UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Alaska Fisheries Science Center
7600 Sand Point Way NE
Seattle, WA 98115

Project Instructions

Date Submitted: 15 November 2016

Platform: NOAA Ship *Oscar Dyson*

Project Number: DY-17-00 (OMAO)

Project Title: Puget Sound Gear Trials

Project Dates: 23-24 January 2017

Prepared by: _____ Dated: 1/3/17
Denise McKelvey, Chief Scientist
Research Fishery Biologist
AFSC/RACE Division

Approved by: _____ Dated: 1/3/17
Dr. Jeffrey M. Napp
Division Director
AFSC/RACE Division

Approved by: _____ Dated: 1/3/17
Dr. Douglas P. DeMaster,
Science and Research Director
Alaska Fisheries Science Center

Approved by: _____ Digitally signed by PARKER.BRIAN.W.1076514042 Date: 2017.01.20 13:09:33 -08'00' Dated: Jan. 20, 2017
Command Brian Parker, NOAA
Commanding Officer
Marine Operations Center – Pacific

I. Overview

A. Brief Summary and Project Period: Acoustic system calibration, trawl and equipment testing, 23-24 January 2017. Pre-season scientific gear loading will be completed 19-20 January 2017.

B. Days at Sea (DAS): Of the 2 DAS scheduled for this project, 2 DAS are funded by OMAO allocation, 0 DAS are funded by a Line Office Allocation, 0 DAS are Program Funded, and 0 DAS are Other Agency funded. This project is estimated to exhibit a high Operational Tempo.

C. Operating Area: Puget Sound, Port Madison (see Appendix 1).

D. Summary of Objectives 1) complete pre-field season acoustic system calibration, 2) test acoustic-trawl (AT) survey trawling /oceanographic winches and sampling equipment, 3) test a spar buoy/hydrophone free-drifting vessel radiated noise measurement system.

E. Participating Institutions: Alaska Fisheries Science Center (AFSC), Seattle, WA.

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

Name (Last, First)	Title	Date Aboard	Date Disembark	Gender	Affiliation	Nationality
Anderson, Loren	Marine Equipment Specialist	Jan 23	Jan 24	Male	AFSC	USA
Bassett, Chris	Ocean Acoustics Engineer	Jan 24	Jan 24	Male	AFSC	USA
Chisolm, Greg	Marine Equipment Specialist	Jan 23	Jan 24	Male	AFSC	USA
Furnish, Scott	IT Specialist	Jan 23	Jan 24	Male	AFSC	USA
Gallagher, Michael	Oceanographer	Jan 24	Jan 24	Male	AFSC	USA
Kim, Steven	Marine Equipment Specialist	Jan 23	Jan 24	Male	AFSC	USA
Lauffenburger, Nate	Fish Biologist	Jan 23	Jan 24	Male	AFSC	USA
Levine, Mike	Fish Biologist	Jan 23	Jan 24	Male	AFSC	USA
McKelvey, Denise	Chief Scientist	Jan 23	Jan 24	Female	AFSC	USA
Towler, Rick	IT Specialist	Jan 23	Jan 24	Male	AFSC	USA
Williams, Kresimir	Fish Biologist	Jan 23	Jan 24	Male	AFSC	USA
Wilson, Matt	Fish Biologist	Jan 23	Jan 24	Male	AFSC	USA
Baker, Barney	Net Shed Lead	Jan 23	Jan 23	Male	AFSC	USA

G. Administrative

1. Points of Contacts:

- Denise McKelvey (Chief Scientist), 206-526-4167, denise.mckelvey@noaa.gov; 7600 Sand Point Way NE Seattle WA 98115,
- Chris Wilson (MACE Program manager), 206-526-6435, Chris.Wilson@noaa.gov. 7600 Sand Point Way NE Seattle WA 98115,
- LT Aras Zygas - Operations Officer, NOAA Ship *Oscar Dyson*. Ops.oscar.dyson@noaa.gov; 541-867-8911

2. Diplomatic Clearances

None Required.

3. Licenses and Permits

This project will be conducted under the Washington State Scientific Collection Permit (Permit # Porter 16-149). Permit Holder: Steven Porter (206-526-4271; steve.porter@noaa.gov).

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:

Day 1:

Embark scientists at Seattle, Pier 90/91 in Puget Sound, WA
Depart pier in the morning, time to be determined by CO
Transit to Port Madison, WA (1 hr)
Set DP system and determine if calibration is possible without anchoring
Conduct CTD & acoustic system calibration (6 hrs)
Transit to deep area of Puget Sound (0.5 hr)
Trawl/Winch tests – Aleutian wing trawl (AWT); Poly nor'eastern trawl (PNE); Oceanographic Traction Winch (3.5 hrs)
Transit to Pier (1 hr)
Disembark scientists.

Day 2:

Embark scientists at Seattle, Pier 90/91 in Puget Sound, WA

Depart pier in the morning, time to be determined by CO
Transit to deep water (about 150 m water depth) (1 hr)
Deploy spar buoy/hydrophone system (3 hrs)
Deploy Drop TS canister via side-sampling hydrographic winch (1 hr)
Deploy Seacat using aft side-sampling hydrographic winch (0.5 hr)
Transit to Pier (1 hr)
Disembark scientists. End of Gear Trials

B. Staging and Destaging: To be determined in consultation with ship's personnel.

C. Operations to be Conducted:

1. A standard sphere calibration of the centerboard-mounted scientific acoustic systems (18-, 38-, 70-, 120-, and 200-kHz) will be conducted in Port Madison, WA (priority 1, Figure 1). This requires suspending a calibration sphere assembly directly beneath the vessel's centerboard. Anchoring the vessel at the bow and stern will be required if winds and/or currents prevent conducting these operations while the ship holds position using dynamic positioning. A CTD cast will be conducted prior to the calibration. Previous calibrations have been successfully completed at the position: 47° 43.358' N, 122° 31.162' W.

2. Trawl and winch testing (priority 2) - AWT, PNE, and Oceanographic Traction winch. AWT will be deployed with CamTrawl camera system, FS70, ITI, and SBE temperature sensors attached and PNE will be deployed with Furuno. Oceanographic Traction winch will be tested by visually inspecting cable termination, attaching tom weights (or other suitable weights), and paying out cable to ensure proper winch functionality.

3. Testing of a spar buoy/hydrophone drifter developed to monitor radiated noise will be conducted (priority 3). The vessel noise drifter (see appendix for a detailed description) has two main parts: a 10 ft spar (roughly 7 ft of which is submerged) and a weighted line down to approximately 300 ft (100 m) that includes three hydrophones. The spar has U-bolts connected near the top and bottom to aid in deployment/recovery. It also has trailing line and float to aid in recovery. The spar is equipped with an orange flag, a light, and a GPS that communicates over the unlicensed 900 MHz band with a shipboard receiver for real-time monitoring of the drifter's location. The radio specifications suggest receipt of the drifter's GPS location should be possible to ranges of greater than 35 nautical miles. The total dry weight is approximately 100 lbs and previous experience deploying the prototype drifter has been used to identify deployment procedures (summarized below). Changes to the deployment and recovery procedures on *Dyson* will be determined in collaboration with the command and chief bosun.

The drifter (spar and downline) will be deployed in an area with water depths > 150m. The vessel will sail to a range of roughly 2 nm before circling back on a constant heading

and passing roughly 100 m from the spar at the closest point of approach. At a minimum the vessel should pass the drifter and transit to a range of 2 nm two times. Additional passes would be preferred but may not be possible given time constraints. A laptop computer with connections to a shipboard GPS and the drifter GPS, both provided by the scientific crew, will be provided on the bridge to provide the drifter location throughout this process. When the vessel is within 250 m of the closest point of approach it should maintain 96 RPM and a constant heading, ideally passing the drifter at a range of 100 m off of the beam. After finishing the passes the drifter will be recovered following the recovery procedures

4. Test the Drop-TS and SeaCat units alternately on the aft hydrographic winch at the side-sampling station (priority 4). These tests will check operation, and recoverability of both systems. The Drop-TS unit test deployment will require the use of an underwater acoustic modem that can be hand-deployed by AFSC personnel from the side sampling station. Survey personnel will coordinate with AFSC personnel to change between the Drop-TS and SeaCat systems on the aft winch (a waterproof dummy plug is required on the sea cable when deploying the Drop-TS; see appendix for detailed description). The SeaCat will be deployed with suitable weight to test cable payout and proper winch functionality and data transfer via conducting cable.

5. Miscellaneous (requiring no vessel time):

- Test SCS and scientific seawater system, -20°C and -80°C freezer operations, controlled environment room (4°C), calibrate the crane scales
- Test heave correction input to EK60 and processing of data in Echoview.
- Test CLAMS scientific data collection programs instruments on the bridge and in the wet lab (length measuring boards, weight scales, 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: poor weather conditions, equipment failure, safety concerns, and other unforeseen circumstances. The Chief Scientist will confer with the commanding officer to mitigate the impacts of these circumstances on the project goals.

III. Equipment

A. Equipment and Capabilities provided by the ship (number is 1 unless specified)

1. Acoustic Equipment
    GPS with NEMA 183 to ER60 (2)
    50/200 kHz EK60 Bridge sounder
    Furuno FE-700 fathometer
2. Trawling Equipment
    3rd wire FS-70 net sonar with winch and accessories (2)
    Simrad ITI net mensuration system (2)
    Furuno CN24 headrope transducer
3. Oceanographic Equipment
    Seabird SBE 911plus CTD System
4. Biological Sampling Equipment
    lab conveyor system
    Catch sorting and weighing table
    Controlled environment room stable at 4°C
    -80°C scientific freezer
    -20°C scientific freezer
5. Computing equipment
    Scientific Computing System

B. Equipment and Capabilities provided by the scientists (number is 1 unless specified))

1. Acoustic Equipment
    Simrad ER60 system (2)
    Simrad ES18 transducer (2)
    Simrad ES38B transducer (2)
    Simrad ES38DD transducer (in drop TS canister housing)
    Simrad ES70 transducer (1)
    Simrad ES120-7C transducer (2)
    Simrad ES200-7C transducer (3)
    Standard target & suspension assembly
    Simrad ME70 system
    Drop TS system canister housing and supplies
    Spar buoy and hydrophone system

Note that some of this equipment is ship's equipment and some is supplied by the scientists, but the scientific party will operate and troubleshoot the equipment.

2. Trawling Equipment
    Aleutian wing trawl w/ 0.5" mesh liner installed
    Poly nor'eastern trawl w/ 0.5" mesh liner installed
    Marinovich trawl, modified, with accessories
    Dandylines (bridles) (30 fm x 5/8 in.) for PNE, 83-112, mod Marinovich
    Dandylines (bridles) (45 fm x 5/8 in.) for AWT
    Fishbuster door with accessories (1 pair)
    Spare webbing & twine
    Spare 0.5" mesh cod end liner (2)
    Spare hardware

500 lb. tom weights (4)
250 lb. tom weights (4)
Pocket net (installed on AWT)
CamTrawl system
Miscellaneous supplies*

3. Oceanographic Equipment
   Seabird SBE39 (2)
   Seabird SBE 19plus CTD
4. Biological Sampling Equipment
   Dynamometer
   Marel M60 60 kg scale (2)
   Marel M60 6 kg scale (2)
   Fish length measuring boards and accessories (4)
   Fish baskets (30)
   Misc. biological supplies*
5. Computing equipment
   PCs w/Windows 7 Op. System*
   Dell PowerEdge MACEBASE Server
   Thermal label Printers

Note: * indicates amount not specified.

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.

C. Inventory - see Appendix 2

C. Chemical safety and spill response procedures - see Appendix 2

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. Program Data Request

1. An electronic Marine Operations Abstract (MOA) will be created to log all operations via daily transfers of position data from the ship's SCS system to MACE. An appropriate logging interval will be chosen for automated track position data. Specific events (and frequency) to be recorded will be decided at the beginning of the project. Globe software will be available to log operations data as a backup. All times should be recorded as Greenwich Mean Time (GMT)

2. The data sets requested by the Chief Scientist from the ship will include the following: electronic files (MOA) from the SCS of all operations logged during the project, and backup media (e.g., DVDs) with all sensor data logged to the Scientific Computer System (SCS).

3. The Chief Scientist will represent the AFSC lab director for data disposition. A single copy of all data gathered by the vessel will be delivered to the Chief Scientist, who in turn will be responsible for distributing data to other investigators desiring copies.

VII. Meetings, Vessel Familiarization, and Project Evaluations

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

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

C. Post-Project Meeting: The Commanding Officer is responsible for conducted a meeting no earlier than 24 hrs before or 7 days after the completion of a project to discuss the overall success and short comings of the project. Concerns regarding safety, efficiency, and suggestions for future improvements shall be discussed and mitigations for future projects will be documented for future use. This meeting shall be attended by the ship's officers, applicable crew, the Chief Scientist, and members of the scientific party and is normally arranged by the Operations Officer and Chief Scientist.

D. Project Evaluation Report

Within seven days of the completion of the project, a Customer Satisfaction Survey is to be completed by the Chief Scientist. The form is available

at https://sites.google.com/a/noaa.gov/omao-intranet-dev/operations/marine/customer-satisfaction-survey and provides a "Submit" button at the end of the form. It is also located at https://docs.google.com/a/noaa.gov/forms/d/1a5hCCkgIwaSII4DmrHPudAehQ9HqhRqY3J_FXqbJp9g/viewform. Submitted form data is deposited into a spreadsheet used by OMAO management to analyze the information. Though the complete form is not shared with the ships, specific concerns and praises are followed up on while not divulging the identity of the evaluator.

VIII. Miscellaneous

A. Meals and Berthing

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

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

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

All persons boarding NOAA vessels give implied consent to comply with all safety and security policies and regulations which are administered by the Commanding Officer. All spaces and equipment on the vessel are subject to inspection or search at any time. All personnel must comply with OMAO's Drug and Alcohol Policy dated May 17, 2000 which forbids the possession and/or use of illegal drugs and alcohol aboard NOAA Vessels.

B. Medical Forms and Emergency Contacts

The NOAA Health Services Questionnaire (NHSQ, NF 57-10-01 (3-14)) must be completed in advance by each participating scientist. The NHSQ can be obtained from the Chief Scientist or the NOAA website http://www.corporateservices.noaa.gov/noaaforms/eforms/nf57-10-01.pdf.

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

The completed forms should be sent to the Regional Director of Health Services at the applicable Marine Operations Center. The NHSQ and Tuberculosis Screening Document should reach the Health Services Office no later than 4 weeks prior to the start of the project to allow time for the participant to obtain and submit additional information should health services require it, before clearance to sail can be granted. Please contact MOC Health Services with any questions regarding eligibility or completion of either form. Ensure to fully complete each form and indicate the ship or ships the participant will be sailing on. The participant will receive an email notice when medically cleared to sail if a legible email address is provided on the NHSQ.

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

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

Contact information:

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

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

C. Shipboard Safety

Hard hats are required when working with suspended loads. Work vests are required when working near open railings and during small boat launch and recovery operations. Hard hats and work vests will be provided by the ship when required.

Wearing open-toed footwear or shoes that do not completely enclose the foot (such as sandals or clogs) outside of private berthing areas is not permitted. At the discretion of the ship CO, safety shoes (i.e. steel or composite toe protection) may be required to participate in any work dealing with suspended loads, including CTD deployment and recovery. The ship does not provide safety-toed shoes/boots. The ship's Operations Officer should be consulted by the Chief Scientist to ensure members of the scientific party report aboard with the proper attire.

D. Communications

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

E. IT Security

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

(1) Installation of the latest virus definition (.DAT) file on all systems and performance of a virus scan on each system.
(2) Installation of the latest critical operating system security patches.
(3) No external public Internet Service Provider (ISP) connections.

Completion of the above requirements prior to boarding the ship is required.

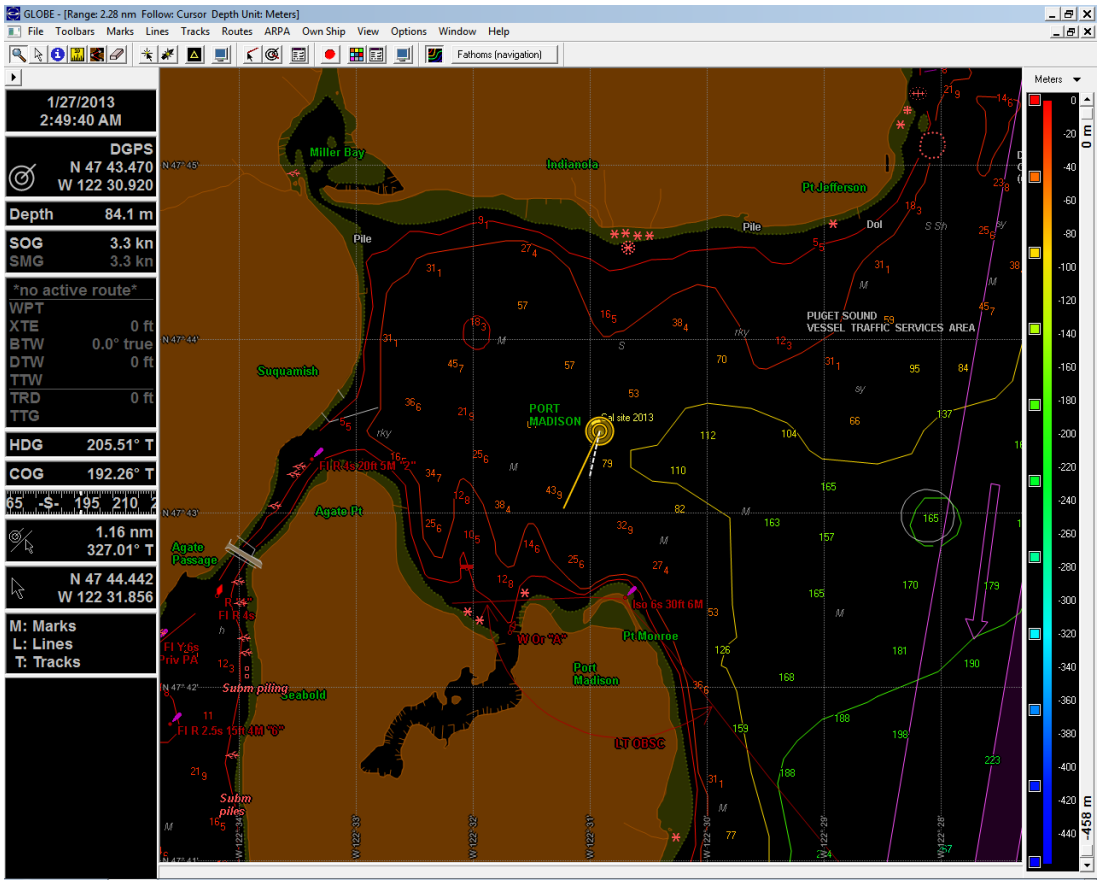
Non-NOAA personnel using the ship's computers or connecting their own computers to the ship's network must complete NOAA's IT Security Awareness Course within 3 days of embarking.

F. Foreign National Guests Access to OMAO Facilities and Platforms

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

VIII. Appendices

Appendix 1. Port Madison, WA calibration area and location


GLOBE - [Range: 2.28 nm Follow: Cursor Depth Unit: Meters]
File Toolbars Marks Lines Tracks Routes ARPA Own Ship View Options Window Help
Fathoms (navigation)
1/27/2013
2:49:40 AM
DGPS
N 47 43.470
W 122 30.920
Depth 84.1 m
SOG 3.3 kn
SMG 3.3 kn
no active route
WPT
XTE 0 ft
BTW 0.0° true
DTW 0 ft
TTW
TRD 0 ft
TTG
HDG 205.51° T
COG 192.26° T
1.16 nm
327.01° T
N 47 44.442
W 122 31.856
M: Marks
L: Lines
T: Tracks
Meters
0 m
-458 m
Miller Bay
Indianola
Pt Jefferson
Pile
Dol
PUGET SOUND
VESSEL TRAFFIC SERVICES AREA
Suquamish
PORT
MADISON
Cal site 2013
Fl R 4s 20ft 5M "2"
Agate Pt
Agate
Passage
Iso 6s 30ft 6M
W Gr "A"
Pt Monroe
Port
Madison
Fl Y 6s
Priv PA
Subm piling
Seabold
Fl R 2.5s 15ft 4M "8"
LT OBSC
Subm
piles
N 47° 45'
N 47° 44'
N 47° 43'
N 47° 42'
W122° 34'
W122° 33'
W122° 32'
W122° 31'
W122° 30'
W122° 29'
W122° 28'

Appendix 2. Drifter Project to Measure Underwater Radiated Vessel Noise

Drifter Specifications, including weight and dimension

The drifter consists of a surface spar buoy, 3 hydrophones suspended along a 300 ft 5/16" nylon line hanging below the spar buoy. Fifteen feet below the base of the spar there is a 2 ft diameter heave plate. The line terminates with five pounds of lead weights. The spar floats at the sea surface, with the hydrophone packages suspended below.

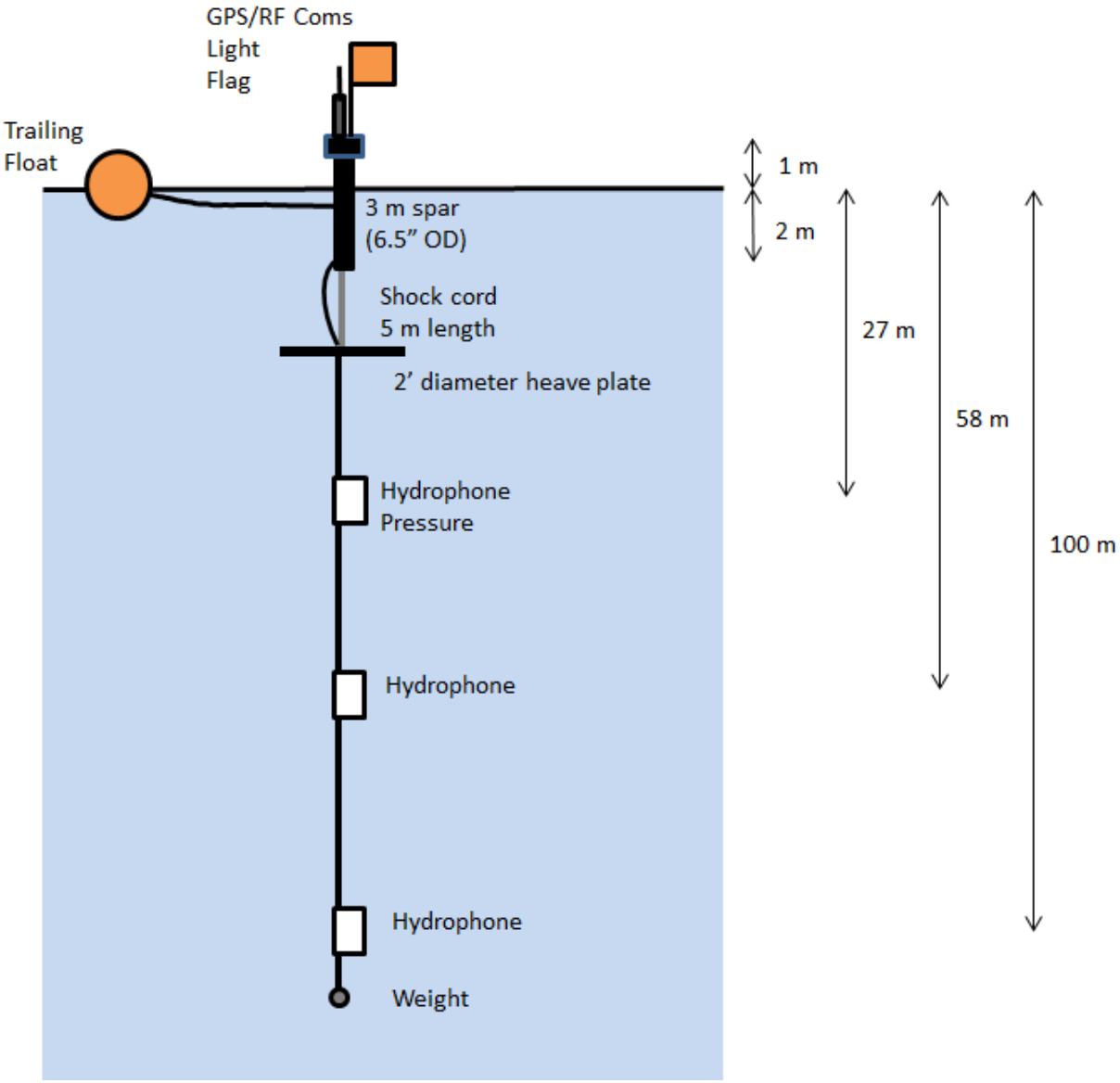
The spar is constructed of schedule 80 PVC pipe 10' long and 6.5" in diameter with a strobe light, GPS receiver, radio antenna, and power switch fixed to the top. The top three feet of the spar is painted yellow and wrapped with SOLAS reflective tape. Fully equipped it weighs approximately 100 lbs. It has four U-bolts which can be used to recover the spar with boat hooks: two near the top and two near the bottom. The deployment/recovery procedures are described below. Three 1 ft by 2 ft hydrophone packages are attached to the lines at depths of 75 ft, 180 ft, and 300 ft. and are sufficiently light (< 10 lbs in air) to be easily deployed by hand. There is also an 18 inch trailing float with line leading back to the spar allowing for recovery using a grappling hook. The trailing float line is equipped with a 3-1/4" stainless steel ring and a small float for recovery. A rough sketch showing the important dimensions is shown below.

Vessel operation when drifter is deployed

Once the drifter is deployed, the Dyson will move about 2 km away from the drifter, and then run in a straight line past the drifter (closest point of approach ~ 100 m) until 2 km past the drifter (i.e., a 4 km long transect). Within 250 m of the drifter it is important to maintain a constant heading. Each transect pass by the drifter will be conducted with a propeller shaft rate of ~ 96 rpm. At a minimum two passes will be made and, depending on time available and discussions with the lead scientist, additional passes should be performed.

It is understood that the ship will determine the operational limits of deployment and recovery operations based on the prevailing conditions.

The equipment was deployed during DY1608 summer EBS AT survey. We only intend to deploy and recovery the spar under good weather conditions (seas less than 3 ft.). Deployment is expected to last < 3 hours.



Dimensions of the drifter (not to scale)

The hydrophone drifter is designed for deployment and recovery from Dyson class FSVs. The following procedures were successfully used aboard the Dyson in July 2016, but could be revised based on additional discussions with the Dyson personnel.

Deployment:
Deployment operations should be performed with the ship underway at a speed no faster than required to maintain steerage (i.e., ca. < 1 kt). The drifter will be deployed following one of two procedures described below. The first method (preferred) would deploy the spar buoy headfirst down the stern ramp by 2-3 deck hands. Two people positioned on either side of the stern ramp will use tag lines to the buoy to control its descent down the ramp and into the water. Because the drifter will only be deployed in calm seas, one rather than two people may be sufficient to lower the spar buoy down the stern ramp by

simply using the 3/8 in line attached to the bottom of the buoy and hydrophones/heave plate. When the buoy is being lowered down the ramp, another person will be in position at the starboard aft rail of the vessel with the excess hydrophones/heave plate line leading to the bottom of the spar buoy. Once the drifter is freely floating immediately astern of the ship, the hydrophones/heave plate line will be paid by the person at the aft rail as the ship moves slowly away from the buoy.

The second method that could be used to deploy the drifter would involve the following steps. A person will again be positioned at the starboard aft rail. This person will wait at this location anticipating the following steps. The spar buoy would be laid flat on the back deck with a Sea Catch (or other similar toggle/quick release device) attached to one of the upper (near surface) U-bolts and a tag line through the other. The trawl ramp moveable gate should be lowered and the drifter moved to the trawl ramp while slack on the winch is taken in. At this point the buoy is resting entirely on the trawl ramp with no slack in the line. The next step will be to lift the buoy off the deck while the A-frame is moved to the aft position and the winch line is adjusted to keep the buoy just out of the water. At this point, the hydrophones/heave plate line should be rapidly lowered by hand by the person at the aft rail. Once the hydrophone/heave plate line becomes taut below the buoy, the spar buoy will be lowered until over half its length is submerged, and the quick release is then tripped to release the buoy and begin vessel operations to run passes by the drifter with the ship.

Fig 1. – Deployment of drifter buoy using method 2.

Recovery:
The drifter will be recovered on the starboard side of the vessel. The ship will come alongside the spar buoy at a close enough range to use a grappling hook to catch the floating line between the spar and the trailing float. The spar is drawn in by hand until alongside the vessel. A few feet from the U-bolt along the line leading to the trailing float is a stainless steel ring. Line drawn from the A-frame/winch and passed around the stern of the vessel is quickly clipped to the in-line ring on the drifter line. Then the buoy is released so that it drifts to the stern of vessel. Once behind the vessel, it is brought in using standard winch and A-frame operations. Once the spar buoy is above the waterline a boat hook is used to grab the hydrophone/heave plate line, which extends below the spar buoy. The line with associated instruments is recovered manually over the starboard aft rail as the buoy is recovered up the stern ramp and laid down flat on the back deck.

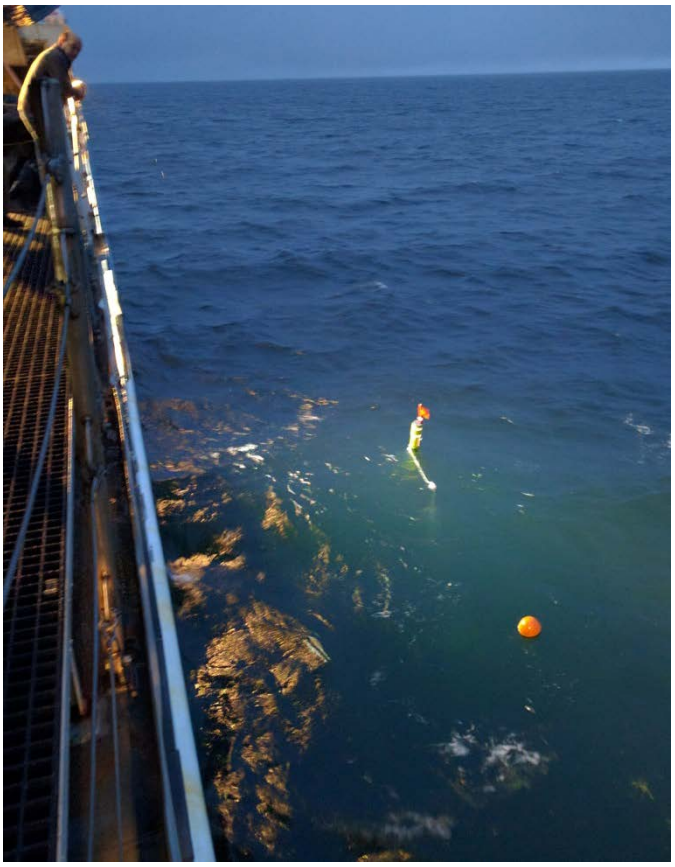


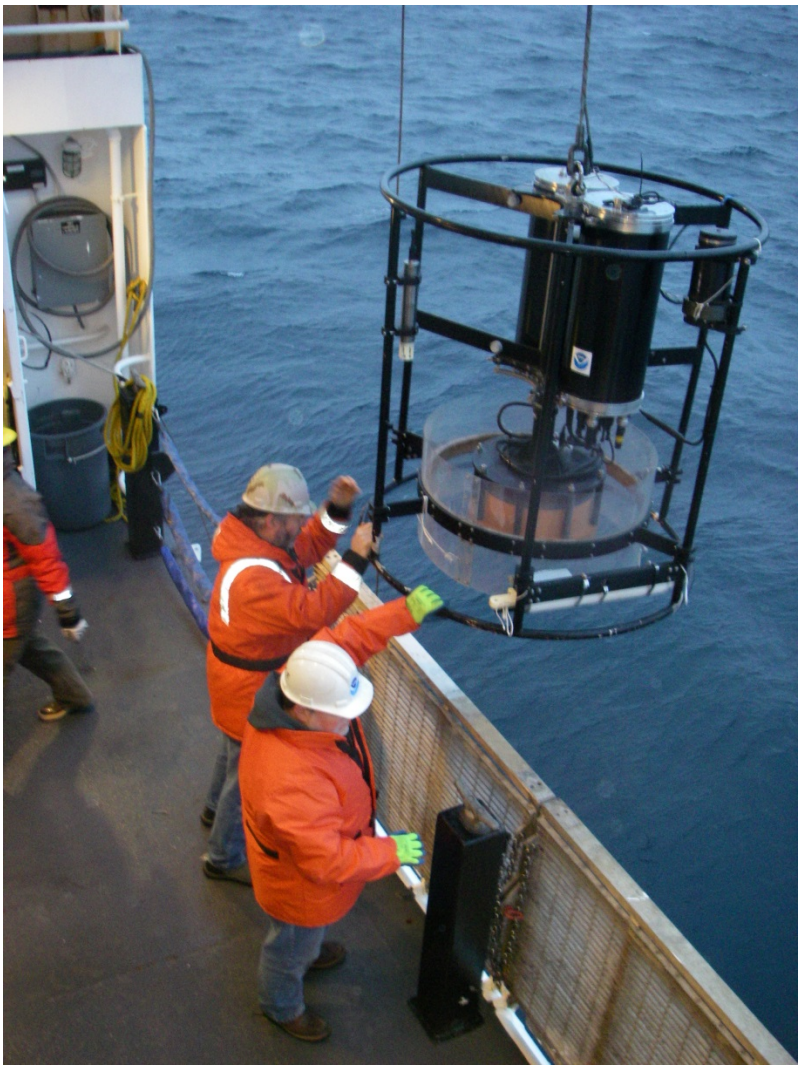
Fig 2. – Drifter buoy in water along starboard side of ship during approach for recovery.

Appendix 2. Drop TS (target strength) echosounder

The DropTS (target strength) is a stand-alone ER60 38 kHz echosounder system mounted in a deployable frame. The system includes a Simrad 38 kHz GPT and 38DD pressure compensated transducer, onboard PC and network communications, frame and transducer tilt sensors, acoustic communications modem, and a battery power system.

Equipment for use of the DropTS system mounted in the ship includes a deck unit for battery charging and network communications, and an acoustic modem for communications with the DropTS system while it is deployed. There is no wired communications with the system while it is deployed; communications is through the acoustic modem system using a software interface on the topside control PC.

A typical DropTS deployment will require the addition of a calibration sphere (suspended about 20 m below the frame) and an SBE 39 bathythermograph.



Appendix 4. Hazardous materials sections B (Inventory) and C (Chemical safety spill kit contents and response procedures)

Inventory (itemized) approximated from previous years. Final amounts not available at this time.

Dyson will be loaded on a date and time TBD in consultation with ship's personnel prior to gear trials on 1/23/2017 by FOCI and MACE personnel. All chemicals listed will be used for the entire 2017 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 Property of FOCI	100%	1-250 ml	Gloves Paper towels Plastic bag	Not a regulated chemical.
Ethanol Property of FOCI	100%	4 -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%	8 - 2.5 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.
Glycerol/Thymol Solution Property of MACE	50 %	2 – 5 gal. buckets	Gloves Paper towels Kitty litter	Not a regulated chemical/solution. Store in Fish Lab under sink.
Hydrocloric Acid		1 – 500 ml	Gloves 1-1 Spilfyter Acid	Stored in over-pack bucket

Property of PMEL			Neutralizer	
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 Property of PMEL	0.11M	1 liter	Spill Control: B	Used for oxygen titrations.
Sodium Thiosulfate	0.11 M	1 liter	Spill Control: ST	Used for oxygen titrations.

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

Chemical safety and spill response procedures

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

PMEL Acid-Base Spill Kit Contents	**Amount**	**Use**	**Total Spill Volume Controllable**	**Notes**
Spilfyter Acid Neutralizer	1 box	Clean up acid spill—H_2SO_4	1.5 l of 5M Sulfuric Acid 5.57 l of 10% (1N) HCl	
Spilfyter Base Neutralizer	1 box	Clean up base spill--NaOH	2.0 l 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

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.

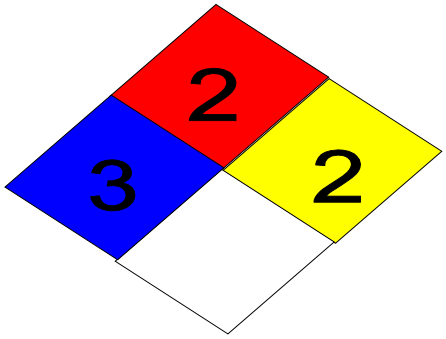
The scientific chemicals to be used for this project are: (1) ethyl alcohol (100%) and (2) formaldehyde (37%). Other chemicals brought aboard are consumer products in consumer quantities. Dilutions of the scientific chemicals will be used to preserve in faunal organisms collected with benthic grab samplers, 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

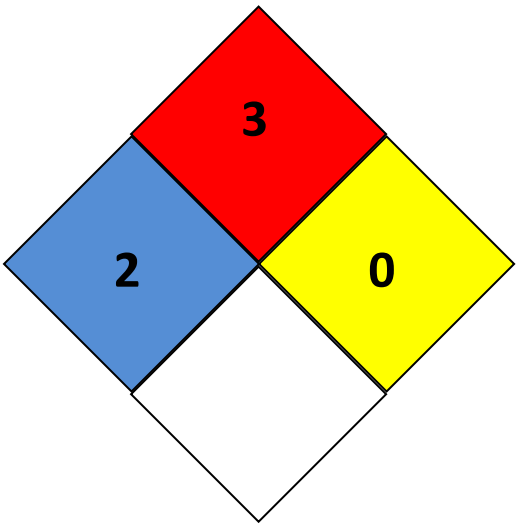
37% formaldehyde cannot be ship by air due to its flammability rating.

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.