

FINAL CRUISE INSTRUCTIONS

ECO-FOCI

NOAA Ship *MILLER FREEMAN*, Cruise MF-05-06
April 18 – May 7, 2005
Chief Scientist – Carol L. DeWitt, NOAA/PMEL

1.0 FINAL CRUISE INSTRUCTIONS

1.1 **Cruise Title** – Ecosystem and Fisheries-Oceanography Coordinated Investigations (Eco-FOCI).

1.2 **Cruise Numbers**

1.2.1 **Cruise Number** – MF-05-06

1.2.2 **Eco-FOCI Number** – 4MF05

1.3 **Cruise Dates**

1.3.1 **Departure** – Depart Kodiak, Alaska, at 1500 hours on Monday, April 18, 2005.

1.3.2 **Arrival** – Arrive Dutch Harbor, Alaska, on Saturday, May 7, 2005.

1.4 **Operating Area** – Bering Sea

2.0 CRUISE OVERVIEW

2.1 **Cruise Objectives** – To Recover and deploy surface and subsurface oceanographic instrumentation moorings. To complete Conductivity, Temperature, and Depth (CTD) profiler casts and California Cooperative Oceanic Fisheries Investigation (CalCOFI) Vertical Egg Tow (CalVET) and plankton tows at designated areas.

2.2 **Applicability** – These instructions, with **FOCI Standard Operating Instructions for NOAA Ship MILLER FREEMAN**, dated March 1, 2005, present complete information for this cruise.

2.3 **Participating Organizations**

NOAA – Pacific Marine Environmental Laboratory (PMEL)
7600 Sand Point Way N.E.
Seattle, Washington 98115-6439

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

University of Alaska – Fairbanks (UAF)
Institute of Marine Science
200 O’Neill, Fairbanks, Alaska 99775-1080

Scripps Institute of Oceanography (SIO)
8602 La Jolla Shores Drive
La Jolla, California 92037

2.4 Personnel

2.4.1 Chief Scientist

Name	Gender	Affiliation	E-mail Address
Carol L. DeWitt (206) 526-6808	Female	PMEL	Carol.DeWitt@noaa.gov

2.4.2 Participating Scientists

Name	Gender	Affiliation	E-mail Address
Carol L. DeWitt	Female	PMEL	Carol.DeWitt@noaa.gov
William J. Floering	Male	PMEL	William.Floering@noaa.gov
Earl Roskie	Male	PMEL	Earl.Roskie@noaa.gov
Hendrick V. Miller	Male	PMEL	Hendrick.V.Miller@noaa.gov
Sarah J. Thornton	Female	UAF	sarahjt@imsuaf.edu
Lisa Munger	Female	SIO	cslmunger@ucsd.edu
Christopher Garsha	Male	SIO	cgarsha@ucsd.edu
Jim Jenkins	Male	Teacher-at-Sea	jenkinsj@earthlink.net

2.5 Administration

2.5.1 Ship Operations

Marine Operations Center, Pacific
1801 Fairview Avenue East
Seattle, Washington 98102-3767
Telephone: (206) 553-4548
Fax: (206) 553-1109

Commander Mark P. Ablondi, NOAA
Chief, Operations Division, Pacific (MOP1)
Telephone: (206) 553-8705
Cellular: (206) 390-7527
E-mail: Mark.Ablondi@noaa.gov

Larry Mordock
Deputy Chief, Operations Division (MOP1x1)
Telephone – Work: (206) 553-4764
Home: (206) 365-3567
Cellular: (206) 465-9316
E-mail: Larry.Mordock@noaa.gov

2.5.2 **Scientific Operations**

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

Dr. Jeffrey Napp, AFSC
Telephone: (206) 526-4148
E-mail: Jeff.Napp@noaa.gov

3.0 OPERATIONS

3.1 Data To Be Collected – In addition to the standard suite of Scientific Computer System (SCS) integrated instruments, we will deploy the Sea-Bird SBE 911*plus* Conductivity, Temperature, and Depth (CTD) profiler system and the Sea-Bird SBE 25 SEACAT/Bongo combination.

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 equipment will be barged to Kodiak, Alaska. The scientific party will be responsible for arranging vehicles for moving their equipment from the airport and/or docks.

3.3 De-staging Plan – The equipment will be off-loaded in Dutch Harbor, Alaska, and barged to Seattle, Washington. The scientific party will be responsible for arranging vehicles for moving their equipment from the docks.

3.4 Cruise Plan – The ship will depart Kodiak, Alaska, on Monday, April 18, 2005. See [Section 9.2 Cruise MF-05-06 Chartlet](#) and [Section 9.3 Cruise MF-05-06 Station Locations and Itinerary](#) for an overall view of the proposed cruise.

3.4.1 GLOBEC Subsurface Mooring Search – A search for the subsurface mooring 04GBP-12A will be conducted.

3.4.2 EDD Test Mooring – If this surface mooring is not recovered during Cruise MF-05-04, the test mooring will be recovered on this cruise. No CTD will be required at the EDD Test Mooring site.

- 3.4.3 Kodiak Crab Moorings** – Prior to each of the mooring operations, a calibration CTD will be completed. At each of two sites, mooring operations will consist of recovering one subsurface mooring and deploying one subsurface mooring. No CTD will be required after the deployment of either of the moorings.
- 3.4.4 FOCI Bering Sea Site 2** – Prior to mooring operations, a calibration CTD with nutrient and chlorophyll samples, Marine Assessment Monitoring and Prediction (MARMAP) Bongo tow, and triplicate California Cooperative Oceanic Fisheries Investigation (CalCOFI) Vertical Egg Tow (CalVET) will be completed. Mooring operations will consist of recovering two subsurface moorings and deploying one surface and one subsurface mooring. After the completion of all mooring operations, a calibration CTD with nutrient and chlorophyll samples will be completed. At four sites surrounding Site 2, a CTD with nutrient and chlorophyll samples and a MARMAP Bongo tow will be completed.
- 3.4.5 FOCI Bering Sea Site 4** – The ship will transit along the 70m isobath from FOCI Bering Sea Site 2 to FOCI Bering Sea Site 4. At each of the four stations along this transit, a CTD with nutrient and chlorophyll samples and a MARMAP Bongo tow will be completed. Prior to mooring operations, a calibration CTD with nutrient and chlorophyll samples, MARMAP Bongo tow, and triplicate CalVET will be completed. Mooring operations will consist of recovering one subsurface mooring and deploying two subsurface mooring. After the completion of all mooring operations, a calibration CTD with nutrient and chlorophyll samples will be completed. At four sites surrounding Site 4, a CTD with nutrient and chlorophyll samples and a MARMAP Bongo tow will be completed.
- 3.4.6 FOCI Bering Sea Site 5** – The ship will transit along the 70m isobath from FOCI Bering Sea Site 4 to FOCI Bering Sea Site 5. At each of the four stations along this transit, a CTD with nutrient and chlorophyll samples and a MARMAP Bongo tow will be completed. Prior to mooring operations, a calibration CTD with nutrient and chlorophyll samples, MARMAP Bongo tow, and triplicate CalVET will be completed. Mooring operations will consist of recovering two subsurface moorings and deploying two subsurface moorings. After the completion of all mooring operations, a calibration CTD with nutrient and chlorophyll samples will be completed. At four sites surrounding Site 5, a CTD with nutrient and chlorophyll samples and a MARMAP Bongo tow will be completed.
- 3.4.7 FOCI Bering Sea Site 8 (Saint Lawrence)** – Prior to mooring operations, a calibration CTD with nutrient and chlorophyll samples, MARMAP Bongo tow, and triplicate CalVET will be completed. Mooring operations will consist of recovering one subsurface mooring and deploying two subsurface mooring. Note that the mooring recovery will be located at a site due east of 04STL-1B (62° 11.66'N, 174° 51.32'W) and in 72m water depth – this site is DEPTH DEPENDENT. After the completion of all mooring operations, a calibration CTD with nutrient and chlorophyll samples will be completed. At four sites surrounding Site 5, a CTD with nutrient and chlorophyll samples and a MARMAP Bongo tow will be completed. As time allows, a search for 03STL-1A will be conducted.
- 3.4.8 Scripps Marine Mammal Laboratory (MML) Mooring** – Recover one MML Acoustic Recording Package (ARP) mooring. No CTD will be required.

- 3.4.9 Pribilof Islands** – A search for two subsurface moorings, 04PIP-2A and 04PI-7A, will be undertaken in the Pribilof Island area. During transit to next MML mooring site, deploy two Argo Autonomous Profiling Explorer (APEX) floats.
- 3.4.10 Scripps Marine Mammal Laboratory (MML) Mooring** – Recover one MML Acoustic Recording Package (ARP) mooring. No CTD will be required.
- 3.4.11 Samalga Pass** – Mooring operations will consist of recovering one subsurface mooring at 03SG-1A. Last year the windows of opportunity – when the release tilt switch was off that allowed the release to be interrogated and released – were less than thirty minutes and occurred approximately 12 hours apart. This will result in a minimal “heads-up” time prior to release of the mooring for both the deck crew and bridge watch.
- 3.4.12 Alaska Stream** – A search for 03GSP-9A will be conducted. Dragging operations may be conducted.
- 3.4.13 CTD “L”** – If time permits we will complete CTD stations along an “L” heading north from the Aleutian chain and east towards Site 2 – See [Section 9.3 Cruise MF-05-06 Station Locations and Itinerary](#).
- 3.4.14 Scripps Marine Mammal Laboratory (MML) Mooring** – Recover one MML Acoustic Recording Package (ARP) mooring. No CTD will be required.
- 3.5 Station Locations** – See [Section 9.3 Cruise MF-05-06 Station Locations and Itinerary](#).
- 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.
- Mooring Operations,
 - CTD/Water Sample Operations (SOI 3.2.1),
 - MARMAP Bongo Tows (SOI 3.2.2),
 - CalVET Net Tows (SOI 3.2.6),
 - Chlorophyll Sampling Operations (SOI 3.2.10), and
 - SIMRAD EK 500 Scientific Echosounder Monitoring (SOI 3.2.12).
- 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.
- Acoustic Doppler Current Profiler (ADCP) Operations (SOI 3.2.13),
 - Radiometer Operations (SOI 3.2.14),
 - Scientific Computer System (SCS) data acquisition (SOI 5.2),
 - Fluorometer monitoring (SOI 5.3), and
 - Thermosalinograph monitoring (SOI 5.3).
- 3.8 Applicable Restrictions** – None.

3.9 Small Boat Operations – Small boat operations at FOCI Bering Sea Site 2 may be required.

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 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 and tape recorder for the two systems,
- 10-liter Niskin sampling bottles for use with rosette (10 plus 4 spares),
- Conductivity and temperature sensor package to provide dual sensors on the CTD (primary),
- 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, and Marco winches,
- 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 and chemical samples (blast and storage freezers, indicate desired temperatures),
- SIMRAD EQ-50 echosounder,
- RD Instruments' ADCP written to Iomega Zip drive,
- Scientific Computer System (SCS),
- Electrical connection between Rowe winch and DataPlot,
- Removable stern platform (in place),
- 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 911*plus* CTD system,
- Sea-Bird Electronics' SBE-19 SEACAT 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 CTD (backup),
- CTD rosette sampler,
- IAPSO standard water,

- 60-cm bongo sampling arrays,
- 20 cm bongo arrays,
- Spare wire angle indicator,
- CalVET net array,
- Surface moorings (FOCI biophysical platforms),
- Subsurface moorings,
- 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 instruments used,
- CTD Cast Information/Rosette Log,
- Autosalinometer Logs,
- ADCP Log Sheets,
- ADCP Iomega Zip and/or recordable compact diskette (CD-RW), 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 Cruise MF-05-06 HAZMAT](#).

7.2 Material Safety Data Sheet (MSDS) – All MSDSs can be found on the OERD HAZMAT Emergency Guidelines – MSDS compact diskette dated January 25, 2005, 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.moc.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) 790-7594 (OOD)

Iridium:

- (808) 659-5684

INMARSAT Mini-M:

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

INMARSAT B:

- 011-872-330-394-120 (voice)
- 011-872-330-394-121 (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 Cruise MF-05-06 Equipment Inventory

Equipment	Quantity	Weight	Total Weight
Acoustic Release	10	111 lbs	1,110 lbs
Float, Syntactic, 36-37-inch	4	1,000 lbs	4,000 lbs
Float, 28-inch	8	140 lbs	1,120 lbs
Float, 30-inch	6	165 lbs	990 lbs
Float, 41-inch	1	404 lbs	404 lbs
Toroid/Tower/Bridle	1	1,500 lbs	1,500 lbs
Miscellaneous Hardware	2	300 lbs	600 lbs
Anchors			
Railroad wheel	6	1,600 lbs	9,600 lbs
Railroad wheel	1	2,150 lbs	2,150 lbs
Railroad wheel	2	650 lbs	1,300 lbs
Concrete dome	1	5,000 lbs	5,000 lbs
TOTAL WEIGHT:			27,774 lbs

9.3 Cruise MF-05-06 Station Location and Itinerary – The provided itinerary includes several options dependent upon location of ice edge. If the ice edge extends further southward some of the northern stations may not be visited. Therefore, the following stations will be modified to reflect the projects priorities. Although the following itinerary shows that vessel arriving later than the agreed schedule, the cruise will conclude in Dutch Harbor, Saturday, May 7, 2005.

Activity	Latitude	Longitude	Dist (nm)	Spd (kts)	Trans (hrs)	Approx Bott Depth (m)	On Sta (hrs)	Arrive (Local) Date/Time	Depart (Local) Date/Time
Depart Kodiak, Alaska	57° 43.716' N	152° 31.209' W							18-Apr-2005 15:00
Search for 04GBP-12A	58° 41.017' N	148° 50.848' W	119.7	10	12.0	197	2.0	19-Apr-2005 04:57	19-Apr-2005 06:57
Recover EDD test mooring	59° 17.726' N	148° 58.099' W	36.9	10	3.7	187	2.0	19-Apr-2005 10:38	19-Apr-2005 12:38
CTD at 04KC-2A	56° 30.000' N	161° 00.750' W	177.7	11.5	15.5	60	0.4	22-Apr-2005 14:57	22-Apr-2005 15:21
Recover 04KC-2A	56° 29.894' N	160° 59.923' W	0.5	10	0.0	60	1.0	22-Apr-2005 15:23	22-Apr-2005 16:23
Deploy 05KC-2A	56° 29.894' N	160° 59.923' W	0.0	10	0.0	60	0.5	22-Apr-2005 16:23	22-Apr-2005 16:53
CTD at 04KC-1A	56° 25.500' N	160° 12.968' W	26.3	10	2.6	16	0.4	22-Apr-2005 19:31	22-Apr-2005 19:52
Recover 04KC-1A	56° 25.037' N	160° 12.957' W	0.5	10	0.0	16	1.0	22-Apr-2005 19:55	22-Apr-2005 20:55
Deploy 05KC-1A	56° 25.037' N	160° 12.957' W	0.0	10	0.0	16	0.5	22-Apr-2005 20:55	22-Apr-2005 21:25
CTD - Site 2/east (chlor: 0, 10,20,30,40,50m)	56° 56.500' N	163° 50.010' W	123.3	10	12.3	69	0.4	23-Apr-2005 09:45	23-Apr-2005 10:10
20/60-cm Bongo (150/333 nets) - Site 2/east	56° 56.500' N	163° 50.010' W	0.0	10	0.0	69	0.3	23-Apr-2005 10:10	23-Apr-2005 10:25
CTD at Site 2 (chlor: 0,11(x3),20,30,40,50m; nuts at ?)	56° 52.500' N	164° 03.000' W	8.1	10	0.8	71	0.4	23-Apr-2005 11:14	23-Apr-2005 11:39
CalVET (triplicate)	56° 52.500' N	164° 03.000' W	0.0	10	0.0	71	0.5	23-Apr-2005 11:39	23-Apr-2005 12:09
20/60-cm Bongo (150/333 nets)	56° 52.500' N	164° 03.000' W	0.0	10	0.0	71	0.5	23-Apr-2005 12:09	23-Apr-2005 12:39
Recover 04BS-2C	56° 52.522' N	164° 03.422' W	0.2	10	0.0	71	1.0	23-Apr-2005 12:40	23-Apr-2005 13:40
Recover 04BSP-2B	56° 51.614' N	164° 03.651' W	0.9	10	0.1	72	1.0	23-Apr-2005 13:46	23-Apr-2005 14:46
Deploy 05BSM-2A	56° 52.000' N	164° 03.000' W	0.5	10	0.1	72	4.0	23-Apr-2005 14:49	23-Apr-2005 18:49
Deploy 05BSP-2A	56° 51.600' N	164° 03.500' W	0.5	10	0.0	72	0.5	23-Apr-2005 18:52	23-Apr-2005 19:22
CTD at Site 2 (chlor: 0,12(x3),20,24(x3),30,40,50m; nuts at ?)	56° 52.500' N	164° 03.000' W	0.9	10	0.1	72	0.4	23-Apr-2005 19:27	23-Apr-2005 19:52
CTD - Site 2/south (chlor: 0, 10,20,30,40,50m)	56° 40.000' N	163° 52.000' W	13.9	10	1.4	75	0.4	23-Apr-2005 21:15	23-Apr-2005 21:40
20/60-cm Bongo (150/333 nets) - Site 2/south	56° 40.000' N	163° 52.000' W	0.0	10	0.0	75	0.3	23-Apr-2005 21:40	23-Apr-2005 21:57
CTD - Site 2/west (chlor: 0, 10,20,30,40,50m)	56° 46.000' N	164° 20.000' W	16.5	10	1.6	75	0.4	23-Apr-2005 23:36	24-Apr-2005 00:01
20/60-cm Bongo (150/333 nets) - Site 2/west	56° 46.000' N	164° 20.000' W	0.0	10	0.0	75	0.3	24-Apr-2005 00:01	24-Apr-2005 00:17
CTD - Site 2/north (chlor: 0, 10,20,30,40,50m)	57° 01.000' N	164° 13.000' W	15.5	10	1.5	69	0.4	24-Apr-2005 01:50	24-Apr-2005 02:14
20/60-cm Bongo (150/333 nets) - Site 2/north	57° 01.000' N	164° 13.000' W	0.0	10	0.0	69	0.3	24-Apr-2005 02:14	24-Apr-2005 02:30
CTD - 70-m isobath (nuts: 0,10,20,30,40,50m)	57° 07.000' N	165° 00.000' W	26.2	10	2.6	70	0.4	24-Apr-2005 05:07	24-Apr-2005 05:32
20/60-cm Bongo (150/333 nets)	57° 07.000' N	165° 00.000' W	0.0	10	0.0	70	0.3	24-Apr-2005 05:32	24-Apr-2005 05:48

Activity	Latitude	Longitude	Dist (nm)	Spd (kts)	Trans (hrs)	Approx Bott Depth (m)	On Sta (hrs)	Arrive (Local) Date/Time	Depart (Local) Date/Time
CTD - 70-m isobath (nuts: 0,10,20,30,40,50 m)	57° 25.000' N	165° 52.000' W	33.4	10	3.3	69	0.4	24-Apr-2005 09:08	24-Apr-2005 09:33
20/60-cm Bongo (150/333 nets)	57° 25.000' N	165° 52.000' W	0.0	10	0.0	69	0.3	24-Apr-2005 09:33	24-Apr-2005 09:48
CTD - 70-m isobath (nuts: 0,10,20,30,40,50m)	57° 32.000' N	166° 44.000' W	28.8	10	2.9	69	0.4	24-Apr-2005 12:41	24-Apr-2005 13:06
20/60-cm Bongo (150/333 nets)	57° 32.000' N	166° 44.000' W	0.0	10	0.0	69	0.3	24-Apr-2005 13:06	24-Apr-2005 13:22
CTD - 70-m isobath (nuts: 0,10,20,30,40,50m)	57° 38.000' N	167° 37.000' W	29.0	10	2.9	71	0.4	24-Apr-2005 16:16	24-Apr-2005 16:41
20/60-cm Bongo (150/333 nets)	57° 38.000' N	167° 37.000' W	0.0	10	0.0	71	0.3	24-Apr-2005 16:41	24-Apr-2005 16:56
CTD at Site 4 (chlor: 0,11(x3),20,30,40,50m; nuts at ?)	57° 51.000' N	168° 51.250' W	41.7	10	4.2	72	0.4	24-Apr-2005 21:07	24-Apr-2005 21:32
Recover 04BS-4B	57° 51.179' N	168° 52.206' W	0.5	10	0.1	71	1.0	24-Apr-2005 21:35	24-Apr-2005 22:35
Deploy 05BS-4A	57° 51.181' N	168° 52.182' W	0.0	10	0.0	72	2.0	24-Apr-2005 22:35	25-Apr-2005 00:35
Deploy 05BSP-4A	57° 51.181' N	168° 52.182' W	0.0	10	0.0	72	1.0	25-Apr-2005 00:35	25-Apr-2005 01:35
CTD at Site 4 (chlor: 0,11(x3),20,30,40,50m; nuts at ?)	57° 51.000' N	168° 51.250' W	0.5	10	0.1	72	0.4	25-Apr-2005 01:38	25-Apr-2005 02:03
CalVET (triplicate)	57° 51.000' N	168° 51.250' W	0.0	10	0.0	72	0.5	25-Apr-2005 02:03	25-Apr-2005 02:33
20/60-cm Bongo (150/333 nets)	57° 51.000' N	168° 51.250' W	0.0	10	0.0	72	0.3	25-Apr-2005 02:33	25-Apr-2005 02:49
CTD - Site 4 south (chlor: 0,10,20,30,40,50m)	57° 39.200' N	169° 01.200' W	12.9	10	1.3	71	0.4	25-Apr-2005 04:06	25-Apr-2005 04:31
20/60-cm Bongo - Site 4/south	57° 39.200' N	169° 01.200' W	0.0	10	0.0	71	0.3	25-Apr-2005 04:31	25-Apr-2005 04:47
CTD - Site 4/west (chlor: 0, 10,20,30,40,50m)	57° 55.600' N	169° 19.300' W	19.0	10	1.9	71	0.4	25-Apr-2005 06:41	25-Apr-2005 07:06
20/60-cm Bongo - Site 4/west	57° 55.600' N	169° 19.300' W	0.0	10	0.0	71	0.3	25-Apr-2005 07:06	25-Apr-2005 07:22
CTD - Site 4/east (chlor: 0,10,20,30,40,50m)	57° 46.000' N	168° 28.000' W	28.9	10	2.9	71	0.4	25-Apr-2005 10:15	25-Apr-2005 10:40
20/60-cm Bongo - Site 4/east	57° 46.000' N	168° 28.000' W	0.0	10	0.0	71	0.3	25-Apr-2005 10:40	25-Apr-2005 10:56
CTD - Site 4/north (chlor: 0,10,20,30,40,50m)	58° 04.000' N	168° 43.800' W	19.9	10	2.0	71	0.4	25-Apr-2005 12:55	25-Apr-2005 13:20
20/60-cm Bongo - Site 4/north	58° 04.000' N	168° 43.800' W	0.0	10	0.0	71	0.3	25-Apr-2005 13:20	25-Apr-2005 13:36
CTD - 70-m isobath (nuts: 0,10,20,30,40,50m)	58° 13.000' N	169° 51.000' W	36.6	10	3.7	70	0.4	25-Apr-2005 17:15	25-Apr-2005 17:40
20/60-cm Bongo (150/333 nets)	58° 13.000' N	169° 51.000' W	0.0	10	0.0	70	0.3	25-Apr-2005 17:40	25-Apr-2005 17:56
CTD - 70-m isobath (nuts: 0,10,20,30,40,50m)	58° 41.000' N	170° 11.000' W	29.9	10	3.0	70	0.4	25-Apr-2005 20:55	25-Apr-2005 21:20
20/60-cm Bongo (150/333 nets)	58° 41.000' N	170° 11.000' W	0.0	10	0.0	70	0.3	25-Apr-2005 21:20	25-Apr-2005 21:35
CTD - 70-m isobath (nuts: 0,10,20,30,40,50m)	59° 19.000' N	170° 24.000' W	38.6	10	3.9	70	0.4	26-Apr-2005 01:27	26-Apr-2005 01:52
20/60-cm Bongo (150/333 nets)	59° 19.000' N	170° 24.000' W	0.0	10	0.0	70	0.3	26-Apr-2005 01:52	26-Apr-2005 02:07
CTD - 70-m isobath (nuts: 0,10,20,30,40,50m)	59° 54.000' N	171° 10.000' W	42.0	10	4.2	70	0.4	26-Apr-2005 06:19	26-Apr-2005 06:44
20/60-cm Bongo (150/333 nets)	59° 54.000' N	171° 10.000' W	0.0	10	0.0	70	0.3	26-Apr-2005 06:44	26-Apr-2005 07:00
CTD - Site 5/west (chlor: 0,10,20,30,40,50m)	59° 53.880' N	172° 10.000' W	30.1	10	3.0	70	0.4	26-Apr-2005 10:00	26-Apr-2005 10:25
20/60-cm Bongo - Site 5/west	59° 53.880' N	172° 10.000' W	0.0	10	0.0	70	0.3	26-Apr-2005 10:25	26-Apr-2005 10:41
CTD at Site 5 (chlor: 0, 12(x3),20,30,40,50m)	59° 53.500' N	171° 41.500' W	14.3	10	1.4	72	0.4	26-Apr-2005 12:07	26-Apr-2005 12:31
20/60-cm Bongo (150/333 nets)	59° 53.500' N	171° 41.500' W	0.0	10	0.0	72	0.3	26-Apr-2005 12:31	26-Apr-2005 12:47

Activity	Latitude		Longitude		Dist (nm)	Spd (kts)	Trans (hrs)	Approx Bott Depth (m)	On Sta (hrs)	Arrive (Local) Date/Time	Depart (Local) Date/Time		
CalVET (triplicate)	59°	53.500'	N	171°	41.500'	W	0.0	10	0.0	72	0.5	26-Apr-2005 12:47	26-Apr-2005 13:17
Recover 04BS-5A	59°	53.842'	N	171°	42.190'	W	0.5	10	0.0	72	1.0	26-Apr-2005 13:20	26-Apr-2005 14:20
Recover 04BSP-5A	59°	53.878'	N	171°	42.636'	W	0.2	10	0.0	72	0.5	26-Apr-2005 14:22	26-Apr-2005 14:52
Deploy 05BS-5A	59°	53.878'	N	171°	42.636'	W	0.0	10	0.0	73	2.0	26-Apr-2005 14:52	26-Apr-2005 16:52
Deploy 05BSP-5A	59°	53.900'	N	171°	42.640'	W	0.0	10	0.0	73	1.0	26-Apr-2005 16:52	26-Apr-2005 17:52
CTD at Site 5 (chlor: 0,12(x3),20,30,40,50m; take duplicate nuts - for UAF and PMEL - at nitrate meter depths)	59°	53.400'	N	171°	42.500'	W	0.5	10	0.1	72	0.4	26-Apr-2005 17:55	26-Apr-2005 18:20
CTD - Site 5/south (chlor: 0,10,20,30,40,50m)	59°	42.000'	N	171°	30.000'	W	13.0	10	1.3	70	0.4	26-Apr-2005 19:38	26-Apr-2005 20:02
20/60-cm Bongo - Site 5/south	59°	42.000'	N	171°	30.000'	W	0.0	10	0.0	70	0.3	26-Apr-2005 20:02	26-Apr-2005 20:18
CTD - Site 5/east (chlor: 0,10,20,30,40,50m)	59°	53.880'	N	171°	15.500'	W	13.9	10	1.4	70	0.4	26-Apr-2005 21:42	26-Apr-2005 22:06
20/60-cm Bongo - Site 5/east	59°	53.880'	N	171°	15.500'	W	0.0	10	0.0	70	0.3	26-Apr-2005 22:06	26-Apr-2005 22:22
CTD - Site 5/north (chlor: 0,10,20,30,40,50m)	60°	04.500'	N	172°	00.000'	W	24.7	10	2.5	70	0.4	27-Apr-2005 00:50	27-Apr-2005 01:15
20/60-cm Bongo - Site 5/north	60°	04.500'	N	172°	00.000'	W	0.0	10	0.0	70	0.3	27-Apr-2005 01:15	27-Apr-2005 01:31
WP-052	60°	26.945'	N	171°	59.635'	W	22.4	10	2.2			27-Apr-2005 03:45	27-Apr-2005 03:45
CTD - Site 8/south (chlor: 0,10,20,30,40,50m)	61°	58.500'	N	174°	37.000'	W	118.8	10	11.9	72	0.4	27-Apr-2005 15:38	27-Apr-2005 16:03
20/60-cm Bongo (150/333 nets) - Site 8/south	61°	58.500'	N	174°	37.000'	W	0.0	10	0.0	72	0.3	27-Apr-2005 16:03	27-Apr-2005 16:19
CTD - Site 8/west (chlor: 0,10,20,30,40,50m)	62°	11.660'	N	175°	14.300'	W	21.9	10	2.2	79	0.4	27-Apr-2005 18:30	27-Apr-2005 18:55
20/60-cm Bongo (150/333 nets) - Site 8/west	62°	11.660'	N	175°	14.300'	W	0.0	10	0.0	79	0.3	27-Apr-2005 18:55	27-Apr-2005 19:12
CTD - Site 8/north (chlor: 0,10,20,30,40,50m)	62°	25.300'	N	174°	42.000'	W	20.3	10	2.0	72	0.4	27-Apr-2005 21:14	27-Apr-2005 21:38
20/60-cm Bongo (150/333 nets) - Site 8/north	62°	25.300'	N	174°	42.000'	W	0.0	10	0.0	72	0.3	27-Apr-2005 21:38	27-Apr-2005 21:54
CTD - Site 8/east (chlor: 0,10,20,30,40,50m)	62°	11.660'	N	174°	16.000'	W	18.2	10	1.8	64	0.4	27-Apr-2005 23:44	28-Apr-2005 00:08
20/60-cm Bongo (150/333 nets) - Site 8/east	62°	11.660'	N	174°	16.000'	W	0.0	10	0.0	64	0.3	28-Apr-2005 00:08	28-Apr-2005 00:23
CTD at 04STL-1B (chlor: 0,10,21(x3),30,40,50m)	62°	11.656'	N	174°	51.320'	W	16.5	10	1.6	78	0.4	28-Apr-2005 02:02	28-Apr-2005 02:27
20/60-cm Bongo (150/333 nets)	62°	11.656'	N	174°	51.320'	W	0.0	10	0.0	78	0.3	28-Apr-2005 02:27	28-Apr-2005 02:44
CalVET (triplicate)	62°	11.656'	N	174°	51.320'	W	0.0	10	0.0	78	0.5	28-Apr-2005 02:44	28-Apr-2005 03:14
Search for 03STL-1A or CTD box	62°	04.879'	N	175°	00.117'	W	7.9	10	0.8	80	8.0	28-Apr-2005 04:01	28-Apr-2005 12:01
Recover 04STL-1B	62°	11.656'	N	174°	51.320'	W	7.9	10	0.8	78	1.0	28-Apr-2005 12:49	28-Apr-2005 13:49
Deploy 05STL-1A	62°	11.656'	N	174°	45.000'	W	2.9	10	0.3	72	2.0	28-Apr-2005 14:07	28-Apr-2005 16:07
Deploy 05STP-1A	62°	11.656'	N	174°	45.000'	W	0.0	10	0.0	72	1.0	28-Apr-2005 16:07	28-Apr-2005 17:07
CTD at 04STL-1B (chlor: 0,10,21(x3),30,40,50m)	62°	11.656'	N	174°	45.000'	W	0.0	10	0.0	72	0.4	28-Apr-2005 17:07	28-Apr-2005 17:31
WP-060	60°	25.617'	N	173°	30.485'	W	111.9	10	11.2			29-Apr-2005 04:43	29-Apr-2005 04:43
Recover MML	56°	45.555'	N	170°	28.832'	W	239.5	11.5	20.8		1.0	30-Apr-2005 01:32	30-Apr-2005 02:32
Search for 04PIP-2A	56°	34.606'	N	170°	05.986'	W	16.7	10	1.7	100.6	8.0	30-Apr-2005 04:12	30-Apr-2005 12:12

Activity	Latitude	Longitude	Dist (nm)	Spd (kts)	Trans (hrs)	Approx Bott Depth (m)	On Sta (hrs)	Arrive (Local) Date/Time	Depart (Local) Date/Time
CTD/Bongo at 04PIP-2A (chlor&nuts: 0,12(x3),20,30,40,50m, nuts at ?)	56° 34.800' N	170° 06.500' W	0.3	10	0.0	100.6	1.2	30-Apr-2005 12:14	30-Apr-2005 13:26
Search for 04PI-7A	56° 17.175' N	169° 41.746' W	22.3	10	2.2	200	8.0	30-Apr-2005 15:40	30-Apr-2005 23:40
CTD/Bongo at 04PI-7A (chlor&nuts at: 0,10,20,30,40,50, nuts at ?)	56° 17.100' N	169° 42.600' W	0.5	10	0.0	200	1.5	30-Apr-2005 23:43	01-May-2005 01:13
Greg Johnson's ARGO drifters	55° 36.000' N	170° 00.000' W	42.2	10	4.2		0.3	01-May-2005 05:27	01-May-2005 05:45
Greg Johnson's ARGO drifters	54° 53.000' N	169° 34.000' W	45.5	10	4.5		0.3	01-May-2005 10:17	01-May-2005 10:35
Recover MML	54° 00.000' N	170° 00.000' W	55.1	10	5.5		1.0	01-May-2005 16:06	01-May-2005 17:06
WP-067	52° 56.249' N	169° 31.452' W	66.0	10	6.6			01-May-2005 23:42	01-May-2005 23:42
Recover 03SG-4A	52° 41.361' N	169° 34.486' W	15.0	10	1.5	111	24.0	02-May-2005 01:12	03-May-2005 01:12
Search for 03GSP	52° 09.930' N	168° 12.367' W	59.1	10	5.9	4348	15.0	03-May-2005 07:07	03-May-2005 22:07
WP-070	52° 42.458' N	169° 25.449' W	55.2	10	5.5			04-May-2005 03:38	04-May-2005 03:38
WP-071	52° 50.221' N	169° 25.449' W	7.8	10	0.8			04-May-2005 04:24	04-May-2005 04:24
CTD	53° 22.000' N	168° 42.000' W	41.1	10	4.1	700	0.9	04-May-2005 08:31	04-May-2005 09:23
CTD	53° 24.358' N	168° 51.234' W	6.0	10	0.6	1020	1.1	04-May-2005 09:59	04-May-2005 11:04
CTD	53° 31.000' N	168° 55.000' W	7.0	10	0.7	1825	1.4	04-May-2005 11:46	04-May-2005 13:10
CTD	53° 36.000' N	169° 04.000' W	7.3	10	0.7	1870	1.4	04-May-2005 13:54	04-May-2005 15:18
CTD	53° 47.000' N	169° 16.000' W	13.1	10	1.3	1575	1.4	04-May-2005 16:37	04-May-2005 18:01
CTD	54° 02.000' N	169° 34.000' W	18.4	10	1.8	1840	1.4	04-May-2005 19:51	04-May-2005 21:15
CTD	54° 20.000' N	169° 50.000' W	20.3	10	2.0	1900	1.4	04-May-2005 23:16	05-May-2005 00:40
CTD	54° 40.000' N	169° 12.000' W	29.8	10	3.0	1730	1.4	05-May-2005 03:39	05-May-2005 05:03
CTD	54° 58.000' N	168° 45.000' W	23.8	10	2.4	2067	1.4	05-May-2005 07:26	05-May-2005 08:50
CTD	55° 07.000' N	168° 29.000' W	12.8	10	1.3	1735	1.4	05-May-2005 10:07	05-May-2005 11:31
CTD - Shelf Break (1,000m) DEPTH DEPENDENT	55° 20.500' N	168° 15.200' W	15.6	10	1.6	1000	1.1	05-May-2005 13:05	05-May-2005 14:09
CTD - Shelf Break (500m) DEPTH DEPENDENT	55° 22.300' N	168° 10.500' W	3.2	10	0.3	500	0.7	05-May-2005 14:29	05-May-2005 15:12
CTD - Shelf Break (200m) DEPTH DEPENDENT	55° 25.700' N	168° 04.400' W	4.9	10	0.5	120	0.5	05-May-2005 15:41	05-May-2005 16:09
CTD - Outer Shelf Domain	55° 33.000' N	167° 46.000' W	12.7	10	1.3	120	0.5	05-May-2005 17:25	05-May-2005 17:53
CTD - Outer Shelf Domain	55° 39.000' N	167° 30.020' W	10.8	10	1.1	120	0.5	05-May-2005 18:58	05-May-2005 19:26
CTD - Outer Shelf Domain	55° 46.000' N	167° 10.000' W	13.3	10	1.3	120	0.5	05-May-2005 20:46	05-May-2005 21:14
CTD - Outer Shelf Domain	55° 54.000' N	166° 54.000' W	12.0	10	1.2	120	0.5	05-May-2005 22:26	05-May-2005 22:54
CTD - Site 3	56° 02.941' N	166° 20.304' W	20.9	10	2.1	127	0.5	06-May-2005 00:59	06-May-2005 01:28
CTD - Cross-shelf	56° 16.480' N	165° 46.320' W	23.3	10	2.3	96	0.4	06-May-2005 03:47	06-May-2005 04:14
CTD - Cross-shelf	56° 23.540' N	165° 23.170' W	14.6	10	1.5	89	0.4	06-May-2005 05:42	06-May-2005 06:08

Activity	Latitude		Longitude		Dist (nm)	Spd (kts)	Trans (hrs)	Approx Bott Depth (m)	On Sta (hrs)	Arrive (Local) Date/Time	Depart (Local) Date/Time
CTD - Cross-shelf	56°	30.630' N	165°	00.000' W	14.6	10	1.5	81	0.4	06-May-2005 07:36	06-May-2005 08:01
CTD - Cross-shelf	56°	37.820' N	164°	36.000' W	15.1	10	1.5	79	0.4	06-May-2005 09:31	06-May-2005 09:56
Recover MML	54°	10.840' N	166°	53.770' W	166.5	10.5	15.9		3.0	07-May-2005 01:48	07-May-2005 04:48
WP-095	54°	02.995' N	166°	37.409' W	12.4	10.0	1.2			07-May-2005 06:02	07-May-2005 06:02
WP-096	53°	55.677' N	166°	29.222' W	8.8	10.0	0.9			07-May-2005 06:55	07-May-2005 06:55
WP-097	53°	54.461' N	166°	29.327' W	1.2	8.0	0.2			07-May-2005 07:04	07-May-2005 07:04
Weather day	53°	53.488' N	166°	30.698' W	1.3	5	0.3	200	12.0	07-May-2005 07:19	07-May-2005 19:19
Arrive Dutch Harbor, Alaska	53°	53.488' N	166°	30.698' W	0.0	1	0.0	200		07-May-2005 19:19	

9.4 Cruise MF-05-06 HAZMAT

9.4.1 Cruise MF-05-06 HAZMAT Inventory by Equipment

Instrument	Battery Type	Manufacturer	Cell Type	Req. Cells	Total Instr.	Spares	Total Cells	Contact Person
Argos APEX	Lithium	Electrochem	DD-cell	8	2	0	16	DeWitt

9.4.2 Cruise MF-05-06 HAZMAT Inventory

Chemical	CAS Number	Respondee	Org	Qty	H	F	R	Storage Color Code	Hazard Class	Packing Group Number	UN	Reportable Quantity	Response Indices
Battery, Lithium	mixture	DeWitt	PMEL		2	2	3	General	9	II	3090		
Tributyltin Oxide	56-35-9	DeWitt	PMEL		3	1	0	Poison	Not regulated				1

Spill Response 1: Stop the leak, if possible. Ventilate the space involved. Absorb, sweep up, and place in container for disposal. Shut off or remove all ignition sources. Prevent waterway contamination. Construct a dike to prevent spreading. Collect run-off (water) and transfer to drums or tanks for later disposal.