Final Project Instructions

Date Submitted: February 26, 2015

Platform: NOAA Ship *Bell M. Shimada*

Project Number: SH-15-04 (OMAO), 1504SH (SWFSC)

Project Title: Spring CPS Survey, Fisheries Resources Division

Project Dates: March 28, 2015 to May 1, 2015

Prepared by: _____ Dated: February 26, 2015
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I. Overview

A. Brief Summary and Project Period

Survey the distributions and abundances of pelagic fish stocks, their prey, and their biotic and abiotic environments in the area of the California Current between Cape Mendocino, California and San Diego, California during the period of March 28 to May 1, 2015.

Survey will begin with exploration for sardine eggs two transects north of San Francisco (see map). If eggs are found, and the sardine habitat map indicates favorable potential habitat, transects will be occupied northward as far as Cape Mendocino at the discretion of the Chief Scientist. If no eggs are found, transects will be occupied in the southward direction. The goal is to cover the offshore waters between these two locations by occupying transect lines at 20 mile spacing.

B. Days at Sea (DAS)

Of the 35 DAS scheduled for this project, 34 DAS are funded by a Line Office Allocation according to the Fleet Allocation Plan and 1 DAS is a makeup DAS lost earlier due to a ship repair period extension. This project is estimated to exhibit a high Operational Tempo.

C. Operating Area

The area covered during this survey will be from Cape Mendocino to San Diego and extend approximately 150 nautical miles offshore (please refer to appendices 1.a., 1.b. and 1.c.).

D. Summary of Objectives

Survey the distributions and abundances of pelagic fish stocks, their prey, and their biotic and abiotic environments in the area of the California Current between Cape Mendocino, California and San Diego, California.

The following are specific objectives for the Spring ATM/DEPM (Acoustic Trawl Method/Daily Egg Production Method) CPS Survey.

I.D.1. 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 spawning Pacific sardine.

I.D.2. 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.

I.D.3. 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.

I.D.4. Continuously sample air temperature, barometric pressure, and wind speed and direction using an integrated weather station.

I.D.5. Sample profiles of seawater temperature, salinity, oxygen and chlorophyll-a.

I.D.6. 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.

I.D.7. 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.

I.D.8. Sample profiles of currents using the RDI/Teledyne Acoustic Doppler Current Profiler only when conducting station work (which include side stations). The ADCP will be secured during daytime transiting due to interference with the EK60. It is requested that the ship's survey technician be responsible for ADCP operations.

I.D.9. Sample fish near the surface at nighttime by conducting 2-5 surface trawls at stations (appendix 1.a) or at random sites each night. The data will be used to estimate the reproductive parameters, distributions and demographics of sardine, anchovy and mackerel.

E. Participating Institutions

I.E.1 Southwest Fisheries Science Center (SWFSC)

F. Personnel/Science Party: name, title, gender, affiliation, and nationality

Name (Last, First)	Title	Date Aboard	Date Disembark	Gender	Affiliation	Nationality
David Demer**	Fishery Acoustician	March 28, 2015	March 28, 2015	M	SWFSC	US
Josiah Renfree**	Fishery Acoustician	March 28, 2015	March 28, 2015	M	SWFSC	US
Juan Zwolinski **	Fishery Acoustician	March 28, 2015	March 28, 2015	M	SWFSC	Portugal
David Griffith	Project Leader	March 28, 2015	May 1, 2015	M	SWFSC	US
Bryan Overcash	Fishery Biologist	March 28, 2015	May 1, 2015	M	SWFSC	US
Bev Macewicz	Fishery Biologist	March 28, 2015	May 1, 2015	F	SWFSC	US
Sam McClatchie	Fishery Biologist	March 28, 2015	April 12, 2015	M	SWFSC	US
Heather Colley	Fishery Biologist	March 28, 2015	April 12, 2015	F	Volunteer	US
Megan Human	Fishery Biologist	March 28, 2015	April 12, 2015	F	SWFSC	US
Kevin Stierhoff	Fishery Acoustician	March 28, 2015	April 12, 2015	M	SWFSC	US
Bill Watson	Fishery Biologist	April 15, 2015	May 1, 2015	M	SWFSC	US
Ed Weber	Fishery Biologist	April 15, 2015	May 1, 2015	M	SWFSC	US
Kelsey Gilmore	Fishery Biologist	April 15, 2015	May 1, 2015	F	SWFSC	US
Juan Zwolinski	Fishery Acoustician	April 15, 2015	May 1, 2015	M	SWFSC	Portugal

***Note: Acoustic Calibration staff to be transferred ashore via small boat following completion of calibration efforts.*

G. Administrative

1. Points of Contacts:

Chief Scientist/alternate: Sam McClatchie/ Dave Griffith (858-546-7083/ 858-546-7155); 8901 La Jolla Shores Drive, La Jolla, CA, 92037 (Sam.McClatchie@noaa.gov / Dave.Griffith@noaa.gov)

Project Operation Lead: Sam McClatchie (858-546-7083); 8901 La Jolla Shores Drive, La Jolla, CA, 92037 (Sam.McClatchie@noaa.gov)

Ops Officer: LT Zachary P. Cress (206-427-2374) NOAA Ship Bell M. Shimada (OPS.Bell.Shimada@noaa.gov **)**

2. Diplomatic Clearances

N/A

3. Licenses and Permits

a. CDFW on 11 April, 2013 to NOAA-SWFSC-FRD (SC-12372)

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II. Operations

1) Project Itinerary

Leg I:	March 23: Depart Port Hueneme, CA – Transit
	March 24: Arrive San Francisco, CA.
Leg II:	March 28: Calibration in San Francisco Bay, CA (Drakes Bay?).
	March 28: Depart San Francisco, CA – Spring CPS Survey
	April 12: Arrive San Francisco, CA
Leg III:	April 15: Depart San Francisco, CA – Spring CPS Survey
	May 1: Arrive San Francisco, CA

Staging and De-staging

Staging for the Spring CPS Survey requires two full days. Staging and de-staging will be conducted in San Francisco, CA (pier 30-32).

2) Operations to be Conducted

II.C.1. Underway Operations

II.C.1.a. 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. A backup unit (calibrated and in working order) will also be provided by the vessel and remain aboard during the Project. 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 Project.

II.C.1.b. Acoustics: Calibration of the Simrad EK60 echosounders will be performed at the beginning of the Project (requiring 6-8 hours). The ship will anchor in >25 m depth in Drakes Bay (weather permitting) and calibrate. The exact location will be chosen with considerations given to seabed depth, ship traffic, sea-state, tide, and current. The centerboard will remain in the retracted position. Three motorized down-riggers, two on one side of the vessel and one on the other, will be used to swing a 38.1 mm diameter tungsten carbide sphere beneath the centerboard-mounted transducers.

Throughout the project, the EK60 echosounder will be operated at 18, 38, 70, 120 and 200 kHz and interfaced to a data acquisition system to estimate small pelagic fish and krill biomasses between 10 and 750 m. An EK60 Adaptive Logging program (EAL) will be run continuously to detect the seabed depth and optimize the logging range while avoiding aliased seabed echoes ("false bottoms"). A "Z-mux" multiplexer system will be installed to periodically measure the impedances of each of the EK60 transducers and the concomitant environmental conditions. An FTP program will be used in conjunction with the ship's VSAT system to telemeter all EK60 raw data ashore in quasi-real-time. The instrumented centerboard will be extended to mid-depth (ca. transducers at 7.5 m) and the ship will maintain a speed of 10 knots, 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 Project Leader of any use of the vessel's sounders, as it interferes with the signals received on the EK60s that will be used continuously. The ER60/EK60 display on the bridge must be a video replicate of the ER60 running in the Acoustics Lab. A second instance of the ER60 will conflict with the EAL (EK60 Adaptive Logging program) and cause the ER60/EK60 to crash.

Throughout the cruise, the ME70 multibeam system, configured to collect data to 750 m, will be operated synchronously with the EK60s. In addition, an underway CTD (UCTD) will be deployed approximately three times during the day at

random locations indicated by the Chief Scientist. The UCTD requires a vessel speed less than or equal to 10 kts. The ship's survey technician is needed to assist with the operation and maintenance of this equipment. An underway stereo camera (UCAM), which interfaces with the UCTD, will be deployed opportunistically during the day to sample CPS and other potential acoustic scatterers.

II.C.1.c. ADCP: The ship's ADCP should be activated only on station and be logged to a data acquisition system. Complete system settings will be provided by the oceanographer, but will include 5-minute averaging of currents, AGC and 4 beam returns in 60 8-meter bins. The ADCP will be secured during daytime transits due to interference with the Simrad EK60.

II.C.1.d. CUFES: The egg pump will be mounted inside the ship's hull drawing water from a depth of three meters. During both legs, 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 60 minutes. If two consecutive samples have a concentration of Pacific sardine eggs equal to or greater than 1 egg per minute, the ship will stop to conduct a Pairovet tow. Pairovet tows will continue at four mile intervals until a concentration of less than one egg per minute is observed in two consecutive samples.

It is requested that, prior to departure on March 28 that the CUFES intake be cleared from all marine growth.

It is requested that prior to departure on March 28 that sections of the hull and transducer faces are cleaned of all barnacles or any other bio-fouling that will hinder the calibration operations.

II.C.2. Station Operations

Each standard daytime station will include the following:

II.C.2.a. CTD/Rosette will be lowered to approximately 200 meters (depth permitting) at each station to measure physical parameters at discrete depths for: temperature, salinity, oxygen, and chlorophyll.

Please have the ST record CTD deployed and CTD recovered for SCS.

II.C.2.b. CalBOBL (CalCOFI Bongo Oblique): 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. The port side sample will be preserved in buffered ethanol at every station. An additional bongo tow will be taken at night in conjunction with the trawling operations whether the ship is occupying a station or not. Samples in the first CalBOBL net will be analyzed for krill species and their lengths, and preserved in ethanol. The acoustician may require assistance from one member of the trawl team.

Please have the ST record bongo deployed and bongo recovered for SCS.

II.C.2.c. Pairovet net: will be fished from 70 meters to the surface (depth permitting) using paired 25 cm diameter 150 μm mesh nets at all stations. 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.

Please have the ST record Pairovet deployed and Pairovet recovered for SCS.

II.C.2.d. Weather observations.

II.C.3.a. Operations for each standard night station:

1) Two to five surface tows 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.

2) Pairovet net tow.

3) Bongo net tow.

It is requested that the Officer on Watch note the locations and times when the acoustic data collection starts and stops each day. After the last trawl of each night, 30 minutes prior to sunrise, the ship will return to the exact location where the acoustic sampling stopped the previous day, and resume acoustic sampling.

There will be two to five trawls per night. The first set will be approximately one hour after sunset. Trawls may or may not occur on predetermined stations. Trawl spacing will be determined based on sardine egg density, the acoustic backscatter observed during daytime, and other factors.

II.C.4.a. Plankton Nets, Oceanographic Sampling Devices, Video Camera and ROV Deployments: The SWFSC deploys a wide variety of gear to sample the marine environment during all of their research Projects. These types of gear are not considered to pose any risk to protected species and are therefore not subject to specific mitigation measures. However, the OOD and crew monitor for any unusual circumstances that may arise at a sampling site and use their professional judgment and discretion to avoid any potential risks to protected species during deployment of all research equipment.

II.C.4.b. For the nighttime trawl operations, 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., long-lines 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 long-line 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. A forward-facing camera and lights may be installed aft of the MMED to observe the behavior or fishes, contingent on the presence of CPS.

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, 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.

II.C.4.c. Standard tow durations have been reduced to 30 minutes or less at targeted depth, excluding deployment and retrieval time, to reduce the likelihood of attracting and incidentally taking protected species. These short tow durations decrease the opportunity for curious marine mammals to find the vessel and investigate. The resulting tow distances are typically 1 to 2 nautical miles, depending on the survey and trawl speed. Additionally, short tow times reduce the likelihood that captured sea turtles would drown.

II.C.4.d. Vessel speeds are restricted on research Projects in part to reduce the risk of ship strikes with marine mammals. Transit speeds vary from 8-12 knots, but average 10 knots. The vessel's speed during active sampling is typically 3.5-4.5 knots due to sampling design. Thus, these much slower speeds essentially eliminate the risk of ship strikes.

D. Dive Plan

N/A

E. Applicable Restrictions

Conditions which preclude normal operations:

In the event of poor weather conditions, we will work with the ship's officers on developing the best strategy for completion of all stations safely.

We have replacement gear for most operations. Equipment failure should not impact our project.

III. Equipment

A. Equipment and Capabilities provided by the ship (itemized)

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 winch with 0.375" cable for standard Bongo and Pairovet tows

J-frame w/blocks to accommodate 0.375" cable

Port and starboard trawl winches with 1.125" diameter mechanical cable

Stern gantry with blocks to accommodate 1.125” cable

Access to the trawl ramp

Winch monitoring system

Knudsen 12 kHz depth recorder or comparable

Acoustic Doppler Current Profiler

EK60 Echosounders with transducers (ES18-11, ES38B, ES70-7C, ES120-7C, ES200-7C).

Very Small Aperture Terminal (VSAT) high-bandwidth satellite communication system

SBE911+ with calibrated temperature, conductivity, oxygen and fluorometer sensors

Pump, collector and concentrator unit for CUFES water sampling.

Scientific Computing System (SCS)

ME70 multibeam system

-80^{o}C Freezer

Calibration apparatus including motorized downriggers, control box, and standard spheres

B. Equipment and Capabilities provided by the scientists (with counts and approximate total weight)

30 cc and 50 cc syringes (SWFSC)

Canulas (SWFSC)

(34) Pint, (15) quart, (5) gallon, (32) 4 oz., and (9) 8 oz. jar cases (SWFSC) (350 lbs.)

(6) Cases of scintillation vials (SWFSC) (120 lbs.)

Inside and outside labels (SWFSC)

CalCOFI net tow data sheets (SWFSC)

(2) 71 cm CalCOFI Bongo frames (SWFSC) (40 lbs.)

(6) 71 cm CalCOFI 505 μm mesh nets (SWFSC) (10 lbs.)

(4) CalCOFI 150 μm Pairovet nets and codends (SWFSC) (5 lbs.)

(2) CalCOFI Pairovet frames (SWFSC) (10 lbs.)

(12) 333 μm mesh codends (SWFSC)(2 lbs.)

(6) Digital flowmeters (SWFSC) (10 lbs.)

(2) 75 lb Bongo weight (SWFSC)

(1) 100 lb hydro weight (SWFSC)

(2) Standard CalCOFI tool boxes (SWFSC) (50 lbs.)

Bucket thermometers and holders (SIO)

Hand held inclinometer for Pairovet and Bongo tows (SWFSC)

Weather observation sheets (SWFSC)

(1) EK60 calibration apparatus (SWFSC) (75 lbs.)

(2) Dissecting microscopes (SWFSC) (50 lbs. w/case)

(2) NETS Nordic 264 midwater trawl (SWFSC) (4000 lbs.)

(2) NETS 3.0 m X Lite trawl doors (SWFSC) (2400 lbs.)

(2) Trawl rigging (SWFSC) (1000 lbs.)

(4) Fish measuring boards (SWFSC) (20 lbs.)

(4) Motion compensated scales (SWFSC) (100 lbs.)

(2) Go-Pro trawl camera systems (SWFSC) (60 lbs.)

(1) Z-Mux impedance-measuring transducer-multiplexer system (SWFSC) (20 lbs.)

(2) Laptop computer running Matlab / EAL EK60 Adaptive Logging software (SWFSC) (10 lbs.)

(2) Underway CTD – 2 probes, 1 winch (UCTD, SWFSC) (80 lbs.)

(3) Underway stereo camera (UCAM, SWFSC) (60 lbs.)

(3) Experimental incubation bath systems (SWFSC) (200 lbs.)

(12) Shipping containers (fish bins) (SWFSC) (1200 lbs.)

IV. Hazardous Materials

A. Policy and Compliance

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

Per OMAO procedures, the scientific party will include with their project instructions and provide to the CO of the respective ship 30 days before departure:

- List of chemicals by name with anticipated quantity
- List of spill response materials, including neutralizing agents, buffers, and absorbents
- Chemical safety and spill response procedures, such as excerpts of the program's Chemical Hygiene Plan or SOPs relevant for shipboard laboratories
- For bulk quantities of chemicals in excess of 50 gallons total or in containers larger than 10 gallons each, notify ship's Operations Officer regarding quantity, packaging and chemical to verify safe stowage is available as soon as chemical quantities are known.

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

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

Upon departure from the ship, scientific parties will provide the CO or their designee an inventory showing that all chemicals were removed from the vessel. The CO's designee

will maintain a log to track scientific party hazardous materials. MSDS will be made available to the ship's complement, in compliance with Hazard Communication Laws.

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

B. Inventory

Common Name of Material	**Qty**	**Notes**	**Trained Individuals**	**Spill control**
Ethyl alcohol (95%)	20 gallons(in 5 gallon cans)	UN1170, Waste contained and disposed of by SIO at end of project, Stored in preservation alcove and cabinet under fume hood	Dave Griffith	F
Buffered Ethyl alcohol (95%)	20 L (in 20 ml vials)	No waste. Stored in Chem lab	Dave Griffith	F
Buffered formalin (10%)	20 gallons in 4 oz. and 8 oz. jars.	Stored in wet lab, no waste	Dave Griffith	F
Formaldehyde solution (37%)	5 gallons	No waste, Stored in preservation alcove fume hood	Dave Griffith	F
Tris buffer	500ml	Stored in Chem lab	Dave Griffith	F
Sodium borate powder	500gr	Stored in Chem lab	Dave Griffith	F

C. Chemical safety and spill response procedures

A: ACID/Bases

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

F: Formalin/Formaldehyde/Ethanol/Acetone

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

Inventory of Spill Kit supplies

Product Name	Amount	Chemicals it is useful against	Amount it can clean up
Chemical Spill pads	100	Formaldehyde, Alcohols	29 gallons
Formaldehyde Eater	5 gal	Formaldehyde	10 gallons

D. Radioactive Materials

No Radioactive Isotopes are planned for this project.

V. Additional Projects

A. Supplementary ("Piggyback") Projects

V.A.1. If time permits, the SWFSC's fishery acousticians will test recently constructed submersible video cameras to be placed on the interior surface of the Nordic 264 trawl. The cameras will be placed in order to watch fish behavior as well as to determine effects and efficiency of the marine mammal excluder device.

V.A.2. Shipboard egg rearing experiment(s): SWFSC would like to try using sardine eggs incubated in a series of fixed temperature baths to determine temperature-dependent development rates. This will be an opportunistic experiment that will depend on getting one or more ripe male and female sardines from a trawl sample to obtain fertilized eggs of known age to rear in 3 temperature treatments. This experiment will run approximately 5-7 days and will require sampling of 2-3 eggs per treatment at 1-2 hour intervals through hatching (~2-4 days) and sampling 1-2 larvae once or twice daily after that through yolk absorption. It is desired that this project be configured in the constant environment room or the hydro lab (garage).

V.A.3. If time permits, 50 euphausiids will be removed from the port side of each nighttime bongo sample, identified, measured, and returned to the sample.

B. NOAA Fleet Ancillary Projects

No NOAA Fleet Ancillary Project are planned.

VI. 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.

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

Chief Scientist will be released to him, including supplementary data specimens and photos gathered by the scientific crew.

VII. 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.

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.

VIII. Miscellaneous

A. Meals and Berthing

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

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

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

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

B. Medical Forms and Emergency Contacts

The NOAA Health Services Questionnaire (NHSQ, Revised: 02 JAN 2012) must be completed in advance by each participating scientist. The NHSQ can be obtained from the Chief Scientist or the NOAA website http://www.corporateservices.noaa.gov/~noaaforms/eforms/nf57-10-01.pdf.

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).

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

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.

C. 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.

D. Communications

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

E. IT Security

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

(1) Installation of the latest virus definition (.DAT) file on all systems and performance of a virus scan on each system.

(2) Installation of the latest critical operating system security patches.
(3) No external public Internet Service Provider (ISP) connections.

Completion of 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.

F. Foreign National Guests Access to OMAO Facilities and Platforms

All foreign national access to the vessel shall be in accordance with NAO 207-12 and RADM De Bow's March 16, 2006 memo (http://deemedexports.noaa.gov). National Marine Fisheries Service personnel will use the Foreign National Registration System (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 NMFS Deemed Exports point of contact to assist with the process.

Full compliance with NAO 207-12 is required.

Responsibilities of the Chief Scientist:

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

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

Responsibilities of the Commanding Officer:

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

Responsibilities of the Foreign National Sponsor:

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

Appendix 1.a. Requested track lines for 1504SH.

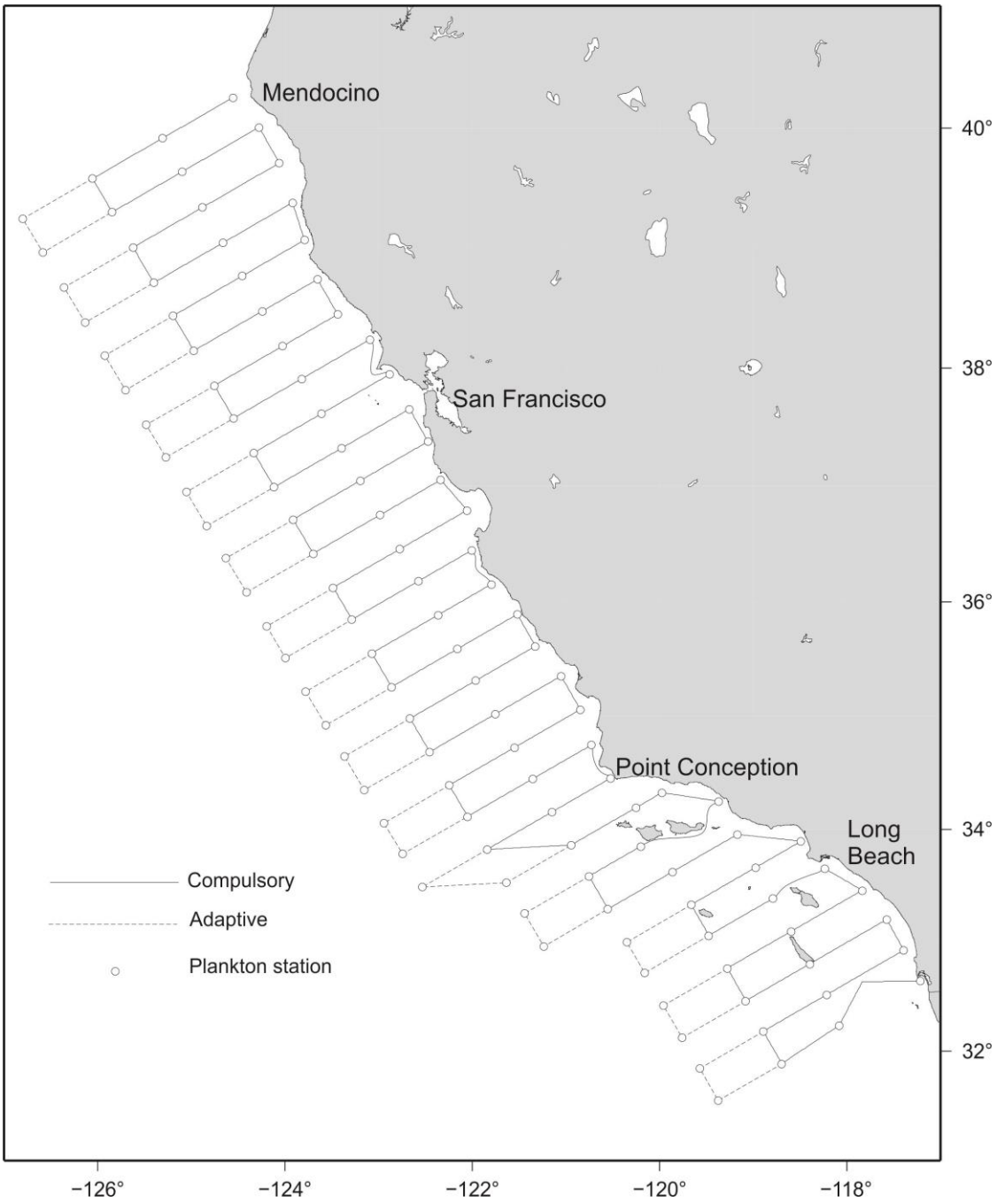

Figure 1: Survey will begin with exploration for sardine eggs two transects north of San Francisco. If eggs are found, and the sardine habitat map indicates favorable potential habitat, transects will be occupied northward as far as Cape Mendocino at the discretion of the Chief Scientist. If no sardine eggs are found, transects will be occupied in the southward direction.

Appendix 1.b. Compulsory Station List (coordinates in decimal Latitude and Longitude).

Schedule_Order	Line	Station	Dlatitude	Dlongitude
1	46.7	50	40.25106252	124.5556347
2	46.7	60	39.91772919	125.3072581
3	46.7	70	39.58439586	126.0552027
4	48.3	70	39.30726773	125.8448289
5	48.3	60	39.64060106	125.0998965
6	48.3	49	40.00726773	124.2762779
7	50	49	39.71281909	124.0604037
8	50	60	39.34615242	124.8804905
9	50	70	39.01281909	125.6222677
10	51.7	70	38.71837045	125.4006823
11	51.7	60	39.05170379	124.6620145
12	51.7	50	39.38503712	123.9198232
13	53.3	51	39.07457566	123.7920533
14	53.3	60	38.77457566	124.4572273
15	53.3	70	38.44124232	125.19301
16	55	70	38.14679369	124.9732783
17	55	60	38.48012702	124.2405181
18	55	52	38.74679369	123.6518467
19	56.7	52	38.45234505	123.4384468
20	56.7	60	38.18567838	124.0246996
21	56.7	70	37.85234505	124.7544813
22	58.3	70	37.57521692	124.5493962
23	58.3	60	37.90855025	123.8223785
24	58.3	50	38.24188359	123.0920316
25	60	50	37.94743495	122.8808493
26	60	60	37.61410162	123.6082525
27	60	70	37.28076828	124.3323747
28	61.7	70	36.98631964	124.1162485
29	61.7	60	37.31965298	123.39498
30	61.7	50	37.65298631	122.6704778
31	63.3	50	37.37585818	122.4732114
32	63.3	60	37.04252485	123.1950214
33	63.3	70	36.70919152	123.9136417
34	65	70	36.41474288	123.6992164
35	65	60	36.74807621	122.9833704
36	65	51	37.04807621	122.3364227
37	66.7	50	36.78696091	122.0563271

38	66.7	60	36.45362757	122.7725371
39	66.7	70	36.12029424	123.4856487
40	68.3	70	35.84316611	123.2854163
41	68.3	60	36.17649944	122.5748422
42	68.3	52	36.44316611	122.0041847
43	70	52	36.14871747	121.7970636
44	70	60	35.88205081	122.3655627
45	70	70	35.54871747	123.0734784
46	71.7	70	35.25426884	122.8623623
47	71.7	60	35.58760217	122.1570666
48	71.7	51	35.88760217	121.5197635
49	73.3	51	35.61047404	121.3264603
50	73.3	60	35.31047404	121.9615407
51	73.3	70	34.97714071	122.6644048
52	75	70	34.68269207	122.4548503
53	75	60	35.0160254	121.7545336
54	75	50	35.34935874	121.0513303
55	76.7	50	35.0549101	120.8476262
56	76.7	60	34.72157677	121.5482772
57	76.7	70	34.38824343	122.2460832
58	78.3	70	34.1111153	122.0503058
59	78.3	60	34.44444864	121.3548297
60	78.3	51	34.74444864	120.7265031
61	80	51	34.45	120.5239048
62	80	60	34.15	121.15
63	80	70	33.81666667	121.8430351
64	81.7	60	33.85555136	120.9458897
65	81.7	50	34.1888847	120.2525343
66	81.7	46	34.32221803	119.9744187
67	83.3	40	34.2450899	119.3695284
68	83.3	52	33.8450899	120.2017824
69	83.3	60	33.57842323	120.7544339
70	85	60	33.2839746	120.5516906
71	85	50	33.61730793	119.8629824
72	85	40	33.95064126	119.1715799
73	86.7	33	33.88952596	118.4903339
74	86.7	40	33.65619263	118.9742516
75	86.7	50	33.32285929	119.6632718
76	88.3	50	33.04573116	119.4758988

77	88.3	40	33.3790645	118.7890892
78	88.3	32	33.64573116	118.2377265
79	90	29	33.45128253	117.8369634
80	90	40	33.08461586	118.5929391
81	90	50	32.75128253	119.2774328
82	91.7	50	32.45683389	119.0795942
83	91.7	40	32.79016722	118.397383
84	91.7	28	33.19016722	117.5753117
85	93.3	28	32.91303909	117.3943818
86	93.3	40	32.51303909	118.2138649
87	93.3	50	32.17970576	118.8939582
88	95	50	31.88525712	118.6973116
89	94.8	40.6	32.23323147	118.0830399
90	93.6	35	32.62774424	117.8387112
91	94.9	28	32.63591096	117.213928

Appendix 1.c. Adaptive Station List

Line	Station	Dlatitude	Dlongitude
46.7	80	39.25106252	126.7995293
48.3	80	38.97393439	126.5861929
50	80	38.67948576	126.3605283
51.7	80	38.38503712	126.1358846
53.3	80	38.10790899	125.9253744
55	80	37.81346035	125.7026699
56.7	80	37.51901171	125.480943
58.3	80	37.24188359	125.2731391
60	80	36.94743495	125.0532694
61.7	80	36.65298631	124.834336
63.3	80	36.37585818	124.6291242
65	80	36.08140954	124.4119698
66.7	80	35.78696091	124.1957124
68.3	80	35.50983278	123.9929838
70	80	35.21538414	123.7784308
71.7	80	34.9209355	123.5647372

73.3	80	34.64380737	123.3643879
75	80	34.34935874	123.1523275
76.7	80	34.0549101	122.9410906
78.3	80	33.77778197	122.7430212
80	80	33.48333333	122.5333494
81.7	70	33.52221803	121.6365191
83.3	70	33.2450899	121.4428307
85	70	32.95064126	121.2377486
86.7	60	32.98952596	120.3496367
88.3	60	32.71239783	120.1600892
90	60	32.41794919	119.9593451
91.7	60	32.12350056	119.7592614
93.3	60	31.84637243	119.5715421
95	60	31.55192379	119.3727132