FINAL CRUISE INSTRUCTIONS
FOCI

NOAA Ship *MILLER FREEMAN*, MF-04-10
September 9 – September 22, 2004
Chief Scientist: Matthew T. Wilson, NOAA/AFSC

1.0 FINAL CRUISE INSTRUCTIONS

1.1 Cruise Title – Fisheries-Oceanography Coordinated Investigations (FOCI).

1.2 Cruise Numbers

1.2.1 Cruise Number – MF-04-10

1.2.2 FOCI Number – 7MF04

1.3 Cruise Dates:

1.3.1 Departure – Depart Kodiak, Alaska, at 1500 on Thursday, September 9, 2004.

1.3.2 Arrival – Arrive Kodiak, Alaska, at 0800 on Wednesday, September 22, 2004**.**

2.0 CRUISE OVERVIEW

2.1 Cruise Objectives – We will be conducting an ichthyoplankton survey in the waters contiguous to Kodiak Island, Alaska. This work is needed to describe larval fish assemblages on the shelf and slope in late summer and early fall, and to study the transport and early life history of larval forage fishes (ex: capelin). Zooplankton data and data on physical characteristics of the water column will also be collected. Limited trawling activities for juvenile groundfishes (age-0 pollock) and adult forage fishes (capelin) will be conducted as well to study differences in production between offshore banks and troughs and nearshore Kodiak Island.

2.2 Applicability – These instructions, with ***FOCI Standard Operating Instructions for NOAA Ship MILLER FREEMAN***, dated October 6, 2003, present complete information for this cruise.

2.3 Operating Area – Gulf of Alaska.

2.4 Participating Organizations

NOAA – Alaska Fisheries Science Center (AFSC)
7600 Sand Point Way N.E., Seattle, Washington 98115-0070

2.5 Personnel

2.5.1 Chief Scientist

Name	Gender	Affiliation	E-mail Address
Matthew T. Wilson (206) 526-6522	Male	AFSC	Matt.Wilson@noaa.gov

2.5.2 Participating Scientists

Name	Gender	Affiliation	E-mail Address
Matthew T. Wilson	Male	AFSC	Matt.Wilson@noaa.gov
Christina M. Deliyanides	Female	AFSC	Christina.Deliyanides@noaa.gov
Susan J. Picquelle	Female	AFSC	Susan.Picquelle@noaa.gov
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2.6 Administrative

2.6.1 Ship Operations

Marine Operations Center, Pacific
1801 Fairview Avenue East
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Commander Michele G. Bullock, NOAA
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Telephone – Work: (206) 553-4764
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2.6.2 Scientific Operations

Dr. Phyllis J. Stabeno, PMEL
Telephone: (206) 526-6453
E-mail: Phyllis.Stabeno@noaa.gov

Dr. Jeffrey M. Napp, AFSC
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3.0 OPERATIONS

3.1 Data To Be Collected – A goal of the FOCI program is to identify the physical and biological factors that underlie ecosystem change and to understand how those factors interact. One focus is the effects of perturbations at lower trophic levels. To this end, we will collect ichthyoplankton and zooplankton data using 60-cm Bongo nets (60BON) and 20-cm Bongo nets (20BON), a Neuston net, a Multiple Opening/Closing Net and Environmental Sensing System (MOCNESS), and an anchovy (Stauffer) trawl. We will occupy at least one, more likely two, 24-hr diel station to study vertical distribution of fish larvae, specifically capelin. We intend to deploy two ARGOS satellite-tracked drifters (drogued at 20m) to study drift of larval capelin and/or circulation over Portlock Bank. We will collect data on the physical environment using the Sea-Bird Electronics SBE 19 SEACAT Profiler to relate larval assemblage structure to environmental variables (temperature, salinity). Sea-Bird Electronics SBE 911*plus* Conductivity, Temperature, and Depth (CTD) casts will collect physical data as well as data on nutrients, microzooplankton, and chlorophyll at selected stations. This cruise will provide new information on larval fish assemblages (especially forage fishes) on the shelf off Kodiak Island during the late summer and early fall. Samples will be collected from a grid of approximately 110 stations (see Section 9.2 MF-04-10 Station Locations.)

3.1.1 Scientific Computer System (SCS) – The ship's SCS shall operate throughout the cruise, acquiring and logging data from navigation, meteorological, oceanographic, and fisheries sensors. See ***FOCI Standard Operating Instructions for NOAA Ship MILLER FREEMAN*** (SOI 5.2) for specific requirements.

3.2 Staging Plan – The majority of the equipment necessary for the cruise was loaded onto the **NOAA Ship *MILLER FREEMAN*** when the ship departed from Seattle, Washington, in March 2004. The Stauffer trawl will be sent up to Kodiak, Alaska, later this summer and will need to be loaded onto the ship prior to the cruise. We request that we be allowed to set up equipment, including the MOCNESS (plus termination), on Tuesday, September 7, 2004, two days prior to departure. To accomplish this, three scientists will arrive on Monday, September 6, 2004, and if possible, we request that they be allowed to berth overnight on the vessel beginning the night of September 6, 2004. We will use the chemistry lab, the rough lab, and the slime lab for sample and equipment preparation, and we request as much counter and cabinet space as possible. We will use DataPlot for CTD, MOCNESS, and SEACAT operations.

3.3 De-staging Plan – The samples and gear will remain on board the ship until the ship returns to Seattle, Washington, on October 13, 2004.

3.4 Cruise Plan – The cruise will depart from Kodiak, Alaska, at 1500 on Thursday, September 9, 2004, and occupy a series of approximately 120 stations. Station positions and a chartlet of the working area are located in Section 9.2 MF-04-10 Station locations and Section 9.3 MF-04-10 Cruise Chartlet, respectively.

3.4.1 **Grid Survey** – During the regular grid survey, the Sameoto Neuston net will be deployed first. The net will collect fish larvae in the surface layer. Samples from the Neuston net gear will be preserved in 1.8% buffered Formaldehyde (5% formalin).

MOA buttons should be set up to mark surface (in) and surface (out), as well as position, date, time, and bottom depth.

Following completion of the Neuston tow, a Marine Assessment Monitoring and Prediction (MARMAP) Bongo tow (SOI 3.2.2) will be conducted. The SBE 19 SEACAT, the 20-cm Bongo (20BON) net with 0.150-mm mesh netting and the 60-cm Bongo (60BON) net mounted with 0.505-mm mesh (Net 1) and 0.333-mm mesh (Net 2) will all be mounted together for this tow. Bongo tows will be to a depth of 200 meters, or to 10 meters off bottom, whichever is shallowest.

MOA buttons should be set up to mark surface (in), at-depth, surface (out), as well as position, date, time, and bottom depth. The sample from 60BON Nets 1 and 2 will be preserved in their entirety in 1.8% buffered Formaldehyde (5% formalin). The sample from 20BON Net 1 will be preserved in its entirety in 1.8% buffered Formaldehyde (5% formalin) and the sample from Net 2 will be discarded.

Selected stations have been chosen for CTD casts to collect water samples for microzooplankton, chlorophyll, and nutrient data (SOI 3.2.1). At these stations, the CTD cast will precede the Neuston and Bongo tows. CTD casts will be made to 200 meters or to 10 meters off bottom, whichever is shallowest.

A MOA button for CTD casts should be set up to mark the at-depth position, date, time, and bottom depth.

3.4.2 **Diel Study** – There will be two 24-hour diel station occupations. The first 24-hour station will likely be located immediately outside of Kodiak, Alaska. At this station, a bongo tow will be taken to determine whether the species of interest, capelin, is present in the water column. Coordinates for this station will be approximately 152° 20.6’ N by 57° 40.45’ W; bottom depth should be around 120m. Providing representative larvae are collected in the bongo net, a CTD cast will be taken at the same location, and water samples will be collected. 10-L bottles should filled be at 0, 20, 40, 60, 80, and 100 meter depths and then filtered for MZ collection. Immediately after the CTD cast, the MOCNESS, rigged with 0.505-mm mesh, will be deployed to provide depth-discrete ichthyoplankton samples. Nets will be tripped at regular intervals between 100 meters to the surface. After the drogue net has reached the bottom, nets 2 through 6 (five nets total) will collect samples at the following depth intervals: 100-80, 80-60, 60-40, 40-20, 20-0 meters. If representative samples are not collected in the bongo tow, relocation of CTD casts and MOCNESS sampling at another nearshore location will be at the discretion of the Chief Scientist and the Commanding Officer.

MOA buttons should be set up for the MOCNESS to mark surface (in), at-depth, each net opening, and surface (out).

Samples collected from each net of the MOCNESS will be preserved in their entirety in 1.8% buffered Formaldehyde (5% formalin). This procedure (CTD then MOCNESS) will be repeated at 3-hour intervals for the 24-hour period.

We will also occupy a 24-hour station on the shelf. Coordinates are approximately 152° 08.75' N by 57° 10.58' W; bottom depth should be around 85m. At this station, a Bongo tow will be taken to determine whether the species of interest, capelin, is present in the water column. If so, a CTD cast will be taken, and water samples will be collected. 10-L bottles should be filled at 0, 20, 40, 60, and ~77 meter depths and then filtered for MZ collection. Immediately after the CTD cast, the MOCNESS, rigged with 0.505-mm mesh, will be deployed to provide depth-discrete ichthyoplankton samples. Nets will be tripped at regular intervals between 75 meters and the surface. After the drogue net has reached the bottom, nets 2 through 8 (seven nets total) will collect samples at the following depth intervals: ~75-60, 60-50, 50-40, 40-30, 30-20, 20-10, 10-0 meters. Samples collected from each net of the MOCNESS will be preserved in their entirety in 1.8% buffered Formaldehyde (5% formalin). This procedure (CTD then MOCNESS) will be repeated at 3-hour intervals for a 24-hour period. If representative larvae are not collected in the Bongo tow, relocation of CTD and MOCNESS sampling at another shelf location will be at the discretion of the Chief Scientist and the Commanding Officer.

In addition, we will opportunistically fly the MOCNESS at a few selected stations on the shelf and/or in Amatuli or Stephenson's Trough during the survey; however, these selected stations will not be 24-hour occupations. Instead, the MOCNESS will be deployed only once and then the regular grid survey will be resumed. At each of these stations, the CTD cast will occur first followed by the MOCNESS tow. Afterwards, regular grid activities will follow. Locations for this sampling to be determined at sea at the discretion of the Chief Scientist and the Commanding Officer.

3.4.3 **ARGOS Drifters** – It is likely that two Advanced Research and Global Observation Satellite (ARGOS) drifters will be deployed during the cruise (drogued at 20m). The first drifter will be deployed at the MOCNESS bay station – coordinates for this station will be approximately 57° 40.45' W by 152° 20.60' N, unless otherwise determined by the Chief Scientist – immediately upon completion of the final MOCNESS tow.

The second will either be deployed at the MOCNESS shelf station (approximately 57° 10.58' W by 152° 08.75' N, unless otherwise determined by the Chief Scientist) or at a station location over Portlock Bank – to be determined by the Chief Scientist at sea. MOA buttons should be set up to mark surface, at depth, position, date, time, and bottom depth.

3.4.4 **Trawling** – The anchovy/Stauffer net will be deployed approximately 12 times over the course of the cruise within the grid survey area. Tow will be made opportunistically. Net depth will be monitored using the ship's Furuno echosounder. Standard trawl operations will be used for deployment. Once equilibrium is achieved, as determined by the fishing officer or scientist, the trawl will be retrieved at a wire rate of about 10 meters per minute. The trawl will usually be fished over a double-oblique path. Occasionally, the trawl may be used to target a specific depth. In this case, standard trawl deployment and retrieval is desired. Four MOA buttons are required: Doors out, EQ, HB (only if targeting a depth layer), and doors in. Specific stations for trawling will be determined at the discretion of the Chief Scientist and the Commanding Officer.

3.4.5 Acoustic backscatter – The EK-500 will be used to continuously collect acoustic data during the cruise.

3.5 Station Locations – See Section 9.2 MF-04-10 Station Locations.

3.6 Station Operations – The following are operations to be conducted on this cruise. The procedures for these operations are listed in the ***FOCI Standard Operating Instructions for NOAA Ship MILLER FREEMAN*** (SOI). Operations not addressed in the SOI and changes to standard procedures are addressed below.

- CTD/Water Sample Operations (SOI 3.2.1),
- MARMAP Bongo Tows (SOI 3.2.2),
- MOCNESS Tows (SOI 3.2.5),
- ARGOS Satellite Tracked Drifter Buoy Deployments (SOI 3.2.11),
- Chlorophyll Samples (SOI 3.2.10),
- SIMRAD EK500 Scientific Echosounder Monitoring (SOI 3.2.12), and
- Midwater Trawls (SOI 3.2.8).

3.6.1 Neuston Net Tows

3.6.1.1 Description – Neuston nets are used for sampling the upper few centimeters of the water column. There are many frame styles that may be used; however, we use a Sameoto sampler made of stainless steel. The mouth opening is 30-cm x 50-cm and is designed to fish half in and half out of the water.

3.6.1.2 Rates/Fishing – The vessel should be moving slowly ahead, about 1.5 to 2.0 knots so that the net is fishing half in and half out of the water. The exact speed is a learning process and may vary with sea conditions. Lower the Neuston net to the surface and pay out 10 to 15 meters of wire. It may be necessary to adjust the ship's speed to maintain the proper skimming action. Start the stopwatch when the net starts to fish and tow the net for approximately 9.5 minutes (unless otherwise instructed).

After 9.5 minutes, the vessel should decrease speed so that the net can be hauled in. Advise winch operator when time is nearly up and retrieve when ready. Read and record flow meter revolutions, time of tow, and any comments.

3.6.1.3 Preservation – The Neuston sample should be preserved immediately, as specified in the ***FOCI Field Manual*** or sample collection request forms.

3.6.1.4 Maintenance – Check net for holes and fill flow meter with water.

3.7 Underway Operations – The following are underway operations to be conducted on this cruise. The procedures for these operations are listed in the ***FOCI Standard Operating Instructions for NOAA Ship MILLER FREEMAN*** (SOI). Operations not addressed in the SOI and changes to standard procedures are addressed below:

- Scientific Computer System (SOI 5.2),
- Thermosalinograph Monitoring (SOI 5.3), and
- Fluorometer Monitoring (SOI 5.3).

3.8 Applicable Restrictions – Sea lion rookery/haulout protected areas.

3.9 Small Boat Operations – None.

4.0 FACILITIES

4.1 Equipment and Capabilities Provided by Ship

- Oceanographic winch with slip rings and 3-conductor cable terminated for CTD,
- Manual wire-angle indicator,
- Oceanographic winch with slip rings and 3-conductor cable terminated for the SBE-19 SEACAT, for net tow operations,
- Sea-Bird Electronics' SBE 911*plus* CTD system with stand, each CTD system should include underwater CTD, weights, and pinger. There should be one deck unit for the two systems,
- 10-liter Niskin sampling bottles for use with rosette (10 plus 4 spares),
- AUTOSAL salinometer, for CTD field corrections,
- Sea-Bird Electronics' SBE-19 SEACAT system,
- Meter block for plankton tows,
- Wire speed indicators and readout for quarterdeck, Rowe winch,
- 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,
- Stern trawl system (winches, wire, electronics, etc.),
- Furuno netsonde system,
- Freezer space for storage of biological and chemical samples (both blast and storage freezers, -20 and -80),
- Sorting table in slime lab,
- SIMRAD EQ-50 and SIMRAD EK-500 echosounders,
- JRC JFV-200R color sounder recorder,
- Bench space in DataPlot for PCs, monitor, printer to fly MOCNESS,
- Use of Pentium PC in DataPlot for data analysis,
- Scientific Computer System (SCS),
- Aft Rowe winch with single conductor cable and slip rings for MOCNESS,
- Electrical connection between Rowe winch and DataPlot,
- Removable stern platform removed (for anchovy trawls),
- Laboratory space with exhaust hood, sink, lab tables, and storage space,
- Sea-water hoses and nozzles to wash nets (quarterdeck and aft deck),
- Adequate deck lighting for night-time operations,
- Navigational equipment including GPS and radar,
- Safety harnesses for working on quarterdeck and fantail, and
- Ship's crane(s) used for loading and/or deploying.

4.2 Equipment and Capabilities Provided by Scientists

- Sea-Bird Electronics' SBE-19 SEACAT system (**primary system**),
- PMEL PC with SEASOFT software for CTD data collection and processing,
- Fluorometer and light meter to be mounted on CTD,
- CTD stand modified for attachment of fluorometer,
- Conductivity and temperature sensor package to provide dual sensors on the primary CTD,
- CTD rosette sampler,
- ARGOS tracked drifter buoys
- 60-cm Bongo sampling arrays,
- 20-cm Bongo arrays,
- IAPSO standard water,
- Spare wire angle indicator,
- Midwater (anchovy/Stauffer) trawl (with 1/8" cod end liner),
- Tail chains, bridle, puckerstring for trawl,
- 5 x 7 doors (1,250 lbs),
- Fishbaskets, dishpans, 5-gal buckets,
- Length boards,
- Triple beam balance for individual fish weights,
- Sieves, jars, squirt bottles, funnels, jar holder,
- EK-500 (38 & 120 kHz) scientific acoustic system,
- Data storage tapes and optical disks,
- MOCNESS,
- Miscellaneous scientific sampling and processing equipment,
- Scientific ultra-cold freezer, and
- Cruise Operations Database (COD).

5.0 DISPOSITION OF DATA AND REPORTS

5.1 The following data products will be included in the cruise data package:

- **NOAA Form 77-13d – *Deck Log – Weather Observation Sheets***,
- Electronic Marine Operations Abstracts,
- SCS backup – recordable compact diskette (CD-RW),
- Calibration Sheets for all ship's and scientific instruments used,
- PMEL CTD weather observation logs,
- CTD Cast Information/Rosette Log,
- Autosalinometer Logs,
- Electronic Navigation suite's export files on diskette, and
- Ultra-cold Freezer Temperature Daily Log (SOI 5.4).

5.2 **Pre- and Post-cruise Meetings** – Cruise meetings may be held in accordance with ***FOCI Standard Operating Instructions for NOAA Ship MILLER FREEMAN*** (SOI 5.5).

6.0 ADDITIONAL PROJECTS

6.1 Definition – Ancillary and piggyback projects are secondary to the objectives of the cruise and should be treated as additional investigations. The difference between the two types of secondary projects is that an ancillary project does not have representation aboard and is accomplished by the ship's force.

6.2 Ancillary Projects – Any ancillary work done during this project will be accomplished with the concurrence of the Chief Scientist and on a not-to-interfere basis with the programs described in these instructions and in accordance with the ***NOAA Fleet Standing Ancillary Instructions***.

6.3 Piggyback Projects – None

7.0 HAZARDOUS MATERIALS

7.1 Inventory – See Section 9.4 MF-04-10 HAZMAT Inventory.

7.2 Material Safety Data Sheet (MSDS) – All MSDSs can be found on the ***OERD HAZMAT Emergency Guidelines – MSDS*** compact diskette dated January 8, 2004, supplied to the ship. A copy of all required MSDS will also be delivered with the chemicals when ship is loaded.

8.0 MISCELLANEOUS

8.1 Communications – Specific information on how to contact the **NOAA Ship *MILLER FREEMAN*** and all other fleet vessels can be found at:

http://www.pmc.noaa.gov/phone.htm

8.2 Important Telephone and Facsimile Numbers and E-mail Addresses

8.2.1 Pacific Marine Environmental Laboratory (PMEL):

FOCI – Ocean Environmental Research Division (OERD2):
- (206) 526-4700 (voice)
- (206) 526-6485 (fax)

Administration:
- (206) 526-6810 (voice)
- (206) 526-6815 (fax)

E-Mail: FirstName.LastName@noaa.gov

8.2.2 Alaska Fisheries Science Center (AFSC):

FOCI – Resource Assessment and Conservation Engineering (RACE):
- (206) 526-4171 (voice)
- (206) 526-6723 (fax)

E-Mail: FirstName.LastName@noaa.gov

8.2.3 **NOAA Ship *MILLER FREEMAN*** – Telephone methods listed in order of increasing expense:

Homeport – Seattle, Washington:
- (206) 553-4589
- (206) 553-4581
- (206) 553-8344

United States Coast Guard – Kodiak, Alaska
- (907) 487-9752
- (907) 487-9753
- (907) 487-4397
- (907) 487-4398

Cellular:
- (206) 660-7167

INMARSAT Mini-M
- 011-872-761-267-346 (voice/PBX)
- 011-872-761-267-347 (voice)
- 011-872-761-267-348 (fax)

INMARSAT B
- 011-872-330-394-113 (voice)
- 011-872-330-394-114 (fax)

E-Mail: NOAA.Ship.Miller.Freeman@noaa.gov (mention the person's name in SUBJECT field)

8.2.4 **Marine Operations Center, Pacific (MOP)**:

Operations Division (MOP1)
- (206) 553-4548 (voice)
- (206) 553-1109 (facsimile)

E-Mail: FirstName.LastName@noaa.gov

E-Mail to Radio Room: Radio.Room@noaa.gov

9.0 APPENDICES

9.1 MF-04-10 Equipment Inventory

Equipment	Quantity	Dimension	Weight
Larval Supply Trunks	1	20" x 22" x 36"	80-lbs
Microzooplankton Supply Trunks	2	20" x 22" x 36"	90-lbs (ea)
Formaldehyde Containers	3 x 20-Liter		40-lbs (ea)
Carboy, 95% Reagent Alcohol	1 x 20-Liter		40-lbs
Miscellaneous Gear Trunks	4	20" x 22" x 36"	80-lbs (ea)
60-cm Bongo Frame	1	8" x 26" x 60"	40 lbs
20-cm Bongo Frame	1	8" x 14" x 16"	40 lbs
MOCNESS Frame	1	90” x 90”	250 lbs
Cases, Glass Jars, 32-oz	30 cases	8" x 12" x 15"	50-lbs
Cases, Glass Jars, 8-oz	10 cases	4" x 6" x 8"	8-lbs
5 x 7 trawl doors	1 pair	5’ x 7’	1250-lbs

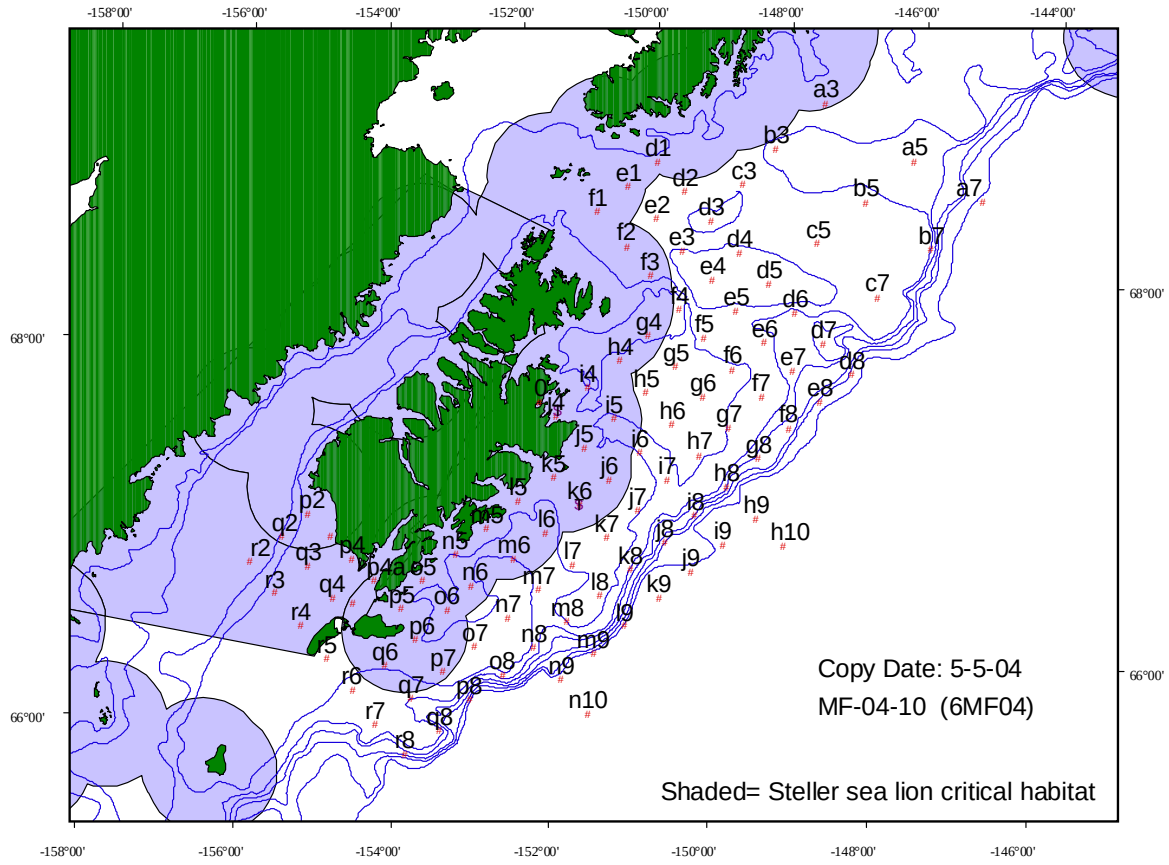
9.2 MF-04-10 Station Locations – Stations may be dropped, added, or relocated at the discretion of the Chief Scientist and the Command Officer. Order of station occupations is also subject to change at the discretion of the Commanding Officer and the Chief Scientist.

Operation	Station	Latitude	Longitude	Declat	Declong
Depart Kodiak, AK	0	57° 43.602' N	152° 31.062' W	57.7267	-152.5177
GRID/**Bay 24 hr**	j4	57° 38.760' N	152° 21.720' W	57.6460	-152.3620
GRID	i4	57° 47.400' N	152° 02.700' W	57.7900	-152.0450
GRID	h4	57° 55.902' N	151° 42.798' W	57.9317	-151.7133
GRID	g4	58° 03.300' N	151° 25.098' W	58.0550	-151.4183
GRID	f4	58° 11.202' N	151° 06.198' W	58.1867	-151.1033
GRID	f3	58° 22.200' N	151° 22.500' W	58.3700	-151.3750
GRID	f2	58° 31.698' N	151° 36.300' W	58.5283	-151.6050
GRID	f1	58° 42.900' N	151° 53.100' W	58.7150	-151.8850
GRID	e1	58° 50.502' N	151° 34.200' W	58.8417	-151.5700
GRID	d1	58° 58.098' N	151° 15.300' W	58.9683	-151.2550
GRID	d2	58° 48.300' N	150° 59.502' W	58.8050	-150.9917
GRID	d3	58° 38.700' N	150° 44.502' W	58.6450	-150.7417
GRID	c3	58° 49.500' N	150° 23.520' W	58.8250	-150.3920
GRID	b3	59° 00.300' N	150° 02.520' W	59.0050	-150.0420
GRID	a3	59° 13.200' N	149° 30.000' W	59.2200	-149.5000
GRID	a5	58° 53.259' N	148° 37.980' W	58.8877	-148.6330
GRID	b5	58° 41.406' N	149° 09.180' W	58.6901	-149.1530
GRID	c5	58° 29.553' N	149° 40.380' W	58.4926	-149.6730
GRID	c7	58° 11.352' N	149° 06.660' W	58.1892	-149.1110
GRID	b7	58° 25.002' N	148° 32.580' W	58.4167	-148.5430
GRID	a7	58° 38.652' N	147° 58.440' W	58.6442	-147.9740
GRID	d8	57° 47.700' N	149° 25.602' W	57.7950	-149.4267
GRID	d7	57° 57.702' N	149° 40.800' W	57.9617	-149.6800

Operation	Station	Latitude	Longitude	Declat	Declong
GRID	d6	58° 08.202' N	149° 56.898' W	58.1367	-149.9483
GRID	d5	58° 17.700' N	150° 11.598' W	58.2950	-150.1933
GRID	d4	58° 28.002' N	150° 27.900' W	58.4667	-150.4650
GRID	e2	58° 40.200' N	151° 17.598' W	58.6700	-151.2933
GRID	e3	58° 29.502' N	151° 02.802' W	58.4917	-151.0467
GRID	e4	58° 19.998' N	150° 45.702' W	58.3333	-150.7617
GRID	e5	58° 09.798' N	150° 32.400' W	58.1633	-150.5400
GRID	e6	57° 59.502' N	150° 16.398' W	57.9917	-150.2733
GRID	e7	57° 49.902' N	150° 00.300' W	57.8317	-150.0050
GRID	e8	57° 39.798' N	149° 45.498' W	57.6633	-149.7583
GRID	f8	57° 31.902' N	150° 04.698' W	57.5317	-150.0783
GRID	f7	57° 42.102' N	150° 19.698' W	57.7017	-150.3283
GRID	f6	57° 51.498' N	150° 36.000' W	57.8583	-150.6000
GRID	f5	58° 01.800' N	150° 52.098' W	58.0300	-150.8683
GRID	g5	57° 53.202' N	151° 09.600' W	57.8867	-151.1600
GRID	g6	57° 43.302' N	150° 54.498' W	57.7217	-150.9083
GRID	g7	57° 33.000' N	150° 39.702' W	57.5500	-150.6617
GRID	g8	57° 22.902' N	150° 23.502' W	57.3817	-150.3917
GRID	h10	56° 55.002' N	150° 12.102' W	56.9167	-150.2017
GRID	h9	57° 04.002' N	150° 26.700' W	57.0667	-150.4450
GRID	h8	57° 14.598' N	150° 43.098' W	57.2433	-150.7183
GRID	h7	57° 24.798' N	150° 58.302' W	57.4133	-150.9717
GRID	h6	57° 35.202' N	151° 13.500' W	57.5867	-151.2250
GRID	h5	57° 45.552' N	151° 28.152' W	57.7592	-151.4692
GRID	i5	57° 37.698' N	151° 47.700' W	57.6283	-151.7950
GRID	i6	57° 26.598' N	151° 32.700' W	57.4433	-151.5450
GRID	i7	57° 17.598' N	151° 17.400' W	57.2933	-151.2900
GRID	i8	57° 06.198' N	151° 02.202' W	57.1033	-151.0367
GRID	i9	56° 56.400' N	150° 46.698' W	56.9400	-150.7783
GRID	j9	56° 48.198' N	151° 06.102' W	56.8033	-151.1017
GRID	j8	56° 58.002' N	151° 20.400' W	56.9667	-151.3400
GRID	j7	57° 08.400' N	151° 35.598' W	57.1400	-151.5933
GRID	j6	57° 18.198' N	151° 51.702' W	57.3033	-151.8617
GRID	j5	57° 28.602' N	152° 05.802' W	57.4767	-152.0967
GRID	k5	57° 19.500' N	152° 23.898' W	57.3250	-152.3983
GRID/**Shelf - 24 Hr**	k6	57° 10.602' N	152° 09.102' W	57.1767	-152.1517
GRID	k7	57° 00.102' N	151° 53.898' W	57.0017	-151.8983
GRID	k8	56° 49.602' N	151° 40.698' W	56.8267	-151.6783
GRID	k9	56° 40.398' N	151° 25.200' W	56.6733	-151.4200
GRID	l9	56° 31.998' N	151° 45.402' W	56.5333	-151.7567
GRID	l8	56° 41.802' N	151° 58.998' W	56.6967	-151.9833
GRID	l7	56° 51.900' N	152° 14.298' W	56.8650	-152.2383
GRID	l6	57° 01.902' N	152° 29.298' W	57.0317	-152.4883
GRID	l5	57° 12.198' N	152° 44.898' W	57.2033	-152.7483
GRID	m5	57° 03.702' N	153° 03.900' W	57.0617	-153.0650
GRID	m6	56° 54.000' N	152° 48.402' W	56.9000	-152.8067
GRID	m7	56° 44.100' N	152° 34.500' W	56.7350	-152.5750

Operation	Station	Latitude			Longitude			Declat	Declong
GRID	m8	56°	33.900'	N	152°	18.702'	W	56.5650	-152.3117
GRID	m9	56°	23.598'	N	152°	03.798'	W	56.3933	-152.0633
GRID	n10	56°	04.602'	N	152°	07.698'	W	56.0767	-152.1283
GRID	n9	56°	15.498'	N	152°	22.902'	W	56.2583	-152.3817
GRID	n8	56°	25.902'	N	152°	37.602'	W	56.4317	-152.6267
GRID	n7	56°	35.502'	N	152°	52.500'	W	56.5917	-152.8750
GRID	n6	56°	45.600'	N	153°	13.302'	W	56.7600	-153.2217
GRID	n5	56°	55.800'	N	153°	22.302'	W	56.9300	-153.3717
GRID	o5	56°	47.700'	N	153°	41.100'	W	56.7950	-153.6850
GRID	o6	56°	38.202'	N	153°	27.300'	W	56.6367	-153.4550
GRID	o7	56°	26.400'	N	153°	11.502'	W	56.4400	-153.1917
GRID	o8	56°	17.400'	N	152°	55.998'	W	56.2900	-152.9333
GRID	p8	56°	09.798'	N	153°	15.000'	W	56.1633	-153.2500
GRID	p7	56°	18.798'	N	153°	29.898'	W	56.3133	-153.4983
GRID	p6	56°	28.902'	N	153°	45.402'	W	56.4817	-153.7567
GRID	p5	56°	38.598'	N	153°	53.502'	W	56.6433	-153.8917
GRID	q6	56°	20.598'	N	154°	03.000'	W	56.3433	-154.0500
GRID	q7	56°	10.200'	N	153°	48.300'	W	56.1700	-153.8050
GRID	q8	56°	00.000'	N	153°	32.298'	W	56.0000	-153.5383
GRID	r8	55°	52.602'	N	153°	51.498'	W	55.8767	-153.8583
GRID	r7	56°	01.998'	N	154°	08.400'	W	56.0333	-154.1400
GRID	r6	56°	12.798'	N	154°	21.600'	W	56.2133	-154.3600
GRID	r5	56°	23.052'	N	154°	36.402'	W	56.3842	-154.6067
GRID	r4	56°	33.300'	N	154°	51.198'	W	56.5550	-154.8533
GRID	r3	56°	43.398'	N	155°	06.798'	W	56.7233	-155.1133
GRID	r2	56°	53.100'	N	155°	21.402'	W	56.8850	-155.3567
GRID	q2	57°	01.302'	N	155°	03.102'	W	57.0217	-155.0517
GRID	q3	56°	51.798'	N	154°	47.400'	W	56.8633	-154.7900
GRID	q4	56°	41.898'	N	154°	33.198'	W	56.6983	-154.5533
GRID	q4a	56°	40.350'	N	154°	21.876'	W	56.6725	-154.3646
GRID	p4a	56°	47.604'	N	154°	09.318'	W	56.7934	-154.1553
GRID	p4	56°	54.492'	N	154°	22.194'	W	56.9082	-154.3699
GRID	p3	57°	01.380'	N	154°	35.106'	W	57.0230	-154.5851
GRID	p2	57°	08.268'	N	154°	48.048'	W	57.1378	-154.8008

9.3 MF-04-10 Cruise Chartlet



9.4 MF-04-10 HAZMAT Inventory

Chemical	CAS Number	Respondee	Quantity	H	F	R	Storage Color Code	Hazard Class	Packing Group Number	UN	Reportable Quantity	Response Indices
Alcohol, Reagent, 95%	mix	Wilson	20-l	3	3	1	Flammable	3	II	1987	350 Lb	1
Formaldehyde, 37%	mix	Wilson	60-l	3	2	2	Flammable	3 & 8	III	1198	100 Lb	2
Sodium Borate	1330-43-4	Wilson	500-g	2	0	0	General	Not regulated			None	3
Sodium Borate Solution, Saturated	mix	Wilson	20-l	2	0	0	General	Not regulated			None	3

Spill Response 1: Ventilate area of leak or spill. Wear appropriate personal protective equipment. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Neutralize with alkaline material (soda ash, lime), then 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 sawdust. **Do not flush to sewer!** U.S. Regulations (CERCLA) requires reporting spills and releases to soil, water, and air in excess of reportable quantities. The toll free number for the U.S. Coast Guard National Response Center is (800) 424-8802.

Spill Response 2: 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, or earth), and place in a chemical waste container. Do not use combustible materials, such as sawdust. **Do not flush to sewer!** If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures. U.S. Regulations (CERCLA) requires reporting spills and releases to soil, water, and air in excess of reportable quantities. The toll free number for the U.S. Coast Guard National Response Center is (800) 424-8802.

Spill Response 3: Ventilate area of leak or spill. Wear appropriate personal protective equipment. Pick up and place in a suitable container for reclamation or disposal, using a method that does not generate dust.