U. S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
OAR Laboratories

Pacific Marine Environmental Laboratory
NOAA Building Number 3
7600 Sand Point Way NE
Seattle, WA 98115

Project Instructions DY-19-08

Date Submitted: August 23, 2019

Platform: NOAA Ship *Oscar Dyson*

Project Number: DY-19-08 (OMAO)

Project Title: Eco-FOCI Fall Mooring Cruise and Hydrographic Survey

Project Dates: Sept 18, 2019 to October 2, 2019

Prepared by: _____ Dated: Aug 23, 2019
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NOAA-PMEL

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NOAA/PMEL

Approved by: _____ Dated: Aug. 26, 2019
Dr. Michelle McClure
Director - PMEL
NOAA/PMEL

Approved by: _____ Digitally signed by HOPKINS.MICHAEL.L.1005253515 Date: 2019.08.30 10:05:43 -07'00' Dated: _____
Captain Michael Hopkins, NOAA
Commanding Officer
Marine Operations Center – Pacific

I. Overview

A. Brief Summary and Project Period

Eco-FOCI Fall Mooring cruise and hydrographic/biological survey; September 18, 2019 to October 02, 2019

B. Days at Sea (DAS)

Of the 15 DAS scheduled for this project, 0 DAS are funded by an OMAO allocation, 15 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)

The operating area will consist of the Bering Sea and the northern Gulf of Alaska, with St Lawrence Island to the North, South to the Aleutian Chain and Unimak Pass, and 177 degrees to the West and 163 degrees to the east. Charts in Appendix I show the overall operating area and individual charts of each type of operation. This Appendix also contains a listing of all stations, their locations, operations to be performed and nominal depths.

D. Summary of Objectives

This project is intended to recover seven (7) and deploy eight (8) subsurface moorings at the Bering Sea sites of M2, M4, M5, and M8, and recover the two surface moorings at M2. In addition, two marine mammal moorings are to be recovered and deployed and four other sites will have a mammal mooring deployed. A hydrographic/biological survey consisting of **C**onductivity/**T**emperature/**D**epth (**CTD**) casts, 20/60 cm bongo tows and **C**alifornia **V**ertical **E**gg **T**ows (**C**al**VET**s) in the Unimak Pass, along the 70-meter isobath, in a box around the four mooring sites, and other areas as time permits such as the DBO1 line. Additionally, deploy 6 popup buoys and 96 Sonobuoys. If located and time permits, dragging for a Marine Mammal Mooring will also be attempted.

E. Participating Institutions

NOAA – Pacific Marine Environmental Laboratory (PMEL)
7600 Sand Point Way NE,
Seattle WA 98115

NOAA – Alaska Fisheries Science Center (AFSC)
7600 Sand Point Way NE,
Seattle, WA 98115

Joint Institute for the Study of the Atmosphere and Oceans (JISAO)
University of Washington
3737 Brooklyn Ave.
Seattle, WA 98105-6715

University of New Hampshire
24 Colovos Rd.
Durham, NH 03824

University of California Santa Barbara
Interdepartmental Program in Marine Science
Santa Barbara, Ca 93106

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

Name (Last, First)	**Title**	**Date Aboard**	**Date Disembark**	**Gender**	**Affiliation**	**Nationality**
Lebon, Geoffrey.	Scientist	16-Sep-19	02-Oct-18	Male	JISAO/UW	US
Proctor, Peter, Dr.	Chief Scientist	16-Sep-19	03-Oct-18	Male	JISAO/UW	US
Deary, Alison	Scientist	16-Sep-19	02-Oct-18	Female	NOAA	US
Lamb, Jesse	Scientist	16-Sep-19	02-Oct-18	Male	NOAA	US
Grassia, Stephanie	Scientist	16-Sep-19	03-Oct-18	Female	JISAO/UW	US
Wisegarver, Eric	Scientist	16-Sep-19	02-Oct-18	Male	NOAA	US
Johnson, Jennifer	Scientist	16-Sep-19	02-Oct-18	Female	Univ. of New Hampshire	US
Ladd, Tanika	Scientist	16-Sep-19	02-Oct-18	Female	UC Santa Barbara	US
Bell, Shaun	Scientist	16-Sep-19	02-Oct-18	Male	JISAO/UW	US
Kimber, Jessica	Scientist	16-Sep-19	02-Oct-18	Female	JISAO/UW	US
Anderson, Steven	Engineer	16-Sep-19	02-Oct-18	Male	JISAO/UW	US

G. Administrative

1. Points of Contact:

Dr. Peter Proctor (Scientist); JISAO, 7600 Sand Point Way NE, Bldg. 3, Seattle WA, 98115. PH: (206) 526-6217; Peter.Proctor@NOAA.GOV

Dr. Phyllis Stabeno (Program Director, Eco-FOCI); 7600 Sand Point Way NE, Bldg. 3, Seattle, WA 98115. PH: (206) 526-6453. Phyllis.Stabeno@NOAA.GOV

Dr. Janet Duffy-Anderson, AFSC (Program Director, FOCI); 7600 Sand Point Way NE, Bldg. 4; Seattle, WA 98115. PH: (206) 526-6465; Janet.Duffy-Anderson@NOAA.GOV

Operations Officer, NOAAS *Oscar Dyson* ; NOAA Corps, 2002 SE Marine Science Drive, Newport OR 97365. PH: (541) 867-8911 (Ship's VOIP); 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.) (SRP) #2019-B2 (U.S.); effective: April 19 to October 8, 2019. Issued to Robert Foy, Science and Research Director – AFSC.

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:

Scientist report to ship September 16, 2019. Gear loading begins.
Departure: Dutch Harbor, Thursday, September 18, 2019
Arrival: Kodiak, Saturday, October 02, 2019
Offload UAF gear upon arrival, Scientist depart ship.

B. Staging and De-staging:
Two 40 foot containers will be shipped from Seattle and will be staged on the pier. Unloading of the containers and the transfer of equipment to the ship shall occur as appropriate prior to departure. Members of the science party will arrive at least two days prior to departure to assist in the loading of equipment onto the ship, preparation of the moorings and setting up the sampling gear on deck and in the labs. The science party will arrange their own vehicles for transporting

personnel and equipment. At the end of the project, most equipment will remain on board the ship to be offloaded at the ship's first in-port upon leaving Alaska. Some equipment will be offloaded for shipment to the University of Alaska, Fairbanks from Kodiak. To assist in the unloading of the containers and setting up the moorings, a crane operator will be needed during normal working hours on Tuesday, Sept 16th and Wednesday, September 17th. Additionally, a crane operator will be needed on Oct 2nd to off-load equipment for shipment to Fairbanks, AK

C. Operations to be Conducted:

a. **Unimak Box CTDs:** CTDs will be taken at each of 18 stations in the "box" in and around Unimak Pass. At each station within the pass and at every other station along the sides and across the northern line, a 20/60 cm bongo net will be towed for the collection of zooplankton.

b. **FOCI Bering Sea Mooring Sites M2, M4, M5, and M8:** Depending upon arrival time, the project will commence with mooring operations or the CTD "box" with the first site to be occupied most likely being site 2. Mooring operations will consist of the recovery of existing moorings at each site, which includes two surface moorings at site M2 and one subsurface mooring. Sites M4, M5, and M8 each have 2 subsurface moorings to be recovered. This will be followed by the deployment of 2 subsurface moorings at each site. The CTD box will consist of a CTD and 20/60 cm bongo at each of four corner stations and a CTD, bongo and three (3) CalVET tows at the location of the mooring in the center of the box. Depending upon water sampling requirements, the CTD at the mooring location may have to be done twice to get adequate water samples. The CTD at the mooring location will serve as a calibration CTD for the moorings. This scenario will be repeated at sites M4, M5, and M8.

c. **70-meter Isobath Survey Line:** A CTD cast with sampling for salinity, chlorophyll, nutrients and oxygen will be conducted at each station along the 70-meter isobath. Stations will commence at Mooring Site M2 and continue as far north as Site M8. CTDs will be conducted to within 5 meters of the bottom unless it is deemed prudent to only go to 10 meters, such as when the ship's motion is such that the CTD may hit the bottom. Winch speeds should be 30 meters/minute on the down and up cast.

d. **Marine Mammal Moorings:** One marine mammal mooring will be recovered at Site BS9 and another will be deployed at site BS1. At a third site, BS3 will have a mooring recovered and deployed. If the mooring lost in 2018 can be located with the EK60, the ship will drag for it before the new mooring at this site is deployed. The mooring at site BS4 will be turned around. Three new mammal sites will have moorings deployed on the way back to Kodiak. CTD's will be conducted at each of these sites to validate the sound velocity.

e. DBO-1 Line: Up to 10 casts and 5 bongos may be done on the DBO-1 line if time permits at the locations listed in Appendix I. CTD casts will be to within 5 meters of the bottom.

f. Sonabuoys: 96 Sonabuoys will be deployed over the side while transiting between stations and every 3 hours while steaming over long periods of time for documentation of marine mammals.

g. Popup Moorings: Six popup moorings will be deployed during the cruise along the 70 m line. The popup moorings can be deployed easily from the side of the vessel by being lowered to the water surface with a hand line and released.

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: poor weather, equipment failure, unforeseen conditions, and ice coverage would all preclude normal operations. Poor weather would have to be waited out or the project track would have to be modified to provide the best prospects for completing the project. A-frame and winch failures would have to be addressed immediately for the project to continue. Ice coverage would negate the ability to conduct mooring operations, these would have to be postponed for later in the project, or conducted during subsequent projects or from another vessel. Additionally, surface floats will not be deployed if there is a possibility of ice in their location.

III. Equipment

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

Hydrographic winch with slip rings and 2-conductor cable terminated for the CTD,

Sea-Bird Electronics' SBE 911plus CTD system with stand and dual Temperature and Conductivity sensors, each CTD system should include underwater CTD, weights, and altimeter, there should be a deck unit for the system,

10 liter Niskin sampling bottles for use with the CTD rosette (11 plus 4 spares); it is not necessary for these bottles to have silicon tubing vice metal springs for this project,

Hydrographic winch with slip rings and 2-conductor cable terminated for the SBE 19plus for net tow operations – bongos and CalVETs.

12 KHz hull mounted EdgeTech Acoustic release transducer,

Scientific Computer System (SCS),

For meteorological observations: 2 anemometers (one R. M. Young system interfaced with the SCS), calibrated air thermometer (wet- and dry-bulb) and a calibrated barometer and/or barograph,

Freezer space for storage of biological and chemical samples (-20° and -80°C), turned on and operating,

SIMRAD ES-60 and EK-60 echo sounders,

A minimum of two (2) computer workstations in the acoustic lab with Internet, printer and email access,

Removable stern platform in place,

Laboratory space with storage space,

Underway flow-through seawater system with TSG,

Seawater hoses and nozzles to wash nets,

Adequate deck lighting for nighttime operations,

Navigational equipment including GPS and radar,

Safety harnesses and floatation equipment for working on the side sample platform and fantail,

Ship's cranes used for loading and/or recovering and deploying moorings,

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

Sea-Bird Electronics SBE 19plus SeaCAT system,

Fluorometer, light meter (PAR), and dual oxygen systems to be mounted on the CTD (backup),

Four (4) Subsurface moorings, floats, instruments, chain, 4 x 1,250 lbs. = 5,000 lbs., Anchors, 4 x 1,600 lbs. = 6,400 lbs.,

Four (4) Subsurface moorings, floats, instruments, chain, 4 x 1,500 lbs. = 6,000lbs, Anchors, 4 x 2,500 lbs. = 10,000 lbs.

Six (6) Marine Mammal subsurface moorings, 6 x 750lbs = 4,500 lbs., Anchors 6 x 730 lbs. = 4,380 lbs.

Six (6) Popup buoys, 6 x 100 lbs = 600 lbs.

Equipment to deploy and recover moorings,

Dragging gear as needed to drag for moorings that fail to release,

20/60 cm bongo net systems,

Manual wire angle indicator,

CalVET net sampling system,

Scientific sampling supplies and storage/preservation supplies, Total ~2,000 lbs.

Case of 96 Sonobuoys, ~2,600 lbs.

Weights of the gear is estimated. Equipment loaded by PMEL, i.e. moorings, anchors, etc., will be weighed before shipment; these weights will be delivered to the ship at the time of loading.

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

Fish/Zooplankton sampling chemicals:

Common Name /Responsibility	Concentration	Qty	Trained Individual	Spill Response	Notes
DNA Away/FOCI	100%	1 – 250 ml	Jesse Lamb	Gloves, paper towels, plastic bags	Not a regulated chemical
Ethanol/FOCI	100%	4 – 1-gallon plastic jugs	Jesse Lamb	Spill Response E, Gloves, 3M absorbent Pads, Plastic bags	Store in Chem. Lab, yellow flammable locker
Ethanol/FOCI	100%	12 – 1-liter plastic bottles	Jesse Lamb	Spill Response E, Gloves, 3M absorbent Pads, Plastic bags	Store in Chem. Lab, yellow flammable locker
Ethylene Glycol /FOCI	100%	1 – 500 ml	Jesse Lamb	Gloves, paper towels, plastic bags	Not a regulated chemical, Store in Spill kit
Formaldehyde /FOCI	37%	8 – 2.5 gallon barrels	Jesse Lamb	Spill Control F, Gloves, eye protection, Fan-Pads, Formalex, PolyForm-F, plastic bags	Store in Fish Lab Flammable cabinets. Will need to place 4 in each cabinet.
Sodium Borate Solution/FOCI	5-6%	1 – 5-gallon carboy	Jesse Lamb	Gloves, Paper towels, plastic bags	Not a regulated chemical. Working container will be secured on Fish Lab bench
Sodium Borate Powder/FOCI	100%	1 – 500 g	Jesse Lamb	Gloves, wet paper towels, plastic bags	Not a regulated chemical, stored in Spill kit

Glycerol/Thymol Solution/MACE	50%	2 – 5 gallon buckets	Jesse Lamb	Gloves, paper towels, Kitty litter, plastic bags	Not a regulated chemical/solution, Store in Fish Lab, Under sink
Boric Acid Buffered Formalin mix	buffered Formalin/glue t mix	250 ml	Jesse Lamb	Spill Control F, Gloves, eye protection, Fan-Pads, Formalex, PolyForm-F, plastic bags	Store in Fish Lab Flammable cabinets.

Oxygen Analysis Chemicals, property of PMEL

Common Name	**Concentration**	**Qty**	**Trained Individual**	**Spill Response**	**Notes**
Manganese Chloride	3 M	1 liter	Peter Proctor	Gloves, Paper Towels, Kitty litter, Plastic bags	Not a regulated chemical /solution.
Potassium Iodate	0.00167 M	1 liter	Peter Proctor	Spill Control PI, Gloves, Kitty litter, Plastic bags	Store in Acid Locker in Chem. Lab.
Sodium Iodide/NaOH Solution	4 M NaI, 8 M NaOH	1 liter	Peter Proctor	Spill Control B	Store in Acid Locker in Chem. Lab.
Sodium Thiosulfate	0.11 M	1 liter	Peter Proctor	Spill Control ST	Store in Acid Locker in Chem. Lab.
Sulfuric Acid	5 M	1 liter	Peter Proctor	Spill Control A	Store in Acid Locker in Chem. Lab.

Lithium Batteries, property of PMEL:

Size	**Qty**	**Spill Response**	**Notes**
9V	48	NA	In SeaBird and WET Labs instruments

AA	77	NA	In SeaBird instruments and MicroCATs Saft LS14500
D	6	NA	In RCM9 & Peggy Mooring
DD	2 x 12 each	NA	In Argo Floats, stored on after deck, outside
Battery Packs BCX85DD	2 x 67ea	NA	In Oculus Gliders, 3 packs per glider, store in the gliders on the after deck.
BCX85D	2 x 16ea	NA	In Prowler moored instrument package

UAF Chemicals and Lithium batteries:

Common Name	Concentration	Qty	Trained Individual	Spill Response	Notes
Compressed Air	Calibration gas used in the CO_2 system on Peggy Buoy	2 tanks (roughly the size of dive tanks)	Peter Proctor	NA	
Mercuric Chloride	Saturated Solution	0.25 liter	Peter Proctor	Spill Control M	
Lithium D Cell Batteries		18	Peter Proctor	NA	In SEACAT instruments for Peggy Buoy

FOCI Spill Kit Contents:

Common Name	Amount	Use	Total Spill Volume Controllable	Notes
Formalex	1 – 5 gallons 2 – 1 gallon	Formaldehyde cleanup, (all concentrations)	1:1 control	Formalex will be used in conjunction with Fan-Pads to reduce spill volumes.
Fan-Pads	2 rolls (50 sheets per roll)	Formaldehyde cleanup, (all concentrations)	50 sheets = 50 – 150 ml spills	Formalex will be used in conjunction with Fan-Pads to reduce spill

				volumes.
PolyForm-F	1 – 5-gallon 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 under fume hood.
Nitrile Gloves	8 pairs each: S,M,L,XL	For all cleanup procedures	NA	Gloves will be restocked by each survey group.
Eye protection	4 pairs goggles,1 face shield	Formaldehyde cleanup	NA	Eye protection will be cleaned before reuse
Tyvex Lab Coats	2 coats	Formaldehyde cleanup	NA	Coats will be cleaned with Fan-Pads and Formalex before reuse.
Plastic Bags	2	Formaldehyde cleanup/Fan-Pads	NA	Bags may be packed full and sealed.

PMEL Acid-Base Spill Kit Contents:

Common Name	**Amount**	**Use**	**Total Spill Volume Controllable**	**Notes**
Spilfyter Acid Neutralizer	1 Box	Clean up acid spill – H_2SO_4	1.5 liters of 5M Sulfuric Acid	
Spilfyter Base Neutralizer	1 Box	Clean up base spill – NaOH	2.0 liters of NaOH	
Vinyl Gloves	1 box each M, L and XL	Protect hands during all cleanups	NA	
Foxtail/Dust pan	1 each	Pick up absorbed neutralizer	NA	
Rubber Apron	1 each	Protect personnel during cleanup	NA	
Paper Towels	1 roll	Absorb small amounts of liquids	NA	

Goggles	2 pair	Protect eyes during cleanups	NA	
Chemical Absorbent (kitty litter)	1 liter	Absorb liquids	0.5 liters	
Plastic Bags	2 each	Contain used absorbents/waste	NA	

C. Chemical safety and spill response procedures

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.

B: BASE

- 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 dilute acid such as 10% HCl if possible. Collect in a non-combustible container for prompt disposal.

E: Ethanol

- 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.

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.

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.

PI: Potassium Iodate

- Wear appropriate personal protective equipment.
- Avoid contact with combustibles (wood, paper, clothing, etc.)
- Absorb with kitty litter or vermiculite.
- Do not use combustible materials, such as saw dust.
- Keep substance damp with water spray.
- Vacuum or sweep up material and place into suitable disposable container (plastic bags).

ST: Sodium Thiosulfate

- Ventilate area of leak or spill.
- Wear appropriate personal protective equipment.
- Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.
- Avoid contact with combustibles (wood, paper, clothing, etc.)
- Absorb with kitty litter or vermiculite.
- Do not use combustible materials, such as saw dust.
- Recover liquid or particulate in 5-gallon bucket.

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*

C. At the end of the project, the Chief Scientist requests the Chief Survey Technician provide copies of the data from the ship's SCS, barometer measurements, log sheets, TSG data, rain sensor data, wind speed and direction data, ship's navigation log data, speed logs, winch system, Fluorometer data, and any other logged scientific data. The number of copies of each data set will be worked out between the Chief Scientist and the Chief Survey Technician.

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 or Principal Investigator, as appropriate. 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 makeup 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. Unless prior arrangements are made, the science party may move aboard the night before scheduled departure and must move off the ship the day after scheduled arrival (at the end of project). The Chief Scientist/Principal Investigator 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 or Principal Investigator 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.

NHSQs must be submitted every 2 years for individuals under the age of 50 and every 1 year for ages 50 and above. NHSQs must be accompanied by NOAA Form (NF) 57-10-02 - Tuberculosis Screening Document in compliance with OMAO Policy 1008 (Tuberculosis Protection Program, which requires a yearly PPD or TB exam).

The completed forms should be sent to Marine 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 submission process approved by NOAA is kiteworks by Accellion Secure File Transfer, which requires the sender to set up an account using a valid NOAA email address and password. User accounts may expire after 30 days of inactivity. Simply re-register to send and receive files.

Persons without a NOAA email account must fax or mail their forms.

Contact information:

Marine 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) shall 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 has increased, on average per ship, to 768 kbs and is shared by all vessel's staff and the science team at no charge to sailing personnel. Increased bandwidth in 7 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.

Computer Operating Systems that the support vendor has identified as reaching "End of Life" for support will not be allowed on the shipboard network. Examples include Microsoft Windows XP and Vista as well as Windows Server 2003.

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. Incidental Take

Summary of mitigation measures for compliance of MMPA and NEPA

These mitigation measures shall include but are not limited to:

- AFSC shall take all necessary measures to coordinate and communicate in advance of each specific survey with the National Oceanic and Atmospheric Administration's (NOAA) Office of Marine and Aviation Operations (OMAO) or other relevant parties on non-NOAA platforms to ensure that all mitigation measures and monitoring requirements described herein, as well as the specific manner of implementation and relevant event-contingent decision-making processes, are clearly understood and agreed upon.
- AFSC shall coordinate and conduct briefings at the outset of each survey and as necessary between ship's crew (Commanding Officer/master or designee(s), as appropriate) and scientific party in order to explain responsibilities, communication procedures, marine mammal monitoring protocol, and operational procedures.
- AFSC shall coordinate as necessary on a daily basis during survey cruises with OMAO personnel or other relevant personnel on non-NOAA platforms to ensure that requirements, procedures, and decision-making processes are understood and properly implemented.
- When deploying any type of sampling gear at sea, AFSC shall at all times monitor for any unusual circumstances that may arise at a sampling site and use best professional judgment to avoid any potential risks to marine mammals during use of all research equipment. AFSC shall convey this requirement to IPHC.
- AFSC shall implement handling and/or disentanglement protocols as specified in the guidance that shall be provided to AFSC survey personnel.
- AFSC shall adhere to a final Communication Plan. In summary and in accordance with the Plan, AFSC shall: (i) notify and provide potentially affected Alaska Native subsistence communities with the Communication Plan through a series of mailings, direct contacts, and planned meetings throughout the regions where AFSC fisheries research is expected to occur;
    - meet with potentially affected subsistence communities to discuss planned activities and to resolve potential conflicts regarding any aspects of either the fisheries research operations or the Communication Plan;
    - develop field operations plans as necessary, which shall address how researchers will consult and maintain communication with contacts in the potentially affected subsistence communities when in the field, including a list of local contacts and contact mechanisms, and which shall describe operational procedures and actions planned to avoid or minimize the risk of interactions between AFSC fisheries research and local subsistence activities;
    - schedule post-season informational sessions with subsistence contacts from the study areas to brief them on the outcome of the AFSC fisheries research and to assess performance of the Communication Plan and individual field operations or cruise plans in working to minimize effects to subsistence activities

Trawl survey protocols:

- AFSC shall conduct trawl operations as soon as is practicable upon arrival at the sampling station.
- AFSC shall initiate marine mammal watches (visual observation) at least 15 minutes prior to beginning of net deployment, but shall also conduct monitoring during any pre-set activities including trackline reconnaissance, CTD casts, and plankton or bongo net hauls. Marine mammal watches shall be conducted by scanning the surrounding waters with the naked eye and range-finding binoculars (or monocular). During nighttime operations, visual observation shall be conducted using the naked eye and available vessel lighting.
- AFSC shall implement the move-on rule mitigation protocol, as described in this paragraph. If one or more marine mammals are observed and are considered at risk of interacting with the vessel or

research gear, or appear to be approaching the vessel and are considered at risk of interaction, AFSC shall either remain onsite or move on to another sampling location. If remaining onsite, the set shall be delayed. If the animals depart or appear to no longer be at risk of interacting with the vessel or gear, a further observation period shall be conducted. If no further observations are made or the animals still do not appear to be at risk of interaction, then the set may be made. If the vessel is moved to a different section of the sampling area, the move-on rule mitigation protocol would begin anew. If, after moving on, marine mammals remain at risk of interaction, the AFSC shall move again or skip the station. Marine mammals that are sighted shall be monitored to determine their position and movement in relation to the vessel to determine whether the move-on rule mitigation protocol should be implemented. AFSC may use best professional judgment in making these decisions.

- AFSC shall maintain visual monitoring effort during the entire period of time that trawl gear is in the water (i.e., throughout gear deployment, fishing, and retrieval). If marine mammals are sighted before the gear is fully removed from the water, AFSC shall take the most appropriate action to avoid marine mammal interaction. AFSC may use best professional judgment in making this decision.
- If trawling operations have been suspended because of the presence of marine mammals, AFSC may resume trawl operations when practicable only when the animals are believed to have departed the area. AFSC may use best professional judgment in making this determination.
- AFSC shall implement standard survey protocols to minimize potential for marine mammal interactions, including maximum tow durations at target depth and maximum tow distance, and shall carefully empty the trawl as quickly as possible upon retrieval.

IX. Appendices

Appendix I – Station Maps and List

Appendix II – Mooring Diagrams

Appendix III- Chemical Hygiene Plan

Appendix I: Station Maps and List

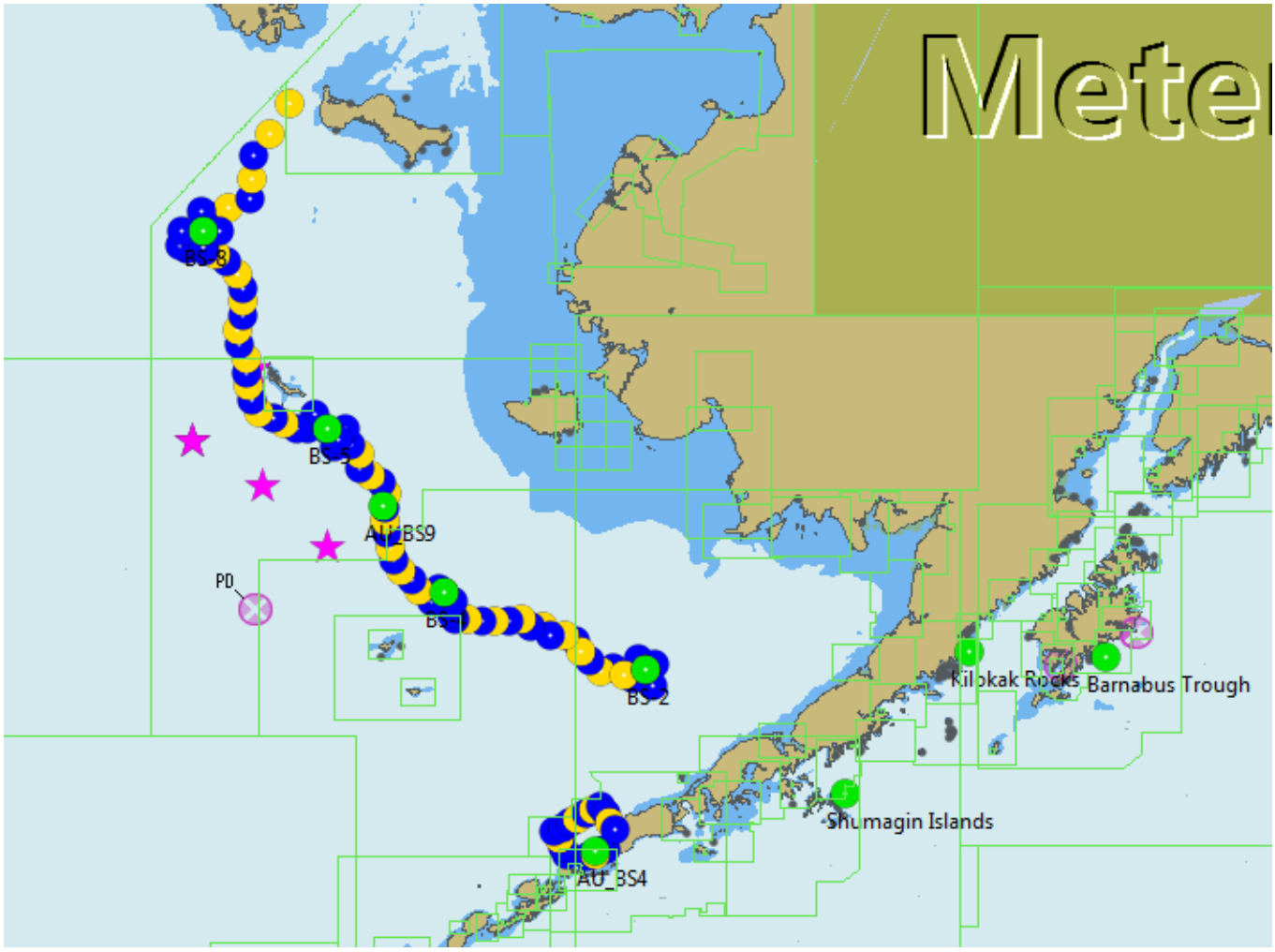


Figure A: Chart of all Stations for Cruise DY1908

CTD/Bongo

CTD only

Eco-FOCI and Marine Mammal Moorings

Popup Mooring

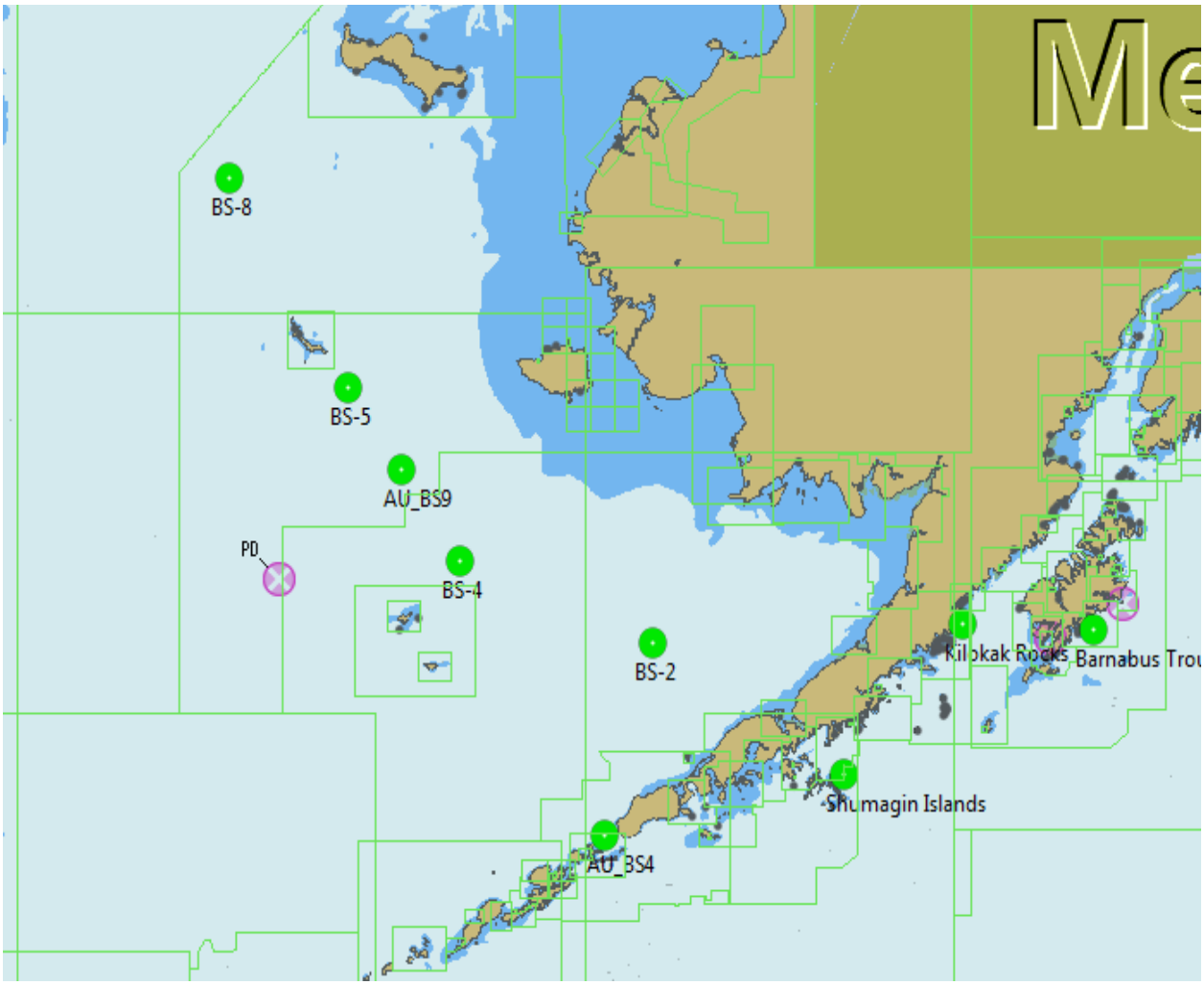


Figure B: Mooring Sites

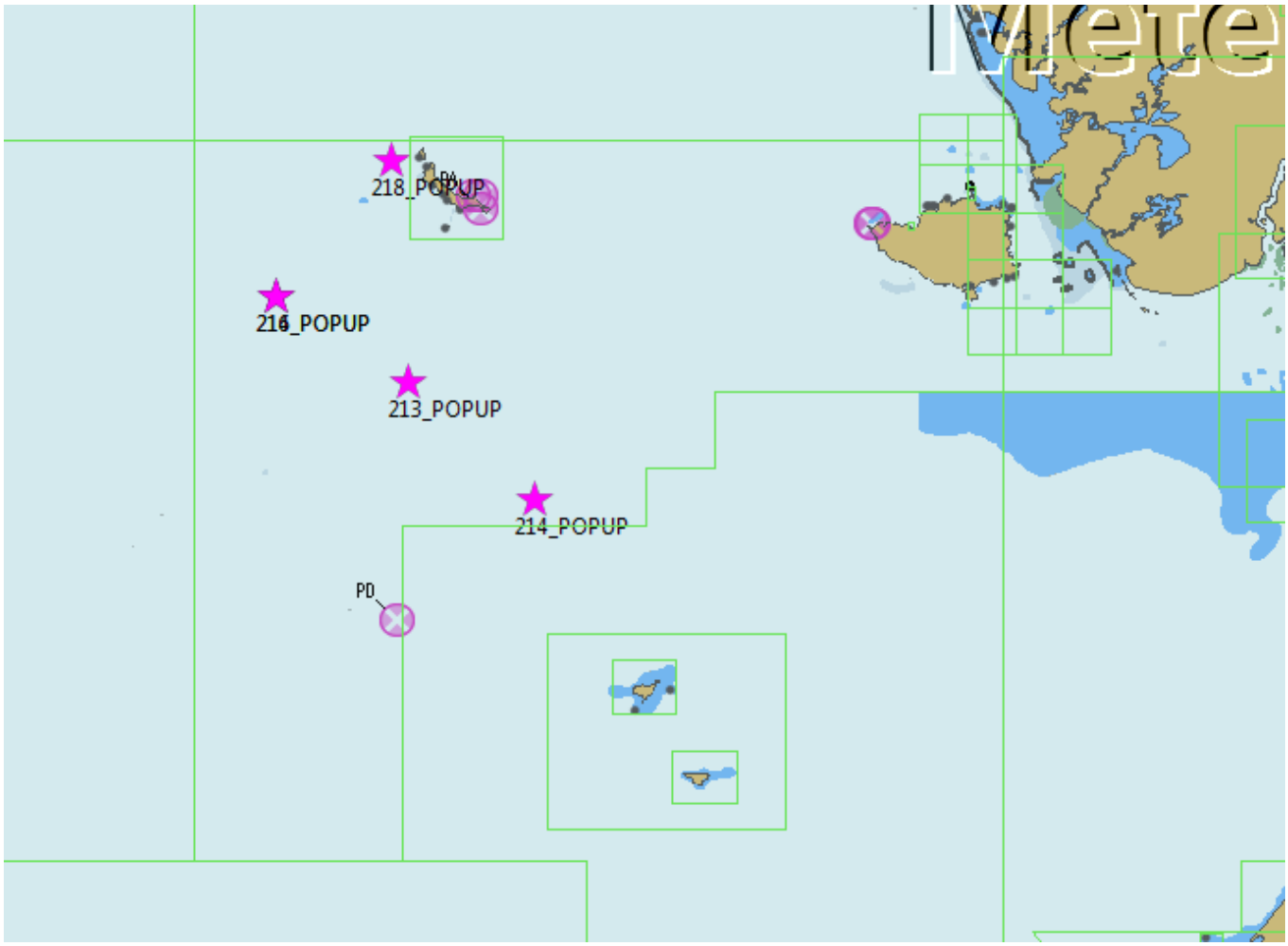


Figure C: Popup Mooring Deployments Sites

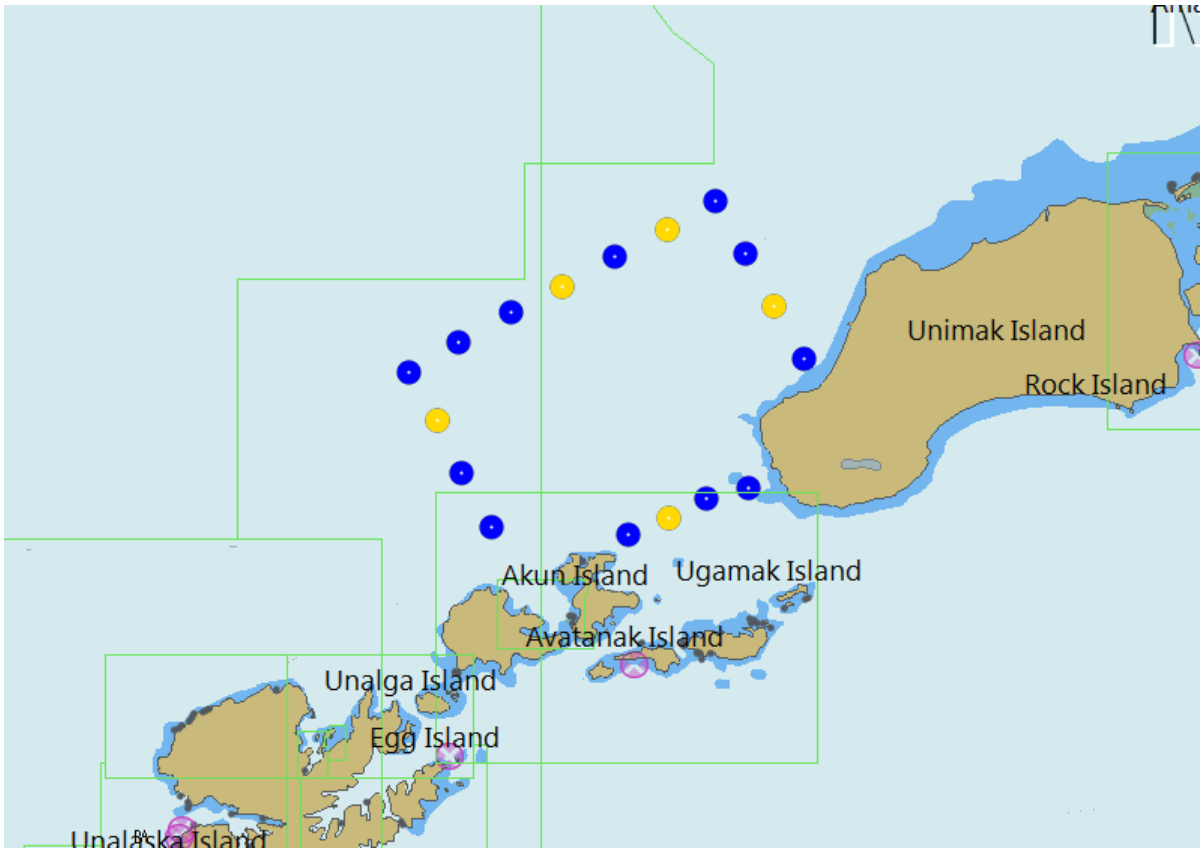


Figure D: Unimak Box

Figure E: 72M Isobath Line

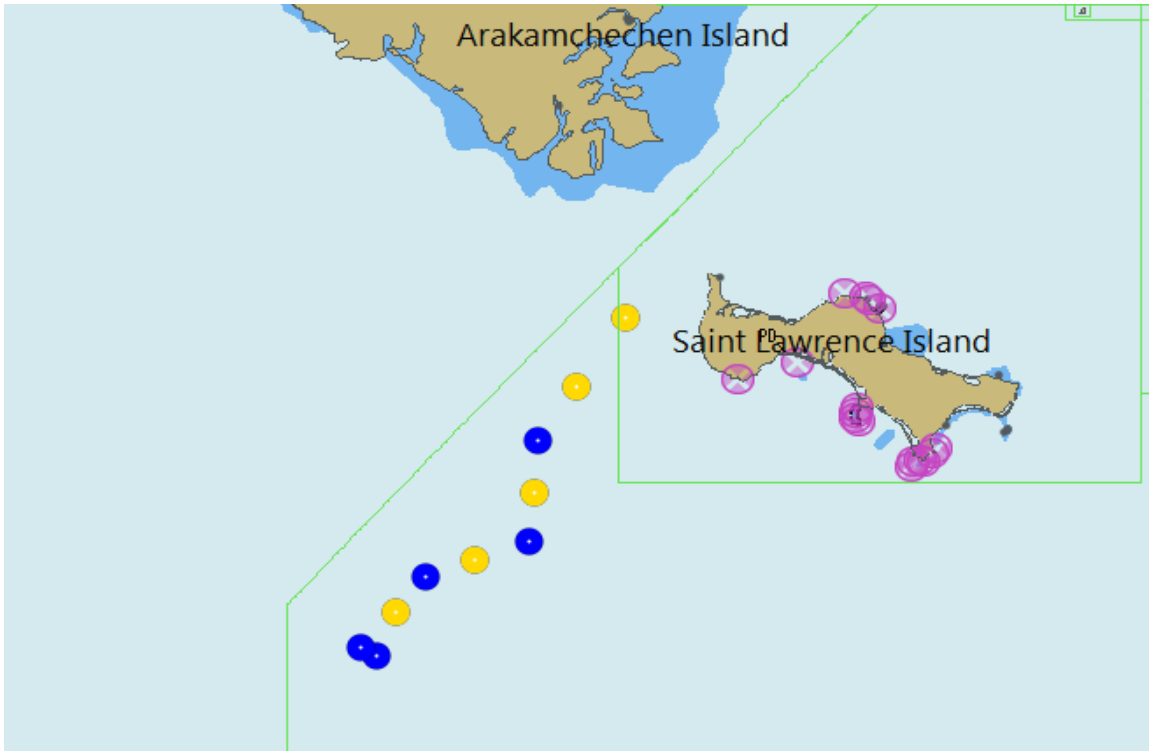


Figure F: DBO1 Line

Note: the locations for the CalVETs and CTD/BON at the locations of the moorings are the actual locations of the moorings; CalVETs and CTDs should be approximately 0.25 nm from the location of the moorings, Bongos adjusted accordingly.

CTD casts will be to 5 meters from the bottom or 1500 meters max.

	Sta. Name	Activity	Water Depth (m)	Lat.dd	Lon.dd
Dutch Harbor	Depart Dutch Harbor	DEPART		53.9	166.545
Unimak Box					
	UBS1	CTD/BON	42	54.441	164.985
	UBS2	CTD/BON	110	54.419	165.141
	UBS3	CTD	203	54.375	165.277
	UBS4	CTD/BON	91	54.342	165.429
	UBW1	CTD/BON	91	54.358	165.929
	UBW2	CTD/BON	511	54.472	166.039
	UBW3	CTD	402	54.583	166.129
	UBW4	CTD/BON	329	54.688	166.237
	UBN1	CTD/BON	183	54.751	166.051
	UBN2	CTD/BON	168	54.813	165.858
	UBN3	CTD	153	54.868	165.671
	UBN4	CTD/BON	139	54.93	165.48
	UBN5	CTD	124	54.987	165.287
	UBN6	CTD/BON	110	55.049	165.107
	UBE1	CTD/BON	88	54.937	164.996
	UBE2	CTD	67	54.827	164.894
	UBE3	CTD/BON	46	54.716	164.784
BS Site 2	Moorings				
	19BS-2	CTD Cal Cast	70	56.87	164.05
	19BSP-2A	Recover Subsurface Mooring	70	56.8667	164.0602
	19BSITAE-2A	Recover Surface Mooring	70	56.8682	164.0667

	19BSM-2A	Recover Surface Mooring	70	56.878	164.054
	19BS-2C	Deploy Subsurface Mooring	70	56.8	164
	19BSP-2B	Deploy Subsurface Mooring	70	56.8	164
Mooring Site M2 Sampling					
	70M2/M2	3 CalVETs	72	56.87	164.055
	70M2/M2	CTD/BON	72	56.87	164.055
	CTD -M2N	CTD/BON	69	57.017	164.217
	CTD - M2E	CTD/BON	69	56.942	163.834
	CTD -M2S	CTD/BON	72	56.667	163.867
	CTD - M2W	CTD/BON	75	56.767	164.333
70 m isobath					
	70M3	CTD	73	56.808	164.583
	70M4	CTD/BON	72	56.909	164.828
	70M5	CTD	73	56.859	165.123
	70M6	CTD/BON	72	56.994	165.378
	70M7	CTD	70	57.107	165.613
	70M8	CTD/BON	70	57.262	165.747
	70M9	CTD	70	57.321	166.011
	70M10	CTD/BON	70	57.322	166.326
	70M11	CTD	70	57.438	166.513
	70M12	CTD/BON	70	57.429	166.812
	70M13	CTD	70	57.522	167.038
	70M14	CTD/BON	71	57.499	167.344
	70M15	CTD	72	57.501	167.665
	70M16	CTD/BON	71	57.501	167.986
	70M17	CTD	79	57.52	168.304
	70M18	CTD/BON	78	57.524	168.614
BS Site 4	Moorings				
	19BS4	CTD Cal Cast	72	57.87	168.87

	18BSP-4A	Recover Subsurface Mooring	72	57.866	168.884
	18BS-4B	Recover Subsurface Mooring	72	57.868	168.893
	19BSP-4A	Deploy Subsurface Mooring	72	57.867	168.877
	19BS-4A	Deploy Subsurface Mooring	72	57.867	168.877
Mooring Site M4 Sampling					
	70m19-M4S	CTD/BON	75	57.653	169.02
	CTD - M4E	CTD/BON	74	57.767	168.467
	70M21/M4	3 CalVETs	73	57.87	168.89
	70M21/M4	CTD/BON	73	57.87	168.89
	70M22 - M4W	CTD/BON	71	57.927	169.322
	CTD - M4N	CTD/BON	71	58.067	168.73
	70M23	CTD	70	57.907	169.5
	70M24	CTD/BON	69	58.042	169.673
	70M25	CTD	71	58.147	169.918
	70M26	CTD/BON	72	58.282	170.095
	70M27	CTD	73	58.446	170.186
	70M28	CTD/BON	72	58.617	170.276
	70M29	CTD	71	58.774	170.294
	70M30	CTD/BON	72	58.948	170.327
	70M31	CTD	69	59.107	170.247
	70M32	CTD/BON	68	59.247	170.412
	70M33	CTD	70	59.335	170.656
	70M34	CTD/BON	81	59.436	170.906
	70M35	CTD	80	59.595	170.923
	70M36	CTD/BON	79	59.716	171.14
	70M37	CTD/BON	78	59.777	171.45
BS Site5	Moorings				
	19BS5	CTD Cal Cast	70	59.9	171.72

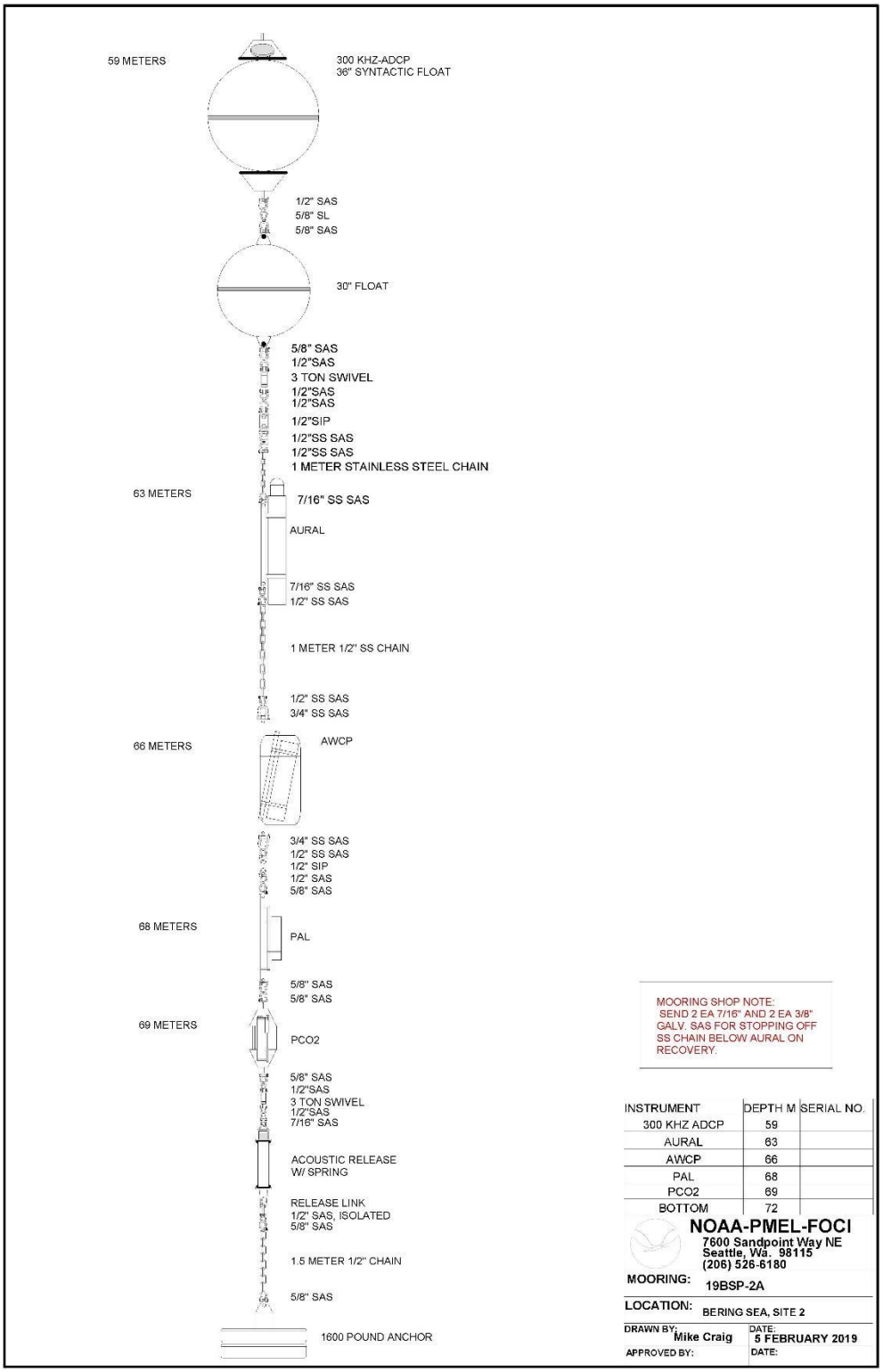
	18BSP-5A	Recover Subsurface Mooring	70	59.9	171.707
	18BS-5A	Recover Subsurface Mooring	70	59.904	171.702
	19BSP-5A	Deploy Subsurface Mooring	70	59.91	171.7
	19BS-5A	Deploy Subsurface Mooring	70	59.91	171.73
Mooring Site M5 Sampling					
	M5E	CTD/BON	81	59.898	171.258
	CTD - M5S	CTD/BON	80	59.7	171.5
	70m38/ M5	3 CalVETs	79	59.91	171.73
	70m38/ M5	CTD/BON	79	59.91	171.73
	70M38 - M5N	CTD/BON	77	60.075	172
	70M39 M5W	CTD/BON	76	59.898	172.167
	70M40	CTD/BON	74	59.912	172.435
	70M41	CTD	68	59.978	172.746
	70M42	CTD/BON	70	60.037	173.007
	70M43	CTD	70	60.101	173.317
	70M44	CTD/BON	70	60.252	173.522
	70M45	CTD	60	60.425	173.592
	70M46	CTD/BON	68	60.572	173.64
	70M47	CTD	72	60.739	173.648
	70M48	CTD/BON	83	60.907	173.825
	70M49	CTD	79	61.066	173.829
	70M50	CTD/BON	75	61.25	173.741
	70M51	CTD	75	61.411	173.736
	70M52	CTD/BON	72	61.56	173.712
	70M53	CTD	71	61.727	173.855
	70M54	CTD/BON	71	61.862	174.094
	70M55	CTD	73	61.943	174.364
	70M56	CTD/BON	74	62.027	174.659

BS Site 8	**Moorings**				
	19BS8	**CTD Cal Cast**	**74**	**62.2**	**174.65**
	18BSP-8A	**Recover Subsurface Mooring**	**74**	**62.195**	**174.684**
	18BS-8A	**Recover Subsurface Mooring**	**74**	**62.199**	**174.686**
	19BSP-8A	**Deploy Subsurface Mooring**	**74**	**62.2**	**174.667**
	19BS-8A	**Deploy Subsurface Mooring**	**74**	**62.2**	**174.667**
	CTD-M8S	**CTD/BON**	**70**	**61.975**	**174.617**
	M8	**CTD/BON**	**70**	**62.195**	**174.666**
	M8	**CALVETS**	**70**	**62.195**	**174.666**
	CTD-M8N	**CTD/BON**	**80**	**62.422**	**174.7**
	CTD-M8W	**CTD/BON**	**80**	**62.2**	**175.2**
	CTD-M8E	**CTD/BON**	**70**	**62.2**	**174.3**
DBO1 Line					
	DBO1.1	**CTD/BON**	**50-80**	**62.01**	**175.06**
	DBO1.2	**CTD/BON**	**50-80**	**62.05**	**175.21**
	DBO1.3	**CTD**	**50-80**	**62.219**	**174.877**
	DBO1.4	**CTD/BON**	**50-80**	**62.39**	**174.57**
	DBO1.5	**CTD**	**50-80**	**62.468**	**174.083**
	DBO1.6	**CTD/BON**	**50-80**	**62.56**	**173.55**
	DBO1.7	**CTD**	**50-80**	**62.787**	**173.5**
	DBO1.8	**CTD/BON**	**50-80**	**63.03**	**173.46**
	DBO1.9	**CTD**	**50-80**	**63.28**	**173.08**
	DBO1.10	**CTD**	**50-80**	**63.604**	**172.591**
Mammal Moorings					
	AL_18AU_BS9	**Recover Marine Mammal Mooring**	**70**	**58.967**	**170.347**

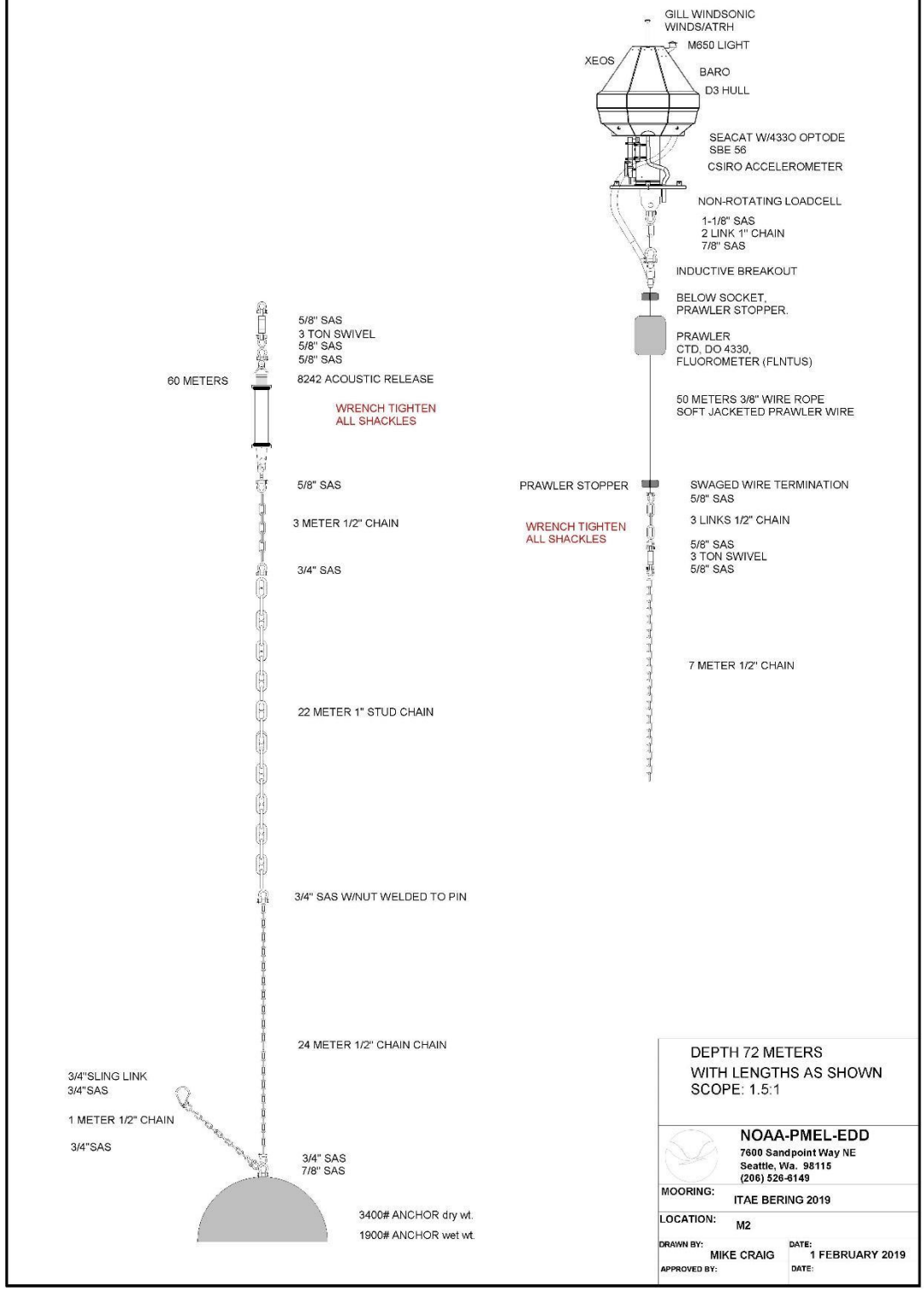
	AL_19AU_BS4A	Recover Marine Mammal Mooring	140	54.438	165.291
	BS4	CTD Cal Cast	60	54.438	165.291
	AL19_AU_BS4B	Deploy Marine Mammal Mooring	140	54.438	165.291
	AL19_AU_BS9	Deploy Marine Mammal Mooring	140	58.967	170.347
	BS9	CTD Cal Cast	140	58.967	170.347
	Barnabas Trough	Deploy Marine Mammal Mooring		57.037	152.978
	AL19_AU_BS1	Deploy Marine Mammal Mooring	44	61.5857	171.3115
	BS1	CTD Cal Cast		61.5857	171.3115
	Barnabas	CTD Cal Cast			
	Shumagin Islands	Deploy Marine Mammal Mooring		55.213	159.261
	Shumagin	CTD Cal Cast			

	Kilokak Rocks	Deploy Marine Mammal Mooring		57.121	156.262
	Kilokak	CTD Cal Cast			
Popup Moorings	213	Deploy Popup		59.2291	173.328
	214	Deploy Popup		58.3959	171.457
	216	Deploy Popup		59.785	174.927
	218	Deploy Popup		60.613	173.449
	Arrive Kodiak	Offload	10	57.8	166.545

Appendix II: Mooring Diagrams –



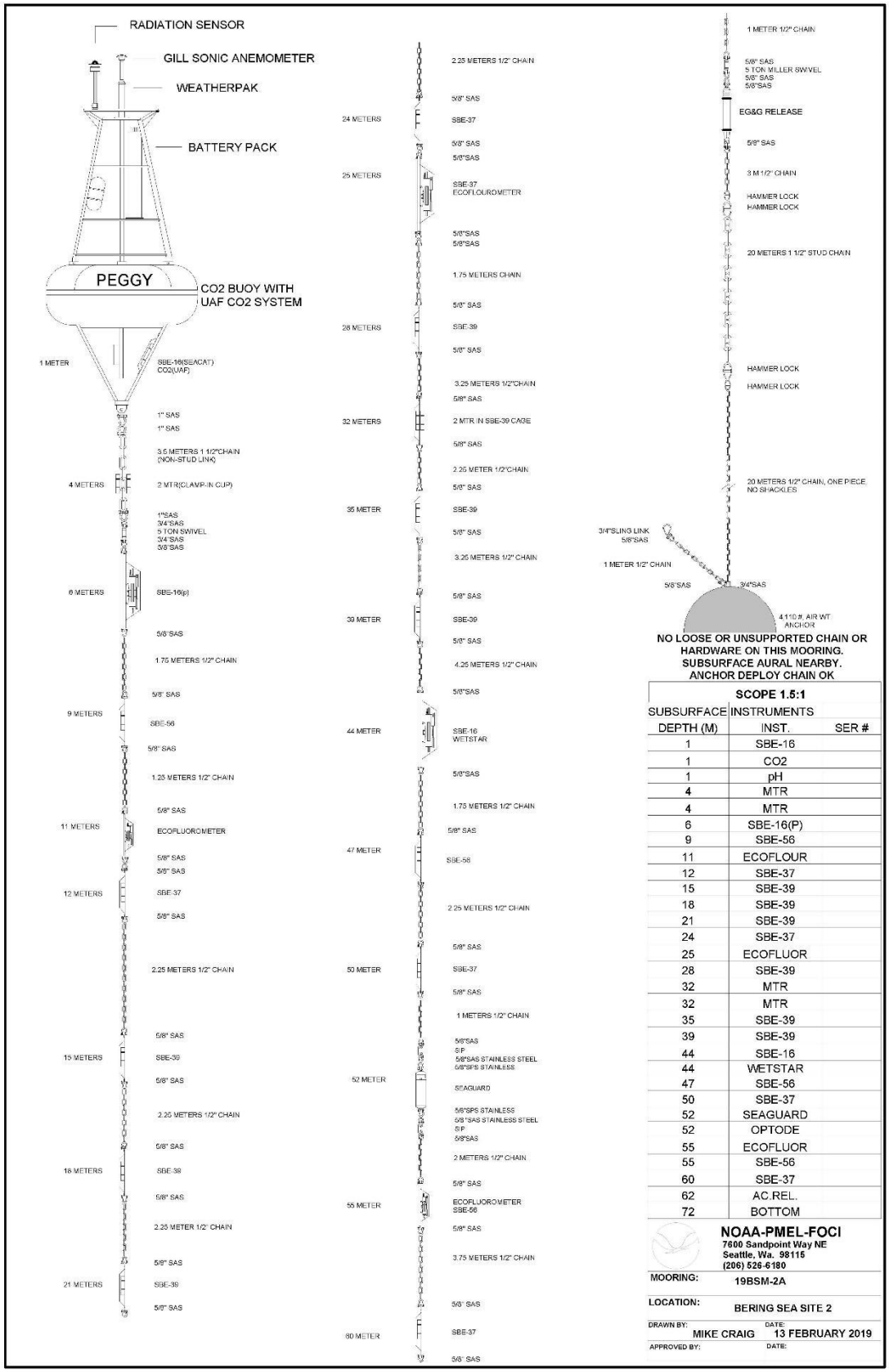
4 each of these subsurface moorings.



DEPTH 72 METERS
WITH LENGTHS AS SHOWN
SCOPE: 1.5:1

NOAA-PMEL-EDD
7600 Sandpoint Way NE
Seattle, Wa. 98115
(206) 526-6149

MOORING:	ITAE BERING 2019
LOCATION:	M2
DRAWN BY:	MIKE CRAIG
DATE:	1 FEBRUARY 2019
APPROVED BY:	
DATE:	



NO LOOSE OR UNSUPPORTED CHAIN OR HARDWARE ON THIS MOORING. SUBSURFACE AURAL NEARBY. ANCHOR DEPLOY CHAIN OK

SCOPE 1.5:1

SUBSURFACE INSTRUMENTS

DEPTH (M)	INST.	SER #
1	SBE-16	
1	CO2	
1	pH	
4	MTR	
4	MTR	
6	SBE-16(P)	
9	SBE-56	
11	ECOFLOUR	
12	SBE-37	
15	SBE-39	
18	SBE-39	
21	SBE-39	
24	SBE-37	
25	ECOFLUOR	
28	SBE-39	
32	MTR	
32	MTR	
35	SBE-39	
39	SBE-39	
44	SBE-16	
44	WETSTAR	
47	SBE-56	
50	SBE-37	
52	SEAGUARD	
52	OPTODE	
55	ECOFLUOR	
55	SBE-56	
60	SBE-37	
62	AC.REL.	
72	BOTTOM	

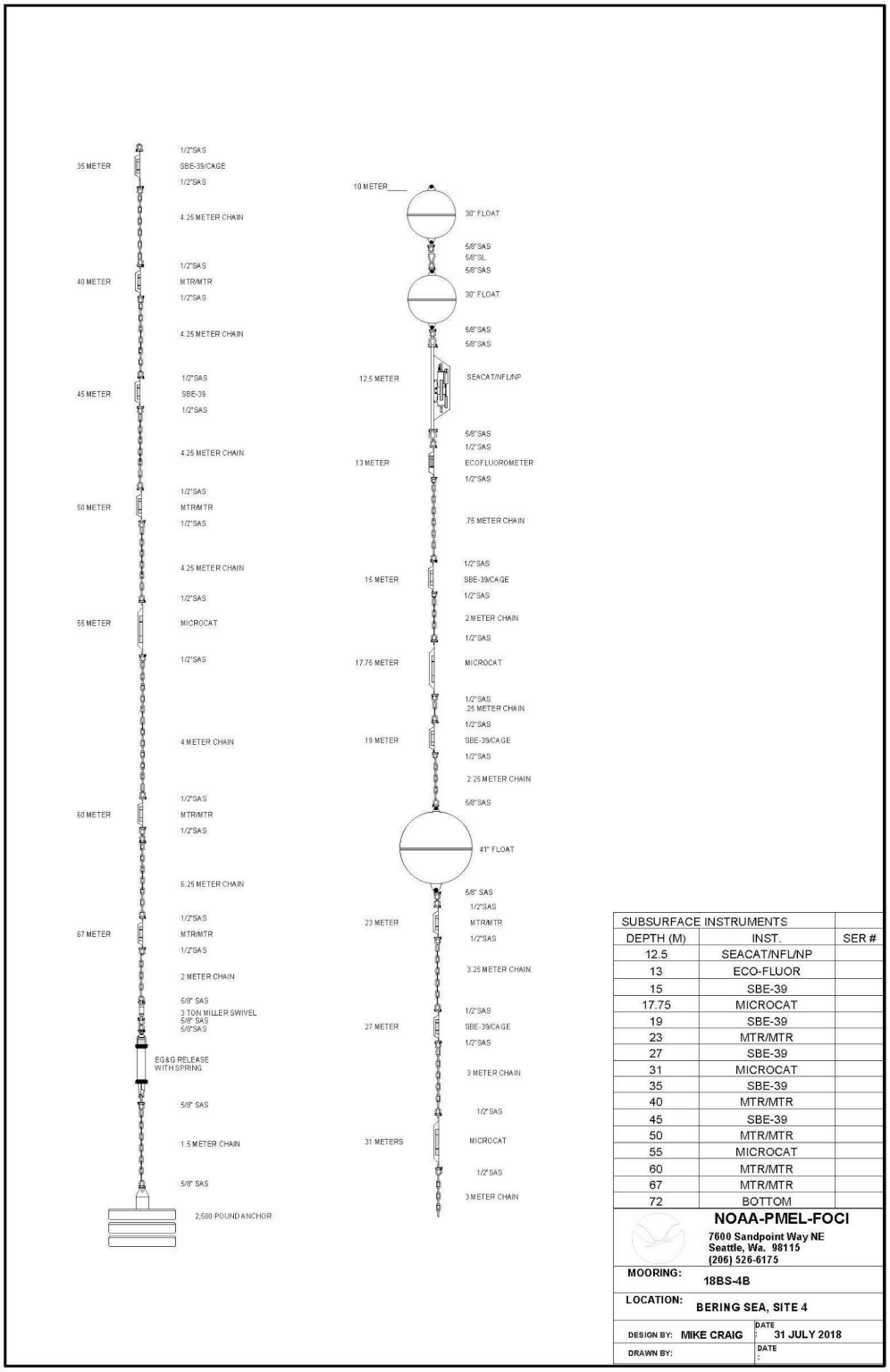
NOAA-PMEL-FOCI
7600 Sandpoint Way NE
Seattle, Wa. 98115
(206) 526-6180

MOORING: 19BSM-2A

LOCATION: BERING SEA SITE 2

DRAWN BY: MIKE CRAIG DATE: 13 FEBRUARY 2019

APPROVED BY: DATE:



SUBSURFACE INSTRUMENTS		
DEPTH (M)	INST.	SER #
12.5	SEACAT/NFL/NP	
13	ECO-FLUOR	
15	SBE-39	
17.75	MICROCAT	
19	SBE-39	
23	MTR/MTR	
27	SBE-39	
31	MICROCAT	
35	SBE-39	
40	MTR/MTR	
45	SBE-39	
50	MTR/MTR	
55	MICROCAT	
60	MTR/MTR	
67	MTR/MTR	
72	BOTTOM	

NOAA-PMEL-FOCI
7600 Sandpoint Way NE
Seattle, Wa. 98115
(206) 526-6175

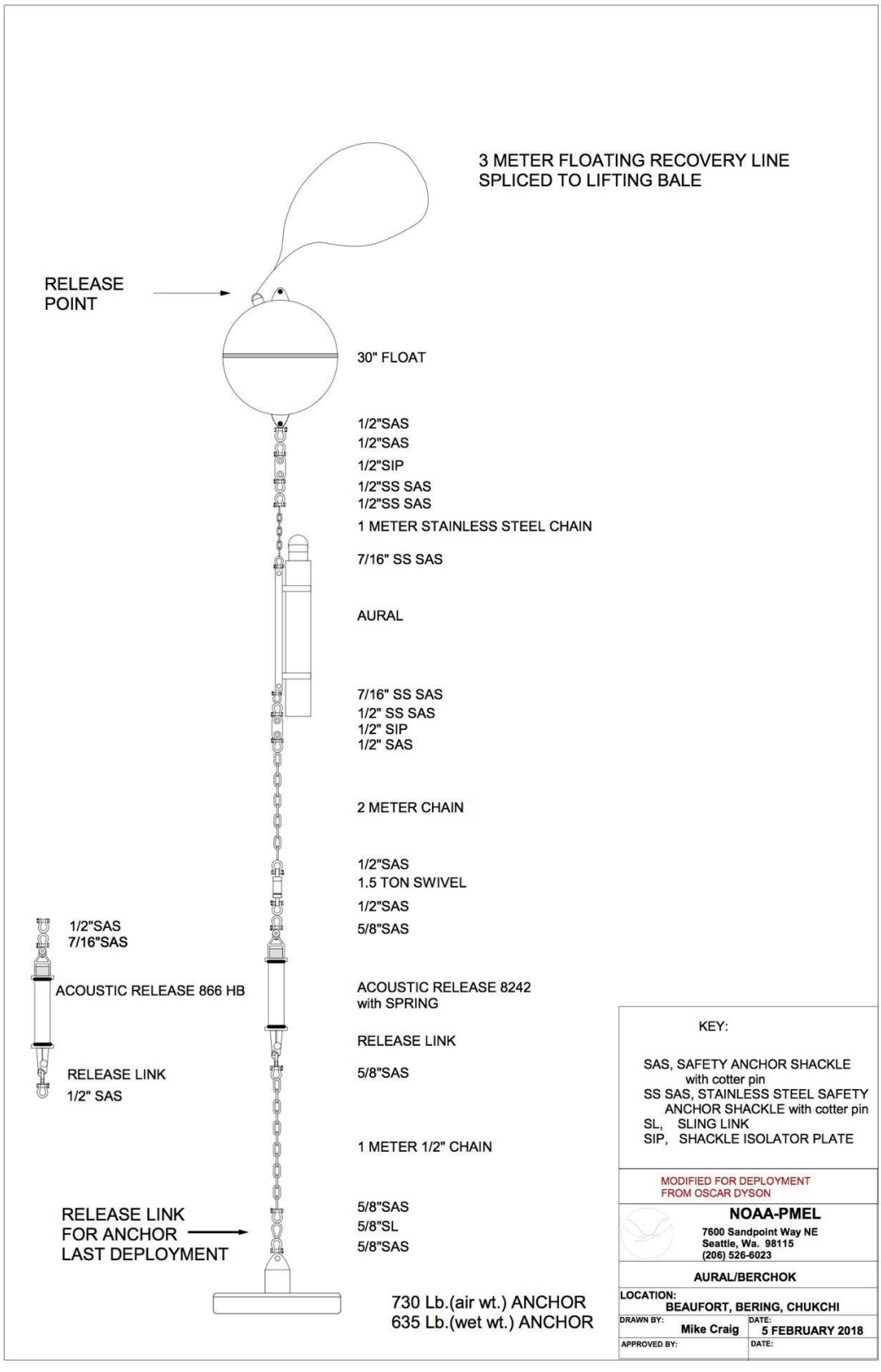
MOORING: 18BS-4B

LOCATION: BERING SEA, SITE 4

DESIGN BY: MIKE CRAIG — **DATE:** 31 JULY 2018

DRAWN BY: — **DATE:**

4 each of these subsurface moorings.



5 each of these subsurface marine mammal moorings.

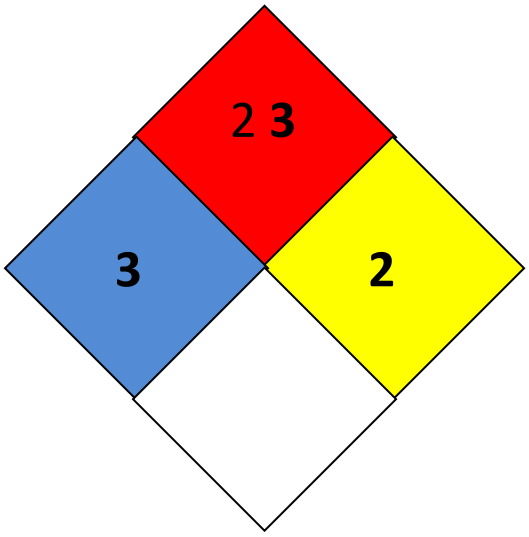
Appendix III– Chemical Hygiene Plan

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%) and reagent chemicals for the preservation and analysis of oxygen samples. 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 towed zooplankton nets (bongos and CalVETs) as described in the Operations section of these Project Instructions and for the pickling and analysis of oxygen samples for calibration of the oxygen sensors on the CTD. 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 vomiting.

*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 ml):

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 ml):

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 (x101).

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.

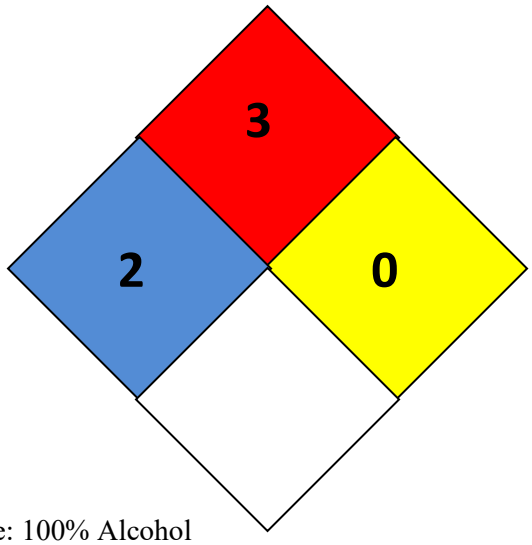
*Fan Pads may be used to absorb small spills alone but these pads work best when used with Formalex to immediately control the vapor layer.

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 vomiting.

* 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 MSDS and the UN number with the shipment for reference in the event of a spill.