

FINAL CRUISE INSTRUCTIONS

ECO-FOCI

NOAA Ship *MILLER FREEMAN*, Cruise MF-06-05
April 12 – May 6, 2006
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-06-05

1.2.2 **Eco-FOCI Number** – 2MF06

1.3 **Cruise Dates**

1.3.1 Departure – Depart Kodiak, Alaska, at 1500 hours on Wednesday, April 12, 2006.

1.3.2 Touch-and-go – Dutch Harbor, Alaska, on Monday, April 17, 2006

1.3.3 Arrival – Arrive Dutch Harbor, Alaska, on Saturday, May 6, 2006

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 deploy ARGOS Satellite Tracked Drifter Buoys at designated areas. To conduct joint operations with the University of Washington R/V THOMAS G. THOMPSON.

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	Female	PMEL	Carol.DeWitt@noaa.gov

2.4.2 Other Participating Scientists

Name	Gender	Affiliation	E-mail Address
William J. Floering	Male	PMEL	William.Floering@noaa.gov
Antonio Jenkins	Male	PMEL	Antonio.Jenkins@noaa.gov
Peter Proctor	Male	PMEL	Peter.Proctor@noaa.gov
Dylan Righi	Male	PMEL	Dylan.Righi@noaa.gov
Steve Smith	Male	PMEL	Stephen.A.Smith@noaa.gov
Chris Wilson	Male	AFSC	Chris.Wilson@noaa.gov
Alex De Robertis	Male	AFSC	Alex.Derobertis@noaa.gov
Sarah J. Thornton	Female	UAF	sarahjt@imsuaf.edu
Lisa Munger	Female	SIO	lmunger@ucsd.edu

2.5 Administration

2.5.1 Ship Operations & Contacts

NOAA Marine Operations Center, Pacific 1801 Fairview Avenue East Seattle, Washington 98102 Telephone: (206) 553-4548 Fax: (206) 553-1109	CDR Mark Pickett, NOAA Chief, Operations (MOP1) Work: (206) 553-1857 Cellular: (206) 390-7527 Mark.Pickett@noaa.gov	Larry Mordock Deputy Chief, Operations Work: (206) 553-4764 Home: (206) 365-3567 Cellular: (206) 465-9316 Larry.Mordock@noaa.gov
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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

2.5.3 Diving Operations

Michael Hopkins, PMEL
Telephone: (206) 526-6197
E-mail: Mike.Hopkins@noaa.gov

Mike Stevenson, PMEL
Telephone: (206) 526-6778
E-mail: Michael.Stevenson@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* CTD profiler system and the Sea-Bird SBE 19 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 and to Dutch Harbor, 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 and barged to Seattle, WA. 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 with DeWitt, Floering, Proctor and Smith aboard, on Thursday, April 12, 2006, and steam directly to the Amukta Pass mooring site. See Section 9.2 Cruise MF-06-05 Chartlet for an overall view of the proposed cruise.

3.4.1 Shelikof Strait – Mooring operations will consist of recovering two subsurface moorings. No CTDs will be completed. Dragging operations will be conducted at 05SSP-1A – which was located during MF06-02 but did not surface.

3.4.2 Amukta Pass – Mooring operations will consist of deploying four subsurface moorings across the pass. No CTDs will be required.

3.4.3 Dutch Harbor touch-and-go – Load equipment and personnel (Jenkins, Righi, Wilson, De Robertis, Thornton, Munger)

3.4.4 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

3.4.5 FOCI Bering Sea Site 2 – Prior to mooring operations, a calibration CTD with nutrient and chlorophyll samples will be completed. Mooring operations will consist of recovering two

subsurface moorings and deploying one surface and three 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 2, a CTD with nutrient and chlorophyll samples will be completed. Note: no CalVETs or bongo tows at this site.

- 3.4.6 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 twenty stations along this transit, a CTD with nutrient and chlorophyll samples will be completed. Prior to mooring operations, a calibration CTD with nutrient and chlorophyll samples will be completed. Mooring operations will consist of recovering two subsurface mooring 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 4, a CTD will be completed. Note: no CalVETs or bongo tows at this site.
- 3.4.7 FOCI Bering Sea Site 5** – The ship will resume the CTD transect along the 70m isobath from FOCI Bering Sea Site 4 to FOCI Bering Sea Site 5. At each of the eighteen stations along this transect, a CTD with nutrient and chlorophyll samples will be completed. Prior to mooring operations, a calibration CTD will be completed. Mooring operations will consist of recovering two subsurface moorings and deploying three 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 will be completed. The ship will resume the CTD transect along the 70m isobath from FOCI Bering Sea Site 5 to FOCI Bering Sea Site 8. At each of the eighteen stations along this transect, a CTD with nutrient and chlorophyll samples will be completed. At some point after discussions with FOCI scientists aboard the University of Washington R/V THOMAS G. THOMPSON, we will break off operations and meet up with R/V THOMAS G. THOMPSON to conduct joint operations. Note: no CalVETs or bongo tows at this site.
- 3.4.8 Joint operations with the University of Washington R/V THOMAS G. THOMPSON:**
In conjunction with FOCI scientists aboard THOMPSON, we will spend six days conducting various operations including diving, CTDs, Methot tows, trawling, collecting acoustics data and towing an underwater vehicle. The stern platform will be removed to enable trawling operations.

Dive operations are tentatively scheduled for the morning hours. No more than eight short, low-intensity dives are anticipated. Weather permitting; we will dive once or twice on each of the first two days, no dives on the third day, one or two dives on each of the next two days, and no dives on the last day. Two divers will be required in the water at any given time. Divers will photograph the underside of ice floes, will scrape samples of the underside of ice, and use a slurp gun to collect plankton under the ice. CTD nutrient samples will be transferred to THOMPSON for analysis; preserved samples will remain on FREEMAN.

Midwater trawling and hydroacoustic transects will generally occur in the morning/afternoon/evening and will follow dive operations. The trawls will be conducted using a poly Noreastern bottom net with a AWT 0.5 inch liner. We anticipate that each towing operation should last 2 to 3 hours – start to finish – and occur once or twice per day. Generally, four hydroacoustic transects per day will be placed at random distances along a line perpendicular to the general direction of the ice edge. Portions of these transects will enter the marginal ice zone. Also during this time frame, Methot tows and towed vehicle operations will be conducted.

Night operations will generally consist of CTD lines starting furthest away from the ice edge and heading towards the ice edge in the morning daylight hours. Trawling operations may occur at night.

At the end of the joint operations with THOMPSON, Wilson and De Robertis will be transferred to THOMPSON and will not return to FREEMAN for the remaining cruise. The stern platform may need to be reinstalled.

3.4.9 FOCI Bering Sea Site 8 (Saint Lawrence) – We will resume the CTD transect at the same CTD site where we left off prior to our operations with THOMPSON. Prior to mooring operations, a calibration CTD with nutrient and chlorophyll samples and a bongo tow 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 bongo tow will be completed. Note: no CalVETs at this site.

3.4.10 Scripps Marine Mammal Laboratory (MML) mooring – Recover 05MM-4A. No CTD will be required.

3.4.11 CTD “L” – If time permits – as in the case that ice formation prevents the mooring operations at FOCI Bering Sea Site 8 – we will complete CTD stations along an “L” heading north from the Aleutian chain and east towards Site 2.

3.5 Station Locations – See Section 9.3 Cruise MF-06-05 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.

- Mooring Operations,
- CTD/Water Sample Operations (SOI 3.2.1),
- MARMAP Bongo Tows (SOI 3.2.2),
- Methot Trawls (SOI 3.2.7)
- Midwater Trawls (SOI 3.2.8),
- Chlorophyll Sampling Operations (SOI 3.2.10),
- ARGOS Satellite Tracked Drifter Buoy Deployments (SOI 3.2.11), and
- SIMRAD EK 60 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.

- 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 Sites 2 and 4 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,
- JRC JFV-200R color sounder recorder,
- RD Instruments' ADCP written to Iomega Zip drive,
- Use of Pentium PC in DataPlot for data analysis,
- Scientific Computer System (SCS),
- Electrical connection between Rowe winch and DataPlot,
- Removable stern platform (in place at start of cruise),
- 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,
- Ship's crane(s) used for loading and/or deploying, and
- Furuno net sonde as backup for WesMar net sonde.

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,
- Conductivity and temperature sensor package to provide dual sensors on the CTD (backup),

- CTD rosette sampler,
- 60-cm bongo sampling arrays,
- 20 cm bongo arrays,
- Spare wire angle indicator,
- Scanmar,
- poly Noreastern bottom trawl, rigging, 5 m² fish buster doors, (catch processing equipment),
- Methot trawl,
- Surface moorings (FOCI biophysical platforms),
- Subsurface moorings,
- ARGOS tracked drifter buoys,
- Miscellaneous scientific sampling and processing equipment,
- Baskets for processing trawl catches,
- 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:

- 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, 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 9.1 MF-06-05 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 **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

Iridium:

- 1 (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-06-05 HAZMAT Inventory

9.1.1 Hazmat Inventory, DeWitt:

Chemical	CAS Number	Respondee	Org	Qty	H	F	R	Storage Color Code	Hazard Class	Packing Group Number	UN #	Response Indices
Battery, Lithium	mixture	DeWitt	PMEL	*	2	2	3	General	9	II	3090	
Tributyltin Oxide	56-35-9	DeWitt	PMEL	6 oz.	3	1	0	Poison	N. R.			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.

* Lithium and Alkaline battery quantities as follows:

- 47 - SBE-39 (9-V lithium battery)
- 13 - Microcat (6 lithium battery sticks and anti-fouling on conductivity cells)
- 6 - Seacat (3 DD lithium battery packs and antifouling cylinders on conductivity cells)
- 6 - ECO-fluorometer (6 9-V lithium batteries)
- 3 - Seacat (6 D alkaline cells and antifouling cylinders on conductivity cells)
- 1 - MTR (1 9-V alkaline cell)
- Spare batteries, in a hazmat can:
 - 6 9-V lithium batteries
 - 6 9-V alkaline batteries
 - 6 lithium battery sticks
 - 2 packs on anti-fouling cylinders

9.1.2 Hazmat Inventory, Proctor:

Common Material Name	Chemical Composition	UN ID #	Unit Type	Unit Size	Unit Qty	MSDS ?	Total Qty	Health	Flammability	Reactivity	Special
NEDA	N-(1-Naphthyl) ethylenediamine dihydrochloride) 98% ACS Reagent	N.R.	plastic	1 g	4	yes	4 g	2	0	1	
Sulfanilamide	Sulfanilamide	N.R.	plastic	10 g	4	yes	40 g	1	1	0	G
Cupric Sulfate	CuSO4	N.R.	plastic	20 g	2	yes	40 g	2	0	0	
Imidazole	C3H4N2	3263	plastic	27.2 g	8	yes	163.2 g	3	1	0	
Hydrochloric Acid	HCl	1789	glass	500 ml	1	yes	500 ml	3	0	1	W
Ammonium Chloride	NH4Cl	3077	plastic	14 g	8	yes	112 g	2	0	0	

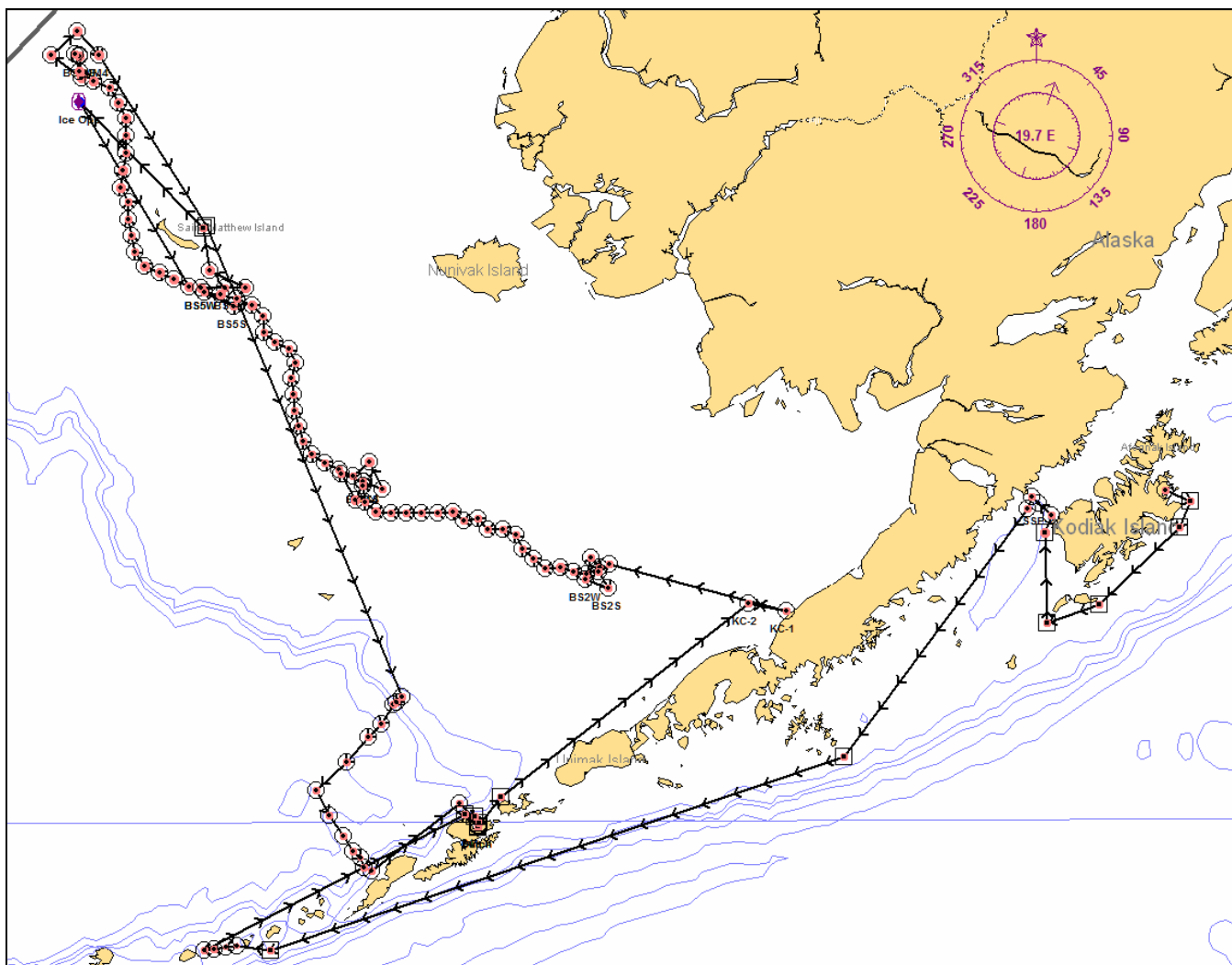
9.2 Cruise MF-06-05 Equipment Inventory

KODIAK ITEM	QTY	TOTAL WT (#)	INDIV WT (#)
ANCHORS, 650#	2	1300	650
ANCHORS, 1600#	8	12800	1600
ANCHORS, 2150#		0	2150
RELEASES	17	1700	100
SURFACE MOORING BUOY	1	800	800
SURFACE MOORING TOWER	1	200	200
SURFACE MOORING BRIDLE	1	250	250
SURFACE MOORING ANCHOR	1	4500	4500
SURFACE MOORING CHAIN	1	3000	3000
STEEL FLOATS			
28"	6	1080	180
30"	7	1260	180
41"	2	800	400
vinys, sets of 3	4	120	30
ADCP FLOAT (AMUKTA PASS)	4	4800	1200
ADCP FLOAT, 300 KHZ	4	3000	750
ADCP FLOAT , 600 KHZ	1	400	400
SCRIPPS BOXES	3	600	200
DRAG GEAR	1	500	500
TOOL CART	1	150	150
SMITH BOXES	1	75	75
MORDY BOXES	1	100	100

KODIAK		TOTAL	INDIV
ITEM	QTY	WT (#)	WT (#)
WOOD BOX, 2x3x2	3	600	200
gray plastic HARDWARE BOX , 4x4x3	1	1500	1500
BLACK TOTE	1	150	150
FOLDED TOTE	1	230	230
WIRE BASKET (SEACATS, MICROCATS, TEMP SENSORS IN CAGE)	2	1300	650
WIRE BASKET	2	1700	850
NITRATE METER	6	1500	250
WATER SAMPLER	1	300	300
RCM 9 (IN BOX)	3	150	50
TAPS 8	1	1000	1000
Shelikof Strait moorings	4	3200	800
TOTAL WT TO BE LOADED IN KODIAK:		47,765	

DUTCH HARBOR		TOTAL	INDIV
ITEM	QTY	WT (#)	WT (#)
ANCHORS, 1600#	2	3200	1600
ANCHORS, 2150#	3	6450	2150
SURFACE MOORING BUOY	1	800	800
SURFACE MOORING TOWER	1	200	200
SURFACE MOORING BRIDLE	1	250	250
SURFACE MOORING ANCHOR	1	4500	4500
SURFACE MOORING CHAIN	1	3000	3000
TOTAL WT TO BE LOADED IN DUTCH HARBOR:		18,400	
TOTAL WT DEPARTING DUTCH HARBOR:		51,365	

Section 9.3 Cruise MF-06-05 Chartlet



Section 9.4 Cruise MF-06-05 Station Locations

Activity	Latitude		Longitude		Dist. (nm)	Spd (kts)	Trans (hrs)	Approx Bottom (m)	On Sta (hrs)	Arrive (Local)	Depart	
Depart Kodiak	57°	45.00'	N	152°	29.60'	W					12-Apr 15:00	
Recover 06SSP-3A	57°	29.01'	N	154°	48.45'	W	76.1	10.8	17.0	192	1.0	13-Apr 8:00 13-Apr 9:00
Recover 06SSP-1A	57°	40.81'	N	155°	12.24'	W	17.4	10.8	1.6	287	1.0	13-Apr 10:36 13-Apr 11:36
Drag for 05SSP-1A	57°	33.18'	N	155°	17.77'	W	8.2	10.8	0.8	292	7.0	13-Apr 12:21 13-Apr 19:21
Deploy 06AMP-1A	52°	26.00'	N	171°	27.00'	W	633.0	11	57.5	408	2.0	16-Apr 4:54 16-Apr 6:54
Deploy 06AMP-2A	52°	25.00'	N	171°	40.00'	W	8.0	11	0.7	460	0.5	16-Apr 7:38 16-Apr 8:08
Deploy 06AMP-3A	52°	24.00'	N	171°	55.00'	W	9.2	11	0.8	273	0.5	16-Apr 8:58 16-Apr 9:28
Deploy 06AMP-4A	52°	23.00'	N	172°	07.00'	W	7.4	11	0.7	356	0.5	16-Apr 10:08 16-Apr 10:38
Touch and go at Dutch Harbor	53°	54.00'	N	166°	31.20'	W	220.9	11	20.1	200	8	17-Apr 6:43 17-Apr 14:43
CTD at 05KC-2A	56°	29.94'	N	160°	59.99'	W	244.9	11	22.3	60	0.4	18-Apr 12:59 18-Apr 13:23
Recover 05KC-2A	56°	29.94'	N	160°	59.99'	W	0.0	11	0.0	60	0.5	18-Apr 13:23 18-Apr 13:53
Deploy 06KC-2A	56°	29.40'	N	161°	00.00'	W	0.5	11	0.0	60	0.5	18-Apr 13:56 18-Apr 14:26
CTD at 05KC-1A	56°	25.20'	N	160°	13.09'	W	26.3	11	2.4	16	0.4	18-Apr 16:50 18-Apr 17:11
Recover 05KC-1A	56°	25.70'	N	160°	13.09'	W	0.5	11	0.0	16	0.5	18-Apr 17:13 18-Apr 17:43
Deploy 06KC-1A	56°	25.70'	N	160°	13.10'	W	0.0	11	0.0	16	0.5	18-Apr 17:43 18-Apr 18:13
CTD - site 2/east (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	56°	56.50'	N	163°	50.01'	W	123.0	11	11.2	69	0.4	19-Apr 5:24 19-Apr 5:49
CTD at site 2 (chlor at: 0, 11(x3),20,30,40,50 m; nuts at 12.5(x3) m)	56°	51.30'	N	164°	03.00'	W	8.8	11	0.8	71	0.4	19-Apr 6:37 19-Apr 7:02
Recover 05BS-2C	56°	51.79'	N	164°	02.90'	W	0.5	11	0.0	71	1.0	19-Apr 7:04 19-Apr 8:04
Recover 05BSP-2B	56°	51.63'	N	164°	03.53'	W	0.4	11	0.0	72	0.5	19-Apr 8:07 19-Apr 8:37
Deploy 06BSM-2A	56°	51.70'	N	164°	03.00'	W	0.3	11	0.0	72	4.0	19-Apr 8:38 19-Apr 12:38
Deploy 06BS-2A	56°	51.70'	N	164°	04.00'	W	0.5	11	0.0	72	1.0	19-Apr 12:41 19-Apr 13:41
Deploy 06BSP-2A	56°	51.70'	N	164°	02.00'	W	1.1	11	0.1	72	0.5	19-Apr 13:47 19-Apr 14:17
Deploy 06BSP-2B	56°	51.70'	N	164°	02.00'	W	0.0	11	0.0	72	0.5	19-Apr 14:17 19-Apr 14:47

Activity	Latitude			Longitude			Dist. (nm)	Spd (kts)	Trans (hrs)	Approx Bottom (m)	On Sta (hrs)	Arrive (Local)	Depart
CTD at site 2 (chlor at: 0, 12(x3),20(x3),24(x3),30,40,50 m; nuts at 0,10(x3),20,30,40, 50,60 m) - 2 casts	56°	52.10'	N	164°	02.50'	W	0.5	11	0.0	72	0.8	19-Apr 14:50	19-Apr 15:38
CTD - site 2/south (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	56°	40.00'	N	163°	52.00'	W	13.4	11	1.2	75	0.4	19-Apr 16:51	19-Apr 17:16
CTD - site 2/west (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	56°	46.00'	N	164°	20.00'	W	16.5	11	1.5	75	0.4	19-Apr 18:46	19-Apr 19:11
CTD - site 2/north (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	57°	01.00'	N	164°	13.00'	W	15.5	11	1.4	69	0.4	19-Apr 20:35	19-Apr 21:00
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	56	54.00	N	164	1.98	W	9.2	10	0.9	70	0.4	19-Apr 21:55	19-Apr 22:20
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	56	49.92	N	164	18.66	W	10.0	10	1.0	70	0.4	19-Apr 23:20	19-Apr 23:44
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	56	51.00	N	164	34.26	W	8.6	10	0.9	70	0.4	20-Apr 0:36	20-Apr 1:01
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	56	54.54	N	164	50.10	W	9.4	10	0.9	70	0.4	20-Apr 1:57	20-Apr 2:21
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	56	53.64	N	165	8.22	W	9.9	10	1.0	70	0.4	20-Apr 3:21	20-Apr 3:46
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	57	0.00	N	165	22.74	W	10.2	10	1.0	70	0.4	20-Apr 4:47	20-Apr 5:11
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	57	6.48	N	165	36.78	W	10.0	10	1.0	70	0.4	20-Apr 6:11	20-Apr 6:36
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	57	15.72	N	165	44.82	W	10.2	10	1.0	70	0.4	20-Apr 7:37	20-Apr 8:02
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	57	19.20	N	166	0.60	W	9.2	10	0.9	70	0.4	20-Apr 8:57	20-Apr 9:22
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	57	19.20	N	166	19.56	W	10.2	10	1.0	70	0.4	20-Apr 10:23	20-Apr 10:48

Activity	Latitude			Longitude			Dist. (nm)	Spd (kts)	Trans (hrs)	Approx Bottom (m)	On Sta (hrs)	Arrive (Local)	Depart
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	57	26.58	N	166	31.38	W	9.7	10	1.0	70	0.4	20-Apr 11:47	20-Apr 12:11
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	57	25.44	N	166	48.42	W	9.2	10	0.9	70	0.4	20-Apr 13:07	20-Apr 13:31
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	57	31.32	N	167	2.40	W	9.5	10	1.0	70	0.4	20-Apr 14:29	20-Apr 14:53
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	57	30.00	N	167	20.94	W	10.0	10	1.0	70	0.4	20-Apr 15:54	20-Apr 16:18
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	57	30.00	N	167	40.02	W	10.3	10	1.0	70	0.4	20-Apr 17:20	20-Apr 17:44
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	57	30.00	N	167	59.10	W	10.3	10	1.0	70	0.4	20-Apr 18:46	20-Apr 19:11
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	57	30.00	N	168	18.18	W	10.3	10	1.0	70	0.4	20-Apr 20:12	20-Apr 20:37
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	57	31.38	N	168	36.72	W	10.1	10	1.0	70	0.4	20-Apr 21:37	20-Apr 22:02
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	57	37.68	N	168	49.32	W	9.2	10	0.9	70	0.4	20-Apr 22:57	20-Apr 23:22
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	57	47.82	N	168	51.78	W	10.2	10	1.0	70	0.4	21-Apr 0:23	21-Apr 0:48
CTD at site 4 (chlor at: 0,14(x3),20,30,40,50 m; nuts at 15.5(x3))	57°	50.70'	N	168°	52.21'	W	2.9	11	0.3	72	0.4	21-Apr 1:04	21-Apr 1:28
Recover 05BS-4B	57°	51.21'	N	168°	52.21'	W	0.5	11	0.0	71	2.0	21-Apr 1:31	21-Apr 3:31
Recover 05BSP-4B	57°	51.21'	N	168°	52.21'	W	0.0	11	0.0	71	0.5	21-Apr 3:31	21-Apr 4:01
Deploy 06BSM-4A	57°	51.21'	N	168°	52.21'	W	0.0	11	0.0	72	4.0	21-Apr 4:01	21-Apr 8:01
Deploy 06BSP-4A	57°	51.21'	N	168°	52.21'	W	0.0	11	0.0	72	0.5	21-Apr 8:01	21-Apr 8:31
CTD at site 4 (chlor at: 0, 12(x3),24(x3),30, 44(x3),50 m; nuts at 0,10(x3),17(x3),30, 40, 50,60 m) - 2 casts	57°	51.70'	N	168°	52.21'	W	0.5	11	0.0	72	0.8	21-Apr 8:34	21-Apr 9:22

Activity	Latitude			Longitude			Dist. (nm)	Spd (kts)	Trans (hrs)	Approx Bottom (m)	On Sta (hrs)	Arrive (Local)	Depart
CTD - site 4 south (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	57°	39.20'	N	169°	01.20'	W	13.4	11	1.2	71	0.4	21-Apr 10:35	21-Apr 11:00
CTD - site 4 west (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	57°	55.60'	N	169°	19.30'	W	19.0	11	1.7	71	0.4	21-Apr 12:43	21-Apr 13:08
CTD - site 4 east (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	57°	46.00'	N	168°	28.00'	W	28.9	11	2.6	71	0.4	21-Apr 15:46	21-Apr 16:11
CTD - site 4 north (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	58°	04.00'	N	168°	43.80'	W	19.9	11	1.8	71	0.4	21-Apr 17:59	21-Apr 18:24
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	57	54.54	N	169	3.66	W	14.2	10	1.4	70	0.4	21-Apr 19:49	21-Apr 20:13
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	57	58.44	N	169	21.54	W	10.3	10	1.0	70	0.4	21-Apr 21:15	21-Apr 21:40
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	58	2.82	N	169	39.00	W	10.2	10	1.0	70	0.4	21-Apr 22:41	21-Apr 23:06
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	58	8.70	N	169	54.84	W	10.2	10	1.0	70	0.4	22-Apr 0:07	22-Apr 0:32
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	58	16.98	N	170	5.28	W	9.9	10	1.0	70	0.4	22-Apr 1:31	22-Apr 1:56
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	58	26.82	N	170	10.80	W	10.3	10	1.0	70	0.4	22-Apr 2:58	22-Apr 3:22
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	58	36.66	N	170	16.26	W	10.2	10	1.0	70	0.4	22-Apr 4:24	22-Apr 4:48
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	58	46.98	N	170	17.58	W	10.3	10	1.0	70	0.4	22-Apr 5:50	22-Apr 6:15
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	58	57.06	N	170	19.56	W	10.1	10	1.0	70	0.4	22-Apr 7:16	22-Apr 7:41
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	59	6.60	N	170	14.40	W	9.9	10	1.0	70	0.4	22-Apr 8:40	22-Apr 9:05

Activity	Latitude			Longitude			Dist. (nm)	Spd (kts)	Trans (hrs)	Approx Bottom (m)	On Sta (hrs)	Arrive (Local)	Depart
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	59	15.54	N	170	22.62	W	9.9	10	1.0	70	0.4	22-Apr 10:04	22-Apr 10:29
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	59	19.74	N	170	39.96	W	9.8	10	1.0	70	0.4	22-Apr 11:27	22-Apr 11:52
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	59	25.92	N	170	53.34	W	9.2	10	0.9	70	0.4	22-Apr 12:47	22-Apr 13:12
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	59	35.88	N	170	55.02	W	10.0	10	1.0	70	0.4	22-Apr 14:12	22-Apr 14:37
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	59	43.14	N	171	8.34	W	9.9	10	1.0	70	0.4	22-Apr 15:36	22-Apr 16:01
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	59	46.86	N	171	27.06	W	10.1	10	1.0	70	0.4	22-Apr 17:02	22-Apr 17:26
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	59	49.80	N	171	46.20	W	10.1	10	1.0	70	0.4	22-Apr 18:27	22-Apr 18:51
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	59	50.76	N	172	6.30	W	10.1	10	1.0	70	0.4	22-Apr 19:52	22-Apr 20:17
CTD - site 5 south (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	59°	42.00	N	171°	30.00	W	20.3	10	2.0	70	0.4	22-Apr 22:18	22-Apr 22:43
CTD - site 5 west (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	59°	53.88	N	172°	10.00	W	23.4	10	2.3	70	0.4	23-Apr 1:03	23-Apr 1:28
CTD at site 5 (chlor at: 0,10, 19(x3),30,40,50 m; nuts at 29(x3) m)	59°	53.50	N	171°	41.50	W	14.3	10	1.4	72	0.4	23-Apr 2:54	23-Apr 3:18
Recover 05BS-5B	59°	54.31	N	171°	42.39	W	0.9	10	0.1	72	1.0	23-Apr 3:24	23-Apr 4:24
Recover 05BSP-5B	59°	53.94	N	171°	42.92	W	0.5	10	0.0	72	0.5	23-Apr 4:27	23-Apr 4:57
Deploy 06BS-5A	59°	54.00	N	171°	43.00	W	0.1	10	0.0	73	2.0	23-Apr 4:57	23-Apr 6:57
Deploy 06BSP-5A	59°	54.00	N	171°	42.10	W	0.5	10	0.0	73	0.5	23-Apr 7:00	23-Apr 7:30
Deploy 06BSW-5A	59°	54.00	N	171°	42.10	W	0.0	10	0.0	73	0.5	23-Apr 7:30	23-Apr 8:00

Activity	Latitude			Longitude			Dist. (nm)	Spd (kts)	Trans (hrs)	Approx Bottom (m)	On Sta (hrs)	Arrive (Local)	Depart
CTD at site 5 (chlor at: 0, 11(x3),20,30,40,50 m; nuts at 0,12(x3),20,30,40,50,59(x3) m)	59°	53.50	N	171°	42.10	W	0.5	10	0.1	72	0.4	23-Apr 8:03	23-Apr 8:28
CTD - site 5 east (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	59°	53.88	N	171°	15.50	W	13.3	10	1.3	70	0.4	23-Apr 9:48	23-Apr 10:13
CTD - site 5 north (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	60°	4.50	N	172°	0.00	W	24.7	10	2.5	70	0.4	23-Apr 12:41	23-Apr 13:05
Day 1 - 2 dives in the morning - (Area 1 - in the ice)	61°	45.00'	N	174°	40.07'	W	127.1	10	12.7	78	4.0	24-Apr 1:48	24-Apr 5:48
Day 1 - 1-2 midwater trawls (Area 1 - perpendicular to ice edge)	61°	45.00'	N	174°	40.07'	W	0.0	10	0.0	78	5.0	24-Apr 5:48	24-Apr 10:48
Day 1 - acoustic lines/towed vehicle (Area 1 - perpendicular to ice edge)	61°	45.00'	N	174°	40.07'	W	0.0	10	0.0	78	10.0	24-Apr 10:48	24-Apr 20:48
Day 1 - CTD (every 2.7 nm) /Methot trawls (500-µm sieve) (Area 1 - perpendicular to ice edge)	61°	45.00'	N	174°	40.07'	W	0.0	10	0.0	78	5.0	24-Apr 20:48	25-Apr 1:48
Day 2 - 2 dives in the morning (at the ice edge)	61°	45.00'	N	174°	40.07'	W	0.0	10	0.0	78	4.0	25-Apr 1:48	25-Apr 5:48
Day 2 - 1-2 midwater trawls/towed vehicle	61°	45.00'	N	174°	40.07'	W	0.0	10	0.0	78	5.0	25-Apr 5:48	25-Apr 10:48
Day 2 - acoustic lines/towed vehicle	61°	45.00'	N	174°	40.07'	W	0.0	10	0.0	78	10.0	25-Apr 10:48	25-Apr 20:48
Day 2 - CTD (every 2.7 nm) /Methot trawls (500-µm sieve)	61°	45.00'	N	174°	40.07'	W	0.0	10	0.0	78	5.0	25-Apr 20:48	26-Apr 1:48
Day 3 - CTD (every 2.7 nm) /Methot trawls (500-µm sieve)	61°	45.00'	N	174°	40.07'	W	0.0	10	0.0	78	4.0	26-Apr 1:48	26-Apr 5:48
Day 3 - 1-2 midwater trawls	61°	45.00'	N	174°	40.07'	W	0.0	10	0.0	78	5.0	26-Apr 5:48	26-Apr 10:48
Day 3 - acoustic lines/towed vehicle	61°	45.00'	N	174°	40.07'	W	0.0	10	0.0	78	15.0	26-Apr 10:48	27-Apr 1:48

Activity	Latitude			Longitude			Dist. (nm)	Spd (kts)	Trans (hrs)	Approx Bottom (m)	On Sta (hrs)	Arrive (Local)	Depart
Day 4 - 2 dives in the morning	61°	45.00'	N	174°	40.07'	W	0.0	10	0.0	78	4.0	27-Apr 1:48	27-Apr 5:48
Day 4 - 1-2 midwater trawls/towed vehicle	61°	45.00'	N	174°	40.07'	W	0.0	10	0.0	78	5.0	27-Apr 5:48	27-Apr 10:48
Day 4 - acoustic lines	61°	45.00'	N	174°	40.07'	W	0.0	10	0.0	78	10.0	27-Apr 10:48	27-Apr 20:48
Day 4 - CTD (every 2.7 nm) /Methot trawls (500-µm sieve)	61°	45.00'	N	174°	40.07'	W	0.0	10	0.0	78	5.0	27-Apr 20:48	28-Apr 1:48
Day 5 - 2 dives in the morning	61°	45.00'	N	174°	40.07'	W	0.0	10	0.0	78	4.0	28-Apr 1:48	28-Apr 5:48
Day 5 - 1-2 midwater trawls	61°	45.00'	N	174°	40.07'	W	0.0	10	0.0	78	5.0	28-Apr 5:48	28-Apr 10:48
Day 5 - acoustic lines/towed vehicle	61°	45.00'	N	174°	40.07'	W	0.0	10	0.0	78	10.0	28-Apr 10:48	28-Apr 20:48
Day 5 - CTD (every 2.7 nm) /Methot trawls (500-µm sieve)	61°	45.00'	N	174°	40.07'	W	0.0	10	0.0	78	5.0	28-Apr 20:48	29-Apr 1:48
Day 6 - 1-2 midwater trawls	61°	45.00'	N	174°	40.07'	W	0.0	10	0.0	78	5.0	29-Apr 1:48	29-Apr 6:48
Day 6 - acoustic lines/towed vehicle	61°	45.00'	N	174°	40.07'	W	0.0	10	0.0	78	13.0	29-Apr 6:48	29-Apr 19:48
Day 6 - CTD (every 2.7 nm) /Methot trawls (500-µm sieve)	61°	45.00'	N	174°	40.07'	W	0.0	10	0.0	78	6.0	29-Apr 19:48	30-Apr 1:48
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	59°	54.30'	N	172°	25.38'	W	128.7	11	11.7	70	0.4	30-Apr 13:30	30-Apr 13:54
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	59°	59.10'	N	172°	43.32'	W	10.2	11	0.9	70	0.4	30-Apr 14:50	30-Apr 15:15

Activity	Latitude	Longitude	Dist. (nm)	Spd (kts)	Trans (hrs)	Approx Bottom (m)	On Sta (hrs)	Arrive (Local)	Depart
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	60° 03.00' N	173° 01.62' W	9.9	11	0.9	70	0.4	30-Apr 16:09	30-Apr 16:33
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	60° 07.02' N	173° 19.68' W	9.9	11	0.9	70	0.4	30-Apr 17:27	30-Apr 17:52
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	60° 15.36' N	173° 31.38' W	10.2	11	0.9	70	0.4	30-Apr 18:47	30-Apr 19:12
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	60° 25.26' N	173° 35.70' W	10.1	11	0.9	70	0.4	30-Apr 20:07	30-Apr 20:32
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	60° 35.22' N	173° 39.54' W	10.1	11	0.9	70	0.4	30-Apr 21:27	30-Apr 21:52
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	60° 45.48' N	173° 39.84' W	10.3	11	0.9	70	0.4	30-Apr 22:48	30-Apr 23:13
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	60° 54.48' N	173° 49.08' W	10.1	11	0.9	70	0.4	01-May 0:07	01-May 0:32
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	61° 04.56' N	173° 46.14' W	10.2	11	0.9	70	0.4	01-May 1:28	01-May 1:52
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	61° 14.64' N	173° 42.78' W	10.2	11	0.9	70	0.4	01-May 2:48	01-May 3:13
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	61° 24.84' N	173° 42.00' W	10.2	11	0.9	70	0.4	01-May 4:08	01-May 4:33
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	61° 35.10' N	173° 42.00' W	10.3	11	0.9	70	0.4	01-May 5:29	01-May 5:54
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	61° 44.22' N	173° 51.48' W	10.2	11	0.9	70	0.4	01-May 6:49	01-May 7:14
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	61° 52.68' N	174° 02.58' W	10.0	11	0.9	70	0.4	01-May 8:08	01-May 8:33
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	61° 56.58' N	174° 22.68' W	10.2	11	0.9	70	0.4	01-May 9:29	01-May 9:53

Activity	Latitude			Longitude			Dist. (nm)	Spd (kts)	Trans (hrs)	Approx Bottom (m)	On Sta (hrs)	Arrive (Local)	Depart
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	62°	02.16'	N	174°	39.96'	W	9.8	11	0.9	70	0.4	01-May 10:47	01-May 11:12
CTD - 70 m isobath (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	62°	12.00'	N	174°	45.00'	W	10.1	11	0.9	70	0.4	01-May 12:07	01-May 12:31
CTD at 05BS-8B (chlor at: 0,10,21(x3),30,40,50 m; no nuts)	62°	11.10'	N	174°	40.07'	W	2.5	11	0.2	78	0.4	01-May 12:45	01-May 13:10
Recover 05BS-8B	62°	11.64'	N	174°	40.07'	W	0.5	11	0.0	78	1.0	01-May 13:13	01-May 14:13
Recover 05BSP-8B	62°	11.73'	N	174°	39.60'	W	0.2	11	0.0	78	0.5	01-May 14:14	01-May 14:44
Deploy 06BS-8A	62°	11.64'	N	174°	40.07'	W	0.2	11	0.0	72	2.0	01-May 14:46	01-May 16:46
Deploy 06BSP-8A	62°	11.73'	N	174°	39.60'	W	0.2	11	0.0	72	0.5	01-May 16:47	01-May 17:17
CTD at 06BS-8A (chlor at: 0, 11(x3),20,30,40,50 m; nuts at 0,12(x3),20,30,40,50,59(x3) m)	62°	12.20'	N	174°	39.60'	W	0.5	11	0.0	72	0.4	01-May 17:20	01-May 17:44
20/60 cm bongo (150/333 nets) at 06BS-8A	62°	12.20'	N	174°	39.60'	W	0.0	11	0.0	72	0.3	01-May 17:44	01-May 18:00
CTD - site 8/south (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	61	58.50	N	174	37.00	W	13.8	10	1.4	72	0.4	01-May 19:23	01-May 19:48
20/60 cm bongo (150/333 nets) - site 8/south	61	58.50	N	174	37.00	W	0.0	10	0.0	72	0.3	01-May 19:48	01-May 20:03
CTD - site 8/west (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	62	11.66	N	175	14.30	W	21.9	10	2.2	79	0.4	01-May 22:15	01-May 22:40
20/60 cm bongo (150/333 nets) - site 8/west	62	11.66	N	175	14.30	W	0.0	10	0.0	79	0.3	01-May 22:40	01-May 22:56
CTD - site 8/north (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	62	25.30	N	174	42.00	W	20.3	10	2.0	72	0.4	02-May 0:58	02-May 1:23
20/60 cm bongo (150/333 nets) - site 8/north	62	25.30	N	174	42.00	W	0.0	10	0.0	72	0.3	02-May 1:23	02-May 1:39
CTD - site 8/east (chlor at: 0,10,20,30,40,50 m; nuts at 0,10,20,30,40,50,60 m)	62	11.66	N	174	16.00	W	18.2	10	1.8	64	0.4	02-May 3:28	02-May 3:52
20/60 cm bongo (150/333 nets) - site 8/east	62	11.66	N	174	16.00	W	0.0	10	0.0	64	0.3	02-May 3:52	02-May 4:08

Activity	Latitude			Longitude			Dist. (nm)	Spd (kts)	Trans (hrs)	Approx Bottom (m)	On Sta (hrs)	Arrive (Local)	Depart
Recover 05-MM4A	55°	54.07'	N	169°	52.01'	W	401.0	11	36.5	78	4.0	03-May 16:35	03-May 20:35
CTD - Shelf Break (200m) DEPTH DEPENDENT	55°	25.70'	N	168°	04.40'	W	67.0	11	6.1	120	0.5	04-May 2:41	04-May 3:09
CTD - Shelf Break (500m) DEPTH DEPENDENT	55°	22.30'	N	168°	10.50'	W	4.9	11	0.4	500	0.7	04-May 3:35	04-May 4:18
CTD - Shelf Break (1000m) DEPTH DEPENDENT	55°	20.50'	N	168°	15.20'	W	3.2	11	0.3	1000	1.1	04-May 4:36	04-May 5:40
CTD	55°	07.00'	N	168°	29.00'	W	15.6	11	1.4	1735	1.4	04-May 7:06	04-May 8:30
CTD	54°	58.00'	N	168°	45.00'	W	12.8	11	1.2	2067	1.4	04-May 9:40	04-May 11:04
CTD	54°	40.00'	N	169°	12.00'	W	23.8	11	2.2	1730	1.4	04-May 13:14	04-May 14:38
CTD	54°	20.00'	N	169°	50.00'	W	29.8	11	2.7	1900	1.4	04-May 17:20	04-May 18:44
CTD	54°	02.00'	N	169°	34.00'	W	20.3	11	1.8	1840	1.4	04-May 20:35	04-May 21:59
CTD	53°	47.00'	N	169°	16.00'	W	18.4	11	1.7	1575	1.4	04-May 23:39	05-May 1:03
CTD	53°	36.00'	N	169°	04.00'	W	13.1	11	1.2	1870	1.4	05-May 2:14	05-May 3:38
CTD	53°	31.00'	N	168°	55.00'	W	7.3	11	0.7	1825	1.4	05-May 4:18	05-May 5:42
CTD	53°	24.36'	N	168°	51.23'	W	7.0	11	0.6	1020	1.1	05-May 6:20	05-May 7:26
CTD	53°	22.00'	N	168°	42.00'	W	6.0	11	0.5	700	0.9	05-May 7:58	05-May 8:50
Search for MM2	54°	10.84'	N	166°	53.77'	W	80.5	11	7.3	78	8.0	05-May 16:09	06-May 0:09
Weather day	53°	54.00'	N	166°	31.20'	W	21.4	11	1.9	78	8.0	06-May 2:06	06-May 10:06
Arrive Dutch Harbor	53°	54.00'	N	166°	31.20'	W	0.0	11	0.0	200		06-May 10:06	06-May 10:06