UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Alaska Fisheries Science Center
RACE Division
7600 Sand Point Way N.E.
Seattle, Washington 98115-6349

Project Instructions

Date Submitted: July 6, 2017

Platform: NOAA Ship *Oscar Dyson*

Project Number: DY-17-07

Project Title: EMA/FOCI Age-0 Groundfish and Salmon Recruitment Processes

Project Dates: August 19 to September 1, 2017 (Leg 1)
September 4 to 17, 2017 (Leg 2)

Prepared by: _____ Dated: July 6, 2017
Matt Wilson
Chief Scientist
AFSC/RACE Division

Approved by: _____ Dated: 7/6/17
Dr. Jeffrey M. Napp
Division Director
AFSC/RACE Division

Approved by: _____ Dated: 7/6/17
Dr. Douglas P. DeMaster
Science and Research Director
Alaska Fisheries Science Center

Approved by: _____ Dated: _____
Digitally signed by ROBERTS.KEITH.W.1042165537
Date: 2017.07.20 16:30:58 -07'00'
CAPT Keith Roberts, NOAA
Commanding Officer
Marine Operations Center – Pacific

I. Overview

A. Brief Summary and Project Period

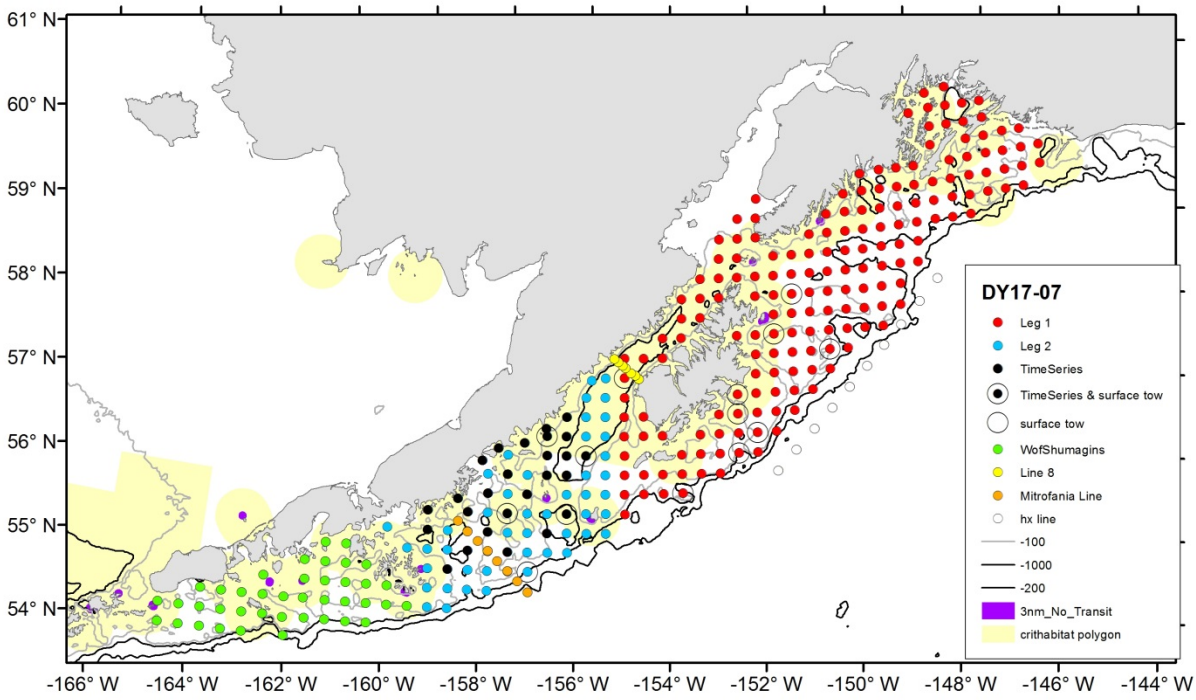
EMA-EcoFOCI Juvenile Walleye Pollock and Forage Fish Survey August 19 to September 17, 2017

B. Days at Sea (DAS)

Of the 28 DAS scheduled for this project, 28 DAS are funded by an OMAO allocation, 0 DAS are funded by a Line Office Allocation, 0 DAS are Program Funded, and 0 DAS are Other Agency funded. This project is estimated to exhibit a High Operational Tempo.

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

Gulf of Alaska – grid locations and CTD transects (see Appendix 1 for coordinates and operations).



D. Summary of Objectives

Fisheries (midwater trawl) and oceanographic survey to:
1. Extend time series of abundance of age-0 Walleye Pollock and other select forage

fishes in the western Gulf of Alaska;
2. Collect zooplankton and measure environmental variables that potentially affect the ecology of these fishes;
3. Trial surface trawling for age-0 juvenile Sablefish; and
4. Conduct CTD casts and water sampling at stations along two transects to examine the physical, chemical, and biological oceanography associated with cross-shelf flow.
5. Conduct underway seabird observations.

E. Participating Institutions

NOAA – Alaska Fisheries Science Center (AFSC), Resource Assessment and Conservation Engineering (RACE) Division
7600 Sand Point Way N.E., Seattle, Washington 98115-0070

NOAA – Pacific Marine Environmental Laboratory (PMEL)
7600 Sand Point Way N.E., Seattle, Washington 98115-0070

NOAA – Alaska Fisheries Science Center (AFSC), Ecosystem Monitoring and Assessment (EMA) Division
17109 Point Lena Loop Road, Juneau, AK, 99801

Prince William Sound Science Center (PWS Sci. Ctr.)
PO Box 705, Cordova, Alaska 99574

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

Name (Last, First)	**Title**	**Date Aboard**	**Date Disembark**	**Gender**	**Affiliation**	**Nationality**
Leg 1						
Wilson, Matt	Chief Sci.	Aug. 17	Sept. 1	M	AFSC/RACE	USA
Brogan, John	Sci.	Aug. 17	Sept. 1	M	AFSC/REFM	USA
Deary, Alison	Sci.	Aug. 17	Sept. 1	F	AFSC/RACE	USA
Fugate, Corey	Sci.	Aug. 17	Sept. 1	M	AFSC/RECA	USA
Lamb, Jesse	Sci.	Aug. 17	Sept. 1	M	AFSC/RACE	USA
Miller, Todd	Sci.	Aug. 17	Sept. 1	M	AFSC/RECA	USA
Dice, Amanda	TAS	Aug. 17	Sept. 1	F	Teacher at Sea	USA
Stocking, Jessica	Bird Obs	Aug. 17	Sept. 1	F	PWS Sci. Ctr.	USA
Leg 2						
Porter, Steve	Chief Sci.	Sept. 2	Sept. 17	M	AFSC/RACE	USA
Dougherty, Annette	Sci.	Sept. 2	Sept. 17	F	AFSC/RACE	USA
Harpold, Colleen	Sci.	Sept. 2	Sept. 17	F	AFSC/RACE	USA
Moss, Jamal	Sci.	Sept. 2	Sept. 17	M	AFSC/EMA	USA
Paquin, Melanie	Sci.	Sept. 2	Sept. 17	F	AFSC/RACE	USA
Rogers, Lauren	Sci.	Sept. 2	Sept. 17	F	AFSC/RACE	USA
Stocking, Jessica	Bird Obs	Aug. 17	Sept. 1	F	PWS Sci. Ctr.	USA
Strausz, David	Sci.	Sept. 2	Sept. 17	M	AFSC/PMEL	USA

Smallwood, Jennifer	TAS	Sept. 2	Sept. 17	F	Teacher at Sea	USA

G. Administrative

1. Points of Contact:

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7600 Sand Point Way NE, Bldg 4
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Phyllis Stabeno, PMEL, Eco-FOCI Supervisor
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Ed Farley, AFSC, EMA Supervisor
TSMRI / 17109 Point Lena Loop Road
Juneau, AK, 99801
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LT Aras Zygas, Operations Officer *Oscar Dyson*
Ph: (VOIP) 541-867-8911, ops.oscar.dyson@noaa.gov

2. Diplomatic Clearances

None Required.

3. Licenses and Permits

This project will be conducted under the Scientific Research Permit (U.S.) #2017-B1 issued on January 4, 2017 to Douglas P. DeMaster.

II. Operations

The Chief Scientist is responsible for ensuring the scientific staff are trained in planned operations and are knowledgeable of project objectives and priorities. The Commanding Officer is responsible for ensuring all operations conform to the ship's accepted practices and procedures.

A. Project Itinerary:

Leg 1
Depart: August 19, 2017 Kodiak, AK
Arrive: September 1, 2017 Kodiak, AK

Leg 2
Depart: September 4, 2017 Kodiak, AK
Arrive: September 17, 2017 Dutch Harbor, AK

B. Staging and Destaging:

The equipment and supplies necessary for the project will be 1) stored in the Kodiak Pier 2 warehouse from the prior EMA-FOCI Larval Groundfish Assessment survey and 2) shipped to Kodiak from Seattle for loading onto NOAA Ship *Oscar Dyson* prior to departure from Kodiak on August 19, 2017. We request ship's assistance with loading on August 18, 2017, including access to the Pier 2 warehouse, a forklift and forklift operator, and use of the ship's crane and a crane operator. We will require dedicated use of the chemistry, hydrographic, wet, dry, and fish processing labs for sample and equipment preparation and request as much counter and cabinet space as possible. We will use the Dry lab for FastCat/SeaCat operations. Gear, unused supplies, and samples collected will remain on board *Oscar Dyson* because much of the gear and remaining supplies will be used during project DY-17-08, and for transport south for offloading near Seattle pending approval from the Commanding Officer.

C. Operations to be Conducted:

Preparation for all project scientific operations will be made prior to project beginning:

1) load one net reel with a Stauffer trawl, load the other net reel with the other Stauffer trawl that has additional floats for surface trawling,
2) hang the 5x7 trawl doors (steel-v, 1250 lbs each),
3) setup bongo/FastCat array,
4) make ready the CTD/rosette,
5) ensure -80 °C and walk-in freezers are working and available, and
5) setup all relevant labs and electronic/computer systems.

The Navigation Officer and Chief Scientist will determine the specific grid location at which to commence station operations. Operations for this project will be conducted 24/7. The project will begin upon departure from Kodiak, Alaska on August 19, 2017.

Please advise the science party if 2 survey technicians will **NOT** be available for the project.

1. **Underway Operations** –

Scientific Computer System (SCS) shall operate throughout the project, acquiring and logging data from navigation, meteorological, and oceanographic sensors. See FOCI Standard Operating Instructions (**SOI 5.2** and **SOI 5.3**) for specific requirements.

Scientific echo-sounder (EK60) shall operate throughout the project to collect acoustic data from multiple transducers (e.g., 18, 38, 120, and 200 kHz). We request that Survey Department monitor and adjust the system as needed.

We request that the centerboard be LOWERED for the duration of the project.

The seabird observer will conduct visual surveys from the inside bridge, typically on the port side. She will require a space at a forward facing window with a good view of the bow and 90 degrees from the ship's beam. We require a small ledge for a laptop computer, with a cable feed from the ship's GPS, and a power source (with extension if necessary; we can bring extra extension cord). The observer will mostly be standing, but a small stool is useful for long transits. The observer may want to go outside to confirm species ID or to take photos for later confirmation. If glare is precluding surveying from the port side, the observer may request to set up on the starboard side of the bridge, and has a handheld GPS unit to use if necessary (it does not always work well from inside the bridge of some ships).

The observer will conduct surveys while the ship is underway and visibility is good (during daylight, seas < 6 Beaufort scale, weather and wind dependent). When not conducting surveys, the observer will need to edit the data, enter notes, and take breaks, thus will not be available for other duties. She is available to answer questions and will notify the crew if she observes marine mammals or ESA listed birds in the path of the ship.

This year we have multiple reports of observations of dead birds at sea. If high numbers of dead birds are encountered (> 3 in a given day), we request that a few carcasses (at minimum) be retrieved if possible, and frozen for later diagnostic examinations and testing for toxins or disease.

2. **Station Operations** –

Juvenile Walleye Pollock and Forage Fish/Zooplankton Survey: A bongo/FastCat array and a Stauffer trawl will be deployed in succession at each grid location. These will

mostly be used to sample the upper 200 m, but at 14 sites the Stauffer trawl will also be trialed for surface trawling. At 6 sites, a CTD cast will be conducted to confirm proper FastCat operation.

The tentative order of station occupation (see Operating Area – Gulf of Alaska) will be determined daily in consultation with ship's personnel. This order will likely change to increase overall sampling efficiency, but is expected to generally adhere to the following.

- Leg 1 (Aug 19- Sep 1) will focus on sampling the eastern part ("**Leg 1**" stations) of the study area;
- Leg 2 (Sep 4-17) will focus on sampling the western part of the study area ("**Leg 2**", "**TimeSeries**" & "**WofShumagins**" stations).

Bongo/FastCat Array

The standard gear for zooplankton/ichthyoplankton sampling will be the bongo/FastCat array (SOI 3.2.2). Both the 60-cm and 20-cm bongo nets will be used. The 60-cm bongo nets will be 0.505-mm mesh. The 20-cm bongo nets will be 0.153-mm mesh. A FastCat will be mounted above the bongo to provide depth, temperature, and salinity data. Tows will be to 200 meters or 10 meters off the bottom where water depth is shallower.

Two SCS buttons are required:

1) Surface (in/out),
2) EQ

Marks to the SCS will be made in the Survey Office (Dry Lab) by a scientist on-watch who will be monitoring the FastCat operation throughout the station occupation. The processing of FastCat files and CTD files will be the responsibility of the scientific personnel on watch.

The samples collected from the 20-cm and 60-cm bongos will be processed in the following manner. For each, Net 1 will be preserved in 1.8% formaldehyde, buffered with sodium borate, and boxed. Net 2 from each bongo will be used for rapid zooplankton assessment and then discarded.

Stauffer trawl

Prior to and during trawling operations, a scientist will be on the Bridge to fill out the FOCI Trawl Haul Form, coordinate with the Fishing Officer on when to call events (doors out, EQ, haulback, doors in), and to record events in SCS and CLAMS.

Four SCS buttons are required:

1) Doors out,
2) EQ,
3) Haulback (which is only necessary on surface tows)

4) Doors in

For oblique tows, the Stauffer trawl will be deployed to a headrope depth of 200 meters, or to a footrope depth of 10 meters off the bottom, whichever is shallowest. Net depth will be monitored using the ship's Simrad ITI (trawl eye), FURUNO, or 3rd-wire systems, whichever is deemed most suitable. Standard trawl operations will be used for deployment. Once equilibrium is achieved, as determined by the fishing officer or scientist, ***the trawl will be retrieved at a wire rate of about 10 meters per minute***. Ship speed during retrieval is typically 2.5-3 kts.

For surface tows, one Stauffer trawl will be equipped with additional, detachable floatation to test its use for sampling age-0 Sablefish, which are thought to dwell near the sea surface. We anticipate a towing speed of 2.5-3 kts with initial tow duration between EQ and haulback of 10 minutes. The amount of wire out will be determined in consultation with the Fishing Officer.

See SOI 3.2.8 for additional trawling instructions, but for catch processing see Appendix 2.

CTD

A CTD cast (SOI 3.2.1) will be conducted at each of 3 locations corresponding approximately with the start, midpoint, and end of each leg. Because these casts are only to verify FastCat performance, the maximum depth should correspond approximately with the intended bongo/FastCat array depth, and no bottles or sensors other than conductivity, temperature, and depth are needed. The CTD will be the first operation at the chosen locations. These are NOT part of the CTD Transects.

CTD Transects: These transects will be occupied weather and time permitting, and Niskin bottles will be needed to collect water samples (SOI 3.2.1).

"Line 8" transect

All 7 Line-8 sites will be sampled: Fox 56, 57, 58, 59, 60, 61, and 55 following Line-8 protocol (SOI 3.2.1); however, only nutrient and phytoplankton samples will be collected. The phytoplankton samples are requested by J. Gann (see Special Sample Requests).

"Mitrofania Line" transect

All hydrographic casts include high-resolution vertical profiling of water properties (including temperature, salinity, chlorophyll fluorescence, PAR, dissolved O_2) to within 10 m of the bottom using a Seabird 911Plus CTD.

Samples to be collected along the Mitrofania Line include:

1. Oxygen samples will be collected at only one site to calibrate the CTD oxygen sensors. At that site, collect a sample at the surface and at 10m off bottom. Samples will be preserved with 1 ml solutions of MnCl2 and sodium hydroxide (8 M) / sodium iodide (4 M), and stored on board for titration during the survey.

2. Nutrient samples will be collected at all sites. At each site, collect a sample at 0, 10, 20, 30, 40, 50, 75, 100m depth, and at 10m off bottom. These samples will be frozen at –80C for analysis at a later date at the NOAA laboratories in Seattle.

3. Phytoplankton samples requested by J. Gann will be preserved with buffered formalin for later taxonomic analysis at NOAA Auke Bay laboratories (see Special Sample Requests).

Special Sample Requests:

1) Ron Heintz (AFSC/RECA, Juneau) requests a small sample of age-0 walleye pollock, Pacific cod, arrowtooth flounder, sablefish, and rockfish. Freeze all juvenile rockfish and 5 of each remaining species for subsequent determination of energy content. Bag individuals by species and station-haul, and label accordingly.

2) Jeanette Gann (AFSC/EMA, Juneau) requests phytoplankton samples for ID and enumeration. These data will be used to compare onshore-offshore differences in phytoplankton taxa as well as to compare eastern and western GOA phytoplankton community differences.

For detailed instructions, see Appendix 3.

D. Dive Plan

All dives are to be conducted in accordance with the requirements and regulations of the NOAA Diving Program (http://www.ndc.noaa.gov/dr.html) and require the approval of the ship's Commanding Officer.

Dives are not planned for this project.

E. Applicable Restrictions

Conditions that could preclude normal operations: poor weather and equipment failure. Poor weather would be waited out in a sheltered area until operations could be resumed and modifications would be made to the sampling grid. Sheltered areas are of scientific interest; therefore, while waiting out poor weather, the Chief Scientist may request sampling operations to assess local physical conditions, zooplankton, and fish populations. Equipment failure would

have to be addressed immediately for the project to continue.

III. Equipment

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

1. Acoustic Equipment
    - GPS with NEMA 183 to ER60 (2)
    - 50/200 kHz ES60 Bridge sounder
    - Furuno FE-700 fathometer
    - Acoustic echosounders (5)
2. Trawling Equipment
    - 3rd wire FS-70 net sonar with winch and accessories (2) [Stauffer and shrimp trawls have been equipped to hold the sonar]
    - Simrad ITI net mensuration system (2)
    - Furuno CN24-40 headrope transducer
    - Stern trawl capabilities for trawling
3. Oceanographic Equipment
    - Both starboard oceanographic winches with conducting cable, slip rings and blocks. Forward winch terminated for CTD/rosette; aft winch terminated for FastCat/SeaCat.
    - Seabird SBE 911+CTD System
    - Seabird SBE19+CTD and PDIM for real time data on zooplankton tows
    - Niskin Bottles 10 L (need 10 total+ spares)
    - SBE45 Thermosalinograph with fluorometer
    - Wire speed indicators and readout for both hydrographic winches visible in Dry Lab or where FastCat/SeaCat operations occur
    - Weather instr. for above surface PAR, wind speed/direction
4. Biological Sampling Equipment
    - Fish lab conveyor system
    - Catch sorting and weighing table
    - Calibrated Marel M60 60kg scale (2)
    - Calibrated Marel M60 6kg scale (2)
    - Large gray tubs for dumping catch into (2)
    - Fish baskets
    - Fish trays
5. Computing equipment
    - Scientific Computing System
6. Sample storage equipment
    - Ultracold freezer (-80C)
    - Walk in freezer (-10C)

- Stand up freezer (-20C)
- Hazmat storage cabinets

7. Laboratory and exterior working space
    - Use of Pentium PC in Dry and/or Computer Lab for data analysis,
    - Remote access in the computer lab to FastCat data stored in the survey lab.
    - Scientific Computer System (SCS)
    - Video monitors in Dry, Chemistry, and Wet labs for viewing SCS output
    - Laboratory space with exhaust hood, sink, lab tables, and storage space
    - Sea-water hoses and spray nozzles to wash nets (quarterdeck and aft deck),
    - Adequate deck lighting for night-time operations,
    - Navigational equipment including GPS and radar,
    - Safety harnesses for working on starboard sampling station/hero platform and fantail
    - Ship's crane(s) used for loading and/or deploying gear and supplies

B. Equipment and Capabilities provided by the scientists (itemized)

1. Trawling Equipment
    - 3 small-mesh midwater trawls (2-Stauffer, a.k.a. anchovy; 1-shrimp) equipped with 3-mm (1/8") mesh codend liner
    - 3 steel-v trawl doors (each door: 5'x7', 1250 lbs)
    - 3 door-rigging wires (legs and extension wire, 62' overall)
    - 11 bridles for Stauffer trawl (30 fm)
    - 10 bridles for shrimp trawl (10 fm)
    - 3 transfer wires (85')
    - All accessories to make trawls fishable

2. Plankton Equipment
    - 60 cm bongo frames (2)
    - 20 cm bongo frames (2)
    - 60 cm bongo nets and cod-ends
    - 20 cm bongo nets and cod-ends
    - 50 kg bongo weights (2)
    - Flow meters (10)
    - Wire angle indicators (2)
    - Miscellaneous supplies

3. Oceanographic Equipment (1,500lbs)
    - Biospherical QSP2300 PAR sensor
    - SBE 43 dissolved oxygen sensor (2)
    - Secondary TC sensors for SBE 911+
    - Two SBE 49 FastCat systems

- Filter racks and pumps (2)

4. Biological Sampling Equipment (500lbs)
    - CLAM system fully complete w/ 2 Marel scales, length boards w/ magnets, multiple stations w/touchscreen monitors, and other hardware
    - 5-gal buckets (5)
    - Two length boards for adult fish
    - Two length boards for small fish
    - Mechanical platform scale (backup for Marel "basket" scale)
    - Triple beam balance (backup for Marel "specimen" scale)
    - 1200 Zip-loc bags (various sizes)
    - Sieves, jar holder, funnels, squirt bottles
    - 51 cases of 32-oz jars, closures, and labels
    - Preservative-dispenser equipment
    - Hazardous materials spill kit
    - Forms: COD (200), Haul (300), Catch (300), Length (600 double-sided)
    - Ream of blank paper
5. Computing equipment (50lbs)
    - CLAMS laptop from AFSC/FOCI
    - IBM compatibles
    - Cruise Operations Database (COD) software
    - Electronic (MS Excel) and paper forms: Haul, Catch, and Length

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 quantity, MSDS, appropriate spill cleanup materials (neutralizing agents, buffers, or absorbents) in amounts adequate to address spills of a size equal to the amount of chemical brought aboard, and chemical safety and spill response procedures. Documentation regarding those requirements will be provided by the Chief of Operations, Marine Operations Center, upon request.

Per OMAO procedure, 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

Oscar Dyson loaded 1/19/2017 by FOCI and MACE personnel. All chemicals listed will be used for the entire 2017 field season. Chemical volumes will be reported to the Ops Officer and the designated contact for each survey will be required to report to chemical owners. The name of the group responsible for each of the chemicals is designated after the chemical name in the table. MSDS, chemical hygiene plan, and SOPs will be provided to *Oscar Dyson* before the loading of the vessel.

Common Name	**Concentration**	**Amount**	**Spill Response (all FOCI/MACE/PMEL/EMA personnel)**	**Trained Person(s)**	**Notes**
DNA Away Property of FOCI	100%	1 – 250 ml	Gloves Paper towels Plastic bag	M. Wilson / S. Porter	Not a regulated chemical.

Common Name	Concentration	Amount	Spill Response (all FOCI/MACE/PMEL/EMA personnel)	Trained Person(s)	Notes
Ethanol Property of FOCI	100%	4 -1 gal. plastic jugs	Gloves 3M Sorbent Pads Plastic bag	M. Wilson / S. Porter	Store in Chem. Lab yellow flammables cabinet.
Ethylene Glycol Property of FOCI	100%	1 – 500 ml	Gloves Paper towels Plastic bag	M. Wilson / S. Porter	Not a regulated chemical. Store in Spill Kit.
Formaldehyde Property of FOCI	37%	8 – 2.5 gal. barrels	Gloves Eye Protection Fan-Pads Formalex PolyForm-F Plastic bags	M. Wilson / S. Porter	Store in Fish Lab flammable cabinets. Will need to place 4 in each cabinet.
Glycerol/Thymol Solution Property of MACE	50 %	2 – 5 gal., bucket	Gloves Paper towels Kitty litter	M. Wilson / S. Porter	Not a regulated chemical/solution. Store in Fish Lab under sink.
Hydrochloric Acid Property of PMEL		1 – 500 ml	Gloves 1-1 Spilfyter Acid Neutralizer	M. Wilson / S. Porter	Stored in over-pack bucket.

Common Name	Concentration	Amount	Spill Response (all FOCI/MACE/PMEL/EMA personnel)	Trained Person(s)	Notes
Lithium 9v Batteries Property of PMEL		8	NA	M. Wilson / S. Porter	In SeaBird and Wetlabs instruments
Lithium AA Batteries Property of PMEL		96	NA	M. Wilson / S. Porter	In SeaBird instruments and MicroCats Saft LS14500
Lithium D Cell Batteries Property of PMEL		150	NA	M. Wilson / S. Porter	In RCM9 & Peggy Mooring
Manganese Chloride Property of PMEL	3M	1 liter	Gloves Kitty Litter Plastic bag	M. Wilson / S. Porter	Not a regulated chemical/solution. Used for oxygen titrations.
Potassium Iodate Property of PMEL	0.00167 M	1 liter	Spill Control: PI Gloves Plastic bag	M. Wilson / S. Porter	Used for oxygen titrations.

Common Name	Concentration	Amount	Spill Response (all FOCI/MACE/PMEL/EMA personnel)	Trained Person(s)	Notes
Sodium Borate Solution Property of FOCI	5-6%	1 – 5 gal.	Gloves Paper towels Plastic bag	M. Wilson / S. Porter	Not a regulated chemical. Working container will be secured on Fish Lab counter.
Sodium Borate Powder Property of FOCI	100%	1 – 500 g	Gloves Wet paper towels Plastic bag	M. Wilson / S. Porter	Not a regulated chemical. Stored in Spill Kit.
Sodium Iodide/NaOH Solution Property of PMEL	0.11M	1 liter	Spill Control: B	M. Wilson / S. Porter	Used for oxygen titrations.
Sodium Thiosulfate Property of PMEL	0.11 M	1 liter	Spill Control: ST	M. Wilson / S. Porter	Used for oxygen titrations.
Sulfuric Acid Property of PMEL	5 M	1 liter	Spill Control: A	M. Wilson / S. Porter	Used for oxygen titrations.

C. Chemical safety and spill response procedures

FOCI Spill Kit Contents	Amount	Use	Total Spill Volume Controllable	Notes
Formalex	1 – 5 gallon 2 -1 gallon	Formaldehyde cleanup (all concentrations)	1:1 control	Formalex will be used in conjunction with Fan-Pads to reduce spill volume.
Fan-Pads	2 rolls (50 sheets each roll)	Formaldehyde cleanup (all concentrations)	50 sheets = 50 - 150 ml spills	Formalex will be used in conjunction with Fan-Pads to reduce total spill volume.
PolyForm-F	1 – 5 gal. bucket	Formaldehyde cleanup (all concentrations)	1:1 control	Pour onto large spill immediately to deactivate formaldehyde.
3 M Pads	10 pads	Ethanol cleanup	10 pads=10 - 250ml spills	Pads may be reused if dried out under fume hood.
Nitrile Gloves	8 pairs each S,M,L,XL	For all cleanup procedures	N/A	Gloves will be restocked by each survey group.
Eye Protection	4 pairs goggles 1 face shield	Formaldehyde cleanup	N/A	Eye protection will be cleaned before re-use.
Tyvex Lab Coats	2 coats	Formaldehyde cleanup	N/A	Coats will be cleaned with Fan-Pads and Formalex before reuse.
Plastic Bags	2	Formaldehyde cleanup/Fan Pads	N/A	Bags may be packed full and sealed.

PMEL Acid-Base Spill Kit Contents	Amount	Use	Total Spill Volume Controllable	Notes

PMEL Acid-Base Spill Kit Contents	Amount	Use	Total Spill Volume Controllable	Notes
Spilfyter Acid Neutralizer	1 box	Clean up acid spill— H_2SO_4	1.5l of 5M Sulfuric Acid 5.57l of 10% (1N) HCl	
Spilfyter Base Neutralizer	1 box	Clean up base spill--NaOH	2.0l of Sodium Hydroxide	
Vinyl Gloves	1 box	Protect hands during cleanup	N/A	
Foxtail/Dustpan	1 each	Pick up absorbed neutralizer	N/A	
Rubber apron	1 each	Protect during cleanup	N/A	
Paper Towels	1 roll	Absorb liquids	N/A	
Goggles	2 pair	Protect eyes	**N/A**	
Chemical absorbent (kitty litter)	1 liter	Absorb liquids	0.5l	
Plastic Bags	2 each	Contain used absorbents/waste	N/A	

SPILL CONTROL

A: ACID

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

B: Base

- Use proper PPE.
- Ventilate area.
- Neutralize with dilute acid such as HCl if possible.
- Absorb with cat litter or vermiculite.
- Vacuum or sweep up material and place into suitable disposal container.
- Do not breathe dust.

- Do not get water on spilled substances.

M: Mercury

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

F: Formalin/Formaldehyde

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

PI: Potassium Iodate

- Avoid Contact with combustibles (wood, paper, clothing …).
- Keep substance damp with water spray.
- Vacuum or sweep up material and place into suitable disposable container (plastic bag).

ST: Sodium Thiosulfate

- Ventilate area of leak or spill.
- Wear protective gloves and clean body-covering
- Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.
- Recover liquid or particulate in 5 gallon bucket. Absorb with a kitty litter and place in disposable bag. Do not use combustible materials, such as sawdust to absorb.

E: Ethanol

- Eliminate all ignition sources
- Wear PPE

D. Radioactive Materials

No Radioactive Isotopes are planned for this project.

V. Additional Projects

A. Supplementary (“Piggyback”) Projects

No Supplementary Projects are planned.

B. NOAA Fleet Ancillary Projects

No NOAA Fleet Ancillary Projects 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.

A. Data Classifications: *Under Development*

a. OMAO Data

b. Program Data

B. Responsibilities: *Under Development*

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 shortcomings 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 https://sites.google.com/a/noaa.gov/omao-intranet-

dev/operations/marine/customer-satisfaction-survey and provides a "Submit" button at the end of the form. It is also located at https://docs.google.com/a/noaa.gov/forms/d/1a5hCCkgIwaSII4DmrHPudAehQ9HqhRqY3J_FXqbJp9g/viewform. 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 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.

B. 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).

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.

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 email 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 through the ship's Commanding Officer at least 30 days in advance.

E. 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.

F. Foreign National Guests Access to OMAO Facilities and Platforms

Foreign National access to the NOAA ship or Federal Facilities is not required for this project.

G. Marine Mammal, Endangered, and Protected Species

During fishing operations, take all proactive steps to avoid deploying the gear in any situation where there is a high likelihood for an incidental take of protected species or marine mammals. This could mean delaying a set or moving to a suitable alternate site. Be on the look for marine mammals or other protected species prior to initiating a tow and also at haul back.

Within 24 hours of any incidental take of, or injuries or mortalities to, marine mammals as a result of operations, the Chief Scientist/Field Party Chief shall report incident to the vessel CO, Jon Kurland (jon.kurland@noaa.gov, 907-586-7638) or Robyn Angliss (robyn.angliss@noaa.gov, 206-526-4032), and Jeff Napp (jeff.napp@noaa.gov, 205-526-4148). This information will be entered into the Protected Species Incidental Take (PSIT) system per instructions below.

Seabirds can be sampled and retained for salvage – if take involves seabird, include Shannon Fitzgerald in notification at shannon.fitzgerald@noaa.gov. If take involves ESA-listed bird, retain specimen and we will notify FWS (to issue collection authority). Do not retain gulls – except Kittiwakes. Albatross are high priority.

KEY ACTIONS IN RESPONSE TO ALL INCIDENTAL TAKES

1. Prior to the project, communicate and coordinate with vessel crew about established protected species incidental take reporting and handling procedures whether NOAA, charter, or partner project. Ensure regional ESA biologists and pertinent staff are in the PSIT email alert notification list. The Office of Law Enforcement (OLE) will be notified of takes via PSIT email alert system for all non-marine mammal takes including seabirds within 48 hours of the event.

2. Notify the geographically-appropriate Regional Stranding Response Coordinator (numbers in this document) immediately following the incidental take of a marine mammal. Stranding Response Coordinator will contact Office of Law Enforcement (OLE). For live injured/uninjured marine mammals, priority should be to release the animal before notifying stranding response networks. NOTE: If Coordinators are unreachable, collect pertinent PSIT information and release animal and/or retain carcass if logistically feasible.

3. For a sea turtle or protected fish (injured/live/dead), follow the Terms and Conditions stated in your Fisheries Independent Monitoring Biological Opinion regarding reporting and data collection. If you do not have a current Biological Opinion, contact your designated Regional or Science Center Protected Species Point of Contact for instructions.

4. For handling, sampling and salvaging seabirds (ESA and non-ESA listed), contact regional

United States Fish and Wildlife Service (USFWS) points of contact or NMFS regional seabird coordinator. If you have a permit, report seabird takes to PSIT.

PRE-PROJECT ACTIONS

1) Prior to the project, communicate and coordinate with vessel crew about established protected species incidental take reporting and handling procedures whether NOAA, charter, or partner project.

2) Ensure regional ESA biologists and pertinent protected resources staff is in the PSIT email alert notification list.

3) The NMFS Chief Scientist or Designee shall contact the appropriate Regional Stranding Network and query about additional numbers or specific contacts to reach in case of an incidental take of a marine mammal.

WHAT TO DO WITH LIVE, INJURED OR UNINJURED MARINE MAMMAL

If a live, injured or uninjured marine mammal is incidentally captured, the animal should be released immediately.

1) Considering human safety, work from the vessel as quickly and carefully as possible to free the animal from the gear. Ensure the animal can continue to breathe while freeing from the gear.

2) If it can be done immediately without further harming the animal, photograph the animal (dorsal and ventral sides including dorsal fin, flanks, head/jaw) and gear interaction at time of capture and when free from gear prior to release and collect required PSIT information.

3) If animal is NOT brought aboard the vessel and taking photos is not an option, provide a comprehensive summary of the incident following requirements described under ‘PSIT narrative’ in this document.

4) Notify Regional Stranding Response Coordinator about the incident.

5) Submit take information for submission to PSIT and attach any forms, photos, and narrative to the take record within a week of the event.

Note: Untrained personnel should not attempt to handle live injured/uninjured marine mammals or disentangle large whales. In the event of a large entangled whale, immediately call your regional entanglement response network.

WHAT TO DO WITH DEAD MARINE MAMMAL OR SEA TURTLE?

1) Notify Regional Stranding Network Coordinator about the take of a dead marine mammal.

2) For sea turtle takes, simply report the take/s to PSIT and follow the instructions listed in your

Biological Opinion or follow Regional or Science Center Protected Species Point of Contact instructions.

3) If logistically feasible, the animal should be hauled aboard the vessel and retained for pick up by the local Stranding Network. Develop a plan with Stranding Network Coordinator or regional ESA biologist and/or relevant Center scientist for carcass pickup and subsequent necropsy.

4) If the animal cannot be hauled aboard due to human safety consideration or there is no feasible way for carcass retention onboard, release animal after necessary information is collected as described below.

5) Photos of the carcass should be taken: Dorsal fin, ventral side, and flank for marine mammals, as well as signs of entanglement, scars, and injuries. This also includes collecting required PSIT data.

6) Submit take information for submission to PSIT and attach any forms, photos, and narrative to the take record.

PSIT Reporting

Report [1] Species involved, [2] number dead, number injured and released, or number uninjured and released, [3] date and time, [4] latitude and longitude, [5] any mitigation measures taken, [6] other comments or observations germane to this take. Note if photo was taken.

In addition to the required PSIT information please complete a narrative which includes the following information.

1) Animal Condition (include photos)

Code 1 – Live Animal

Code 2 – Fresh Dead

Code 3 – Moderate Decomposition

Code 4 – Advanced Decomposition

2) Mention if animal escaped or was released.

3) Indicate if the animal or other marine mammals or sea turtles were seen in the vicinity of the vessel during fisheries operations.

4) Animal condition post-release: Describe any observed injuries, the condition and behavioral state of released or injured animal (e.g., no obvious injuries and animal swam away vigorously, did not swim away vigorously, animal surfaced to breathe, animal sank to bottom, or blood in water observed).

5) If gear was still attached to animal after release, describe how the gear was cut and approximately how much gear is left and where it is still entangled/injured.

6) Photos: Provide comprehensive photographic evidence or written description of live/dead or injured animal. Provide pictures (if possible) of how the animal was entangled in the gear, and any gear-related interactions such as wounds or constrictions.

7) Decision-making: Include rationale for any discretionary decisions taken by Chief Scientist/crew.

8) Describe possible causes for incidental capture of the animal and any additional mitigation measures that were taken, or might be taken to prevent similar captures in all subsequent operations.

ENTANGLEMENT RESPONSE NETWORK NUMBER

Alaska Region: 1-877-925-7773

IX. Appendices

1. Appendix 1. Station/Waypoint List (coordinates in Latitude, Longitude: degree-minutes)

								Operation duration estimate (min.)					
Tentative		Latitude			Longitude			Stauffer	Stauffer				
sequence	Grid	Deg.	Min.	Hem.	Deg.	Min.	Hem.	oblique	surface	Bongo	CTD	CTDB	Comment
1	hf191	57	59.809	N	152	26.970	W	45		20	20		
2	hh193	58	0.179	N	152	1.482	W	45		20			
3	hj191	57	46.035	N	152	1.980	W	45		20			
4	hl189	57	31.891	N	152	2.388	W	45		20			
5	hn187	57	17.746	N	152	2.712	W	45		20			
6	hp185	57	3.648	N	152	2.229	W	45		20			
7	hr183	56	49.371	N	152	2.251	W	45	45	20			
8	ht181	56	34.936	N	152	2.390	W	45		20			
9	hr179	56	34.563	N	152	27.846	W	45	45	20			
10	hp181	56	48.964	N	152	27.773	W	45		20			
11	hn183	57	3.232	N	152	28.122	W	45	45	20			
12	hl185	57	17.376	N	152	27.960	W	45	45	20			
13	hl181	57	2.861	N	152	53.370	W	45		20			
14	hn179	56	48.717	N	152	53.364	W	45		20			
15	hp177	56	34.367	N	152	52.999	W	45		20			
16	hr175	56	19.948	N	152	52.945	W	45		20			
17	hp173	56	19.918	N	153	17.811	W	45		20			
18	hn175	56	34.202	N	153	18.450	W	45		20			
19	hl177	56	48.346	N	153	18.612	W	45		20			
20	hl173	56	33.832	N	153	43.686	W	45		20			
21	hn171	56	19.687	N	153	43.368	W	45		20			

Tentative sequence	Grid	Latitude			Longitude			Operation duration estimate (min.)					Comment
		Deg.	Min.	Hem.	Deg.	Min.	Hem.	Stauffer oblique	Stauffer surface	Bongo	CTD	CTDB	
22	hp169	56	5.682	N	153	42.106	W	45	45	20			
23	hn167	56	5.215	N	154	7.714	W	45		20			
24	hl169	56	19.317	N	154	8.604	W	45		20			
25	hj167	56	18.947	N	154	33.918	W	45		20			
26	hl165	56	4.802	N	154	33.366	W	45		20			
27	hl161	55	50.097	N	154	58.160	W	45		20			
28	hj163	56	4.432	N	154	58.674	W	45		20			
29	hh165	56	18.576	N	154	59.298	W	45		20			
30	hf167	56	32.721	N	154	59.850	W	45		20			
31	hh173	56	47.606	N	154	9.318	W	45		20			
32	hf171	56	47.236	N	154	34.788	W	45		20			
32	hd173	57	1.380	N	154	35.106	W	45		20			
33	hd169	56	46.865	N	155	0.324	W	45		20			
33	hb171	57	1.010	N	155	0.720	W	45		20			
34	gz173	57	15.154	N	155	1.038	W	45		20			
35	gx175	57	29.299	N	155	1.272	W	45	45	20			
36	FOX55	57	28.800	N	154	42.000	W					30	Line 8
37	FOX56	57	31.200	N	154	46.800	W					30	Line 8
38	FOX57	57	33.000	N	154	52.800	W					30	Line 8
39	FOX58	57	36.600	N	155	0.600	W					30	Line 8
40	FOX59	57	38.400	N	155	4.200	W					30	Line 8
41	FOX60	57	40.800	N	155	10.200	W					30	Line 8
42	FOX61	57	43.200	N	155	15.600	W					30	Line 8
44	gv177	57	43.443	N	155	1.422	W	45		20			
43	gx179	57	43.813	N	154	35.562	W	45		20			
45	gz181	57	44.183	N	154	9.774	W	45		20			
46	gx183	57	58.328	N	154	9.672	W	45		20			
47	gz185	57	58.699	N	153	43.884	W	45		20			
48	gx187	58	12.843	N	153	43.614	W	45		20			

Tentative sequence	Grid	Latitude			Longitude			Operation duration estimate (min.)					
		Deg.	Min.	Hem.	Deg.	Min.	Hem.	Stauffer oblique	Stauffer surface	Bongo	CTD	CTDB	Comment
49	gz189	58	13.213	N	153	17.820	W	45		20			
50	gv189	58	26.987	N	153	43.248	W	45		20			
51	gx191	58	27.358	N	153	17.370	W	45		20			
52	gz193	58	27.728	N	152	51.576	W	45		20			
53	gv193	58	41.502	N	153	16.830	W	45		20			
54	gx195	58	41.872	N	152	50.952	W	45		20			
55	gv197	58	56.017	N	152	50.232	W	45		20			
56	gt199	59	10.161	N	152	49.410	W	45		20			
57	gv201	59	10.532	N	152	23.448	W	45		20			
58	gt203	59	24.676	N	152	22.440	W	45		20			
59	gt207	59	39.191	N	151	55.272	W	45		20			
60	gv205	59	25.046	N	151	56.472	W	45		20			
61	gx203	59	10.902	N	151	57.558	W	45		20			
62	gx199	58	56.387	N	152	24.348	W	45		20			
63	gz197	58	42.242	N	152	25.146	W	45		20			
64	hb199	58	42.613	N	151	59.418	W	45		20			
65	hb203	58	57.128	N	151	32.808	W	45		20			
66	hd201	58	42.983	N	151	33.774	W	45		20			
67	hd197	58	28.469	N	152	0.204	W	45		20			
68	hf199	58	28.839	N	151	34.632	W	45		20			
69	hh197	58	14.695	N	151	35.400	W	45		20			
70	hj195	58	0.550	N	151	36.072	W	45	45	20			
71	hl193	57	46.406	N	151	36.648	W	45		20			
72	hn191	57	32.261	N	151	37.134	W	45		20			
73	hp189	57	18.236	N	151	36.685	W	45		20			
74	hr187	57	4.082	N	151	36.656	W	45		20			
75	ht185	56	49.696	N	151	36.872	W	45		20			
76	hx181	56	20.909	N	151	36.855	W	45		20			hx line
77	hx185	56	35.652	N	151	11.526	W	45		20			hx line

Tentative sequence	Grid	Latitude			Longitude			Operation duration estimate (min.)					Comment
		Deg.	Min.	Hem.	Deg.	Min.	Hem.	Stauffer oblique	Stauffer surface	Bongo	CTD	CTDB	
78	hr191	57	18.697	N	151	11.061	W	45		20	20		
95	ht189	57	4.361	N	151	11.355	W	45		20			
79	hp193	57	32.729	N	151	11.141	W	45		20			
80	hn195	57	46.776	N	151	11.382	W	45		20			
81	hl197	58	0.920	N	151	10.728	W	45		20			
82	hj199	58	15.065	N	151	9.984	W	45		20			
83	hh201	58	29.209	N	151	9.138	W	45	45	20			
84	hf203	58	43.354	N	151	8.196	W	45		20			
85	hd205	58	57.498	N	151	7.152	W	45		20			
86	hd209	59	11.822	N	150	40.686	W	45		20			
87	hf207	58	57.868	N	150	41.574	W	45		20			
88	hh205	58	43.724	N	150	42.690	W	45		20			
89	hj203	58	29.579	N	150	43.716	W	45		20			
90	hl201	58	15.435	N	150	44.634	W	45		20			
91	hn199	58	1.291	N	150	45.462	W	45		20			
92	hp197	57	47.125	N	150	45.597	W	45		20			
93	hr195	57	33.215	N	150	45.466	W	45		20			
94	ht193	57	18.929	N	150	45.837	W	45		20			
96	hx189	56	50.299	N	150	46.197	W	45		20			hx line
97	hx193	57	4.851	N	150	20.869	W	45		20			hx line
98	ht197	57	33.402	N	150	20.320	W	45		20			
99	hr199	57	47.638	N	150	19.871	W	45	45	20			
100	hp201	58	1.548	N	150	19.837	W	45		20			
101	hn203	58	15.805	N	150	19.368	W	45		20			
102	hl205	58	29.950	N	150	18.366	W	45		20			
103	hj207	58	44.095	N	150	17.268	W	45		20			
104	hh209	58	58.239	N	150	16.062	W	45		20			
105	hf211	59	12.383	N	150	14.760	W	45		20			
106	hd213	59	25.882	N	150	14.515	W	45		20			

Tentative sequence	Grid	Latitude			Longitude			Operation duration estimate (min.)					Comment
		Deg.	Min.	Hem.	Deg.	Min.	Hem.	Stauffer oblique	Stauffer surface	Bongo	CTD	CTDB	
107	hd217	59	39.845	N	149	48.344	W	45		20			
108	hf215	59	26.898	N	149	47.760	W	45		20			
109	hh213	59	12.810	N	149	49.119	W	45		20			
110	hj211	58	58.609	N	149	50.634	W	45		20			
111	hl209	58	44.465	N	149	51.912	W	45		20			
112	hn207	58	30.320	N	149	53.088	W	45		20			
113	hp205	58	16.008	N	149	53.835	W	45		20			
114	hr203	58	1.965	N	149	54.275	W	45		20			
115	ht201	57	47.780	N	149	54.802	W	45		20			
116	hx197	57	19.309	N	149	55.540	W	45		20			hx line
117	hx201	57	33.673	N	149	30.211	W	45		20			hx line
118	ht205	58	2.062	N	149	29.285	W	45		20			
119	hr207	58	16.197	N	149	28.680	W	45		20			
120	hp209	58	30.321	N	149	27.924	W	45		20			
121	hn211	58	44.835	N	149	26.634	W	45		20			
122	hl213	58	58.979	N	149	25.272	W	45		20			
123	hj215	59	13.241	N	149	23.551	W	45		20			
124	hh217	59	27.235	N	149	22.264	W	45		20			
125	hf219	59	41.150	N	149	21.009	W	45		20			
126	hd221	59	53.713	N	149	22.172	W	45		20			
127	hf223	59	55.374	N	148	54.153	W	45		20			
128	hh221	59	41.557	N	148	55.410	W	45		20			
129	hj219	59	27.661	N	148	56.693	W	45		20			
130	hl217	59	13.687	N	148	57.995	W	45		20			
131	hn215	58	59.938	N	148	58.780	W	45		20			
132	hp213	58	45.658	N	148	59.927	W	45		20			
133	hr211	58	30.864	N	149	2.123	W	45		20			
134	ht209	58	16.309	N	149	3.650	W	45		20			
135	hv207	58	2.117	N	149	4.372	W	45		20			

Tentative sequence	Grid	Latitude			Longitude			Operation duration estimate (min.)					Comment
		Deg.	Min.	Hem.	Deg.	Min.	Hem.	Stauffer oblique	Stauffer surface	Bongo	CTD	CTDB	
136	hx205	57	47.943	N	149	4.883	W	45		20			hx line
137	hx209	58	2.044	N	148	39.688	W	45		20			hx line
138	hv211	58	16.833	N	148	37.901	W	45		20			
139	hx213	58	17.946	N	148	11.078	W	45		20			hx line
140	hx217	58	33.211	N	147	43.352	W	45		20			hx line
141	ht213	58	31.817	N	148	35.575	W	45		20			
142	ht217	58	46.596	N	148	8.557	W	45		20			
143	hr215	58	46.485	N	148	33.587	W	45		20			
144	hp217	59	0.495	N	148	32.656	W	45		20			
145	hr219	59	1.466	N	148	6.040	W	45		20			
146	hp221	59	15.227	N	148	5.385	W	45		20			
147	hn219	59	14.590	N	148	31.626	W	45		20			
148	hl221	59	28.100	N	148	31.128	W	45		20			
149	hn223	59	29.137	N	148	4.471	W	45		20			
150	hl225	59	42.411	N	148	4.262	W	45		20			
151	hj223	59	41.978	N	148	29.835	W	45		20			
152	hh225	59	55.779	N	148	28.556	W	45		20			
153	hj227	59	56.195	N	148	2.976	W	45		20			
154	hn227	59	43.581	N	147	37.317	W	45		20			
155	hp225	59	29.854	N	147	38.113	W	45		20			
156	hr223	59	16.339	N	147	38.493	W	45		20			
157	ht225	59	16.449	N	147	13.464	W	45		20			
158	hv227	59	17.524	N	146	46.639	W	45		20			
159	ht229	59	31.214	N	146	45.917	W	45		20			
160	hr227	59	31.105	N	147	10.947	W	45		20			
161	hp229	59	44.375	N	147	10.842	W	45		20			
162	hr231	59	45.763	N	146	43.400	W	45		20			
163	hp233	59	58.793	N	146	43.571	W	45		20			
164	hn231	59	57.922	N	147	10.163	W	45		20			

Tentative sequence	Grid	Latitude			Longitude			Operation duration estimate (min.)					Comment
		Deg.	Min.	Hem.	Deg.	Min.	Hem.	Stauffer oblique	Stauffer surface	Bongo	CTD	CTDB	
165	hj231	60	10.310	N	147	36.118	W	45		20			
166	hh233	60	23.919	N	147	34.847	W	45		20			
167	hd233	60	34.741	N	148	3.658	W	45		20			
168	hf235	60	37.442	N	147	33.588	W	45		20			
169	hd237	60	48.227	N	147	37.487	W	45		20			
170	hf239	60	51.265	N	147	6.733	W	45		20			
171	hh237	60	37.840	N	147	7.993	W	45		20			
172	hj235	60	24.326	N	147	9.260	W	45		20			
173	hl237	60	24.738	N	146	43.664	W	45		20			
174	hj239	60	38.241	N	146	42.401	W	45		20			
175	hl241	60	38.646	N	146	16.798	W	45		20			
176	hn239	60	26.295	N	146	15.855	W	45		20			
177	hn235	60	12.160	N	146	43.009	W	45		20			
178	hp237	60	13.106	N	146	16.299	W	45		20			
179	hr235	60	0.316	N	146	15.853	W	45		20			
180	ht233	59	45.872	N	146	18.370	W	45		20			
181	hv231	59	32.281	N	146	19.092	W	45		20			
182	hx233	59	32.869	N	145	53.165	W	45		20			
183	hv235	59	46.932	N	145	51.546	W	45		20			
184	ht237	60	0.423	N	145	50.824	W	45		20			
185	hr239	60	14.762	N	145	48.306	W	45		20			
186	ht241	60	14.869	N	145	23.277	W	45		20			
187	hv239	60	1.475	N	145	23.999	W	45		20			
188	hx241	60	2.055	N	144	58.072	W	45		20			
189	hz239	59	48.099	N	144	59.692	W	45		20			
190	hx237	59	47.515	N	145	25.619	W	45		20			
191	hz235	59	33.457	N	145	27.238	W	45		20	20		
192	gv173	57	28.928	N	155	27.126	W	45		20	20		
193	gt171	57	27.000	N	155	46.002	W	45		20			

Tentative sequence	Grid	Latitude			Longitude			Operation duration estimate (min.)					Comment
		Deg.	Min.	Hem.	Deg.	Min.	Hem.	Stauffer oblique	Stauffer surface	Bongo	CTD	CTDB	
194	gx171	57	14.784	N	155	26.814	W	45		20			
195	gz169	57	0.639	N	155	26.418	W	45		20			
196	hb167	56	46.495	N	155	25.944	W	45		20			
197	hd165	56	32.350	N	155	25.386	W	45		20			
198	hf163	56	18.206	N	155	24.756	W	45		20			
199	hh161	56	4.061	N	155	24.054	W	45		20			
200	hj159	55	49.917	N	155	23.274	W	45		20			
201	hl157	55	35.627	N	155	22.536	W	45		20			
202	hj155	55	35.402	N	155	47.724	W	45		20			
203	hh157	55	49.547	N	155	48.654	W	45		20			
204	hf159	56	3.691	N	155	49.506	W	45		20			
205	hd161	56	17.836	N	155	50.292	W	45		20			
206	hb163	56	31.980	N	155	51.000	W	45	45	20			TimeSeries
207	gz165	56	46.124	N	155	51.636	W	45		20			
208	gx167	57	0.269	N	155	52.188	W	45		20			
209	gv169	57	14.413	N	155	52.668	W	45		20			
210	gv165	56	59.899	N	156	18.042	W	45		20			TimeSeries
211	gx163	56	45.754	N	156	17.400	W	45		20			TimeSeries
212	gz161	56	31.610	N	156	16.686	W	45		20			TimeSeries
213	hb159	56	17.465	N	156	15.900	W	45		20			TimeSeries
214	hd157	56	3.321	N	156	15.036	W	45		20			
215	hf155	55	49.177	N	156	14.100	W	45	45	20			TimeSeries
216	hh153	55	35.032	N	156	13.098	W	45		20			
217	hj151	55	20.888	N	156	12.024	W	45		20			
218	hh149	55	20.517	N	156	37.392	W	45		20			
219	hf151	55	34.661	N	156	38.544	W	45		20			TimeSeries
220	hd153	55	48.806	N	156	39.630	W	45		20			
221	gz157	56	17.095	N	156	41.580	W	45		20			TimeSeries
222	gx159	56	31.240	N	156	42.450	W	45		20			TimeSeries

Tentative sequence	Grid	Latitude			Longitude			Operation duration estimate (min.)					Comment
		Deg.	Min.	Hem.	Deg.	Min.	Hem.	Stauffer oblique	Stauffer surface	Bongo	CTD	CTDB	
223	gv161	56	45.384	N	156	43.248	W	45	45	20			TimeSeries
224	gt163	56	51.000	N	156	45.000	W	45		20			TimeSeries
225	gu158	56	40.002	N	157	13.002	W	45		20			TimeSeries
226	gx155	56	16.724	N	157	7.344	W	45		20			
227	gz153	56	2.580	N	157	6.318	W	45		20			TimeSeries
228	hb151	55	48.436	N	157	5.226	W	45		20			
229	hd149	55	34.291	N	157	4.068	W	45		20			
230	hf147	55	20.147	N	157	2.838	W	45		20			
231	hh145	55	6.002	N	157	1.542	W	45	45	20			
232	M1	54	51.000	N	157	0.000	W					30	Mitrofania Line
233	M2	54	58.800	N	157	13.800	W					30	Mitrofania Line
234	M3	55	6.000	N	157	27.000	W					30	Mitrofania Line
235	M4	55	12.600	N	157	40.800	W					30	Mitrofania Line
236	M5	55	19.800	N	157	54.000	W					30	Mitrofania Line
237	M6	55	26.400	N	158	7.200	W					30	Mitrofania Line
238	M7	55	33.000	N	158	21.000	W					30	Mitrofania Line
239	M8	55	40.200	N	158	34.200	W					30	Mitrofania Line
240	hf143	55	5.632	N	157	26.982	W	45		20			
241	hd145	55	19.777	N	157	28.356	W	45		20			TimeSeries
242	hb147	55	33.921	N	157	29.664	W	45		20			
243	gz149	55	48.065	N	157	30.900	W	45	45	20			TimeSeries
244	gx151	56	2.210	N	157	32.076	W	45		20			
245	gv153	56	16.354	N	157	33.180	W	45		20			TimeSeries
246	gt155	56	30.499	N	157	34.212	W	45		20	20		
247	6E	56	35.185	N	157	47.343	W	45		20			TimeSeries
248	5E	56	25.508	N	158	7.546	W	45		20			TimeSeries
249	gt151	56	15.984	N	157	59.094	W	45		20			
250	gv149	56	1.840	N	157	57.906	W	45		20			TimeSeries
251	gx147	55	47.695	N	157	56.652	W	45		20			

Tentative sequence	Grid	Latitude			Longitude			Operation duration estimate (min.)					Comment
		Deg.	Min.	Hem.	Deg.	Min.	Hem.	Stauffer oblique	Stauffer surface	Bongo	CTD	CTDB	
252	gz145	55	33.551	N	157	55.332	W	45		20			TimeSeries
253	hb143	55	19.406	N	157	53.946	W	45		20			
254	hd141	55	5.002	N	157	53.322	W	45		20			
255	hf139	54	50.665	N	157	52.206	W	45		20			
256	hd137	54	50.554	N	158	17.204	W	45		20			
257	hb139	55	4.891	N	158	18.084	W	45		20			
258	gz141	55	19.036	N	158	19.614	W	45		20			TimeSeries
259	gx143	55	33.181	N	158	21.078	W	45		20			
260	gv145	55	47.325	N	158	22.482	W	45		20			TimeSeries
261	3E	55	56.609	N	158	36.310	W	45		20			TimeSeries
262	gr141	55	46.584	N	159	14.370	W	45		20			TimeSeries
263	gt139	55	32.440	N	159	12.810	W	45		20			TimeSeries
264	gp135	55	31.699	N	160	4.848	W	45		20			
265	gt135	55	17.925	N	159	37.080	W	45		20			
266	gv137	55	18.295	N	159	11.178	W	45		20			
267	gv141	55	32.810	N	158	46.908	W	45		20			
268	gx139	55	18.665	N	158	45.360	W	45		20			
269	gz137	55	4.521	N	158	43.746	W	45		20			TimeSeries
270	hb135	54	50.377	N	158	42.072	W	45		20			
271	hd133	54	36.019	N	158	41.086	W	45		20			
272	hb131	54	35.907	N	159	6.084	W	45		20			
273	gz133	54	50.006	N	159	7.734	W	45		20			
274	gx135	55	4.151	N	159	9.486	W	45		20			
275	gz129	54	35.492	N	159	31.578	W	45		20			WofShumagins
276	gx123	54	20.606	N	160	21.012	W	45		20			WofShumagins
277	gv125	54	34.751	N	160	23.124	W	45		20			WofShumagins
278	gx127	54	35.121	N	159	57.312	W	45		20			WofShumagins
279	gv129	54	49.265	N	159	59.286	W	45		20			WofShumagins
280	gt127	54	48.895	N	160	25.176	W	45		20			WofShumagins

Tentative sequence	Grid	Latitude			Longitude			Operation duration estimate (min.)					Comment
		Deg.	Min.	Hem.	Deg.	Min.	Hem.	Stauffer oblique	Stauffer surface	Bongo	CTD	CTDB	
281	gr129	55	3.040	N	160	27.174	W	45		20			WofShumagins
282	gn129	55	16.814	N	160	55.242	W	45		20			WofShumagins
283	gp127	55	2.669	N	160	53.220	W	45		20			WofShumagins
284	gr125	54	48.525	N	160	51.144	W	45		20			WofShumagins
285	gt123	54	34.381	N	160	49.008	W	45		20			WofShumagins
286	gv121	54	20.236	N	160	46.818	W	45		20			WofShumagins
287	gt119	54	19.866	N	161	12.702	W	45		20			WofShumagins
288	gr121	54	34.010	N	161	14.976	W	45		20			WofShumagins
289	gp123	54	48.155	N	161	17.190	W	45		20			WofShumagins
290	gn125	55	2.299	N	161	19.356	W	45		20			WofShumagins
291	gl127	55	16.444	N	161	21.456	W	45		20			WofShumagins
292	gl123	55	1.929	N	161	45.564	W	45		20			WofShumagins
293	gn121	54	47.785	N	161	43.320	W	45		20			WofShumagins
294	gp119	54	34.100	N	161	42.515	W	45		20			WofShumagins
295	gr117	54	19.495	N	161	38.664	W	45		20			WofShumagins
296	gr113	54	4.981	N	162	2.214	W	45		20			WofShumagins
297	gp115	54	18.179	N	162	5.921	W	45		20			WofShumagins
298	gn117	54	33.269	N	162	7.140	W	45		20			WofShumagins
299	gj117	54	47.044	N	162	35.814	W	45		20			WofShumagins
300	gl115	54	32.899	N	162	33.348	W	45		20			WofShumagins
301	gn113	54	18.755	N	162	30.822	W	45		20			WofShumagins
302	gn109	54	4.240	N	162	54.366	W	45		20			WofShumagins
303	gl111	54	18.385	N	162	57.024	W	45		20			WofShumagins
304	gj113	54	32.529	N	162	59.628	W	45		20			WofShumagins
305	gh111	54	32.159	N	163	25.992	W	45		20			WofShumagins
306	gj109	54	18.014	N	163	23.304	W	45		20			WofShumagins
307	gl107	54	3.870	N	163	20.562	W	45		20			WofShumagins
308	gj105	54	3.499	N	163	46.836	W	45		20			WofShumagins
309	gh107	54	17.644	N	163	49.662	W	45		20			WofShumagins

Tentative sequence	Grid	Latitude			Longitude			Operation duration estimate (min.)					Comment
		Deg.	Min.	Hem.	Deg.	Min.	Hem.	Stauffer oblique	Stauffer surface	Bongo	CTD	CTDB	
310	gf109	54	31.788	N	163	52.440	W	45		20			WofShumagins
311	gf105	54	17.273	N	164	16.104	W	45		20			WofShumagins
312	gh103	54	3.129	N	164	13.194	W	45		20			WofShumagins
313	gf101	54	2.759	N	164	39.636	W	45		20			WofShumagins
314	gd103	54	16.903	N	164	42.630	W	45		20			WofShumagins

2. Appendix 2. FOCI Trawl Catch Processing Protocol (30May2017)

Trawl catches will be processed and samples retained according to the following protocol outline, which does **NOT** account for special requests:

A. Post-larval fish of 8 species are the primary target in FOCI trawl sampling in the GOA
Arrowtooth flounder
Capelin
Eulachon
Pacific cod (Age 0, Age 1+)
Pacific Ocean perch (might be indistinguishable from other rockfishes)
Rockfish species
Sablefish
Walleye pollock (Age 0, Age 1+)

1) Separate only walleye pollock and Pacific cod into Age 0 and Age 1+ age/size groups.
    a. For each age/size group, record weight and count of individuals
    b. Measure all or a random subsample of ~100 individuals in each group.
        i. For Age 0 groups (~<140 mm SL), use STANDARD LENGTH.
        ii. For Age 1+ groups, use FORK LENGTH.
    c. For all other species, do not separate into age-groups unless absolutely necessary and then make sure to comment catch processing and length metric procedures.
        i. For each species, record weight and count of individuals; it might not be possible to distinguish POP from other rockfishes
        ii. For each species, randomly choose up to ~50 individuals and measure FORK LENGTH.
2) Freeze age-0 pollock, age-0 cod
    a. Haphazard selection of ~25 ind. by species
    b. Flash freeze in -80, then move to walk-in

B. Other post-larval fish and invertebrates
1) For all other fish, record weight and count by coarse taxon groups (e.g., poacher, etc)
2) Large invertebrates (approx. $\geq$1g/ind)
    a. For jellyfish that can be enumerated, record weight and count by taxonomic group.
        i. *Chrysaora melanaster*
        ii. *Cyanea capillata*
        iii. Other jellyfish
    b. Jellyfish that cannot be enumerated, record only weight of all species as unidentified.
    c. Weigh and count other invertebrates by coarse taxonomic grp (e.g., shrimp).
3) Larval fish and small invertebrates such as krill, amphipods, etc (<1g/ind)
    a. Weigh as a group (combine larval fish and small invertebrates)
    b. Record as Unsorted Catch, which is equivalent to misc. other small plankton (MOSP)
    c. No count or size measurements
    d. Discard

3. Appendix 3. Phytoplankton sampling for Jeanette Gann (AFSC/EMA, Juneau).

Principle Investigator (PI)/Point of Contact: Jeanette Gann
AFSC Point of Contact: Jeanette Gann
Affiliation: AFSC/ABL/EMA
Address: 17109 Point Lena Loop Road, Juneau, AK 99801
Email: Jeanette.gann@noaa.gov
Phone: 907 789-6445

General Description and Objectives:
Preserved phytoplankton samples are to be collected for ID and enumeration. These data will be used to compare onshore-offshore differences in phytoplankton taxa as well as to compare eastern and western GOA phytoplankton community differences.

Collection Protocol:
Detailed descriptor of protocol, labeling, storage

Stations:
Samples should be collected at each CTD station where Niskin bottles are used for water collection (All of Line 8 sampling as well as CTDs A-H). Please collect samples from 3 depths at each station as follows:

1) Surface
2) Depth closest to the fluorescence Max (if there is one, if not then collect at 10 meters)
3) Depth closest to the pycnocline (if there is no distinct pycnocline collect at 30 meters)

Phytoplankton Collection Jars:
Please label jars on the cap using a sharpie marker with (cruise #, station #, year, and depth). Do not put paper labels inside the jars because cells can stick to the paper and not be dislodged when the sample is shaken prior to settling and enumeration.

Preparation of formalin solution:
Dilute formalin solution (~37% - 40% formaldehyde) with distilled water or filtered seawater so that concentration is ~ 20% formaldehyde (i.e. 1:1 ratio of formalin to water), then add buffer and swirl to mix. The end concentration of formalin in each sample will be <1%.

***There should already be a jar of premade buffered formalin with my name on it that was left on board from the spring 70m isobath survey. If there is no formalin left in the jar, more will need to be made using borax, formalin and either filtered seawater or distilled water.
To make 500 mls of buffered formalin:

- 250 mls Distilled water/ filtered seawater
- 250 mls Formalin (~37- 40%)
- Add 4 teaspoons of Borax to the container and swirl until the Borax is dissolved.
- Label the jar with “Gann”, and “ 20% Buffered Formalin”.

Volume of above buffered formalin solution to be added to each sample:
C1*V1 = C2*V2

(20%)*(x) = (1%)*(~200mls)
20x = 200 => 10 mls

Sample collection:
Rinse jar 3 times with a small amount (~10 ml) of sample water. Fill 250 ml jar to approximately 4/5ths full (or ~200 mls. Add 10 ml of buffered formalin using a syringe (syringe can be reused if it doesn't become contaminated by the water sample). After capping tightly, invert the sample bottle gently a couple times to mix. Wrap Parafilm around lip of bottle and lid to keep out air (and keep formalin vapors from escaping). Store in original box that jars came in. Store in cool place but do not freeze.
Wrap bubble wrap (sent along with sampling package) around each jar (or every other jar if they won't fit) before shipping back to Juneau.

Data request:
Any associated sample collection information (Latitude, Longitude, bottom depth, collection date, fluorescence data).

List of supplies:

- Two boxes of 250 ml glass jars with lids
- Parafilm
- Bubble wrap
- Printed protocol sheet

Hazardous materials:
Buffered formalin provided by FOCI (THANK YOU!)
Shipping of preserved samples will contain <1% formalin and are not considered hazmat.

Shipping:
NOAA/TSMRI
Jeanette Gann
17109 Point Lena Loop road
Juneau, AK 99801

Shipping payment to be figured out separately (It's likely Jeanette will coordinate with Lisa Eisner to get samples back to Juneau).

Permits (if applicable):
N/A

4. Appendix 4. Chemical Hygiene Plan

Previous sections of the Project Instructions include a list of hazardous materials by name and anticipated quantity. Chemicals will be transported, stored and used in a manner that will avoid any spills and adequate containment, absorbents and cleanup materials will be available in the event of a chemical spill.

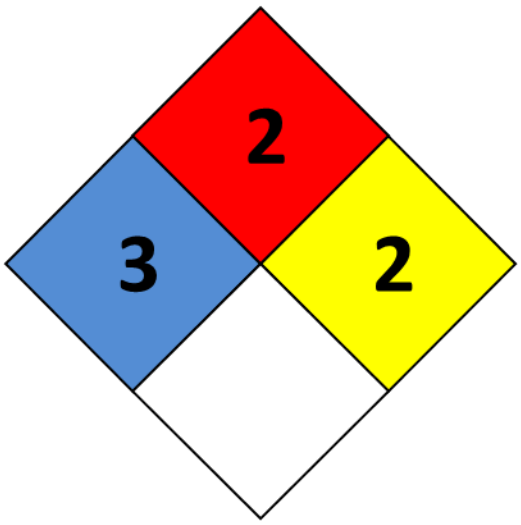
The scientific chemicals to be used for this project are: (1) ethyl alcohol (100%) and (2) formaldehyde (37%). Other chemicals brought aboard are consumer products in consumer quantities. Dilutions of the scientific chemicals will be used to preserve organisms collected with Bongo nets, as described in the Operations section of these Project Instructions. Use of these chemicals and the specified dilutions will only occur in exterior locations on the ship away from air intakes. Scientific chemicals shall not be disposed over the side.

Standard Operating Procedures and Information Sheets are provided here for the scientific chemicals. Included are details concerning personal protective equipment, work area precautions, special handling and storage requirements, spill and accident procedures/first aid, waste disposal and other pertinent information. Both small and large spills are of particular concern. In both cases, the spill response is intended to first contain the spill and then neutralize it. This may be easily accomplished for small spills depending on the degree of vessel motion and the prevailing environmental conditions. In all cases, the first responder should quickly evaluate the risks of personal exposure versus the potential impacts of a delayed response to the spill and act accordingly. For example, if the spill is small and it is safe to do so, a neutralizing agent should be rapidly applied to encircle/contain the spill and then cover it. However, a large formaldehyde spill (> 1 L) is extremely hazardous and individuals at risk of exposure should immediately leave the area. The CO or OOD should be notified immediately so that a response team with self-contained breathing apparatus (SCBA) can be deployed to complete the cleanup operation or dispense the hazard with a fire hose directed overboard. The vessel's course should be adjusted to minimize exposure of personnel to wind-driven vapors and to limit spread of the spill due to vessel motion. The reportable quantity (RQ) of formaldehyde is 1,000 pounds and the RQ for ethyl alcohol is 5,000 pounds which greatly exceed the quantities brought aboard for this project.

Standard Operating Procedures – Formaldehyde At-Sea

Chemical Name: 37% Formaldehyde

UN Number: 1198



Hazard Ratings: (on a scale of 0 to 4)

Health (blue): 3 Flammability (red): 2

Reactivity (yellow): 2 Special (white):

Personal Protection Gear Needed

*gloves

*goggles or face shield

Special Handling Instructions

* If a ventilation hood is not available, then pouring of chemical must be done outside. At least two people should be involved with large chemical transfers in case of an emergency.

* Chemical must be stored at temperatures above 15^{o}C to prevent polymerization of paraformaldehyde.

First Aid

* If swallowed, give large amounts of drinking water and induce vomitting.

*If vapors inhaled, get out into fresh air immediately. Give oxygen if breathing is difficult.

* If spilled on skin or splashed in eyes, flush with water for at least 15 minutes.

Spill Cleanup Procedures

For small spills (500-1000 mls):

Cover spill quickly with a Fan Pad and spray on Formalex to deactivate and absorb chemical. Let material sit for 10 - 15 minutes. Dispose of materials in plastic bag.

For large spills (1000 mls - ?):

Use a combination of Fan Pads and Formalex as quickly as possible to contain spill and deactivate it. Vacate area and try to ventilate room, if possible. Call Bridge immediately.

Deactivation/Disposal Procedures At Sea

*Formalex is a greenish liquid that is to be used to insure proper chemical deactivation. Formalex should also be used in conjunction with Fan Pads. Place used Fan Pad in plastic bag, seal, and put in bottom of Spill Kit.

*Fan Pads may be used to absorb small spills alone but these pads work best when used with Formalex to immediately control the vapor layer.

Shipping Procedures and Restrictions

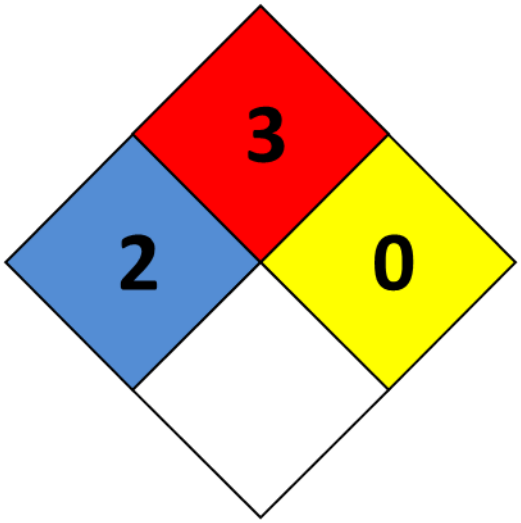
37% formaldehyde cannot be ship by air due to its flammability rating.

All quantities should be over-packed with absorbency material in case the original container is damaged. When shipping by barge or land, labels are not required for quantities under 110 gallons by D.O.T. but the container should have MSDSs and the UN number readily available.

Standard Operating Procedures – Ethanol At-Sea

Chemical Name: 100% Alcohol

UN Number: 1170



Hazard Ratings: (on a scale of 0 to 4)

Health (blue): 2 Flammability (red): 3

Reactivity (yellow): 1 Special (white):

Personal Protection Gear Needed

*gloves

*goggles or face shield when pouring

Special Handling Instructions

* Keep away from heat, flame, and other potential ignition sources.

* Store in a well ventilated area or in a flammable cabinet.

First Aid

* If swallowed, give large amounts of drinking water and induce vomitting.

* If vapors inhaled, get out into fresh air immediately. Give oxygen if breathing is difficult.

* If spilled on skin or splashed in eyes, flush with water for at least 15 minutes.

Spill Cleanup Procedures

Absorb ethanol with 3M Sorbent Pads and allow to dry in a well ventilated area away from ignition source.

Deactivation/Disposal Procedures At Sea

Use 3M Sorbent Pads to absorb the ethanol. Put used pads outside to dry (secure from blowing o verboard and exposure to flame). Once dry, the pads may be reused or burned.

Shipping Procedures and Restrictions

Due to the flammability rating of 95% ethanol, this chemical cannot be shipped by air. Transportation by barge or land vehicle will require the ethanol container to be over-packed with absorbent materials such as clumping kitty litter or shredded paper. Include MSDSs and the UN number with the shipment for reference in the event of a spill.