

FINAL CRUISE INSTRUCTIONS

FOCI

NOAA Ship *MILLER FREEMAN*, Cruise MF-03-06
May 5 – May 15, 2003
Chief Scientist – Carol L. DeWitt, NOAA/PMEL

1.0 FINAL CRUISE INSTRUCTIONS

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

1.2 **Cruise Numbers**

1.2.1 **Cruise Number** – MF-03-06

1.2.2 **FOCI Number** – 3MF03

1.3 **Cruise Dates**

1.3.1 **Departure** – Depart Dutch Harbor, Alaska, at 1600 hours on Monday, May 5, 2003.

1.3.2 **Arrival** – Arrive Dutch Harbor, Alaska, on Thursday, May 15, 2003.

1.4 **Operating Area** – Bering Sea and North Pacific Ocean.

2.0 **CRUISE OVERVIEW** – Fisheries-Oceanography Coordinated Investigations (FOCI) is an effort by National Oceanic and Atmospheric Administration (NOAA) and associated academic scientists. At present, FOCI consists of a Shelikof Strait (western Gulf of Alaska) Walleye Pollock project, and a NOAA Coastal Ocean Program (COP) project: Southeast Bering Sea Carrying Capacity (SEBSCC). FOCI also supports associated projects, such as the Steller Sea Lion (SSL) Research Initiative, Arctic Research Initiative (ARI), United States Global Ocean-Ecosystem Coupling (U.S. GLOBEC), and National Science Foundation (NSF) Inner Front Study, that address scientific issues related to FOCI's mission. FOCI's goal is to understand the effects of abiotic and biotic variability on ecosystems of the North Pacific Ocean and Bering Sea in order to discern the physical and biological processes that determine recruitment variability of commercially valuable finfish and shellfish stocks in Alaskan waters.

2.1 **Cruise Objectives**

- Recover and deploy moorings at the FOCI study areas Site 2 and Site 4,
- Recover and deploy moorings for the SSL project in the Aleutian Islands study areas, and
- Conduct Conductivity, Temperature, and Depth (CTD) profile casts at all mooring sites, and possibly other stations.

2.2 **Applicability** – These instructions, with **FOCI Standard Operating Instructions for NOAA Ship MILLER FREEMAN**, dated April 8, 2002, 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

University of Alaska, Fairbanks (UAF)
Institute of Marine Science
Fairbanks, Alaska 99775-7220

2.4 Personnel

2.4.1 Chief Scientists

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

2.4.2 Participating Scientists

Name	Gender	Affiliation	Nationality	E-mail Address
Carol L. DeWitt	Female	PMEL	USA	Carol.Dewitt@noaa.gov
William Floering	Male	PMEL	USA	William.Floering@noaa.gov
Earl Roskie	Male	PMEL	USA	Earl.Roskie@noaa.gov
Steve Smith	Male	PMEL	USA	Stephen.A.Smith@noaa.gov
Sarah Thornton	Female	UAF	USA	sarahjt@ims.uaf.edu

2.5 Administrative

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 Michele G. Bullock, NOAA
Chief, Operations Division (MOPI)
Telephone: (206)553-8705, Cellular: (206)390-7527
E-Mail: Michele.Bullock@noaa.gov

Larry W. Mordock
Deputy Chief, Operations Division (MOPIx1)
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 M. Napp, AFSC
Telephone: (206)526-4148
E-mail: Jeff.Napp@noaa.gov

3.0 OPERATIONS

3.1 Data To Be Collected

3.1.1 Scientific Computer System– 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 – Most equipment will be loaded on board prior to the ship's departure from Seattle, Washington, on Tuesday, April 29, 2003.

3.3 De-staging Plan – Most equipment will be off-loaded in Dutch Harbor, Alaska, on Thursday, May 15, 2003.

3.4 Cruise Plan – Operations during Cruise MF-03-06 will consist of mooring recoveries and deployments, Conductivity, Temperature, and Depth (CTD) profiler casts, Marine Assessment Monitoring and Prediction (MARMAP) Bongo tows, California Cooperative Oceanic Fisheries Investigation (CalCOFI) Vertical Egg Tow (CalVET) net tows, and water sample collections. CTD casts optimally are performed before each mooring recovery and after each mooring deployment. For expediency, a single cast may be made in lieu of two at the discretion of the Chief Scientist. The Chief Scientist may order additional CTD casts. Water samples shall be taken as possible to ensure accuracy of sensors and to measure nutrient levels.

The Chief Scientist may adjust the schedule to provide daylight for recovery operations. In the event that conditions prohibit mooring deployments/recoveries, operations will focus on CTD lines to be selected by the Chief Scientist.

3.5 Mooring Operations

- **Site 2** – Recover two (2) moorings and deploy two (2) moorings,
- **Site 4** – Recover one (1) mooring and deploy one (1) mooring,
- **Site 6** – Deploy one (1) mooring,
- **Alaska Stream** – Deploy four (4) moorings,
- **Amukta Pass** – Recover four (4) moorings and deploy four (4) moorings,
- **Samalga Pass** – Deploy five (5) moorings,
- **Seguam Pass** – Search for 02SM-1A, and
- **Tenaga Pass** – Recover two (2) moorings.

a) Mooring calibration CTD casts will be completed while on each mooring recovery and deployment site.

- b) At Site 2, two (2) subsurface moorings will be recovered and one (1) surface and one (1) subsurface mooring will be deployed. CTD casts, a bongo net tow and triplicate CalVET tows will be conducted at the mooring location.
- c) At Site 4, one (1) subsurface mooring will be recovered and one (1) subsurface mooring will be deployed. CTD casts, a bongo net tow and triplicate CalVET tows will be conducted at the mooring location.
- d) At Site 6, one (1) subsurface mooring will be deployed, and a CTD will be conducted at the mooring location.
- e) At the Alaska Stream site, four (4) deep subsurface moorings will be deployed. CTD casts will be conducted at the mooring locations, as time permits.
- f) At Amukta Pass, four (4) moorings will be recovered and four (4) moorings will be deployed. CTD casts will be conducted at the mooring locations.
- g) At Samalga Pass, five (5) subsurface moorings will be deployed. CTD casts will be conducted at the mooring locations. It is critical that the moorings on the north and south side of Samalga Pass are deployed at the same depth.
- h) A search for mooring 02SM-1A will be undertaken, as time allows.

3.6 Station Locations – See Sections [9.2 Figures](#) and [9.4 MF-03-06 Station Locations and Itinerary](#).

3.7 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).

- MARMAP Bongo Tows (SOI 3.2.2),
- CTD/Water Sample Operations (SOI 3.2.1),
- CalVET Net Tows (SOI 3.2.6), and
- Chlorophyll Sampling Operations (SOI 3.2.10).

3.8 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).

- 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)
- Thermosalinograph monitoring (SOI 5.3)

3.9 Small Boat Operations – The small boat may be needed for mooring operations, weather permitting.

4.0 FACILITIES

4.1 Equipment and Capabilities Provided by Ship

- Oceanographic winch with slip rings and 3-conductor cable terminated for CTD,
- Sea-Bird Electronics' SBE 911*plus* CTD system with dual pumped conductivity and temperature sensors, each CTD system should include underwater CTD, stand, weights, and pinger. There should be one deck unit for the two systems,

- Two Sea-Bird Electronics' SBE19 profiling SeaCat system with pump and Power Data Interface Module (PDIM – one PDIM, pump and cables will be provided by the scientific party). 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,
- 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,
- 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,
- Laboratory space with exhaust hood, sink, lab tables and storage space,
- 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 with dual pumped conductivity and temperature sensors to be used with PMEL stand,
- 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,
- CTD rosette sampler,
- IAPSO standard water,
- Subsurface and surface moorings, and
- Miscellaneous scientific sampling and processing equipment.

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,
- PMEL CTD Weather Observation Logs,
- CTD Cast Information/Rosette Log,
- Autosalinometer Logs,
- ADCP Log Sheets,
- ADCP Iomega Zip and/or recordable compact diskette (CD-RW), and
- Electronic Navigation suite's export files on diskette.

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 at this time.

7.0 HAZARDOUS MATERIALS

7.1 Inventory List – See Section [9.3 MF-03-06 HAZMAT Inventory](#).

7.2 Material Data Safety Sheets (MSDS) – All MSDSs can be found on the **OERD HAZMAT Emergency Guidelines – MSDS** compact diskette dated January 15, 2003, supplied to the ship.

8.0 COMMUNICATIONS – For scientific projects, the Chief Scientist, or their designated representative, may have access to the ship's communications systems on a cost reimbursable basis.

8.1 Receiving Scientific Status Reports – The Chief Scientist may anticipate the need for daily reports on the position of satellite drifters in the study area and on the status of biophysical mooring(s). These will be sent either by facsimile from PMEL over INMARSAT or over the Internet via email from PMEL.

8.2 Use of Radio Transceivers – Because it is sometimes necessary for the scientific staff to communicate with other research vessels, commercial vessels, and shore based NOAA facilities, the Chief Scientist or designee may request the use of radio transceivers aboard the vessel.

8.3 Radio Interference – Some scientific equipment is sensitive to radio frequency interference. When interference occurs, it may be necessary to adjust operations and communications schedules if efforts to electronically isolate the equipment are unsuccessful.

8.4 Important Telephone and Facsimile Numbers and E-mail Addresses

8.4.1 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)

8.4.2 Alaska Fisheries Science Center (AFSC)

FOCI – Resource Assessment and Conservation Engineering (RACE):

- (206) 526-4171 (voice)
- (206) 526-6723 (fax)

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

Homeport - Seattle, Washington:

- (206) 553-4589
- (206) 553-4581
- (206) 553-8344

Cellular:

- (206) 660-7167

INMARSAT Mini-M:

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

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)

8.4.4 Marine Operations Center, Pacific (MOP)

Operations Division (MOP1):

- (206) 553-4548 (voice)
- (206) 553-1109 (fax)

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

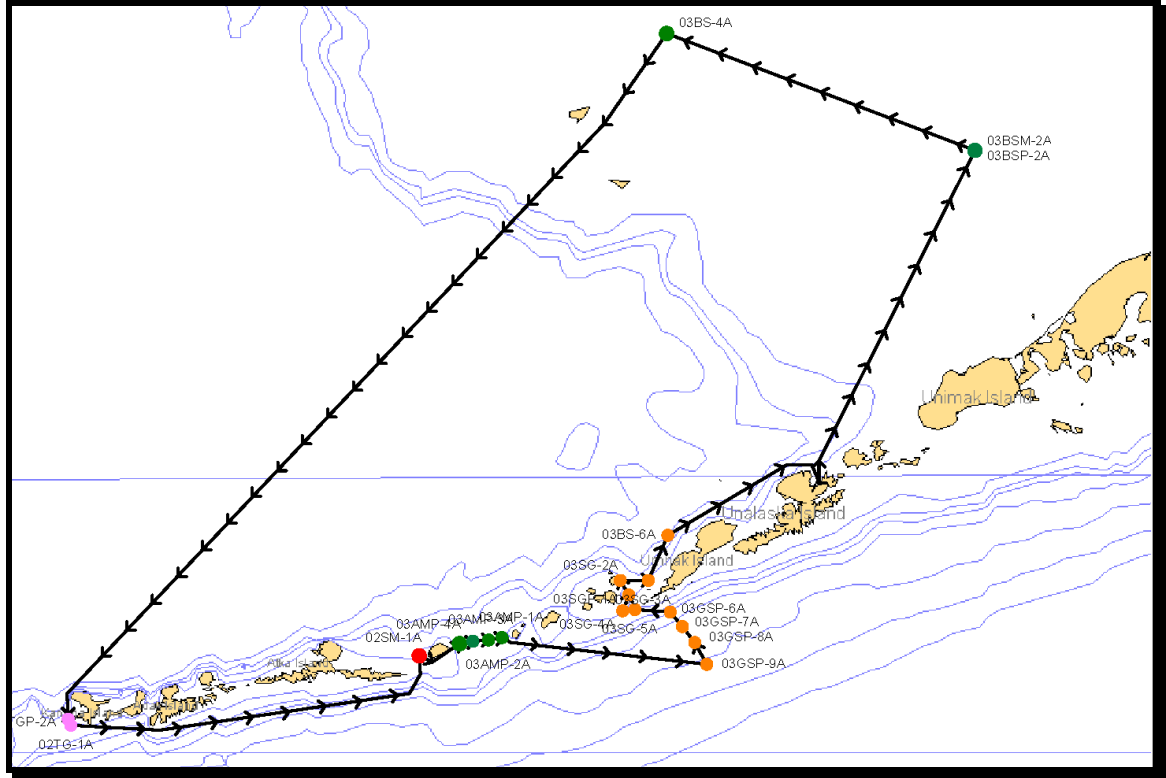
9.0 APPENDICES

9.1 Equipment Inventory

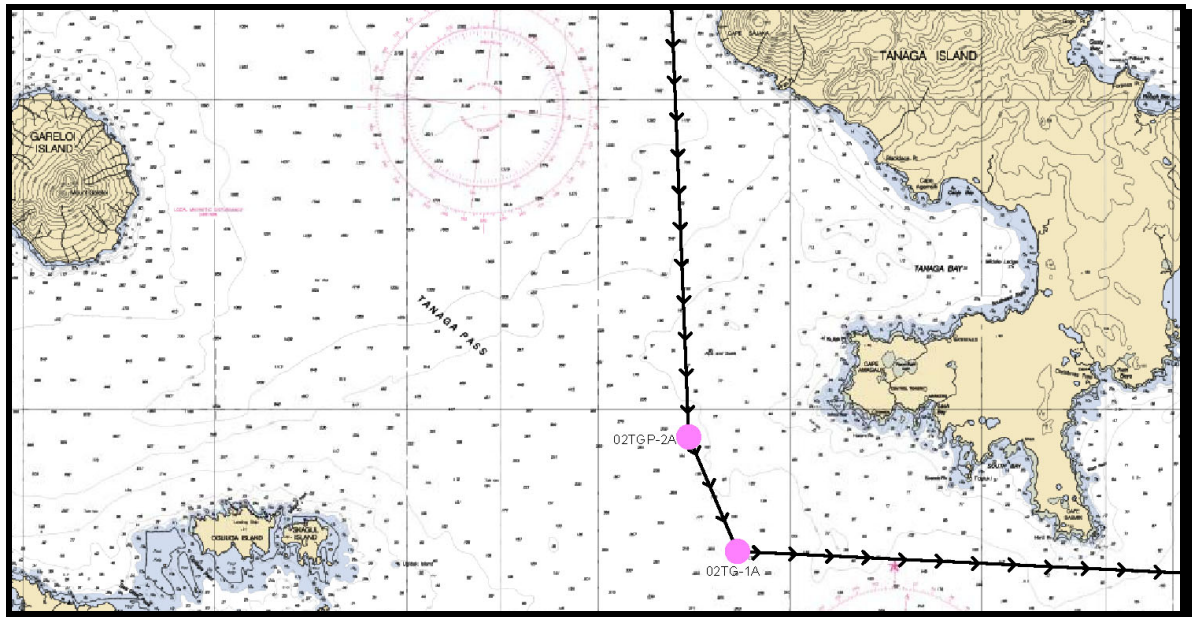
Item	Quantity	Weight	Total Weight
Anchors:			
	3	1300 lbs	3900 lbs
	1	1600 lbs	1600 lbs
	1	1800 lbs	1800 lbs
	1	2400 lbs	2400 lbs
		Subtotal:	9,700 lbs
Anchors to be loaded on the FREEMAN in Dutch Harbor:			
	5	700 lbs	3500 lbs
	3	1600 lbs	4800 lbs
	1	2400 lbs	2400 lbs
	1	4200 lbs	4200 lbs
		Subtotal:	14,900 lbs
Floats:			
Steel 28" floats	7	200 lbs	1400 lbs
20 glass floats in 2 wire cages	1	1000 lbs	1000 lbs
Steel 41" floats	2	400 lbs	800 lbs
37" syntactic foam float	3	432 lbs	1296 lbs
40" syntactic foam float	4	600 lbs	2400 lbs
49" syntactic foam float	3	1107 lbs	3321 lbs
surface toroid and tower	1	1400 lbs	1400 lbs
Miscellaneous Gear:			
Box misc. hardware	1	1500 lbs	1500 lbs
Wood boxes (one empty for recovery)	1	3500 lbs	3500 lbs
Footlocker	2	500 lbs	1000 lbs
Moorings on spools	12	300 lbs	3600 lbs
Tool box	1	50 lbs	50 lbs
Misc Instr. and Cages	1	1000 lbs	1000 lbs
75 kHz ADCP	6	325 lbs	1950 lbs
300 kHz ADCP	4	51 lbs	204 lbs
Current Meters	24	50 lbs	1200 lbs
Water Level Recorders	5	24 lbs	120 lbs
Acoustic Releases	17	125 lbs	2125 lbs
Drifters (2/box)	1.5	150 lbs	225 lbs
Total Weight (Seattle to Dutch Harbor):			22,891 lbs
Total Weight (Departing Dutch Harbor):			37,791 lbs

9.2 Figures

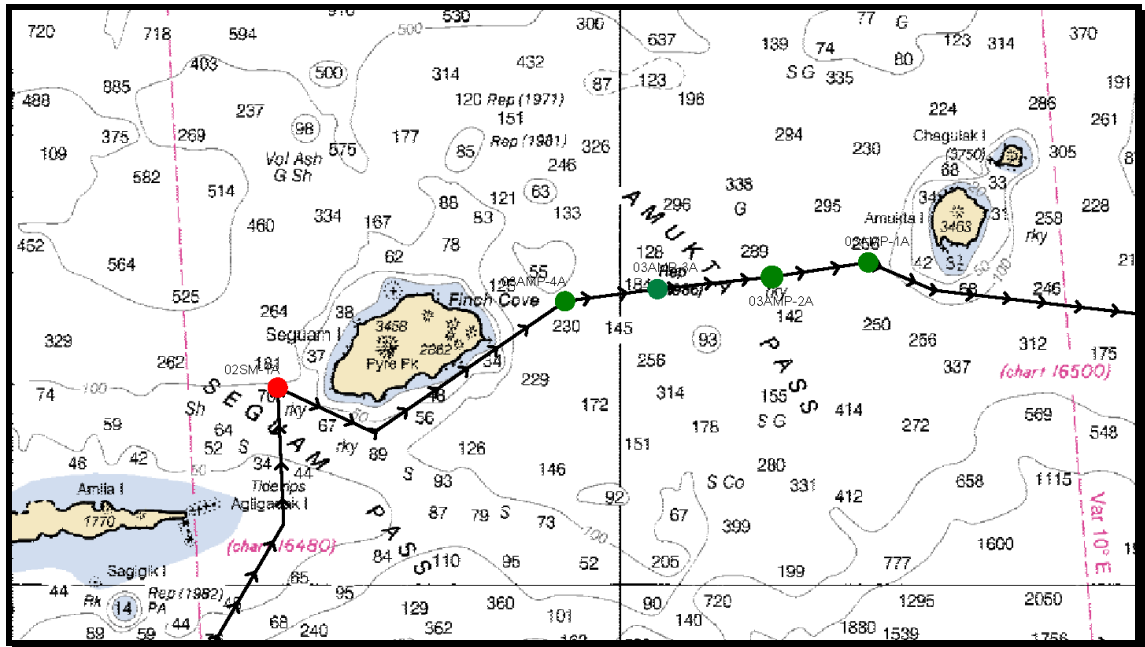
9.2.1 Cruise MF-03-06 Chartlet



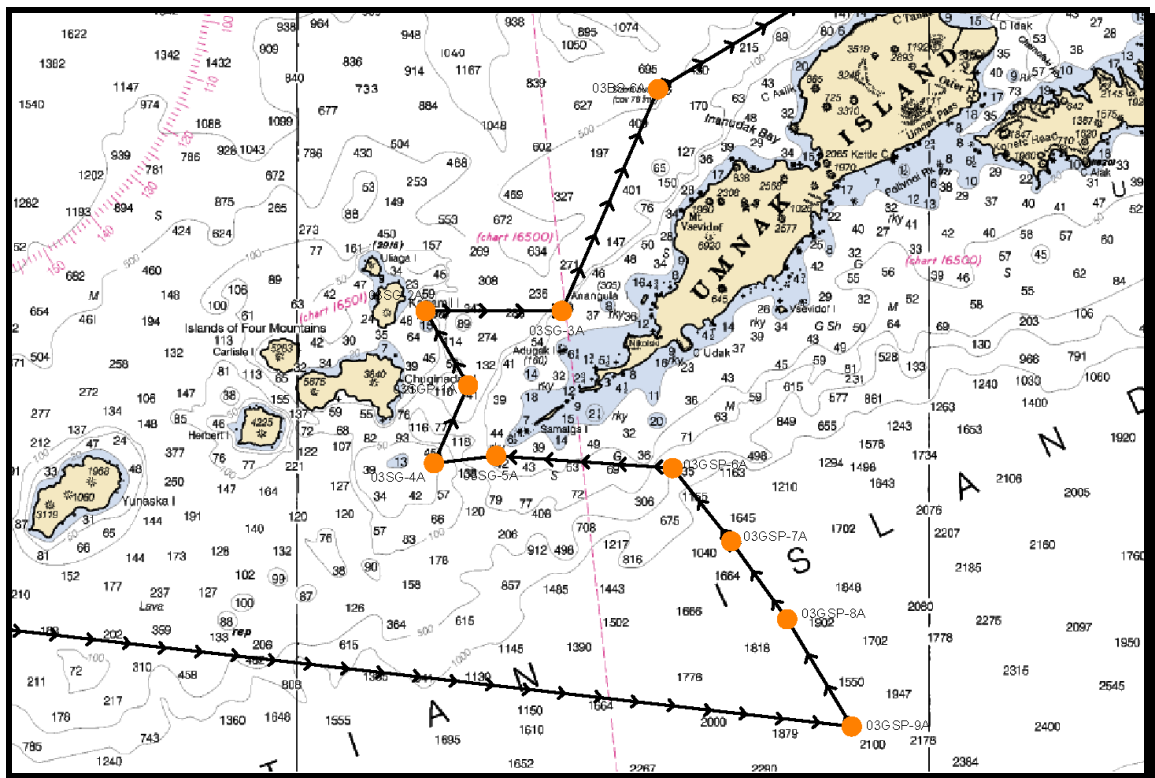
9.2.2 Cruise MF-03-06 Detail – Tenaga Pass



9.2.3 MF-03-06 Detail – Seguam and Amukta Passes



9.2.4 MF-03-06 Detail – Umnak Island



9.3 MF-03-06 HAZMAT Inventory

Chemical	CAS Number	Responder	Qty	H	F	R	Storage Color Code	Hazard Class	Packing Group Number	UN	Rep. Qty.	Rep. Indices
Battery, Lithium	mix	DeWitt		1	1	2	General	9	II	3090	None	None
Copper Sulfate	7758-99-8	Thornton	2.5-g	2	0	0	Hazardous	9	III	3077	400 Lb	1
Hydrochloric Acid, Solution	7647-01-0	Thornton	< 500.0-ml	3	0	0	Corrosive	8	II	1789	5000 Lb	2
Imidazole	288-32-4	Thornton	68.0-g	3	1	0	Corrosive	8	III	3263	5 Kg	3
Potassium Iodine (Lugols Solution)	mix	Thornton	300.0-ml				General	Not regulated				
Potassium Nitrate	7757-79-1	Mordy	21.0-g	1	0	0	Reactive	5.1	III	1486	100 Kg	3
N-1-Naphthylethylenediamine Dihydrochloride	1465-25-4	Thornton	1.5-g	2	1	0	General	Not regulated			None	4
Sodium Chloride	7647-14-5	Thornton	600.0-g	1	0	0	General	Not regulated			None	5
Sodium Nitrite	7632-00-0	Thornton	2.0-g	2	0	1	Reactive	5.1 & 6.1	III	1500	100 Lb	6
Sulfanilamide	63-74-1	Thornton	15.0-g	1	1	0	General	Not regulated			None	7
Tributyltin Oxide	56-35-9	DeWitt	8.0-oz	3	1	0	Poison	6.1	II	3020	None	8

Spill Response 1: Ventilate area of leak or spill. Keep unnecessary and unprotected people away from area of 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. 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. 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 saw dust. **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 3: Remove all sources of ignition. Ventilate area of leak or spill. Wear appropriate personal protective equipment. Clean up spills in a manner that does not disperse dust into the air. Use non-sparking tools and equipment. Reduce airborne dust and prevent scattering by moistening with water. Pick up spill for recovery or disposal and place in a closed container.

Spill Response 4: 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.

Spill Response 5: Ventilate area of leak or spill. Wear appropriate personal protective equipment. Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal. Small amounts of residue may be flushed to sewer with plenty of water.

Spill Response 6: Remove all sources of ignition. Ventilate area of leak or spill. Wear appropriate personal protective equipment. Clean up spills in a manner that does not disperse dust into the air. Use non-sparking tools and equipment. Reduce airborne dust and prevent scattering by moistening with water. Pick up spill for recovery or disposal and place in a closed container. 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 7: Ventilate area of leak or spill. Wear appropriate personal protective equipment. Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal. Place material in closed container.

Spill Response 8: 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.

9.4 MF-03-06 Station Locations and Itinerary

Activity	Latitude			Longitude			Dist. (nm)	Spd (kts)	Trans (hrs)	Approx Depth (m)	On Sta (hrs)	Arrive (Local) Date/Time		Depart (Local) Date/Time	
Depart Dutch Harbor	53°	53.545'	N	166°	30.726'	W								5-May-2003	16:00
CTD - site 2/middle	56°	52.000'	N	164°	03.000'	W	185.8	10	18.6	83	0.4	6-May-2003	11:50	6-May-2003	12:14
20/60 Bongo - site 2/middle	56°	52.000'	N	164°	03.000'	W	0.0	10	0.0	72	0.3	6-May-2003	12:14	6-May-2003	12:32
CALVet - site 2/middle	56°	52.020'	N	164°	03.022'	W	0.0	10	0.0	72	0.5	6-May-2003	12:32	6-May-2003	13:02
Recover 03BSP-2A	56°	52.020'	N	164°	03.022'	W	0.0	10	0.0	72	1	6-May-2003	13:02	6-May-2003	14:02
Recover 03BS-2A	56°	52.020'	N	164°	03.022'	W	0.0	10	0.0	72	1	6-May-2003	14:02	6-May-2003	15:02
Deploy 03BSM-2A	56°	52.020'	N	164°	03.022'	W	0.0	10	0.0	72	4	6-May-2003	15:02	6-May-2003	19:02
Deploy 03BSP-2B	56°	52.020'	N	164°	03.022'	W	0.0	10	0.0	72	2	6-May-2003	19:02	6-May-2003	21:02
CTD - Middle Domain (M2)	56°	52.020'	N	164°	03.022'	W	0.0	10	0.0	72	0.4	6-May-2003	21:02	6-May-2003	21:26
CTD/Chlorophyll/Nutrients (site 4)	57°	51.184'	N	168°	52.208'	W	166.8	10	16.7	65	0.4	7-May-2003	14:06	7-May-2003	14:30
20/60 Bongo (site 4)	57°	51.184'	N	168°	52.208'	W	0.0	10	0.0	65	0.6	7-May-2003	14:30	7-May-2003	15:06
CalVET (triplicate tows) (site 4)	57°	51.172'	N	168°	52.199'	W	0.0	10	0.0	65	0.5	7-May-2003	15:06	7-May-2003	15:36
Recover 02BS-4B	57°	51.172'	N	168°	52.199'	W	0.0	10	0.0	71	1	7-May-2003	15:36	7-May-2003	16:36
Deploy 03BS-4A	57°	51.172'	N	168°	52.199'	W	0.0	10	0.0	71	2	7-May-2003	16:36	7-May-2003	18:36
CTD at 03BS-4A	57°	51.172'	N	168°	52.199'	W	0.0	10	0.0	71	0.4	7-May-2003	18:36	7-May-2003	19:00

Activity	Latitude			Longitude			Dist. (nm)	Spd (kts)	Trans (hrs)	Approx Depth (m)	On Sta (hrs)	Arrive (Local) Date/Time	Depart (Local) Date/Time
CTD at 02TGP-2A	51°	39.038'	N	178°	15.195'	W	14.8	10	1.5	187	0.5	9-May-2003 16:54	9-May-2003 17:24
Recover 02TGP-2A	51°	39.038'	N	178°	15.195'	W	0.0	10	0.0	187	1	9-May-2003 17:24	9-May-2003 18:24
CTD at 02TG-1A	51°	35.332'	N	178°	12.650'	W	4.0	10	0.4	165	0.5	9-May-2003 18:48	9-May-2003 19:18
Recover 02TG-1A	51°	35.332'	N	178°	12.650'	W	0.0	10	0.0	165	1	9-May-2003 19:18	9-May-2003 20:18
Search for 02SM-1A	52°	15.990'	N	172°	45.000'	W	11.0	10	1.1	154	7	10-May-2003 17:14	11-May-2003 00:14
CTD at 03AMP-4A	52°	22.967'	N	172°	07.186'	W	13.0	10	1.3	362	0.6	11-May-2003 2:58	11-May-2003 03:34
CTD at 03AMP-3A	52°	23.996'	N	171°	54.986'	W	7.5	10	0.8	310	0.6	11-May-2003 4:19	11-May-2003 04:55
CTD at 03AMP-2A	52°	25.003'	N	171°	39.955'	W	9.2	10	0.9	459	0.7	11-May-2003 5:51	11-May-2003 06:33
CTD at 03AMP-1A	52°	26.139'	N	171°	27.311'	W	7.8	10	0.8	414	0.7	11-May-2003 7:19	11-May-2003 08:01
Recover 02AMP-1A	52°	26.139'	N	171°	27.311'	W	0.0	10	0.0	414	1	11-May-2003 8:01	11-May-2003 09:01
Recover 02AMP-2A	52°	25.003'	N	171°	39.955'	W	7.8	10	0.8	459	1	11-May-2003 9:48	11-May-2003 10:48
Recover 02AMP-3A	52°	23.996'	N	171°	54.986'	W	9.2	10	0.9	310	1	11-May-2003 11:44	11-May-2003 12:44
Recover 02AMP-4A	52°	22.967'	N	172°	07.186'	W	7.5	10	0.8	362	1	11-May-2003 13:29	11-May-2003 14:29
Deploy 03AMP-4A	52°	22.967'	N	172°	07.186'	W	0.0	10	0.0	362	1	11-May-2003 14:29	11-May-2003 15:29
Deploy 03AMP-3A	52°	23.996'	N	171°	54.986'	W	7.5	10	0.8	310	1	11-May-2003 16:14	11-May-2003 17:14
Deploy 03AMP-2A	52°	25.003'	N	171°	39.955'	W	9.2	10	0.9	459	1	11-May-2003 18:09	11-May-2003 19:09
Deploy 03AMP-1A	52°	26.139'	N	171°	27.311'	W	7.8	10	0.8	414	1	11-May-2003 19:56	11-May-2003 20:56
Deploy 03GSP-9A	52°	11.000'	N	168°	14.500'	W	113.4	11	10.3	4340	3	12-May-2003 7:46	12-May-2003 10:46
Deploy 03GSP-8A	52°	23.500'	N	168°	26.700'	W	14.6	10	1.5	3300	3	12-May-2003 12:13	12-May-2003 15:13
Deploy 03GSP-7A	52°	32.500'	N	168°	37.500'	W	11.1	10	1.1	2850	2	12-May-2003 16:20	12-May-2003 18:20
Deploy 03GSP-6A	52°	41.000'	N	168°	48.500'	W	10.8	10	1.1	1000	2	12-May-2003 19:25	12-May-2003 21:25
CTD at 03GSP-6A	52°	41.000'	N	168°	48.500'	W	0.0	10	0.0	1000	1.1	12-May-2003 21:25	12-May-2003 22:31
CTD at 03GSP-7A	52°	32.500'	N	168°	37.500'	W	10.8	10	1.1	2850	1.4	12-May-2003 23:36	13-May-2003 01:00
CTD at 03GSP-8A	52°	23.500'	N	168°	26.700'	W	11.1	10	1.1	3300	1.4	13-May-2003 2:06	13-May-2003 03:30
Deploy 03SG-5A	52°	42.400'	N	169°	22.000'	W	38.6	10	3.9	120	2	13-May-2003 7:22	13-May-2003 09:22
CTD at 03SG-5A	52°	42.400'	N	169°	22.000'	W	0.0	10	0.0	120	0.5	13-May-2003 9:22	13-May-2003 09:52
Deploy 03SG-4A	52°	41.500'	N	169°	34.000'	W	7.3	11	0.7	120	1	13-May-2003 10:32	13-May-2003 11:32
CTD at 03SG-4A	52°	41.500'	N	169°	34.000'	W	0.0	10	0.0	120	0.5	13-May-2003 11:32	13-May-2003 12:02
Deploy 03SGP-1A	52°	50.500'	N	169°	27.500'	W	9.8	11	0.9	230	1	13-May-2003 12:55	13-May-2003 13:55
CTD/nutrients at 03SGP-1A	52°	50.500'	N	169°	27.500'	W	0.0	10	0.0	230	0.5	13-May-2003 13:55	13-May-2003 14:25
Deploy 03SG-2A	52°	59.000'	N	169°	35.500'	W	9.8	11	0.9	120	1	13-May-2003 15:19	13-May-2003 16:19

Activity	Latitude	Longitude	Dist. (nm)	Spd (kts)	Trans (hrs)	Approx Depth (m)	On Sta (hrs)	Arrive (Local) Date/Time	Depart (Local) Date/Time
CTD at 03SG-2A	52° 59.000' N	169° 35.500' W	0.0	10	0.0	120	0.5	13-May-2003 16:19	13-May-2003 16:49
Deploy 03SG-3A	52° 59.000' N	169° 09.500' W	15.7	11	1.4	120	1	13-May-2003 18:14	13-May-2003 19:14
CTD at 03SG-3A	52° 59.000' N	169° 09.500' W	0.0	10	0.0	120	0.5	13-May-2003 19:14	13-May-2003 19:44
Deploy 03BS-6A	53° 24.358' N	168° 51.234' W	27.6	11	2.5	1000	2	13-May-2003 22:15	14-May-2003 00:15
CTD at 03BS-6A	53° 24.358' N	168° 51.234' W	0.0	10	0.0	1000	1.1	14-May-2003 0:15	14-May-2003 01:21
Arrive Dutch Harbor	53° 53.545' N	166° 30.726' W	1.4	10	0.1			14-May-2003 11:36	