UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration

National Marine Fisheries Service
Alaska Fisheries Science Center
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FINAL Project Instructions

Date Submitted:	July 1, 2016
Platform:	NOAA Ship *Oscar Dyson*
Project Number:	DY-~~15~~16-09 (OMAO)
Project Title:	Bering Arctic subarctic Integrated Survey (BASIS)
Project Dates:	August 22 to September 20, 2016 (DY-16-09)

Prepared by: _____ **Dated:** 8/11/2016
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Approved by: _____ **Dated:** 8/11/2016
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Approved by: _____ **Dated:** 8-12-16
for **Phillip R. Mundy**
Director
Auke Bay Laboratories

Approved by: _____ **Dated:** 8/19/2016
FOR **Command Brian W. Parker, NOAA**
Commanding Officer
Marine Operations Center – Pacific

I. Overview

A. Brief Summary and Project Period

Project Period: August 22 – September 20, 2016

This research area is focused on improving and reducing uncertainty in stock assessment models of important commercial fish species in the Bering Sea through the collection of acoustics information, fish and zooplankton samples, and fisheries oceanographic indices.

B. Days at Sea (DAS)

Of the _28_ DAS scheduled for this project, _0_ DAS are funded by an OMAO allocation, _28_ 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)

Eastern Bering Sea (see Appendices 1 and 2).

D. Summary of Objectives

Note: Several major changes from past BASIS surveys are: 1) two trawls will be fished at each predetermined grid station (core trawl stations); a surface tow will be performed using a Can Trawl and an oblique trawl will be performed using our new NETS 156 trawl (200 m maximum headrope depth), 2) Predetermined grid stations (core trawl stations) are further apart than in the past and are identified as either core stations or adaptive sampling stations (adaptive trawl station); when catches at core trawl stations are deemed large enough the Chief Scientist will ask that we continue fishing at adjacent adaptive sampling stations, 3) Surface tows are to be performed during daylight hours only; however, co-occurring oblique trawls can be performed during day or night; order of operations is likely to be different at morning and afternoon stations, and 4) There will be no trawling on DY-16-10.

Summary of Objectives: Fisheries (surface, oblique, and targeted midwater trawls) and oceanographic survey to:

(1) Describe the community structure, biomass, energetic status, diets, and biological composition of epi-pelagic nekton including Pacific salmon, Pacific cod, age-0 pollock, jellyfish, herring, capelin and sand lance.

(2) Collect electronic oceanographic data including CTD (Conductivity-temperature-depth) vertical profiles of temperature, salinity, light transmission, chlorophyll a fluorescence, dissolved oxygen, photosynthetic available radiation (PAR). Continuously (along-track) collect sea surface temperature, salinity, chlorophyll a (chl-a) fluorescence data and above surface PAR (Hobo PAR sensor and data logger).

(3) Collect biological oceanographic samples (water and plankton); i.e. zoo- and ichthyoplankton data using a 20 and 60 cm bongo samplers (oblique tow with 150 µm and 505 µm nets, respectively to near bottom or 200 m), and nutrients, chl-a, dissolved oxygen, and salinity using Niskin bottles attached to the carousel housing the CTD.

These samples are collected to yield environmental indices of the current status and trends in the Bering Sea ecosystem.

(4) Conduct jellyfish sampling and experimentation to determine the diets and feeding rates of the dominant large jellyfish, *Chrysaora melanaster*, on fish eggs and larvae and on important fish prey (copepods, ichthyoplankton, euphausiids). Experiments will run in 24 hour intervals and require dip-netting of up to 150 individuals.

(5) Collect microzooplankton samples from Niskin bottles at a subset of stations.

(6) Sort zooplankton to taxa for energetics analysis (fatty acids) and filter water samples for fatty acid analysis of phytoplankton and microzooplankton at a subset of stations.

E. Participating Institutions

AFSC - Alaska Fisheries Science Center, Juneau, AK and Seattle, WA

PMEL - Pacific Marine Environmental Laboratory, Seattle, WA

USFWS – United States Fish and Wildlife Service, Anchorage, AK

YALE – Yale University, New Haven, CT

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

Name (Last, First)	**Title**	**Date Aboard**	**Date Disembark**	**Gender**	**Affiliation**	**Nationality**
Andrews, Alex	Chief Scientist	8/19	9/21	M	AFSC	USA
Wilson, Matt	Fish Res. Biol.	8/19	9/4	M	AFSC	USA
Siddon, Elizabeth	Fish Res. Biol.	8/20	9/4	F	AFSC	USA
Spear, Adam	Fish Res. Biol.	8/20	9/21	M	AFSC	USA
Auburn-Cook, Mary	Fish Res. Biol.	8/20	9/21	F	AFSC	USA
Strausz, David	Oceanographer	8/20	9/4	M	PMEL	USA
Cross, Jessica	Oceanographer	8/20	9/4	F	PMEL	USA
Lamb, Jesse	Fish Res. Biol.	8/20	9/4	M	AFSC	USA
Zeman, Samantha	Fish Res. Biol.	8/20	9/4	F	AFSC	USA
DiFiore, Bartholomew	Fish Res. Biol.	8/20	9/4	M	YALE	USA
Mosher, Stella	Fish Res. Biol.	8/20	9/4	F	AFSC	USA
Cooper, Dan	Chief Scientist	9/5	9/21	M	AFSC	USA
Randall, Jessica	Fish Res. Biol.	9/5	10/7	F	AFSC	USA
Johnson, Melissa	Fish Res. Biol.	9/5	10/7	F	AFSC	USA
Proctor, Peter	Oceanographer	9/5	10/7	M	PMEL	USA
Tabisola, Heather	Oceanographer	9/5	9/20	F	PMEL	USA
Weiss, Courtney	Fish Res. Biol.	9/5	9/20	F	AFSC	USA

G. Administrative

1. Points of Contacts:

Alex Andrews (Chief Scientist, DY-16-09, Leg 1), AFSC, 17109 Point Lena Loop Road, Juneau, AK 99801, ph: 907-789-6655, Alex.Andrews@noaa.gov

Dan Cooper (Chief Scientist, DY-16-09, Leg 2), AFSC, 7600 Sand Point Way NE, Bldg 4, Seattle, WA 98115, ph: 206-526-4330, Dan.Cooper@noaa.gov

Elizabeth Siddon (Alternate, DY-16-09, Leg 1), AFSC, 17109 Point Lena Loop Road, Juneau, AK 99801, ph: 907-789-6055, Elizabeth.Siddon@noaa.gov

Ed Farley (EMA Program Manager), AFSC, 17109 Point Lena Loop Road, Juneau, AK 99801, 907-789-6085, Ed.Farley@noaa.gov

Janet Duffy-Anderson (RP Program Manager), AFSC, 7600 Sand Point Way NE, Bldg 4, Seattle, WA 98115, ph: 206-526-6465, Janet.Duffy-Anderson@noaa.gov

Phyllis Stabeno (PMEL Program Manager), PMEL, 7600 Sand Point Way NE, Bldg 3, Seattle, WA 98115, ph: 206-526-6453, Phyllis.Stabeno@noaa.gov

LT Carl Rhodes (Operations Officer NOAA Ship *Oscar Dyson*), NOAA Corps, 2002 SE Marine Science Dr., Newport, OR 97365, ph: (541) 867-8911, cell: (617) 283-1324, ops.oscar.dyson@noaa.gov

Oscar Dyson
CO cell: 206-271-4475
XO cell: 206-295-0775
CME cell: 206-604-4685
Iridium: 808-659-0050
Underway VIOP: 301-713-7778
INMARSAT: 011-870-336-995-920 (voice)

2. Diplomatic Clearances

None Required.

3. Licenses and Permits

This project will be conducted under the Scientific Research Permit (U.S.) issued by the Alaska Regional Office, National Marine Fisheries Service (Permit number 2016-B1). The Chief Scientists are included as authorized participants on this permit.

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:

DY-16-09, Leg 1

Aug 19/20	Load nets, doors, totes, etc.
Aug 20	Embark scientists in Dutch Harbor, AK
Aug 22	Depart Dutch Harbor, AK for eastern Bering Sea
Aug 22 - Sep 4	Fish/Ocean survey

Sep 4	Arrive Dutch Harbor, AK
Sep 4 - 5	Disembark scientific party

DY-16-09, Leg 2

Sep 5	Embark scientists in Dutch Harbor, AK
Sep 7	Depart Dutch Harbor, AK for eastern Bering Sea
Sep 7 - 20	Fish/Ocean survey
Sep 20	Arrive Dutch Harbor, AK
Sep 20 - 21	Offload Can Trawl nets, doors, etc. Disembark scientific party

B. Staging and De-staging:

The scientific gear necessary for the project will be shipped to Dutch Harbor, AK and loaded onto NOAA Ship *Oscar Dyson* prior to departure 19-21 August 2016.

Can Trawls, doors, and bridles will be offloaded in Dutch Harbor at the end of Leg 2 (DY-16-09). Some equipment will be offloaded in Kodiak, AK. **Request DY transport biological and oceanographic samples, equipment, and chemicals to Port Angeles, WA (or suitable port in WA) sometime in mid-October as in past years.**

C. Operations to be Conducted:

1. Perform several comparison tows with new NETS 156 pelagic trawl and Can Trawl to evaluate trawl performance. Attach Simrad net sounder and ITI sensors to collect net mensuration data; adjust tom weights and headrope floatation, as needed. Consult with CO and OPS officer to select an area where the water depth and weather will allow for a variety of tests.

2. Conduct trawl operations during day and night-time periods. We request 24 hour operations, with sufficient deck and survey support for all operations. Surface tows will be performed with the Can Trawl during day-time periods only; while oblique trawls will be performed with our new pelagic trawl NETS 156 during day and night-time periods. Stations will be sampled using a systematic grid design with stations spaced every 60 minutes of Latitude and 1 degree of Longitude. The main survey grid will cover the area from 160° W to 175° W at locations with water depths of at least 25 meters (see Appendix 1). We have achieved stations of this depth in the past on *Oscar Dyson*, but as always, we can modify trawl station locations as required. Our grid is comprised of both core and adaptive trawl stations. Our goal is to occupy all core stations and to occupy adjacent adaptive stations when age-0 pollock catches meet our threshold at core stations.

The purpose of having core and adaptive stations is to improve the efficiency of our survey time and focus our efforts in areas where age-0 pollock are found and to minimize our sampling in areas where they are not found.

As we work along the transects north to south or vice versa, and the ship approaches the edge of our core grid age-0 pollock catches will be evaluated from the surface and pelagic trawls. The decision to continue to adjacent

adaptive stations will be based on a threshold. If the age-0 pollock catches are below the threshold, no adaptive stations will be sampled along that transect and the ship moves to the next line. If the age-0 pollock catches are above the threshold, the first adaptive station is sampled (and any oceanography station in between). This will continue until the threshold is reached, or until there are no more adaptive stations along that line.

The threshold is determined for each survey. A threshold of the 25th percentile of age-0 pollock catches from previous years is the default. After survey operations begin, the threshold may be adjusted up to insure that all core stations are sampled based on remaining ship time.

3. Trawl operations require that the NETS 156 pelagic trawl be loaded onto one net reel and the Can Trawl be loaded onto the other. In addition, we will have a spare NETS 156 and a spare Can Trawl. A pair of NETS five-meter alloy doors will be used with both trawls. We may need to experiment by adding tom weights to the footrope and trawl floats to the headrope to obtain an adequate vertical mouth opening. A second pair of NETS doors will be stored on board the vessel as backup gear. We request that the Chief Boatswain keep a trawl gear logbook to record all modifications made to trawl gear during the project. An average of 2 oblique tows, 2 surface tows, and an occasional opportunistic targeted midwater per 24 hrs is anticipated.

Surface trawl haul duration will be 30 minutes, beginning when the doors are fully deployed to ensure an adequate sample. Due to ship location of the Simrad FS-70 3rd wire net sounder, and past complications in using this sounder to successfully conduct surface trawl operations, the net sounder will not be used to document net dimensions (width and depth) during the 30 minute surface trawl. In place of the Simrad FS-70, SBE39 sensors will be placed on the headrope and footrope of the surface trawl to collect data on net spread (vertical) and location in the water column. Potentially, Simrad ITI sensors (i.e. trawl monitoring system) will be attached to the footrope for real-time depth information.

Pelagic trawl haul duration will vary depending on water depth, beginning when the doors go in and ending when the doors come out. The Simrad FS-70 3rd wire net sounder **will** be placed on the kite at the headrope to provide real-time net dimensions. In addition, SBE39 sensors will be placed on the headrope and footrope of the surface trawl to collect data on vertical spread and location in the water column. Potentially, Simrad ITI sensors (i.e. trawl monitoring system) will be attached to the footrope for real-time depth information. We will place small cameras on the trawl to learn more about the water flow characteristics and possible areas of fish escapement.

Targeted midwater trawl hauls will be made to identify acoustic backscatter and to provide fish samples and other biological data. Targeted midwater trawl hauls will be conducted during daytime periods when suitable backscatter conditions are encountered. Tow duration will depend on the echosign present, but it is generally anticipated that no more than 30 minutes will be spent within the scattering layer (estimate excludes trawl deployment/recovery times). The Simrad FS-70 system **will** be used for all targeted midwater hauls. Additionally,

SBE39 sensors will be attached to the trawl headrope and footrope to estimate net mouth vertical opening.

Biological data collected from each haul will include species composition by weight and number, sex composition, length frequencies, whole fish weight, maturities, salmon scales, and otoliths.

4. Acoustic data will be collected continuously with a Simrad EK60 echo integration system incorporating centerboard-mounted transducers at 18, 38, 70, 120, and 200 kHz. The centerboard should be left in the **intermediate** position during the entire project. It is requested that vessel not operate other echo sounders or acoustic equipment that interferes with collection of scientific acoustic data unless it is unsafe to navigate without them. The bow thrusters, Doppler speed log and bridge Furuno depth sounder should all be secured, as long as it is safe to do so as determined by the ship's OOD, as those degrade the quality of acoustic data.

5.. At each predetermined trawl station and at each oceanography stations, small fishes and zooplankton will be sampled using fine-mesh nets: 60 cm diameter bongo nets (oblique tow) with 505 micron nets, and a 20 cm bongo array with 150 micron nets. Zooplankton net tows will occur during day and nighttime hours. The bongo net will be deployed on one of the oceanographic winches with conducting wire (using real time CTD data collected with an SBE19 or SBE 49). Plankton samples will be preserved in 5% buffered formalin. 60Bon Net 1 will be preserved for zoo- and ichthyoplankton and 60Bon Net 2 will be sorted at sea for special projects (e.g. fatty acid analysis) and then discarded. Samples for fatty acids must be stored in the -80 ºC freezer. 20 Bon Net 1 will be preserved for zooplankton, 20 Bon Net 2 will be sorted for special projects (time permitting, e.g. fatty acid analysis) and discarded. Zooplankton tows will be to near-bottom (5-10 m from bottom) or 200 m (if bottom depths are > 200 m).

6. CTD casts will be conducted at each trawl station and at each oceanography station; *ad-hoc* casts may be necessary to document changes in oceanographic characteristics during the survey. For each cast, instruments and 5 or 10 L Niskin bottles will be added to the ship's CTD carousel. Instruments added to the ship's SBE 911+ CTD include secondary TC sensors, a PAR spherical sensor (Biospherical Instruments QSP 2300), chl-a fluorometer with turbidity sensor (Wet Labs ECO FL-NTU), beam transmissometer (Wet Labs C-star), and two dissolved oxygen sensors (SBE 43). CTD casts will be to near-bottom (5-10 m from bottom).

7. We will collect along-track surface measurements of temperature, salinity, and chlorophyll a fluorescence using the ship's thermosalinograph (TSG) system (SBE-45, Wet Labs WetStar fluorometer).

8. Water samples collected with Niskin bottles attached to the CTD will be sampled for chlorophyll a, nutrients, salinity, oxygen, phytoplankton taxa, primary production experiments and possibly microzooplankton (preserved with Lugols). Primary production experiments using stable (non-radioactive) isotopes will be conducted at a subset of stations using deck-board incubators cooled with surface seawater. Water samples for fatty acid analysis will be conducted at a

subset of stations. Chl-a, primary production, and fatty acid samples must be stored in the -80 ºC freezer.

9. Above surface PAR data will be continually recorded with a HoBo PAR sensor and data logger mounted on the flying bridge.

10. Up to 200 samples of the target species *Chrysaora melanaster* will be collected for gut analysis. Jellyfish will be netted from the hero deck at the surface with a long-handled dip-net or with a 1-m "gel net" to keep sample intact and to minimize net damage. If time allows on station, we may request that the hero deck platform be deployed to allow for easier netting of specimens further away from the ship's hull. A total of 25 specimens will be collected per station to allow analysis of the relationship between the local diet and local oceanographic, zooplankton, and pelagic fish community observations. Upon collection, individual jellyfish will be weighed and measured, and all gut and appendage contents will be immediately preserved in 5% formalin in separate containers. Samples will be processed for diet analysis in the laboratory or onboard depending on vessel staffing and time.

11. Gut evacuation experiments will be conducted August 22 to September 4 to estimate digestion times of different prey types by the jellyfish, *C. melanaster*. During the BASIS surveys aboard NOAA Ship *Oscar Dyson*, 40 jellyfish will be dip-netted from the sea surface and placed in 20 20-L containers filled with 80-µm filtered seawater at ambient temperature in total darkness. Individual feeding intensity will be factored into determining digestion rates. Ten jellyfish will be removed and preserved at 0, 2, 4, and 6h intervals. Individual jellyfish will be placed in separate containers in 5% buffered formalin and gut contents will be enumerated as above. Deck space for tanks with seawater access will be needed; approximately a 6 foot by 6 foot footprint.

12. Standard station activities include:

<u>Core and Adaptive Trawl Stations</u>

- CTD cast with Niskin water sample collection.
- Jellyfish (when present near surface) sampled with dipnet.
- Oblique bongo net tow (FOCI set-up, 20 & 60 cm bongo).
- Oblique tow (NETS 156 pelagic trawl, average 2 tows/24 h)
- Surface tow (Can Trawl, average 2 tows/**day time period**)

<u>Oceanography Stations</u>

- CTD cast with Niskin water sample collection.
- Jellyfish (when present near surface) sampled with dipnet.
- Oblique bongo net tow (FOCI set-up, 20 & 60 cm bongo).

*Targeted mid-water trawl (opportunistically; location and duration determined at sea).

Station Time (estimated). This schedule may be adjusted depending on time of sunrise and sunset:

1 ~05:00 – CTD, Jellyfish, Bongo, Oblique, Surface (day time only)
2 ~13:00 – CTD, Jellyfish, Bongo

3 ~17:00 – CTD, Jellyfish, Bongo, Surface (day time only), Oblique

4 ~ 01:00 – CTD, Jellyfish, Bongo

We plan for 2 scientific teams with 12 hour shifts each. It is likely that the first shift will begin on or around 06:00 and end at 18:00 and the second shift will begin around 18:00 and end around 06:00. When time allows, we request assistance from the survey techs sorting and processing the fish catch.

13. The Scientific Computing System (SCS) will be configured to log data from a large array of sensors during the project including data from the thermosalinograph, CTD casts, weather data (particularly above surface PAR or other light measurements (e.g. radiometer) and wind speed and direction), etc.

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 which preclude normal operations: None known.

F. 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-out 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 guy.fleischer@noaa.gov and jeff.napp@noaa.gov with cc to john.c.clary@noaa.gov. 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

III. Equipment (Hazardous materials are not to be listed here. They should be included in Hazardous Materials Section.)

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

1. Acoustic Equipment
   - GPS with NEMA 183 to ER60 (2)
   - 50/200 kHz EK60 Bridge sounder
   - Furuno FE-700 fathometer
   - Acoustic echosounders (5)
2. Trawling Equipment
   - 3rd wire FS-70 net sonar with winch and accessories (2)
   - Simrad ITI net mensuration system (2)
   - Furuno CN24-40 headrope transducer
   - Stern trawl capabilities for pelagic and beam trawls
   - Slack lines and door legs
3. Oceanographic Equipment

- Both starboard oceanographic winches with conducting cable, slip rings and blocks. Forward winch terminated for CTD/rosette; aft winch terminated for SeaCat/FastCat.
- Seabird SBE 911+CTD System with 10 L Niskin bottles
- Seabird SBE19+CTD and PDIM for real time data on zooplankton tows
- SBE45 Thermosalinograph with fluorometer
- Wire speed indicators and readout for both hydrographic winches visible in Dry Lab or where SEACAT operations occur
- Weather instr. For above surface PAR, wind speed/direction
- Ship's crane

4. Biological Sampling Equipment
    - Fish lab conveyor system
    - Catch sorting and weighing table
5. Computing equipment
    - Scientific Computing System
6. Sample storage equipment
    - Supercold freezer (-80C)
    - Walk in freezer (-10C)
    - Stand up freezer (-20C)
    - Hazmat storage cabinets
7. Laboratory and exterior working space
    - Scientific Computer System (SCS)
    - Video monitors in Dry, Chemistry, and Wet labs for viewing SCS and Electronic MOA 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
    - Surface seawater on aft deck for jellyfish experiments, primary production experiments, and zooplankton starvation experiments (see special project 2 below).

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

1. Trawling Equipment (11,000lbs)
    - Can Trawl mid water trawl w/accessories (e.g., 2.0cm mesh liners,) (2); 7,000lbs
    - Can Trawl - Spectra bridles (60 m); 300lbs
    - NETS pelagic trawl w/ accessories (2; 1800lbs)
    - NETS 5.0m doors with accessories (2 sets; 3,000lbs)
    - Tom weights 600 lbs (4 ea 100 lb , and 50 lb clump weights)
    - All accessories to make trawls fishable and spare web if available
2. Oceanographic Equipment (1,500lbs)
    - Biospherical SP2300 PAR sensor
    - Wet labs ECO Fluorometer and turbidity sensor (FL-NTU)

- Wet labs C-star Transmissometer
- SBE 43 dissolved oxygen sensor (2)
- Secondary TC sensors for SBE 911+
- SBE 19Plus SeaCat
- SBE 49 FastCat
- Filter racks and pumps (3)
- Microscopes (compound, dissecting, stereo) (4)
- 20 & 60 cm Bongo frames, 505/153 mesh nets, cod ends, weights, and flowmeters
- CalVET frame and 53 µm mesh nets, cod ends, and flow meters
- Multinet and associated nets and gear
- Two wire-angle indicators
- Deck-board incubators (2) for primary production experiments
- Deck-board tanks for jellyfish experiments
- Biological supplies (misc.) *
- Jellyfish dipnets (3)

3. Biological Sampling Equipment (500lbs)
    - Dynamometer
    - Marel M60 60 kg scale (2); already on ship (MACE)
    - Marel M60 6 kg scale (2); already on ship (MACE)
    - Mechanical platform scale (2); already on ship (MACE)
    - Fish baskets (30); already on ship (MACE)
    - Fish catch logging system (CLAMS); already on ship (MACE)
    - Elect. Fish meas. Board (2); already on ship (MACE)
4. Miscellaneous scientific sampling and processing equipment
    - Dishpans (10, MACE)
    - 5-gal buckets (5)
    - Wading pools (small and large)
    - Two length board and strips for adult fish
    - Three length boards for small fish
    - SBE-39 temperature and depth sensor (MACE) for beam trawl
    - Triple-beam balance for small fish weights
    - 1000 Zip-loc bags (12”)
    - Sieves, jar holder, funnels, squirt bottles
    - 30 cases of 32-oz jars, closures, and labels
    - 10 flowmeters, calibration data, hardware for attaching and maintaining them
    - Preservative-dispenser equipment
    - Hazardous materials spill kit
    - Spare wire angle indicator
5. Computing equipment (50lbs)
    - IBM compatibles
    - Printers*
    - Laptops
    - Cruise Operations Database (COD) software and forms

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 and ship's ECO 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

Dyson loaded 1/28/2016 by FOCI and MACE personnel. All chemicals listed will be used for the entire 2016 *Dyson* 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 the *Dyson* before the loading of the vessel.

Common Name	Concentration	Amount	Spill Response (all FOCI/MACE/PMEL/EMA personnel)	Notes
Dihydrogen Oxide Property of PMEL		20 liters	Spill Control: W Gloves Paper towels	Not a regulated chemical/solution. Used for oxygen titrations.
DNA Away	100%	1 – 250 ml	Gloves Paper towels Plastic bag	Not a regulated chemical.
Ethanol Property of FOCI	100%	2 -1 gal. plastic jugs	Gloves 3M Sorbent Pads Plastic bag	Store in Chem. Lab yellow flammables cabinet.
Ethylene Glycol Property of FOCI	100%	1 – 500 ml	Gloves Paper towels Plastic bag	Not a regulated chemical. Store in Spill Kit.
Formaldehyde Property of FOCI	37%	3 – 5 gal. barrels	Gloves Eye Protection Fan-Pads Formalex PolyForm-F Plastic bags	Store in Fish Lab flammable cabinets. Will need to place 2-3 in each cabinet.
Formaldehyde Property of Sandi Neidetcher	37%	5 – 1 liter plastic bottles	Gloves Eye Protection Fan-Pads Formalex PolyForm-F Plastic bag	Store in Fish Lab flammable cabinet.
Formaldehyde Property of Troy Buckley	37%	6 – 1 liter plastic bottles	Gloves Eye Protection Fan-Pads Formalex PolyForm-F Plastic bag	Store in Fish Lab flammable cabinet.
Glycerol/Thymol Solution Property of	50 %	1 – 5 gal., 1 – 4 gal. bucket	Gloves Paper towels Kitty litter	Not a regulated chemical/solution. Store in Fish Lab under sink.

MACE				
Hydrochloric Acid Property of PMEL		1 – 500 ml	Gloves 1-1 Spilfyter Acid Neutralizer	Stored in over-pack bucket.
Lithium 3v Batteries Property of FOCI		9	NA	Store in Survey Office for Spring Mooring Multi-Net use
Lithium 9v Batteries Property of PMEL		8	NA	In SeaBird and Wetlabs instruments
Lithium AA Batteries Property of PMEL		96	NA	In SeaBird instruments and MicroCats Saft LS14500
Lithium D Cell Batteries Property of PMEL		150	NA	In RCM9 & Peggy Mooring
Manganese Chloride Property of PMEL	3M	1 liter		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	Used for oxygen titrations.
Sodium Borate Solution Property of FOCI	5-6%	1 – 5 gal.	Gloves Paper towels Plastic bag	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	Not a regulated chemical. Stored in Spill Kit.
Sodium Iodide/NaOH Solution	0.11M	1 liter	Spill Control: B	Used for oxygen titrations.

Property of PMEL				
Sodium Thiosulfate Property of PMEL	0.11 M	1 liter	Spill Control: ST	Used for oxygen titrations.
Sulfuric Acid Property of PMEL	5 M	1 liter	Spill Control: A	Used for oxygen titrations.

C. Chemical safety and spill response procedures

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 in faunal 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.

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.

Formalin/Formaldehyde

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

Inventory of Spill Kit supplies

Product Name	Amount	Chemicals it is useful against	Amount it can clean up	Notes
Formalex	1-5 gallon 2 – 1 gal.	Formaldehyde cleanup (all concentrations)	7 gallons 1:1 control	Formalex will be used in conjunction with Fan-Pads to reduce total spill volume
Fan-Pads	2 rolls (50 sheets)	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=10-250 ml spills	Pads may be reused if dried out
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 reuse
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**
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	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 breath 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 saw dust to absorb.

W: Water

☐ Absorb the liquid and wash with water

☐ Wear PPE

E: Ethanol

☐ Eliminate all ignition sources

☐ Wear PPE

Chemical Hygiene Plan and Standard Operating Procedures (SOPs)

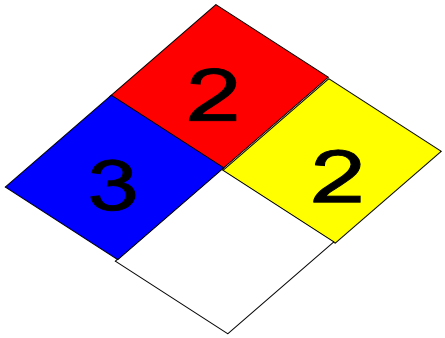
Chemical Hygiene Plan

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 in faunal organisms collected with benthic grab samplers, 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.

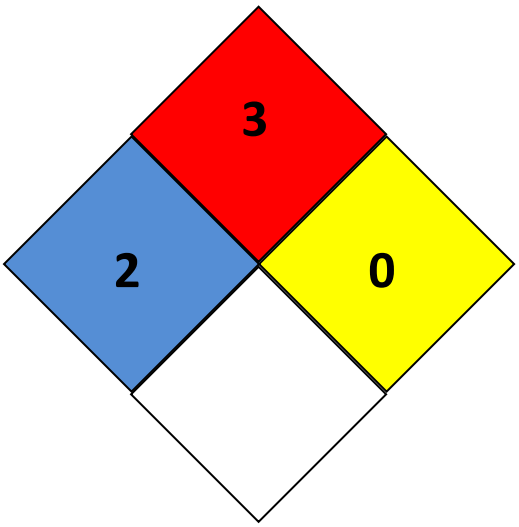
*Fan Pads may be used to absorb small spills alone but these pads work best when used with Formalex to immediately control the vapor layer.

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 overboard 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.

D. Radioactive Materials

No Radioactive Isotopes are planned for this project.

E. Inventory (itemized) of Radioactive Materials – **N/A**

V. Additional Projects

A. Supplementary ("Piggyback") Projects

Description:

1. Nutrient sampling and dissolved oxygen sample analysis will be conducted on-board ship by scientists from PMEL.

Nutrient sampling:

Nutrients will be sampled from the Niskin bottles on the CTD rosette. Samples will be filtered through a 0.45 micron filter directly into acid washed and dried, 60 ml bottles. The bottles will then be frozen in the -80°C freezer and shipped to PMEL at the end of the season for analysis at PMEL.

Oxygen Measurements

The procedure is based on that of Carpenter (1965)[JS1]. Winkler (1888) [CGR2]titrations will be conducted according to WOCE/CLIVAR protocols, and described in detail in GO_SHIP Repeat Hydrography Manual, Report number 14, ICPO Publication Series No. 134, Version 1, 2010. Samples will usually be collected in the upper layer on one station and in the bottom layer on the next station. End point determinations of the Winker titration will be determined by an amperometric method Culberson, (1991). Thiosulfate will be standardized for each batch of sample titrations, and blanks will be measured periodically during the project. Side by side comparison of this method with the photometric method show differences 0.06% or +/- 0.15 umol/kg. The automated amperometric titrator was designed by Chris Langdon at RSMAS in Miami.

References:

Carpenter, J. H., 1965. The Chesapeake Bay Institute technique for the Winkler dissolved oxygen method. *Limnol. Oceanogr.* **10**, 141 -143.

Culberson, C. H., 1991. Dissolved Oxygen, *in* WHP Operations and Methods – July 1991

Winkler, L. W., 1888. Die Bestimmung des im Wasser gelosten Saurestoffes. *Berichte der deutschen chemischen Gesellshaft.* **21**, 2, 2843 – 2854.

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. 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.

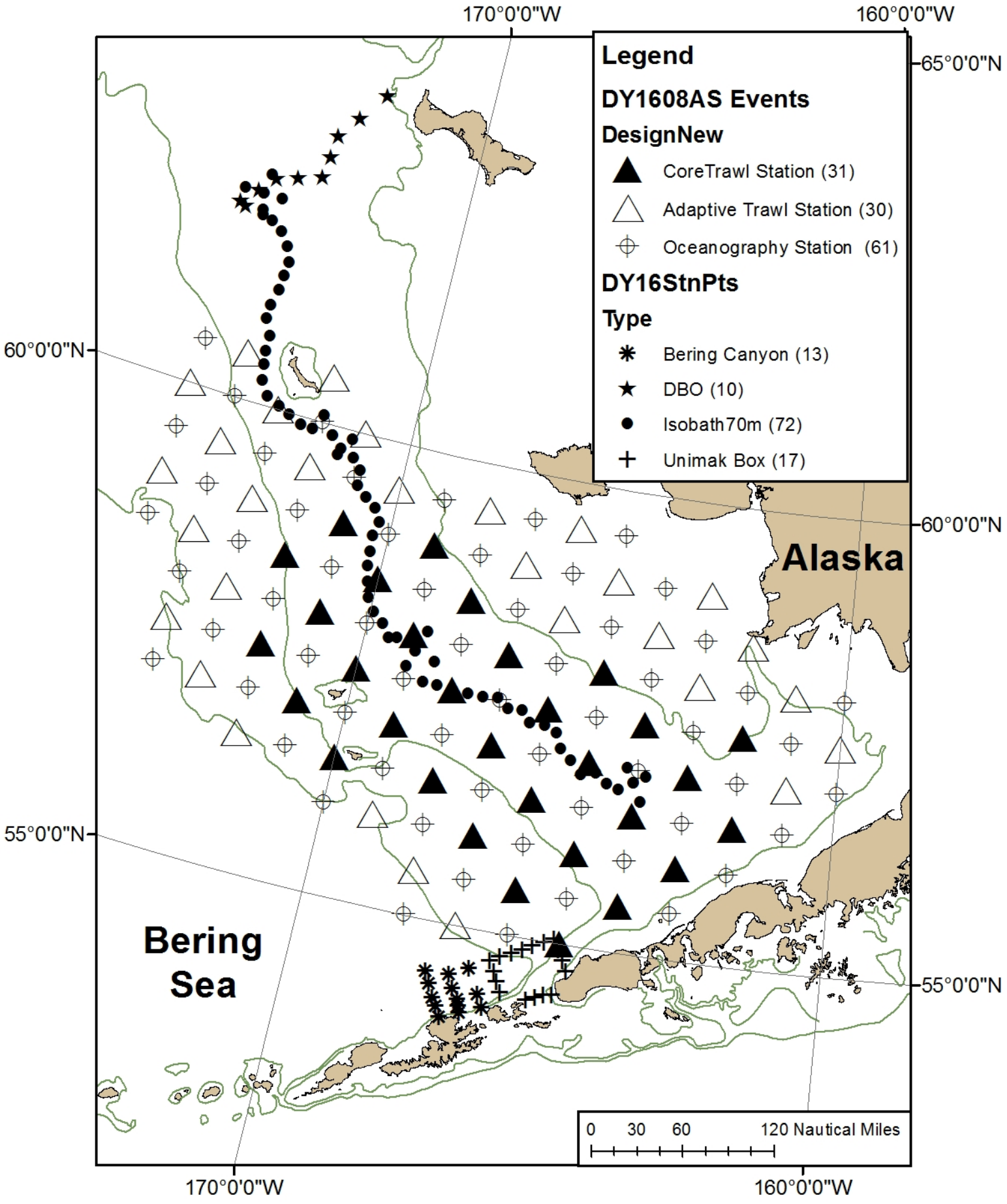
Non-NOAA personnel using the ship's computers or connecting their own computers to the ship's network must complete NOAA's IT Security Awareness Course within 3 days of embarking.

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.

IX. Appendices

1. Map of study area
2. Station/Waypoint List (coordinates in Latitude, Longitude; degrees-minutes)


170°0'0"W
160°0'0"W
65°0'0"N
60°0'0"N
55°0'0"N
Legend
DY1608AS Events
DesignNew
CoreTrawl Station (31)
Adaptive Trawl Station (30)
Oceanography Station (61)
DY16StnPts
Type
Bering Canyon (13)
DBO (10)
Isobath70m (72)
Unimak Box (17)
Alaska
Bering Sea
0 30 60 120 Nautical Miles

Type	StnID	Latdd	Londd	Lat Deg	Lat Min	Lon Deg	Lon Min	Operation
BASIS	CoreTrawl	57.5000	-172.0000	57	30.0000	-172	0.0000	CTD/BON/TRAWL
BASIS	CoreTrawl	58.5000	-172.0000	58	30.0000	-172	0.0000	CTD/BON/TRAWL
BASIS	CoreTrawl	57.0000	-171.0000	57	0.0000	-171	0.0000	CTD/BON/TRAWL
BASIS	CoreTrawl	58.0000	-171.0000	58	0.0000	-171	0.0000	CTD/BON/TRAWL
BASIS	CoreTrawl	59.0000	-171.0000	59	0.0000	-171	0.0000	CTD/BON/TRAWL
BASIS	CoreTrawl	56.5000	-170.0000	56	30.0000	-170	0.0000	CTD/BON/TRAWL
BASIS	CoreTrawl	57.5000	-170.0000	57	30.0000	-170	0.0000	CTD/BON/TRAWL
BASIS	CoreTrawl	58.5000	-170.0000	58	30.0000	-170	0.0000	CTD/BON/TRAWL
BASIS	CoreTrawl	57.0000	-169.0000	57	0.0000	-169	0.0000	CTD/BON/TRAWL
BASIS	CoreTrawl	58.0000	-169.0000	58	0.0000	-169	0.0000	CTD/BON/TRAWL
BASIS	CoreTrawl	59.0000	-169.0000	59	0.0000	-169	0.0000	CTD/BON/TRAWL
BASIS	CoreTrawl	56.5000	-168.0000	56	30.0000	-168	0.0000	CTD/BON/TRAWL
BASIS	CoreTrawl	57.5000	-168.0000	57	30.0000	-168	0.0000	CTD/BON/TRAWL
BASIS	CoreTrawl	58.5000	-168.0000	58	30.0000	-168	0.0000	CTD/BON/TRAWL
BASIS	CoreTrawl	56.0000	-167.0000	56	0.0000	-167	0.0000	CTD/BON/TRAWL
BASIS	CoreTrawl	57.0000	-167.0000	57	0.0000	-167	0.0000	CTD/BON/TRAWL
BASIS	CoreTrawl	58.0000	-167.0000	58	0.0000	-167	0.0000	CTD/BON/TRAWL
BASIS	CoreTrawl	55.5000	-166.0000	55	30.0000	-166	0.0000	CTD/BON/TRAWL
BASIS	CoreTrawl	56.5000	-166.0000	56	30.0000	-166	0.0000	CTD/BON/TRAWL
BASIS	CoreTrawl	57.5000	-166.0000	57	30.0000	-166	0.0000	CTD/BON/TRAWL
BASIS	CoreTrawl	55.0000	-165.0000	55	0.0000	-165	0.0000	CTD/BON/TRAWL
BASIS	CoreTrawl	56.0000	-165.0000	56	0.0000	-165	0.0000	CTD/BON/TRAWL
BASIS	CoreTrawl	57.0000	-165.0000	57	0.0000	-165	0.0000	CTD/BON/TRAWL
BASIS	CoreTrawl	58.0000	-165.0000	58	0.0000	-165	0.0000	CTD/BON/TRAWL
BASIS	CoreTrawl	55.5000	-164.0000	55	30.0000	-164	0.0000	CTD/BON/TRAWL
BASIS	CoreTrawl	56.5000	-164.0000	56	30.0000	-164	0.0000	CTD/BON/TRAWL
BASIS	CoreTrawl	57.5000	-164.0000	57	30.0000	-164	0.0000	CTD/BON/TRAWL
BASIS	CoreTrawl	56.0000	-163.0000	56	0.0000	-163	0.0000	CTD/BON/TRAWL
BASIS	CoreTrawl	57.0000	-163.0000	57	0.0000	-163	0.0000	CTD/BON/TRAWL
BASIS	CoreTrawl	56.5000	-162.0000	56	30.0000	-162	0.0000	CTD/BON/TRAWL
BASIS	CoreTrawl	57.5000	-162.0000	57	30.0000	-162	0.0000	CTD/BON/TRAWL
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BASIS	Oceanograph	59.0000	-168.0000	59	0.0000	-168	0.0000	CTD/BON
BASIS	Oceanograph	59.5000	-167.0000	59	30.0000	-167	0.0000	CTD/BON
BASIS	Oceanograph	59.0000	-166.0000	59	0.0000	-166	0.0000	CTD/BON
BASIS	Oceanograph	58.5000	-165.0000	58	30.0000	-165	0.0000	CTD/BON
BASIS	Oceanograph	59.5000	-165.0000	59	30.0000	-165	0.0000	CTD/BON
BASIS	Oceanograph	58.0000	-164.0000	58	0.0000	-164	0.0000	CTD/BON

BASIS	Oceanograph	59.0000	-164.0000	59	0.0000	-164	0.0000	CTD/BON
BASIS	Oceanograph	58.5000	-163.0000	58	30.0000	-163	0.0000	CTD/BON
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BASIS	Oceanograph	57.5000	-161.0000	57	30.0000	-161	0.0000	CTD/BON
BASIS	Oceanograph	57.0000	-160.0000	57	0.0000	-160	0.0000	CTD/BON
BASIS	Oceanograph	58.0000	-160.0000	58	0.0000	-160	0.0000	CTD/BON
BASIS	Oceanograph	57.5000	-173.0000	57	30.0000	-173	0.0000	CTD/BON
BASIS	Oceanograph	58.5000	-173.0000	58	30.0000	-173	0.0000	CTD/BON
BASIS	Oceanograph	59.5000	-173.0000	59	30.0000	-173	0.0000	CTD/BON
BASIS	Oceanograph	57.0000	-172.0000	57	0.0000	-172	0.0000	CTD/BON
BASIS	Oceanograph	58.0000	-172.0000	58	0.0000	-172	0.0000	CTD/BON
BASIS	Oceanograph	59.0000	-172.0000	59	0.0000	-172	0.0000	CTD/BON
BASIS	Oceanograph	56.5000	-171.0000	56	30.0000	-171	0.0000	CTD/BON
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BASIS	Oceanograph	58.5000	-171.0000	58	30.0000	-171	0.0000	CTD/BON
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BASIS	Oceanograph	59.0000	-170.0000	59	0.0000	-170	0.0000	CTD/BON
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BASIS	Oceanograph	57.0000	-168.0000	57	0.0000	-168	0.0000	CTD/BON
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BASIS	Oceanograph	57.0000	-164.0000	57	0.0000	-164	0.0000	CTD/BON
BASIS	Oceanograph	55.5000	-163.0000	55	30.0000	-163	0.0000	CTD/BON
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BASIS	Oceanograph	56.0000	-162.0000	56	0.0000	-162	0.0000	CTD/BON
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BASIS	AdaptiveTraw	60.0000	-175.0000	60	0.0000	-175	0.0000	CTD/BON/TRAWL
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BASIS	AdaptiveTraw	59.5000	-174.0000	59	30.0000	-174	0.0000	CTD/BON/TRAWL
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BASIS	AdaptiveTraw	57.0000	-161.0000	57	0.0000	-161	0.0000	CTD/BON/TRAWL
BASIS	AdaptiveTraw	58.0000	-161.0000	58	0.0000	-161	0.0000	CTD/BON/TRAWL
BASIS	AdaptiveTraw	57.5000	-160.0000	57	30.0000	-160	0.0000	CTD/BON/TRAWL