yellow-green to reddish-brown to almost black. Loggerheads and olive ridley turtles can be easily mistaken for a green turtle. When in doubt, look at the head and check the number of prefrontal scales.

Sea Turtle Identification

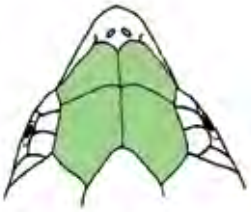
Hawksbill Sea Turtle

(Eretmochelys imbricata)

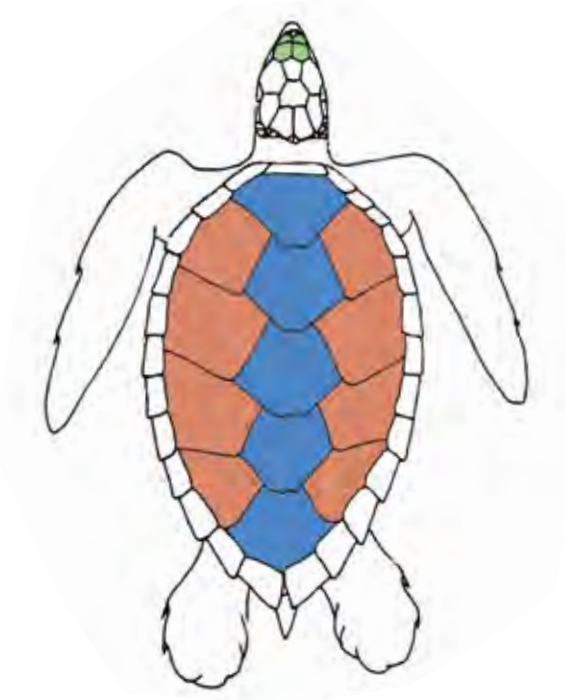
- 2 pairs of prefrontal scales
- 5 central overlapping scutes
- 4 pairs of overlapping lateral scutes
- 4 pairs of inframarginal scutes



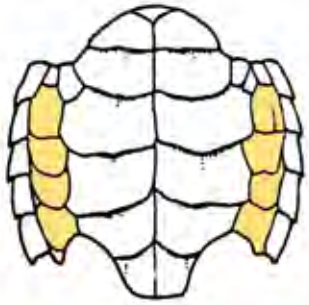
Approximate range



TOP VIEW
OF HEAD



TOP VIEW



BOTTOM VIEW
OF TURTLE

TURTLE FACTS:

There has been no reported interaction between a hawksbill turtle and the Hawaii longline fisheries. Hawksbills can be found in tropical and sub-tropical regions across the Pacific. They nest in low numbers throughout the Pacific, including Hawaii. Adult hawksbills can grow to almost 3 feet (90 cm) in shell length and weigh up to 200 pounds (91 kg). The hawksbill is named for its sharp, pointed, bird-like beak. The shell has "tortoise shell" coloring, ranging from dark to golden brown, with streaks of orange, yellow, brown and black. These are the only sea turtles that have overlapping scutes on the top shell, like roof shingles.

Questions? Call Pacific Islands Regional Office,
Sustainable Fisheries Division at (808) 944-2200

Marine Mammal Handling and Release Guidelines

Have an identification guide and paper available in case of a marine mammal interaction.

Small Whales and Dolphins

1. Make sure the crew is ready to help.
2. Move the boat carefully, stop the boat, and put the transmission in neutral when the animal is close.
3. If the far side of the mainline is within reach, use gaffs to grab only the line. This will keep any remaining gear in the water from pulling on the line and the animal. Do NOT use gaffs or sharp objects to grab an animal.
4. Slowly bring the animal next to the boat.
5. Avoid sudden actions that may scare the animal.

If the animal is tangled in line:

1. Grab the far side of the mainline and tie the mainline to the boat.
2. Use a long-handled line cutter to cut as much line off the animal as you can.

If the animal is hooked:

1. Use a dehooker to remove the hook.
2. If the hook cannot be removed, use a long-handled line cutter to cut the line as close as you can to the hook.
3. Remove as much line as possible from the animal. Do not use ropes or other lines to tie the animal to the boat.

Large Whales

If a large whale is alive and hooked or entangled in fishing gear, immediately call the Disentanglement Hotline at **1-888-256-9840** or the U.S. Coast Guard on VHF Ch. 16 for instructions.

If a large whale is dead and hooked or entangled in fishing gear, immediately call the U.S. Coast Guard on VHF Ch. 16 for instructions.

For All Interactions

Write down as much information as possible to describe the animal, and its injuries.

- How long was the animal?
- What did the animal look like (did it have stripes, spots, or different colors)?
- Was there any fishing gear still on the animal when it was released? If so, where, what kind, how much?
- Did you see any tags on the animal? If yes, can you see any letters or numbers on the tag?

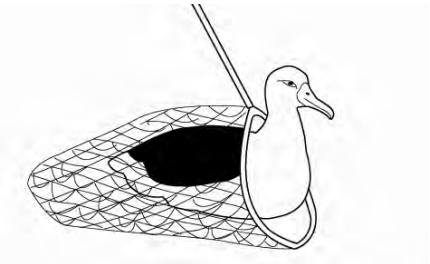
After an interaction with a marine mammal, get the rest of your fishing gear out of the water. Then record all the information about the interaction on your Marine Mammal Injury / Mortality Reporting Form, even if you had an observer aboard. Mail the form when you get to port.

If you have a marine mammal interaction, you could have another if you keep fishing in the same area. Move away from the area, and call other fishermen to warn them. If you stay in the same area, wait 2 days before setting your gear to avoid more interactions.

Seabird Handling Guidelines

PLEASE NOTE: If bird is a short-tailed albatross, follow special guidelines for handling short-tailed albatross. For all other seabirds, see below.

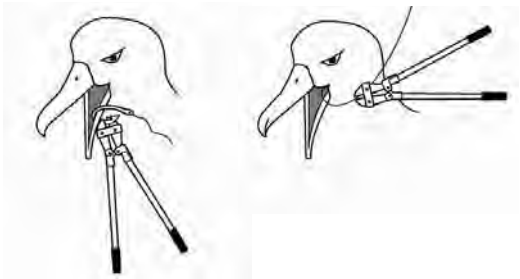
1. Stop vessel to reduce tension on the line and bring bird aboard using a dip net.



2. Working with another person, hold the back of the bird's head and isolate the hooked or entangled area while the other person takes the bird from the net. Fold the bird's wings to their natural resting position against the body.

3. Wrap the bird's wings and feet with a clean towel or blanket. Do not wrap the bird's body too tightly or block the nostrils, as these will prevent the bird from breathing.

4. Cut and remove all fishing line from bird. If bird is lightly hooked in the bill, leg, or wing, and the barbed end of the hook is visible, use bolt cutters to cut the barb and then back the hook out. If bird has been deeply hooked, cut the line as close as possible to hook and leave hook in place.



Never attempt to remove a hook from anywhere on a bird by pulling on line.

5. Allow bird to dry for 1/2 hour to 4 hours in a safe, enclosed place. Refer to **Release Guidelines.**

6. Record any leg band numbers observed on the bird in logbook.

Wear gloves, long sleeves and protective eyewear when handling seabirds. They have sharp beaks and give painful bites.

Release Guidelines

A bird is ready for release when its feathers are dry.

Albatross NOT ready to be released

Albatross ready to be released

If bird is ready for release:
Stop the vessel. Gently place bird onto the surface of the water. Do not throw bird in air or motor away if bird is not clear of vessel.

Questions? Call Pacific Islands Regional Office, Sustainable Fisheries Division at (808) 944-2200

Short-Tailed Albatross Handling Guidelines

Short-tailed albatross are an endangered species and have special handling requirements.

If you catch a short-tailed albatross:

Immediately try to contact National Marine Fisheries Service, U.S. Coast Guard, or U.S. Fish and Wildlife Service. They will contact an expert to give you advice in the handling and release of short-tailed albatross.

National Marine Fisheries Service (NMFS)
(808) 944-2200

U.S. Coast Guard (USCG)
08240.0 KHz (Daytime ITU Channel 816)
12242.0 KHz (Daytime ITU Channel 1205)
04134.0 KHz (Nightime ITU Channel 424)
06200.0 KHz (Nightime ITU Channel 601)

U.S. Fish and Wildlife Service at French Frigate Shoals (USFWS)
Contact frequency: 10.0054

If a short-tailed albatross is hooked or entangled:

1. Stop vessel to reduce tension on the line and bring bird aboard using a dip net.
2. Wrap the bird's wings and feet with a clean towel to protect its feathers from oils or damage.
3. Remove any entangled lines from the bird and determine if the bird is dead or alive.

   If dead, notifiy NMFS. Label the bird, put it in a plastic bag and store in freezer. Give bird to NMFS when you return to port.

   If alive, place bird in a safe, enclosed place and immediately contact NMFS, USCG and USFWS.

   If unable to make contact for 24-48 hours, determine if the bird is lightly, moderately, or deeply hooked. See description.
4. If bird is deeply hooked, keep bird in a safe, enclosed place until further instructed. Do NOT release the bird.
5. If bird is lightly or moderately hooked, remove hook by cutting the barb and backing hook out.
6. Allow bird to dry for 1/2 hour to 4 hours in a safe, enclosed place. Refer to **Release Guidelines.**
7. Record information in the short-tailed albatross recovery data form.

Short-tailed albatross fly across the entire North Pacific. Around Hawaii, only young short-tailed albatross (shown above) have been seen. The number of birds is increasing, but fewer than 3,000 birds remain in the wild.

Is the bird lightly, moderately, or deeply hooked?

Lightly Hooked: Hook is clearly visible on bill, leg or wing.

Moderately Hooked: Hooked in the mouth or throat with hook visible.

Deeply Hooked: Hook has been swallowed and is located inside the bird's body below the neck.

Release Guidelines

The bird is ready for release if it meets ALL of the following criteria:

- Stands on both feet with toes pointed forward
- Holds its head erect and responds to sound and motion
- Breathes without making noise
- Flaps and retracts wings to normal folding position
- Feathers are dry

If any of these conditions are not met, the bird cannot be released.

If bird is ready for release:
Stop the vessel. Gently place bird onto the surface of the water. Do not throw bird in air or motor away if bird is not clear of vessel.

Seabird Identification

Laysan Albatross *(Phoebastria immutabilis)*

Feathers:
- White head, neck, and belly
- Dark brown upper wings and back
- Brown and white under wings
- Dark area around each eye

Legs/Feet Color: Pink to gray

Bill Color: Yellow-pink with gray tip

Black-footed Albatross *(Phoebastria nigripes)*

Feathers:
- Dark brown head, body, and wings
- Small white patch behind the eyes
- White ring around base of bill
- Adults - small white patch at base of tail

Legs/Feet Color: Black-brown

Bill Color: Black-brown

Short-tailed Albatross *(Phoebastria albatrus)*

ENDANGERED SPECIES

JUVENILE

Feathers: Dark brown head, body, and wings

Legs/Feet Color: Brown-gray

Bill Color: Bright pink with a thin black line around base

SUB ADULT

Feathers:
- White neck, belly, and back
- Dark brown cap and back of neck
- Black and white wings

Legs/Feet Color: Pink to gray

Bill Color: Bright pink with a thin black line around base

ADULT

Feathers:
- Golden-yellow head and neck
- White back, base of tail, and belly
- Black and white wings

Legs/Feet Color: Pink to gray

Bill Color: Bright pink with a thin black line around base

Questions? Call Pacific Islands Regional Office,
Sustainable Fisheries Division at (808) 944-2200

APPENDIX B.2

Observer ID

DOC/NOAA Fisheries
Pacific Islands Region
Longline Observer Program

Trip No.

Set No.

Marine Mammal Biological Data Form

Capture

Date/Time: Day | Month | Year (2 0 _ _) | Hour | Minute

Latitude: Deg. | Decimal Min. (.) | N/S

Longitude: Deg. | Decimal Min. (.) | E/W

Landed? ☐ ✓

Tags Present? ☐

Y= Yes
N= No
U= Unknown

Species Code

742	False Killer Whale
746	Risso's Dolphin
743	Short-Finned Pilot Whale
731	Bottlenose Dolphin
700	Unidentified Cetacean

Release Condition

03	Injured
04	Dead

Associated Form Code

Associated Form Page No.

Associated Form Line No.

Photo? ☐ ✓

Specimen? ☐ ✓

Sketch? ☐ ✓

Hooking/Entanglement

Hook Type

01	Tuna	05	Circle
02	J-Hook	06	Other
03	Offset Tuna	07	Offset Circle
04	Offset J-hook		

Hook Size

Hooked? ☐ Y N

Entangled? ☐ Y N

Location (check all that apply)		Code	Location (check all that apply)	
Mouth	☐	MO	Mouth	☐
Lip	☐	LP	Lip	☐
Head	☐	HD	Head	☐
Body	☐	BO	Body	☐
Pectoral Fin	☐	PF	Pectoral Fin	☐
Dorsal Fin	☐	DF	Dorsal Fin	☐
Fluke	☐	FK	Fluke	☐
Internal/Ingested	☐	IN	Internal/Ingested	☐
Unknown	☐	UK	Unknown	☐
Other (describe on back)	☐	OT	Other (describe on back)	☐

Gear

Gear Attached After Release

Code			
NO	None	☐	
HK	Hook	☐	
WL	Wire leader	☐	If ✓'d, provide length.
MN	Mono leader	☐	If ✓'d, provide length.
WT	Weight	☐	If ✓'d, provide size & numbers.
BL	Branch line	☐	If ✓'d, provide numbers & lengths.
FO	Float line	☐	If ✓'d, provide numbers & lengths.
FT	Floats	☐	If ✓'d, provide numbers.
ML	Main line	☐	If ✓'d, provide length.
OT	Other	☐	If ✓'d, provide description.

Provide requested details about anything ✓'d above on reverse side under Gear Comments.

Measurements

Total Length ☐☐☐ **cm**

OR

Approximate Length ☐☐

☐ F= feet M= meters

Capture Behavior

		Code
☐	**Struggling?**	SR
☐	**Calm?**	CA
☐	**Vocalizing?**	VO

form v. MM.12.01

APPENDIX B.2

Observer ID

DOC/NOAA Fisheries
Pacific Islands Region
Longline Observer Program

Trip No.

Set No.

Marine Mammal Biological Data Form Comments

Comments:

Gear Comments: (Please describe in detail anything ✓ 'd on front, & how/where remaining gear was attached upon release)

Injuries Description: (Where exactly is hook? Where/how are lines constricting? Additional injuries sustained during handling/release? Bleeding?

Identifying Characteristics:

APPENDIX B.2

Observer ID

DOC/NOAA Fisheries
Pacific Islands Region
Longline Observer Program

Trip No.

Set No.

Sea Turtle Biological Data Form

Species Code

504 Loggerhead Sea Turtle
502 Green Sea Turtle
506 Leatherback Sea Turtle
503 Hawksbill Sea Turtle
505 Olive Ridley Sea Turtle
500 Unid. Hard Shell Sea Turtle
501 Unidentified Sea Turtle

Photo? ☐ ✓
Specimen? ☐ ✓
Sketch? ☐ ✓
Tag? ☐ ✓
Comment? ☐ ✓ (Enter comments on back of this form.)

Associated Form Code
Associated Form Page No.
Associated Form Line No.

Capture

Date/Time: Day | Month | Year (2 0 _ _) | Hour | Minute

Latitude: Deg. | Decimal Min. | N/S

Longitude: Deg. | Decimal Min. | E/W

Boarded (0 _)

01 Boarded w/ Dipnet
02 Boarded w/o Dipnet
03 Not Boarded

Tags Present?

Y Yes
N No
U Unk.

Release

Date/Time: Day | Month | Year (2 0 _ _) | Hour | Minute | Disposition Code (0 _)

Latitude: Deg. | Decimal Min. | N/S

Longitude: Deg. | Decimal Min. | E/W

Tags Removed? ☐ ✓

Tags Applied? ☐ ✓

01 Previously dead
02 Relsd. unharmed
03 Relsd. injured
04 Died
05 Escaped
06 Treated as catch
07 Other/Unknown

Hooking/Entanglement

Hooked ?

Y Yes
N No
U Unknown

Entangled ?

Hook Location

Entangle Location

01 Ingested (in esophagus)
03 Front Flipper
04 Body/Shell
05 Unknown
06 Tail
07 Rear Flipper
20 Other
10 Upper beak
11 Lower beak
12 Side of mouth
13 Tongue/Glottis
14 Head/Neck
15 Roof of mouth
16 Mouth unknown

Gear Removal

00 Unknown
02 Fell from gear while in water.
03 Fell from gear once out of water.
04 Fell from gear by force of roller.
05 Removal req. cutting gear/animal
06 Removal with no cutting.
12 Dehooker
99 Other

Remaining Gear

X None
H Hook
L Line
B Both Hook and Line

Describe hook or line and length left on animal:

Morphology

Skin Covered Carapace? (N implies carapace is covered w/ scutes.)

Overlapping Scutes?

Inframarginal scutes with pores?

One pair of prefrontal scales? (N implies more than one pair.)

Y Yes
N No
U Unknown

Carapace Scute Counts

(Enter the no. of scutes in the boxes.)

No. of Left Lateral Scutes

No. of Right Lateral Scutes

No. of Vertebral Scutes

No. of Inframarginal Scutes

Dorsal Coloration (0 _)

01 Orange/Red
02 Grayish
03 Other, give color below

Other dorsal color:

Measurements

Round to the nearest half cm.

Carapace Length (curved) ___.___ cm

Carapace Width (curved) ___.___ cm

Plastron Length (straight) ___.___ cm

Tail Length ___.___ cm

Carapace Length (straight) ___.___ cm

Carapace Width (straight) ___.___ cm

Light Device

Complete only if light devices were used and the light device type has been indicated on the gear configuration form.

Color Code

01 Blue
02 Green
03 Black
04 Pink
05 White
06 Yellow
07 Magenta
08 Mixed
09 Other
10 Clear
11 Red
12 Orange
13 Silver/Metal

Proximity Code (0 _)

00 On this branch line
01 Light is 1 branch line away
02 Light is 2 branch lines away
03 Light is 3 branch lines away
04 None in vicinity

APPENDIX B.2

Observer ID

DOC/NOAA Fisheries
Pacific Islands Region
Longline Observer Program

Trip No.

Set No.

Sea Turtle Biological Data Form Comments

Comments:

Injuries Description:

Identifying Characteristics:

APPENDIX B.3

Supplemental Questions for Marine Mammal Biological Data Form – Longline gear

Please attempt to provide answers to the following questions, as they related to the interaction, when completing the comment section of your MMBD form.

1. How long was the observed/documented part of the interaction? Did you observe the entire interaction? Was the animal primarily at the surface? If not, approximately how many times did you see the animal surface during the interaction?
2. How far was the animal from the vessel when it was initially sighted? How long did it take to pull the animal in to the vessel and how long was it handled along-side the vessel?
3. *If applicable* – If hooking location is not clearly specified, what can you tell us about likely locations? What prevented you from seeing the hooking location?
4. *If applicable* – How did the interaction end? Did the line break? Was it cut? Where was it cut?
5. Did you attempt to get a sample from the animal?
6. Were there any other animals in the area during the interaction? If so, please describe number, appearance, and behavior.

Please attempt to provide answers to the following questions, as they related to the interaction, when completing the gear section of your MMBD form.

1. *If applicable* – Did you measure the remaining branchline after it snapped/ was cut to determine the amount remaining on the animal, or did you estimate?
2. *If applicable* – Could you verify the hook type/ size associated with the interaction? Did the hook straighten or break during the interaction?

Please attempt to provide answers to the following questions, as they related to the interaction, when completing the injury section of your MMBD form.

1. *If applicable* – If entangled- Could you see line wrapped around or restricting movement in the entanglement location? How many times was the entangled line wrapped around the animal? Were there multiple wraps remaining after its release? Was the line wrapped tightly or loosely?
2. Did the animal incur any injuries during the course of this interaction.

Please attempt to provide answers to the following questions, as they related to the interaction, when completing the identifying characteristics section of your MMBD form.

1. Describe the color of the animal(s)?
2. Describe capes? patterns? scars? masks? etc?
3. Describe head shape? color? Was a beak present? If so, describe its size?
4. Did the animal have a dorsal fin? What size? shape? Describe relative location on the body?
5. When species is unidentified what species might it have been?

APPENDIX B.4

Detailed Sampling Protocol for Marine Mammal and Sea Turtle Incidental Takes on SWFSC Research Cruises

When marine mammals or sea turtles are incidentally killed during research activities cannot be retained (i.e., frozen or transferred to shore) as much data as possible is to be collected at sea.

Each animal needs to have a unique identifying field number assigned to it and a data sheet created (Figure 1). A procedural outline for processing follows.

1) **Assign a Field ID**: The identification number consists of three parts: 1) letters identifying the platform on which the animal was collected: Bell M Shimada is BMS; Ocean Starr is OS; 2) the date in the format of year, month, day: yymmdd, and 3) a sequential number assigned to each animal as it is processed. For example, the third animal collected by scientists aboard the Bell M Shimada on June 4, 2012 would be BMS120604.03. Attach two tags with cable or zip ties to the animal. Put one around the flukes and flipper of cetaceans, and the hind and fore flippers (of pinnipeds and sea turtles).
2) **Record collection details**: Record the year, month and day of collection along with the lat/long and time of day. Record the name(s) of data recorders as "Collector."
3) **Other data to record**:
    a. **Photos:** Photograph both sides of the animal, the head and genital region. Include a label or tag with the animal's unique Field ID and an object such as a ruler or pen for scale.
    b. **Species Id:** ***Record the species or common name.***
    c. **Total Standard Length**
        i. **Marine mammals:** Measure from tip of upper jaw to fluke notch (cetaceans – Figure 2) or tip of nose to tip of tail (pinnipeds – Figure 3), see diagram on following page. Straight length is preferable to curvilinear. It is assumed length is straight. Please note if it is curvilinear.
        ii. **Sea turtles:**
            1. **Curved carapace length (CCL):** Measure from the nuchal notch of the carapace (where the skin of the neck meets the carapace) to the caudal tip making sure to measure to the longest point. For leatherbacks, pull the tape tight between the middle of the nuchal notch and the tip of the caudal peduncle (pygal), without forcing the tape along the top of the ridge. Record measurement in centimeters (cm).
            2. **Curved carapace width (CCW):** Measure across the widest point of the carapace from one edge to the other for both hard-shelled species and leatherbacks. The exact location will vary amongst species and individuals so be sure to move the tape up and down to find the widest point. Record measurement in centimeters (cm).
            3. **Straight carapace length (SCL):** Use same landmarks as for CCL, but use calipers if available. If unable to use calipers, please estimate straight length as accurately as possible with a measuring tape, either by laying it out next to the turtle or stretching it out above the turtle. Please check the appropriate box for tape or calipers. Record measurement in centimeters (cm).

4. **Straight carapace width (SCW):** Use same landmarks as for CCW, but use calipers if available. If unable to use calipers, please estimate straight width as accurately as possible with a measuring tape by stretching it out above the turtle. Please check the appropriate box for tape or calipers. Record measurement in centimeters (cm).
5. **Total tail length:** On the ventral side, measure the length of the tail from the caudal end of the plastron to the tip of the tail, following the curve of the tail. Record measurement in centimeters (cm).
6. **Cloaca to tail tip:** On the ventral side, measure from the cloacal opening to the tip of the tail. Record measurement in centimeters (cm).

d. **Girth.** Maximum girth is collected for cetaceans (Figure 2) and axillary girth is collected for pinnipeds (Figure 3). If there is no dorsal fin on a cetacean (e.g. northern right whale dolphins) take axillary girth.
e. **Sex**. Photograph genital region. In cetaceans – Figure 2, anus and genital slit are almost continuous in females, but are clearly separate in males. In pinnipeds – Figure 3, two openings between the rear flippers indicates female, one between rear flippers and one on belly indicates male.
f. **Skin** (3 x 0.5 cm is sufficient), frozen in whirlpack or vial. In pinnipeds, skin (not fur) is available at the end of the flippers. For sea turtles, collect 2-6 mm of soft skin tissue from either the neck or hip area.
g. **Blubber** with thin layer of muscle attached, 4 x 4 in, wrapped in foil, frozen. For cetaceans, this is collected from left lateral side just anterior of dorsal fin (where max. girth is taken).
h. **Head** - the head should simply disarticulate once you cut through the blubber, muscle and esophagus. Start cutting one fist length posterior to the blowhole. You do not need to cut through any bone to get the head off.
i. **Flippers** – Collect one front flipper with humerus bone intact and one rear flipper with femur bone intact.

APPENDIX B.4

Figure 1. Data sheet for recording information about each animal.

MARINE MAMMAL and SEA TURTLE SPECIMEN DATA
INCIDENTAL RESEARCH TAKES ONLY

Collection Date:

Collector:

Field ID (ship initials-yymmdd.xx):

Species:

Locality:

Lat/Long:

Sex: Male/Female/Unknown

Marine Mammals:

Length (cm):

Girth (cm):

Sea Turtles:

Straight carapace length (cm):

Straight carapace width (cm):

Curved carapace length (cm):

Curved carapace width (cm):

Brief History: Date of Death:

Time of Death:

ADDITIONAL DATA COLLECTED:	**Yes**	**No**
Photographs:		
Carcass:		
Head:		
Skin:		
Blubber:		

EXTERNAL EXAMINATION: Provide as much detail as possible

General condition (lesions, deformities, appearance, color):

Parasites:
Mouth / Teeth:
Eyes:
Blowhole / Nostrils:
Anus and Urogenital openings:
Mammary slits / glands:
Fins / Flukes / Flippers:

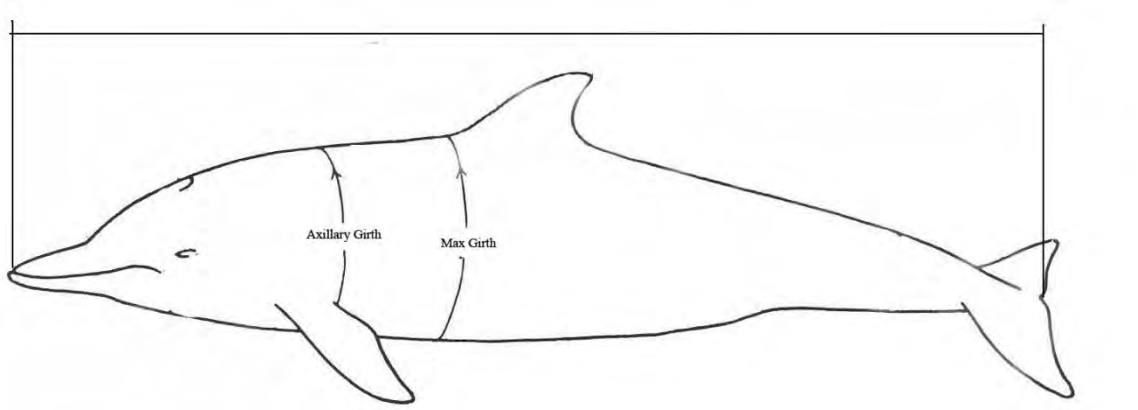
Supplies provided: sampling instructions, data sheets including a fillable pdf, tags, cable ties, body bags.

Questions? For mammals contact Kerri Danil: kerri.danil@noaa.gov, (858) 366-2667, or Susan Chivers: susan.chivers@noaa.gov, (858) 945-0759, and for sea turtles contact Robin LeRoux: robin.leroux@noaa.gov, (619) 840-0693 or Erin LaCasella: erin.lacasella@noaa.gov, (858) 337-9065.

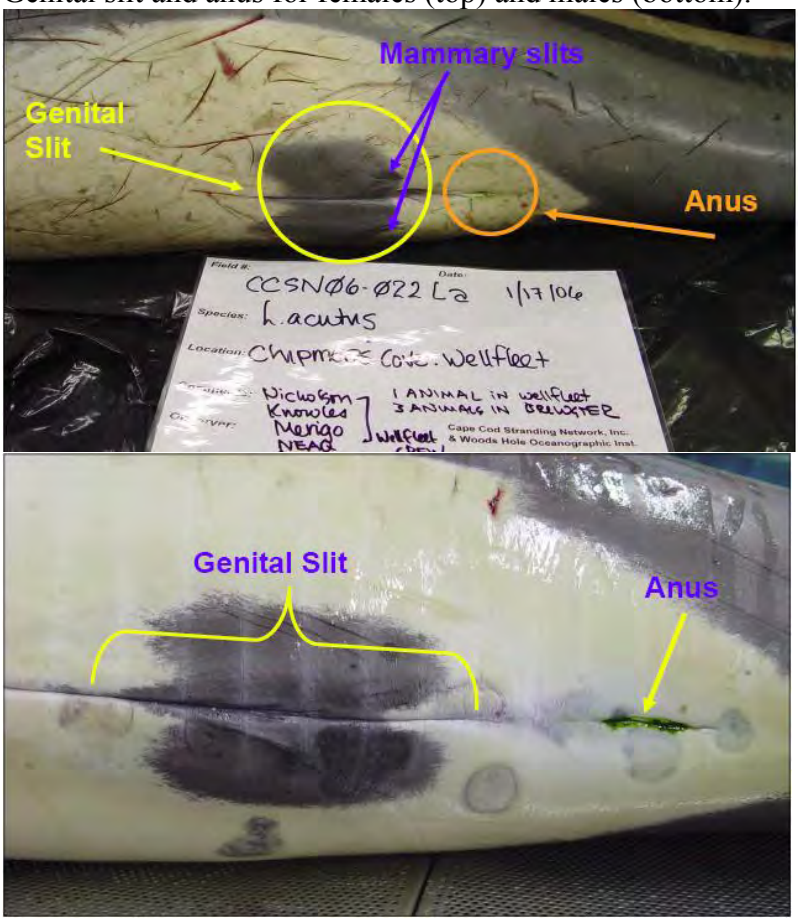
APPENDIX B.4

Figure 2: Cetacean data collection:

a. Standard total length = tip of upper jaw to fluke notch; Locations for axillary and maximum girth measurements are also shown.



b. Genital slit and anus for females (top) and males (bottom).



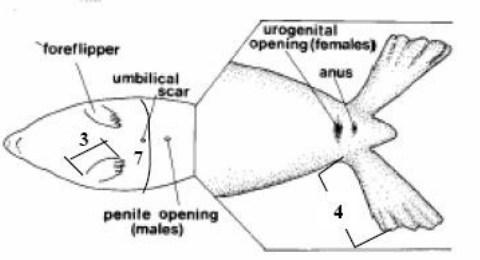
APPENDIX B.4

Figure 3: Pinniped data collection: total body length measurement endpoints, girth measurement location and sex determination quide.

Standard straight length: tip of nose to tip of tail

Curvilinear length: tip of nose to tip of tail (only use if straight length not possible)

Girth measurement



APPENDIX B.4

Figure 4. Sea turtle data collection: curved carapace length (CCL) and curved carapace width (CCW) measurements for hard-shelled and leatherback species, and straight carapace length (SCL) measurement.

APPENDIX B.4

Curved Carapace Width - leatherback

Straight Carapace Length