



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
Alaska Fisheries Science Center  
Resource Assessment and Conservation Engineering  
7600 Sand Point Way NE  
Seattle, WA 98115

### Final Cruise Instructions

**Date Submitted:** April 12, 2013  
**Platform:** NOAA Ship *Oscar Dyson*  
**Project Number:** DY-13-06 (AFSC)  
**Project Title:** EcoFOCI Spring Ichthyoplankton Survey  
**Project Dates:** May 15, 2013 to June 3, 2013

Prepared by: Annette Dougherty Dated: 4/12/2013

Annette Dougherty  
Chief Scientist  
AFSC/RACE

Approved by: Guy Fleischer Dated: 12 April 2013

Guy Fleischer  
Acting Division Director  
AFSC/RACE Division

Approved by: \_\_\_\_\_ Dated: \_\_\_\_\_

Dr. Douglas P. DeMaster,  
Director  
Alaska Fisheries Science Center

Approved by: \_\_\_\_\_ Dated: \_\_\_\_\_

Captain Wade Blake, NOAA  
Commanding Officer  
Marine Operations Center - Pacific

**I. Overview**

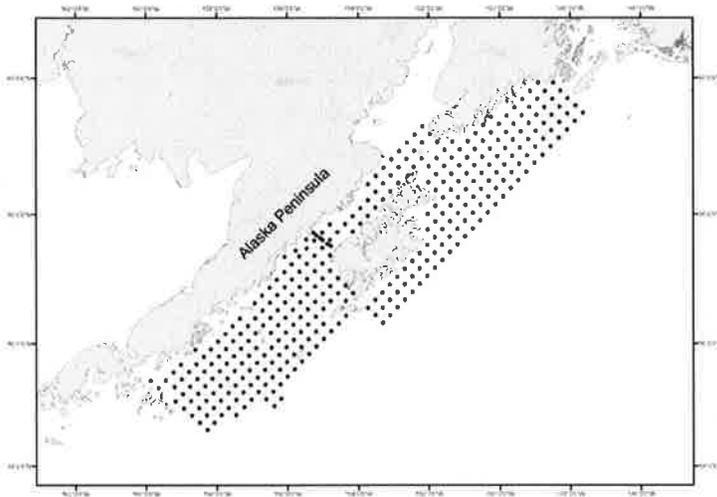
A. EcoFOCI Spring Ichthyoplankton Survey, May 15 – June 3, 2013

B. Service Level Agreements

Of the 20 DAS scheduled for this project, 0 DAS are funded by the program and 20 days are funded by OMAO. This project is estimated to exhibit a High Operational Tempo.

C. Operating Area

Gulf of Alaska (map shows potential stations to be occupied, see Appendix 1 for station locations)



D. Summary of Objectives

The objectives of this cruise are to conduct an ichthyoplankton survey and process studies in the region between the Shumagin Islands and Shelikof Strait so that we may estimate the abundance, transport, and factors influencing the survival of young walleye pollock larvae. We will also occupy Line 8 to continue our 27-year time series of environmental and biological conditions in Shelikof Strait. In addition to this sampling, stations have been selected from the main grid for the GOA-IERP research project at the shelf break and as well as on the NE side of Kodiak to acquire larval fish of four target species.

E. Participating Institutions

NOAA – Alaska Fisheries Science Center (AFSC)

7600 Sand Point Way N.E., Seattle, Washington 98115-0070

F. Personnel/Science Party:

Name (Last, First)	Title	Date Aboard	Date Disembark	Gender	Affiliation	Nationality
Dougherty, Annette	Chief Sci.	5/13/2013	6/4/2013	F	AFSC	USA
Overdick, Ashlee	Sci.	5/13/2013	6/3/2013	F	AFSC	USA
Porter, Steve	Sci.	5/13/2013	6/4/2013	M	AFSC	USA
Spear, Adam	Sci.	5/13/2013	6/3/2013	M	AFSC	USA
Gann, Jeanette	Sci	5/13/2013	6/3/2013	F	AFSC	USA

G. Administrative

1. Points of Contacts:

Annette Dougherty (Chief Scientist), AFSC, 7600 Sand Point Way NE, Bldg 4, Seattle, WA 98115, ph:206-526-6523, [Annette.Dougherty@noaa.gov](mailto:Annette.Dougherty@noaa.gov)

Jeff Napp (Program Leader), AFSC, 7600 Sand Point Way NE, Bldg 4, Seattle, WA 98115, ph:206-526-4148, [Jeff.Napp@noaa.gov](mailto:Jeff.Napp@noaa.gov)

Ann Matarese (Supervisor), AFSC, 7600 Sand Point Way NE, Bldg 4, Seattle, WA 98115, ph:206-526-4111, [Ann.Matarese@noaa.gov](mailto:Ann.Matarese@noaa.gov)

Oscar Dyson

CO cell: 206-403-8433

XO cell: 206-295-0775

CME cell: 206-295-0670

Iridium: 808-659-0050

Underway VIOP: 301-713-7778

INMARSAT: 011-870-336-995-920 (voice)

**Field Operations Officer**

Lt. Mark Frydrych

[ops.oscar.dyson@noaa.gov](mailto:ops.oscar.dyson@noaa.gov)

2. Diplomatic Clearances N/A

3. Licenses and Permits

This project will be conducted under the Blanket Scientific Research Permit #2013-B issued by the U.S. on January 14, 2013 effective January 31 – October 14, 2013 to AFSC research personnel and the *Oscar Dyson*. In addition, the State of Alaska Fish Resource Permit CF-13-002 has been granted and is effective February 5, 2013 to December 31, 2015.

## II. Operations

### A. Project Itinerary

Departure: May 15, 2013 1300 Dutch Harbor, AK

Arrival: June 3, 2013 0800 Dutch Harbor, AK

### B. Staging and Destaging

Loading for this survey will be conducted by the previous survey personnel in Seward, AK. The scientific party will arrive at least one day early to prepare for survey. FOCI equipment and samples will be off-loaded in Dutch Harbor and transported to the proper shipping avenues by the scientific party.

### C. Operations to be Conducted: Operations for this survey will be conducted 24/7.

#### 1. Underway Operations

The ship's Scientific Computer System (SCS) shall operate throughout the cruise, acquiring and logging data from navigation, meteorological, and oceanographic sensors. See FOCI Standard Operating Instructions (SOI 5.2 and SOI 5.3) for specific requirements at [http://www.pmel.noaa.gov/foci/operations/cruise\\_docs/FOCI\\_OD\\_SOI.pdf](http://www.pmel.noaa.gov/foci/operations/cruise_docs/FOCI_OD_SOI.pdf).

#### 2. Station Operations

An ichthyoplankton survey will be conducted from the Shumagin Islands, through Shelikof Strait, and SE Kodiak to the Kenai Peninsula. A total of 342 stations have been planned, but all stations may not be occupied. The standard gear for this survey will be a 60-cm bongo (SOI 3.2.2) with 0.505-mm mesh netting. A FastCat will be mounted above the bongo to provide depth, temperature, and salinity data. Tows will be to 100 meters or 10 meters off the bottom where water depth is shallower. Live tows may be conducted with the bongos to examine larval walleye pollock condition if larvae  $\leq 8$  mm are found. If larvae are collected for the pollock condition study, a CalVET tow will be conducted to collect small zooplankton. The neuston gear will be deployed at selected stations for the GOA-IERP project after the standard bongo has been conducted.

Line 8 sampling will include 20-cm and 60-cm bongos and conductivity, temperature, and depth (CTD) (SOI 3.2.1) profiles with Niskin bottle samples for chlorophyll, microzooplankton, and nutrients. Net tows at Line 8 are to 10 meters off the bottom. The 60-cm bongo will be fitted with 0.505-mm mesh nets and the 20-cm bongo mesh will be .153-mm. On completion of Line 8, the 20-cm bongo frame and nets will be removed from the line and sampling at planned stations will resume as before.

The samples collected from the 60-cm bongos will be processed in the following manner. Net 1 will be preserved in 1.8% formaldehyde, buffered with sodium borate, and boxed for shipment at the end of the

survey. Net 2 samples will be sorted for all fish larvae and preserved in 100% ethanol and/or frozen in the -80 °C freezer. The rest of contents of Net 2 will be discarded unless otherwise requested. Net 1 of the 20-cm and 60-cm bongo samples collected from Line 8 will be preserved in 1.8% formaldehyde and buffered with sodium borate.

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

D. Dive Plan N/A

E. Applicable Restrictions

Conditions that could preclude normal operations would be poor weather and equipment failure. Poor weather would be waited out in a sheltered area until operations could be resumed and modifications would be made to the sampling grid. Equipment failure (starboard winches) would have to be addressed immediately for the project to continue.

### III. Equipment

A. Equipment and Capabilities Provided by the Ship (itemized)

\* Oceanographic winch with slip rings and 3-conductor cable terminated for CTD,

\* 12 Khz hull mounted Edgetech Acoustic release transducer

\* Oceanographic winch with slip rings and 3-conductor cable terminated for the SBE 19+ for net tow operations,

\* Sea-Bird Electronics' SBE19+ CTD system with stand, each CTD system should include underwater CTD, weights, pinger, and a deck unit for the system.

\* 5 or 10-liter Niskin sampling bottles for use with rosette (10 plus 4 spares, 6 10-liter bottles required for Line 8 operations),

\* Conductivity and temperature sensor package to provide dual sensors on the CTD (primary),

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

\* Freezer space for storage of biological samples (blast and storage freezers, -20 °C and -80 °C, turned on and operating)

\* SIMRAD ES-60 and EK-60 echosounders,

\* SIMRAD ME-70 Downward-Facing Multi-Beam Sonar,

\* RD Instruments ADCP written to disk,

\* Scientific Computer System (SCS),

- \* Minimum of 2 computers with internet and e-mail access,
- \* Laboratory with storage space,
- \* Sea-water hoses and nozzles to wash nets,
- \* Adequate deck lighting for night-time operations,
- \* Navigational equipment including GPS and radar,
- \* Safety harnesses for working on quarterdeck and fantail,
- \* Ship's crane(s) used for loading/unloading.

B. Equipment and Capabilities Provided by the Scientists (itemized)

- \* Sea-Bird Electronics' SBE FastCat system,
- \* Fluorometer, light meter and dual oxygen sensors to be mounted on CTD,
- \* Conductivity and temperature sensor package to provide dual sensors on the CTD (backup),
- \* 60 cm bongo sampling arrays,
- \* 20 cm bongo sampling arrays,
- \* Neuston sampling array,
- \* Manual wire angle indicator,
- \* CalVET net array,
- \* Misc. scientific sampling and processing equipment,
- \* Chlorophyll and nutrient sampling equipment,

**IV. Hazardous Materials**

A. Policy and Compliance

The Chief Scientist is responsible for complying with FEC 07 Hazardous Materials and Hazardous Waste Management Requirements for Visiting Scientific Parties (or the OMAO procedure that supersedes it). By Federal regulations and NOAA Marine and Aviation Operations policy, the ship may not sail without a complete inventory of all hazardous materials by name and the anticipated quantity brought aboard, MSDS and appropriate neutralizing agents, buffers, or absorbents in amounts adequate to address spills of a size equal to the amount of chemical brought aboard, and a chemical hygiene plan (see Appendix 2 for Chemical Hygiene Plan and SOPs. All FOCI personnel on this survey are trained to manage and respond

to spills for the chemicals listed below in the Inventory). Documentation regarding those requirements will be provided by the Chief of Operations, Marine Operations Center, upon request.

Upon departure from the ship, scientific parties will provide the CO or their designee an inventory of hazardous material indicating all materials have been used or 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.

Overboard discharge of scientific chemicals is not permitted during projects aboard NOAA ships.

B. Radioactive Isotopes N/A

C. Inventory (itemized)

Common Name	Concentration	Amount	Spill Response (all FOCI personnel)	Notes
Formaldehyde	37%	6 – 5 gal.	Gloves Eye Protection Fan-Pads Formalex Plastic bag	Dyson loaded 1/23/2013, working volume for all Spring FOCI cruises. MSDS, hygiene plan, and SOPs provided at time of loading.
Ethanol	100%	4 – 1 gal.	Gloves 3M Sorbent Pads Plastic bag	Loaded 1/23/2013, working volume for all Spring and Fall FOCI cruises.
Sodium Borate Solution	5-6%	1 – 5 gal.	Gloves Paper towels Plastic bag	Loaded 1/23/2013, not a regulated chemical.
Sodium Borate Powder	100%	1 – 500 g	Gloves Wet paper towels Plastic bag	Loaded 1/23/2013, not a regulated chemical.
Ethylene Glycol	100%	1 – 500 ml	Gloves Paper towels Plastic bag	Loaded 1/23/2013, not a regulated chemical.
Formalex	100%	1.5 gal.	Gloves Paper towels	Loaded 1/23/2013, not a regulated solution. Used for spill cleanup.
Spill Kit Contents	Amount	Use	Total Spill Volume Controllable	Notes
Formalex	1.5 gallons	Formaldehyde cleanup (all	1.5 gallons 1:1 control	Formalex will be used in conjunction

		concentrations)		with Fan-Pads to reduce total spill volume.
Fan-Pads	1 roll (50 sheets)	Formaldehyde cleanup (all concentrations)	50 sheets=50-150 ml spills	Formalex will be used in conjunction with Fan-Pads to reduce total spill volume.
3 M Pads	10 pads	Ethanol cleanup	10 pads=10-250ml spills	Pads may be reused if dried out.
Nitrile Gloves	4 pairs each S,M,L,XL	For all cleanup procedures	N/A	Gloves will be restocked by each survey group.
Eye Protection	4 pairs	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.

**V. Additional Projects**

- A. Supplementary (“Piggyback”) Projects N/A
- B. NOAA Fleet Ancillary Projects

**VI. Disposition of Data and Reports**

- A. Data Responsibilities
- B. Pre and Post Project Meeting

Prior to departure, the Chief Scientist will conduct a meeting of the scientific party to train them in sample collection and inform them of cruise objectives. Some vessel protocols, e.g., meals, watches, etiquette, etc. will be presented by the ship’s Operations Officer.

Post-Project Meeting: Upon completion of the project, a meeting will normally be held at 0830 (unless prior alternate arrangements are made) and attended by the ship’s officers, the Chief Scientist and members of the scientific party to review the project. Concerns regarding safety, efficiency, and suggestions for improvements for future projects should be discussed. Minutes of the post-cruise meeting will be distributed to all participants by email, and to the Commanding Officer and Chief of Operations, Marine Operations Center.

- C. Ship Operation Evaluation Report

Within seven days of the completion of the project, a Ship Operation Evaluation form is to be completed by the Chief Scientist. The preferred method of transmittal of this form is via email to [omao.customer.satisfaction@noaa.gov](mailto:omao.customer.satisfaction@noaa.gov). If email is not an option, a hard copy may be forwarded to:

Director, NOAA Marine and Aviation Operations  
NOAA Office of Marine and Aviation Operations  
8403 Colesville Road, Suite 500  
Silver Spring, MD 20910

## **VII. Miscellaneous**

### **A. Meals and Berthing**

Meals and berthing are required for up to 4 scientists. Meals will be served 3 times daily beginning one hour before scheduled departure, extending throughout the project, and ending two hours after the termination of the project. Since the watch schedule is split between day and night, the night watch may often miss daytime meals and will require adequate food and beverages (for example a variety of sandwich items, cheeses, fruit, milk, juices) during what are not typically meal hours. Special dietary requirements for scientific participants will be made available to the ship's command at least seven days prior to the survey.

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

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

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

### **B. Medical Forms and Emergency Contacts**

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

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

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](mailto: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

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. Steel-toed shoes are required to participate in any work dealing with suspended loads, including CTD deployments and recovery. The ship does not provide steel-toed boots. Hard hats are also 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.

D. Communications

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

E. IT Security

Any computer that will be hooked into the ship's network must comply with the *NMAO Fleet IT Security Policy 1.1* (November 4, 2005) prior to establishing a direct connection to the NOAA WAN.

Requirements include, but are not limited to:

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

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

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

#### F. Foreign National Guests Access to OMAO Facilities and Platforms

All foreign national access to the vessel shall be in accordance with NAO 207-12 and RADM De Bow's March 16, 2006 memo (<http://deemedexports.noaa.gov>). National Marine Fisheries Service personnel will use the Foreign National Registration System (FRNS) to submit requests for access to NOAA facilities and ships. The Departmental Sponsor/NOAA (DSN) is responsible for obtaining clearances and export licenses and for providing escorts required by the NAO. DSNs should consult with their designated NMFS Deemed Exports point of contact to assist with the process.

The following are basic requirements. Full compliance with NAO 207-12 is required.

Responsibilities of the Chief Scientist:

1. Provide the Commanding Officer with the e-mail generated by the FRNS granting approval for the foreign national guest's visit. This e-mail will identify the guest's DSN and will serve as evidence that the requirements of NAO 207-12 have been complied with.
2. Escorts – The Chief Scientist is responsible to provide escorts to comply with NAO 207-12 Section 5.10, or as required by the vessel's DOC/OSY Regional Security Officer.
3. Ensure all non-foreign national members of the scientific party receive the briefing on Espionage Indicators (NAO 207-12 Appendix A) at least annually or as required by the servicing Regional Security Officer.
4. Export Control - *The NEFSC currently neither possesses nor utilizes technologies that are subject to Export Administration Regulations (EAR).*

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

Responsibilities of the Commanding Officer:

1. Ensure only those foreign nationals with DOC/OSY clearance are granted access.
2. Deny access to OMAO platforms and facilities by foreign nationals from countries controlled for anti-terrorism (AT) reasons and individuals from Cuba or Iran without written NMAO approval and compliance with export and sanction regulations.

3. Ensure foreign national access is permitted only if unlicensed deemed export is not likely to occur.
4. Ensure receipt from the Chief Scientist or the DSN of the FRNS e-mail granting approval for the foreign national guest's visit.
5. Ensure Foreign Port Officials, e.g., Pilots, immigration officials, receive escorted access in accordance with maritime custom to facilitate the vessel's visit to foreign ports.
6. Export Control - 8 weeks in advance of the cruise, provide the Chief Scientist with a current inventory of OMAO controlled technology onboard the vessel and a copy of the vessel Technology Access Control Plan (TACP). Also notify the Chief Scientist of any OMAO-sponsored foreign nationals that will be onboard while program equipment is aboard so that the Chief Scientist can take steps to prevent unlicensed export of Program controlled technology. The Commanding Officer and the Chief Scientist will work together to implement any access controls necessary to ensure no unlicensed export occurs of any controlled technology onboard regardless of ownership.
7. Ensure all OMAO personnel onboard receive the briefing on Espionage Indicators (NAO 207-12 Appendix A) at least annually or as required by the servicing Regional Security Officer.

**Responsibilities of the Foreign National Sponsor:**

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

**Appendices**

1. Station/Waypoint List (station order and number of stations occupied will vary)

Grid	Lat Deg	Lat DecMin		Long Deg	Long DecMin		DecLat	DecLong
gr135	55°	24.8118	N	159°	50.9400	W	55.4135	-159.8490
gt135	55°	17.9250	N	159°	37.0800	W	55.2988	-159.6180
gx135	55°	4.1508	N	159°	9.4860	W	55.0692	-159.1581
gz135	54°	57.2640	N	158°	55.7580	W	54.9544	-158.9293
hb135	54°	50.3766	N	158°	42.0720	W	54.8396	-158.7012
hd135	54°	43.2972	N	158°	29.1450	W	54.7216	-158.4858
hf135	54°	36.1308	N	158°	16.0884	W	54.6022	-158.2681
hf137	54°	43.4082	N	158°	4.1472	W	54.7235	-158.0691
hd137	54°	50.5536	N	158°	17.2038	W	54.8426	-158.2867
hb137	54°	57.6342	N	158°	30.0960	W	54.9606	-158.5016
gz137	55°	4.5210	N	158°	43.7460	W	55.0754	-158.7291
gx137	55°	11.4084	N	158°	57.4440	W	55.1901	-158.9574

gv137	55°	18.2952	N	159°	11.1780	W	55.3049	-159.1863
gt137	55°	25.1820	N	159°	24.9600	W	55.4197	-159.4160
gt139	55°	32.4396	N	159°	12.8100	W	55.5407	-159.2135
gv139	55°	25.5528	N	158°	59.0640	W	55.4259	-158.9844
gx139	55°	18.6654	N	158°	45.3600	W	55.3111	-158.7560
gz139	55°	11.7786	N	158°	31.6980	W	55.1963	-158.5283
hb139	55°	4.8912	N	158°	18.0840	W	55.0815	-158.3014
hd139	54°	57.7886	N	158°	5.2628	W	54.9631	-158.0877
hf139	54°	50.6647	N	157°	52.2061	W	54.8444	-157.8701
hh141	54°	50.7756	N	157°	27.2084	W	54.8463	-157.4535
hf141	54°	57.8992	N	157°	40.2651	W	54.9650	-157.6711
hd141	55°	5.0018	N	157°	53.3217	W	55.0834	-157.8887
hb141	55°	12.1488	N	158°	6.0360	W	55.2025	-158.1006
gz141	55°	19.0356	N	158°	19.6140	W	55.3173	-158.3269
gx141	55°	25.9230	N	158°	33.2400	W	55.4321	-158.5540
gv141	55°	32.8098	N	158°	46.9080	W	55.5468	-158.7818
gt141	55°	39.6972	N	159°	0.6180	W	55.6616	-159.0103
gv143	55°	40.0674	N	158°	34.7160	W	55.6678	-158.5786
gx143	55°	33.1806	N	158°	21.0780	W	55.5530	-158.3513
gz143	55°	26.2932	N	158°	7.4940	W	55.4382	-158.1249
hb143	55°	19.4064	N	157°	53.9460	W	55.3234	-157.8991
hd143	55°	12.5190	N	157°	40.4400	W	55.2087	-157.6740
hf143	55°	5.6322	N	157°	26.9820	W	55.0939	-157.4497
hh143	54°	58.7448	N	157°	13.5600	W	54.9791	-157.2260
hh145	55°	6.0024	N	157°	1.5420	W	55.1000	-157.0257
hf145	55°	12.8892	N	157°	14.9280	W	55.2148	-157.2488
hd145	55°	19.7766	N	157°	28.3560	W	55.3296	-157.4726
hb145	55°	26.6634	N	157°	41.8260	W	55.4444	-157.6971
gz145	55°	33.5508	N	157°	55.3320	W	55.5592	-157.9222
gx145	55°	40.4376	N	158°	8.8860	W	55.6740	-158.1481
gv145	55°	47.3250	N	158°	22.4820	W	55.7888	-158.3747
gt145	55°	54.2118	N	158°	36.1260	W	55.9035	-158.6021
gv147	55°	54.5820	N	158°	10.2120	W	55.9097	-158.1702
gx147	55°	47.6952	N	157°	56.6520	W	55.7949	-157.9442
gz147	55°	40.8078	N	157°	43.1340	W	55.6801	-157.7189
hb147	55°	33.9210	N	157°	29.6640	W	55.5654	-157.4944
hd147	55°	27.0342	N	157°	16.2300	W	55.4506	-157.2705
hf147	55°	20.1468	N	157°	2.8380	W	55.3358	-157.0473
hh147	55°	13.2600	N	156°	49.4880	W	55.2210	-156.8248
hj147	55°	6.3726	N	156°	36.1800	W	55.1062	-156.6030
hl147	54°	59.6161	N	156°	22.5580	W	54.9936	-156.3760
hl149	55°	6.7052	N	156°	10.8136	W	55.1118	-156.1802
hj149	55°	13.6320	N	156°	24.1200	W	55.2272	-156.4020

hh149	55°	20.5200	N	156°	37.3920	W	55.3420	-156.6232
hf149	55°	27.4044	N	156°	50.7120	W	55.4567	-156.8452
hd149	55°	34.2912	N	157°	4.0680	W	55.5715	-157.0678
hb149	55°	41.1786	N	157°	17.4660	W	55.6863	-157.2911
gz149	55°	48.0654	N	157°	30.9000	W	55.8011	-157.5150
gx149	55°	54.9522	N	157°	44.3820	W	55.9159	-157.7397
gv149	56°	1.8396	N	157°	57.9060	W	56.0307	-157.9651
gv151	56°	9.0972	N	157°	45.5640	W	56.1516	-157.7594
gx151	56°	2.2098	N	157°	32.0760	W	56.0368	-157.5346
gz151	55°	55.3230	N	157°	18.6300	W	55.9221	-157.3105
hb151	55°	48.4356	N	157°	5.2260	W	55.8073	-157.0871
hd151	55°	41.5488	N	156°	51.8640	W	55.6925	-156.8644
hf151	55°	34.6614	N	156°	38.5440	W	55.5777	-156.6424
hh151	55°	27.7746	N	156°	25.2660	W	55.4629	-156.4211
hj151	55°	20.8860	N	156°	12.0240	W	55.3481	-156.2004
hj153	55°	28.1460	N	155°	59.8920	W	55.4691	-155.9982
hh153	55°	35.0322	N	156°	13.0980	W	55.5839	-156.2183
hf153	55°	41.9190	N	156°	26.3400	W	55.6987	-156.4390
hd153	55°	48.8058	N	156°	39.6300	W	55.8134	-156.6605
hb153	55°	55.6932	N	156°	52.9560	W	55.9282	-156.8826
gz153	56°	2.5800	N	157°	6.3180	W	56.0430	-157.1053
gx153	56°	9.4674	N	157°	19.7280	W	56.1578	-157.3288
gv153	56°	16.3542	N	157°	33.1800	W	56.2726	-157.5530
gv155	56°	23.6118	N	157°	20.7540	W	56.3935	-157.3459
gx155	56°	16.7244	N	157°	7.3440	W	56.2787	-157.1224
gz155	56°	9.8376	N	156°	53.9700	W	56.1640	-156.8995
hd155	55°	56.0634	N	156°	27.3540	W	55.9344	-156.4559
hf155	55°	49.1766	N	156°	14.1000	W	55.8196	-156.2350
hh155	55°	42.2892	N	156°	0.8940	W	55.7048	-156.0149
hj155	55°	35.4000	N	155°	47.7240	W	55.5900	-155.7954
hj157	55°	35.5200	N	155°	42.6594	W	55.7110	-155.5920
hh157	55°	48.6540	N	155°	49.5468	W	55.8258	-155.8109
hf157	55°	56.4336	N	156°	1.8240	W	55.9406	-156.0304
hd157	56°	3.3210	N	156°	15.0360	W	56.0554	-156.2506
hb157	56°	10.2078	N	156°	28.2900	W	56.1701	-156.4715
gz157	56°	17.0952	N	156°	41.5800	W	56.2849	-156.6930
gx157	56°	23.9820	N	156°	54.9180	W	56.3997	-156.9153
gv159	56°	38.1264	N	156°	55.7880	W	56.6354	-156.9298
gx159	56°	31.2396	N	156°	42.4500	W	56.5207	-156.7075
gz159	56°	24.3522	N	156°	29.1540	W	56.4059	-156.4859
hb159	56°	17.4654	N	156°	15.9000	W	56.2911	-156.2650
hd159	56°	10.5780	N	156°	2.6820	W	56.1763	-156.0447
hf159	56°	3.6912	N	155°	49.5060	W	56.0615	-155.8251

hh159	55°	56.8044	N	155°	36.3720	W	55.9467	-155.6062
hj159	55°	49.9170	N	155°	23.2740	W	55.8320	-155.3879
hj161	55°	57.1746	N	155°	10.9920	W	55.9529	-155.1832
hh161	56°	4.0614	N	155°	24.0540	W	56.0677	-155.4009
hf161	56°	10.9488	N	155°	37.1520	W	56.1825	-155.6192
hd161	56°	17.8356	N	155°	50.2920	W	56.2973	-155.8382
hb161	56°	24.7224	N	156°	3.4680	W	56.4120	-156.0578
gz161	56°	31.6098	N	156°	16.6860	W	56.5268	-156.2781
gx161	56°	38.4966	N	156°	29.9460	W	56.6416	-156.4991
gv161	56°	45.3840	N	156°	43.2480	W	56.7564	-156.7208
gv163	56°	52.6410	N	156°	30.6660	W	56.8774	-156.5111
gx163	56°	45.7542	N	156°	17.4000	W	56.7626	-156.2900
gz163	56°	38.8674	N	156°	4.1820	W	56.6478	-156.0697
hb163	56°	31.9800	N	155°	51.0000	W	56.5330	-155.8500
hd163	56°	25.0932	N	155°	37.8600	W	56.4182	-155.6310
hf163	56°	18.2058	N	155°	24.7560	W	56.3034	-155.4126
hh163	56°	11.3190	N	155°	11.6940	W	56.1887	-155.1949
hj163	56°	4.4316	N	154°	58.6740	W	56.0739	-154.9779
hj165	56°	11.6892	N	154°	46.3140	W	56.1948	-154.7719
hh165	56°	18.5760	N	154°	59.2980	W	56.3096	-154.9883
hf165	56°	25.4634	N	155°	12.3240	W	56.4244	-155.2054
hd165	56°	32.3502	N	155°	25.3860	W	56.5392	-155.4231
hb165	56°	39.2376	N	155°	38.4900	W	56.6540	-155.6415
gz165	56°	46.1244	N	155°	51.6360	W	56.7687	-155.8606
gx165	56°	53.0118	N	156°	4.8180	W	56.8835	-156.0803
gv165	56°	59.8986	N	156°	18.0420	W	56.9983	-156.3007
gv167	57°	7.1562	N	156°	5.3760	W	57.1193	-156.0896
gx167	57°	0.2688	N	155°	52.1880	W	57.0045	-155.8698
gz167	56°	53.3820	N	155°	39.0480	W	56.8897	-155.6508
hb167	56°	46.4946	N	155°	25.9440	W	56.7749	-155.4324
hd167	56°	39.6078	N	155°	12.8760	W	56.6601	-155.2146
hf167	56°	32.7210	N	154°	59.8500	W	56.5454	-154.9975
hj167	56°	18.9468	N	154°	33.9180	W	56.3158	-154.5653
hj169	56°	26.2038	N	154°	21.4800	W	56.4367	-154.3580
hf169	56°	39.9780	N	154°	47.3400	W	56.6663	-154.7890
hd169	56°	46.8654	N	155°	0.3240	W	56.7811	-155.0054
hb169	56°	53.7522	N	155°	13.3500	W	56.8959	-155.2225
gz169	57°	0.6390	N	155°	26.4180	W	57.0107	-155.4403
gx169	57°	7.5264	N	155°	39.5220	W	57.1254	-155.6587
gv169	57°	14.4132	N	155°	52.6680	W	57.2402	-155.8778
gt169	57°	21.3000	N	156°	5.0000	W	57.3550	-156.0833
gt171	57°	27.0000	N	155°	46.0000	W	57.4500	-155.7667
gv171	57°	21.6708	N	155°	39.9180	W	57.3612	-155.6653

gx171	57°	14.7840	N	155°	26.8140	W	57.2464	-155.4469
gz171	57°	7.8966	N	155°	13.7460	W	57.1316	-155.2291
hb171	57°	1.0098	N	155°	0.7200	W	57.0168	-155.0120
hd171	56°	54.1224	N	154°	47.7360	W	56.9020	-154.7956
hf171	56°	47.2356	N	154°	34.7880	W	56.7873	-154.5798
hh171	56°	40.3482	N	154°	21.8760	W	56.6725	-154.3646
hh173	56°	47.6058	N	154°	9.3180	W	56.7934	-154.1553
hfl173	56°	54.4926	N	154°	22.1940	W	56.9082	-154.3699
hd173	57°	1.3800	N	154°	35.1060	W	57.0230	-154.5851
hb173	57°	8.2668	N	154°	48.0480	W	57.1378	-154.8008
gz173	57°	15.1542	N	155°	1.0380	W	57.2526	-155.0173
gx173	57°	22.0410	N	155°	14.0640	W	57.3674	-155.2344
gv173	57°	28.9284	N	155°	27.1260	W	57.4821	-155.4521
gt173	57°	37.0000	N	155°	28.0000	W	57.6167	-155.4667
gv175	57°	36.1854	N	155°	14.2980	W	57.6031	-155.2383
gx175	57°	29.2986	N	155°	1.2720	W	57.4883	-155.0212
gz175	57°	22.4112	N	154°	48.2820	W	57.3735	-154.8047
FOX56	57°	31.2000	N	154°	46.8000	W	57.5200	-154.7800
FOX57	57°	33.0000	N	154°	52.8000	W	57.5500	-154.8800
FOX58	57°	36.6000	N	155°	0.6000	W	57.6100	-155.0100
FOX59	57°	38.4000	N	155°	4.2000	W	57.6400	-155.0700
FOX60	57°	40.8000	N	155°	10.2000	W	57.6800	-155.1700
FOX61	57°	43.2000	N	155°	15.6000	W	57.7200	-155.2600
gx177	57°	36.5556	N	154°	48.4380	W	57.6093	-154.8073
gv177	57°	43.4430	N	155°	1.4220	W	57.7241	-155.0237
gv179	57°	50.7006	N	154°	48.4980	W	57.8450	-154.8083
gx179	57°	43.8132	N	154°	35.5620	W	57.7302	-154.5927
gx181	57°	51.0708	N	154°	22.6380	W	57.8512	-154.3773
gz181	57°	44.1834	N	154°	9.7740	W	57.7364	-154.1629
gz183	57°	51.4410	N	153°	56.8500	W	57.8574	-153.9475
gx183	57°	58.3278	N	154°	9.6720	W	57.9721	-154.1612
gx185	58°	5.5854	N	153°	56.6640	W	58.0931	-153.9444
gz185	57°	58.6986	N	153°	43.8840	W	57.9783	-153.7314
gz187	58°	5.9556	N	153°	30.8700	W	58.0993	-153.5145
gx187	58°	12.8430	N	153°	43.6140	W	58.2141	-153.7269
gz189	58°	13.2132	N	153°	17.8200	W	58.2202	-153.2970
gx189	58°	20.1000	N	153°	30.5160	W	58.3350	-153.5086
gv189	58°	26.9874	N	153°	43.2480	W	58.4498	-153.7208
gv191	58°	34.2444	N	153°	30.0660	W	58.5707	-153.5011
gx191	58°	27.3576	N	153°	17.3700	W	58.4560	-153.2895
gz191	58°	20.4708	N	153°	4.7160	W	58.3412	-153.0786
gz193	58°	27.7278	N	152°	51.5760	W	58.4621	-152.8596
gx193	58°	34.6152	N	153°	4.1820	W	58.5769	-153.0697

gv193	58°	41.5020	N	153°	16.8300	W	58.6917	-153.2805
gv195	58°	48.7596	N	153°	3.5580	W	58.8127	-153.0593
gx195	58°	41.8722	N	152°	50.9520	W	58.6979	-152.8492
gz197	58°	42.2424	N	152°	25.1460	W	58.7040	-152.4191
gx197	58°	49.1298	N	152°	37.6740	W	58.8188	-152.6279
gv197	58°	56.0166	N	152°	50.2320	W	58.9336	-152.8372
gv199	59°	3.2742	N	152°	36.8640	W	59.0546	-152.6144
gx199	58°	56.3874	N	152°	24.3480	W	58.9398	-152.4058
gx201	59°	3.6444	N	152°	10.9740	W	59.0607	-152.1829
gv201	59°	10.5318	N	152°	23.4480	W	59.1755	-152.3908
gv203	59°	17.7888	N	152°	9.9840	W	59.2965	-152.1664
gx203	59°	10.9020	N	151°	57.5580	W	59.1817	-151.9593
hl173	56°	33.8316	N	153°	43.6860	W	56.5639	-153.7281
hn173	56°	26.9448	N	153°	30.9300	W	56.4491	-153.5155
hp173	56°	19.9185	N	153°	17.8107	W	56.3320	-153.2968
hp175	56°	27.0039	N	153°	5.6631	W	56.4501	-153.0944
hn175	56°	34.2018	N	153°	18.4500	W	56.5700	-153.3075
hl175	56°	41.0892	N	153°	31.1700	W	56.6848	-153.5195
hl177	56°	48.3462	N	153°	18.6120	W	56.8058	-153.3102
hn177	56°	41.4594	N	153°	5.9280	W	56.6910	-153.0988
hp177	56°	34.3671	N	152°	52.9993	W	56.5728	-152.8833
hp179	56°	41.5855	N	152°	40.5445	W	56.6931	-152.6757
hn179	56°	48.7170	N	152°	53.3640	W	56.8120	-152.8894
hl179	56°	55.6038	N	153°	6.0120	W	56.9267	-153.1002
hl181	57°	2.8614	N	152°	53.3700	W	57.0477	-152.8895
hn181	56°	55.9740	N	152°	40.7640	W	56.9329	-152.6794
hp181	56°	48.9638	N	152°	27.7726	W	56.8161	-152.4629
hp183	56°	56.3180	N	152°	15.0007	W	56.9386	-152.2500
hn183	57°	3.2316	N	152°	28.1220	W	57.0539	-152.4687
hl183	57°	10.1184	N	152°	40.6860	W	57.1686	-152.6781
hl185	57°	17.3760	N	152°	27.9600	W	57.2896	-152.4660
hn185	57°	10.4892	N	152°	15.4380	W	57.1748	-152.2573
hp185	57°	3.6481	N	152°	2.2288	W	57.0608	-152.0371
hp187	57°	10.9542	N	151°	49.4569	W	57.1826	-151.8243
hn187	57°	17.7462	N	152°	2.7120	W	57.2958	-152.0452
hl187	57°	24.6336	N	152°	15.1980	W	57.4106	-152.2533
hl189	57°	31.8906	N	152°	2.3880	W	57.5315	-152.0398
hn189	57°	25.0038	N	151°	49.9440	W	57.4167	-151.8324
hp189	57°	18.2362	N	151°	36.6850	W	57.3039	-151.6114
hp191	57°	25.4943	N	151°	23.9130	W	57.4249	-151.3986
hn191	57°	32.2614	N	151°	37.1340	W	57.5377	-151.6189
hl191	57°	39.1482	N	151°	49.5420	W	57.6525	-151.8257
hj191	57°	46.0350	N	152°	1.9800	W	57.7673	-152.0330

hh193	58°	0.1794	N	152°	1.4820	W	58.0030	-152.0247
hj193	57°	53.2926	N	151°	49.0500	W	57.8882	-151.8175
hl193	57°	46.4058	N	151°	36.6480	W	57.7734	-151.6108
hn193	57°	39.5184	N	151°	24.2820	W	57.6586	-151.4047
hp193	57°	32.7285	N	151°	11.1411	W	57.5455	-151.1857
hp195	57°	39.9389	N	150°	58.3692	W	57.6656	-150.9728
hn195	57°	46.7760	N	151°	11.3820	W	57.7796	-151.1897
hl195	57°	53.6628	N	151°	23.7120	W	57.8944	-151.3952
hj195	58°	0.5502	N	151°	36.0720	W	58.0092	-151.6012
hh195	58°	7.4370	N	151°	48.4620	W	58.1240	-151.8077
hh197	58°	14.6946	N	151°	35.4000	W	58.2449	-151.5900
hj197	58°	7.8072	N	151°	23.0460	W	58.1301	-151.3841
hl197	58°	0.9204	N	151°	10.7280	W	58.0153	-151.1788
hn197	57°	54.0330	N	150°	58.4460	W	57.9006	-150.9741
hp197	57°	47.1254	N	150°	45.5973	W	57.7854	-150.7600
hp199	57°	54.2815	N	150°	32.8372	W	57.9047	-150.5473
hn199	58°	1.2906	N	150°	45.4620	W	58.0215	-150.7577
hl199	58°	8.1780	N	150°	57.7020	W	58.1363	-150.9617
hj199	58°	15.0648	N	151°	9.9840	W	58.2511	-151.1664
hh199	58°	21.9516	N	151°	22.2900	W	58.3659	-151.3715
hf197	58°	21.5814	N	151°	47.7840	W	58.3597	-151.7964
hd197	58°	28.4688	N	152°	0.2040	W	58.4745	-152.0034
hd199	58°	35.7258	N	151°	47.0100	W	58.5954	-151.7835
hb199	58°	42.6132	N	151°	59.4180	W	58.7102	-151.9903
gz199	58°	49.5000	N	152°	11.8680	W	58.8250	-152.1978
hb201	58°	49.8702	N	151°	46.1340	W	58.8312	-151.7689
hd201	58°	42.9834	N	151°	33.7740	W	58.7164	-151.5629
hf201	58°	36.0960	N	151°	21.4380	W	58.6016	-151.3573
hf199	58°	28.8390	N	151°	34.6320	W	58.4807	-151.5772
hh201	58°	29.2092	N	151°	9.1380	W	58.4868	-151.1523
hj201	58°	22.3224	N	150°	56.8740	W	58.3720	-150.9479
hl201	58°	15.4350	N	150°	44.6340	W	58.2573	-150.7439
hn201	58°	8.5482	N	150°	32.4360	W	58.1425	-150.5406
hp201	58°	1.5483	N	150°	19.8365	W	58.0258	-150.3306
hp203	58°	8.7905	N	150°	6.8358	W	58.1465	-150.1139
hn203	58°	15.8052	N	150°	19.3680	W	58.2634	-150.3228
hl203	58°	22.6926	N	150°	31.5240	W	58.3782	-150.5254
hj203	58°	29.5794	N	150°	43.7160	W	58.4930	-150.7286
hh203	58°	36.4668	N	150°	55.9380	W	58.6078	-150.9323
hf203	58°	43.3536	N	151°	8.1960	W	58.7226	-151.1366
hd203	58°	50.2410	N	151°	20.4840	W	58.8374	-151.3414
hb203	58°	57.1278	N	151°	32.8080	W	58.9521	-151.5468
gz203	59°	4.0146	N	151°	45.1620	W	59.0669	-151.7527

hb205	59°	4.3854	N	151°	19.4280	W	59.0731	-151.3238
hd205	58°	57.4980	N	151°	7.1520	W	58.9583	-151.1192
hf205	58°	50.6112	N	150°	54.9060	W	58.8435	-150.9151
hh205	58°	43.7238	N	150°	42.6900	W	58.7287	-150.7115
hj205	58°	36.8370	N	150°	30.5160	W	58.6140	-150.5086
hl205	58°	29.9496	N	150°	18.3660	W	58.4992	-150.3061
hn205	58°	23.0628	N	150°	6.2520	W	58.3844	-150.1042
hp205	58°	16.0083	N	149°	53.8351	W	58.2668	-149.8973
hp207	58°	23.2016	N	149°	40.8343	W	58.3867	-149.6806
hn207	58°	30.3204	N	149°	53.0880	W	58.5053	-149.8848
hl207	58°	37.2072	N	150°	5.1600	W	58.6201	-150.0860
hj207	58°	44.0946	N	150°	17.2680	W	58.7349	-150.2878
hh207	58°	50.9814	N	150°	29.4000	W	58.8497	-150.4900
hf207	58°	57.8682	N	150°	41.5740	W	58.9645	-150.6929
hd207	59°	4.7556	N	150°	53.7720	W	59.0793	-150.8962
hd209	59°	11.8220	N	150°	40.6863	W	59.1970	-150.6781
hf209	59°	5.1258	N	150°	28.1940	W	59.0854	-150.4699
hh209	58°	58.2390	N	150°	16.0620	W	58.9707	-150.2677
hj209	58°	51.4197	N	150°	3.8388	W	58.8570	-150.0640
hl209	58°	44.4648	N	149°	51.9120	W	58.7411	-149.8652
hn209	58°	37.5774	N	149°	39.8820	W	58.6263	-149.6647
hp209	58°	30.3209	N	149°	27.9238	W	58.5053	-149.4654
hp211	58°	37.8440	N	149°	14.2335	W	58.6307	-149.2372
hn211	58°	44.8350	N	149°	26.6340	W	58.7473	-149.4439
hl211	58°	51.7218	N	149°	38.6160	W	58.8620	-149.6436
hj211	58°	58.6092	N	149°	50.6340	W	58.9768	-149.8439
hh211	59°	5.5596	N	150°	2.5457	W	59.0927	-150.0424
hf211	59°	12.3834	N	150°	14.7600	W	59.2064	-150.2460
hd211	59°	18.8642	N	150°	27.6007	W	59.3144	-150.4600
hd213	59°	25.8821	N	150°	14.5150	W	59.4314	-150.2419
hf213	59°	19.6404	N	150°	1.2840	W	59.3273	-150.0214
hh213	59°	12.8102	N	149°	49.1186	W	59.2135	-149.8186
hj213	59°	6.0911	N	149°	36.7989	W	59.1015	-149.6133
hl213	58°	58.9794	N	149°	25.2720	W	58.9830	-149.4212
hn213	58°	52.0926	N	149°	13.3380	W	58.8682	-149.2223
hp213	58°	45.6577	N	148°	59.9273	W	58.7610	-148.9988
hp215	58°	53.0899	N	148°	46.2917	W	58.8848	-148.7715
hn215	58°	59.9383	N	148°	58.7797	W	58.9990	-148.9797
hl215	59°	6.4423	N	149°	11.4277	W	59.1074	-149.1905
hj215	59°	13.2410	N	149°	23.5513	W	59.2207	-149.3925
hh215	59°	20.0353	N	149°	35.6914	W	59.3339	-149.5949
hf215	59°	26.8980	N	149°	47.7600	W	59.4483	-149.7960
hf217	59°	33.9999	N	149°	34.4361	W	59.5667	-149.5739

hh217	59°	27.2348	N	149°	22.2643	W	59.4539	-149.3711
hj217	59°	20.4635	N	149°	10.1221	W	59.3411	-149.1687
hl217	59°	13.6870	N	148°	57.9946	W	59.2281	-148.9666
hn217	59°	7.2772	N	148°	45.2027	W	59.1213	-148.7534
hp217	59°	0.4955	N	148°	32.6560	W	59.0083	-148.5443
hp219	59°	7.8746	N	148°	19.0204	W	59.1312	-148.3170
hn219	59°	14.5900	N	148°	31.6256	W	59.2432	-148.5271
hl219	59°	20.9060	N	148°	44.5615	W	59.3484	-148.7427
hj219	59°	27.6605	N	148°	56.6929	W	59.4610	-148.9449
hh219	59°	34.4088	N	149°	8.8371	W	59.5735	-149.1473
hf219	59°	41.1498	N	149°	21.0085	W	59.6858	-149.3501
hf221	59°	48.2744	N	149°	7.5809	W	59.8046	-149.1263
hh221	59°	41.5575	N	148°	55.4100	W	59.6926	-148.9235
hj221	59°	34.8321	N	148°	43.2638	W	59.5805	-148.7211
hl221	59°	28.0996	N	148°	31.1285	W	59.4683	-148.5188
hn221	59°	21.8767	N	148°	18.0485	W	59.3646	-148.3008
hp221	59°	15.2273	N	148°	5.3847	W	59.2538	-148.0897
hp223	59°	22.5537	N	147°	51.7490	W	59.3759	-147.8625
hn223	59°	29.1375	N	148°	4.4715	W	59.4856	-148.0745
hl223	59°	35.2678	N	148°	17.6954	W	59.5878	-148.2949
hj223	59°	41.9783	N	148°	29.8346	W	59.6996	-148.4972
hh223	59°	48.6808	N	148°	41.9828	W	59.8113	-148.6997
hf223	59°	55.3737	N	148°	54.1534	W	59.9229	-148.9026
hh225	59°	55.7789	N	148°	28.5557	W	59.9296	-148.4759
hj225	59°	49.0992	N	148°	16.4054	W	59.8183	-148.2734
hl225	59°	42.4105	N	148°	4.2623	W	59.7068	-148.0710
hn225	59°	36.3723	N	147°	50.8944	W	59.6062	-147.8482
hp225	59°	29.8538	N	147°	38.1134	W	59.4976	-147.6352

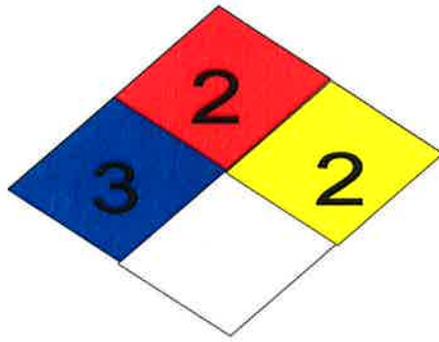
## 2. Chemical Hygiene Plan and Standard Operating Procedures (SOPs)

### **Appendix 2 – 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° 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 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.

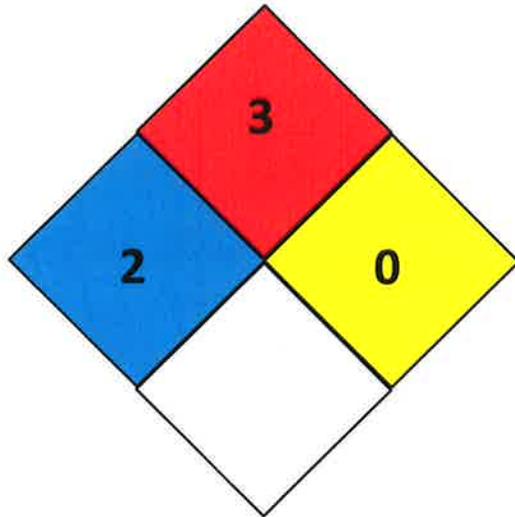
\*Fan Pads may be used to absorb small spills alone but these pads work best when used with Formalex to immediately control the vapor layer.

#### 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 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 MSDSs and the UN number with the shipment for reference in the event of a spill.