

FINAL CRUISE INSTRUCTIONS

ECO-FOCI

NOAA Ship *Oscar Dyson*, Cruise **DY-09-06**
Apr 24 – May 4, 2009
Chief Scientist – Carol DeWitt, NOAA/PMEL

1.0 FINAL CRUISE INSTRUCTIONS

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

1.2 **Cruise Numbers: DY-09-06**

1.2.1 **Cruise Number** – DY-09-06

1.2.2 **Eco-FOCI Number** – 2-DY-09

1.3 **Cruise Dates:** 24 Apr – 4 May, 2009

1.3.1 **Departure** – Dutch Harbor, AK - 24 Apr, 1500 L

1.3.2 **Arrival** – Dutch Harbor, AK - 4 May, 0900 L

1.4 **Operating Area** – Bering Sea

2.0 CRUISE OVERVIEW

2.1 **Cruise Objectives** – The primary objective of this cruise will be mooring operations – including recoveries, deployments and searches - in the Bering Sea. Depending on ice conditions, the following mooring operations will be conducted on this cruise:

OPERATIONS	SITE	LATITUDE	LONGITUDE
Recover/Deploy	Bristol Bay 1	56° 25.608' N	160° 13.124' W
Recover/Deploy	Bristol Bay 2	56° 29.937' N	161° 00.061' W
Recover/Deploy	Mooring 2	56° 51.83' N	164° 03.05' W
Recover/Deploy	Mooring 4	57° 51.45' N	168° 52.85' W
Recover/Deploy	Mooring 5	59° 54.58' N	171° 42.47' W
Recover/Deploy	Amukta Pass	52° 25.98' N	171° 27.00' W

2.2 Applicability - These instructions, with ***FOCI Standard Operating Instructions for NOAA Ship Oscar Dyson***, dated November 11, 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

2.4 Personnel

2.4.1 Chief Scientist

Name	Gender	Nationality	Affiliation	E-mail Address
Carol DeWitt	F	USA	PMEL	Carol.DeWitt@noaa.gov

2.4.2 Other Participating Scientists – *We are not sure who is coming from the EDD division – it may be Michael Craig. We will let you know as soon as we hear who has been assigned.

Name	Gender	Nationality	Affiliation	E-mail Address
William Floering	M	USA	PMEL	William.Floering@noaa.gov
David Strausz	M	USA	PMEL	David.Strausz@noaa.gov
Michael Craig/EDD*	M	USA	PMEL	Michael.Craig@noaa.gov
Jay Clark	M	USA	AFSC	Jay.Clark@noaa.gov
Dan Cooper	M	USA	AFSC	Dan.Cooper@noaa.gov

2.4.3 Foreign Nationals None

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

CDR Mike Francisco
Chief, Operations Division, Pacific (MOP1)
Telephone: (206) 553-8705
Cellular: (206) 390-7527/(206) 518-1941
E-mail: chiefops.MOP@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

- 3.1.1 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 Oscar Dyson** (SOI 5.2) for specific requirements.
- 3.2 Staging Plan** – A container will be shipped to Dutch Harbor prior to the cruise. 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. The scientific party will be responsible for arranging vehicles for moving their equipment from the docks.
- 3.4 Cruise Plan** – Due to the time of the year that this cruise occurs, the amount of mooring work accomplished and the order of operations will be highly dependent on ice, weather and daylight conditions. Based on the past several years, it is unlikely that we will be able to reach Bering Sea site 5. And although we may reach Bering Sea site 4, the current and predicted future ice conditions may prevent us from deploying the surface mooring and/or reaching all of the four surrounding CTD sites. If the surface mooring can't be deployed, the surface mooring may be altered and deployed as a subsurface mooring.

The ship will depart on Thursday, April 24, 2009. If the ice edge is still fairly far south – which is what we expect - we will steam directly to Amukta Pass. However, if the ice edge has retreated significantly, we will alter the order of mooring operations – going to either Bristol Bay or FOCI Bering Sea site 5.

- a) **Amukta Pass** – Six CTDs (with nutrient samples) will be completed across the pass. The easternmost and westernmost CTD sites are depth dependent – the middle four sites are position dependent. At the eastern side of the pass, we will conduct a search for a subsurface ADCP mooring (07AMP-1A) using the DYSON's multi-beam sonar. The ADCP mooring was deployed in February 2007 in 406 m depth. The mooring was located – both acoustically and visually (using an echo sounder) – and repeatedly released during a cruise on the FREEMAN in March 2008. Eventually the release stopped communicating; however, echo sounder visuals were maintained throughout the night – the mooring had not moved. In the morning, we concluded that further recovery attempts would be futile. In September 2008, during a FREEMAN cruise, we were unable to conclusively determine whether the mooring had moved or not. The following are mooring locations for 07AMP-1A, listed in order of relevance:
- Echo sounder location 52 26.517'N, 171 26.801' W
 - Ranging location (deck gear) 52 26.447'N, 171 26.792' W
 - Deployment location 52 25.979'N, 171 27.000' W

Our goal during this cruise is to visually locate the mooring using the DYSON's echo sounder. We will then – at a future date – return with a submersible to recover the mooring.

- b) **Bristol Bay** – Prior to each of the mooring operations, a calibration CTD will be completed. At the deeper of the two sites, mooring operations will consist of recovering one subsurface mooring and deploying one subsurface mooring. No CTD will be required after the mooring deployment. At the shallower site, mooring operations will

consist of recovering one subsurface mooring. The shallow mooring was deployed in April 2007 and was not recovered in 2008 due to cruise time limitations. It is likely that the release on this mooring will be heavily encrusted with marine growth and will probably not release on its own. In the past we have "snagged" the mooring with drag hooks using the aft facing non conductive wire winch. PMEL will provide the drag gear. No mooring will be deployed at the shallow site.

- c) **FOCI Bering Sea Site 2** – Prior to mooring operations, calibration CTDs (with nutrient and chlorophyll samples) will be completed. Mooring operations will consist of recovering two subsurface moorings and deploying one surface and two subsurface moorings. After the completion of all mooring operations, a CTD, with nutrient and chlorophyll samples, a MARMAP Bongo tow and triplicate CalVET tows will be completed approximately 0.5 mile from the mooring site and at the four stations surrounding Site 2. Depending on weather and daylight conditions, a mooring search for a subsurface ADCP mooring (08BSP-2A) will be conducted either before or after the mooring recovery/deployment operations. The mooring we will be searching for was deployed during a DYSON cruise in May 2008. In September 2008, the mooring did not respond and an 18 hr search was conducted. A search plan – that takes into consideration the previous search – will be provided to the ship in the final cruise instructions.
- d) **FOCI Bering Sea Site 4** – If ice conditions allow, the ship will transit from FOCI Bering Sea Site 2 to FOCI Bering Sea Site 4. 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 (see comments in first paragraph of section 3.4) and one subsurface mooring. After the completion of all mooring operations, a CTD will be completed. A CTD, with nutrient and chlorophyll samples, a MARMAP Bongo tow and triplicate CalVET tows will be completed at the four stations surrounding Site 4. Depending on weather and daylight conditions, a mooring search for a subsurface mooring (08BS-4A) will be conducted either before or after the mooring recovery/deployment operations. The mooring we will be searching for was deployed in May 2008. In September 2008, the mooring did not respond and a 26 hr search was conducted. A search plan – that takes into consideration the previous search – will be provided to the ship in the final cruise instructions.
- e) **FOCI Bering Sea Site 5** – If ice conditions allow, the ship will transit from FOCI Bering Sea Site 4 to FOCI Bering Sea Site 5. Prior to mooring operations, a calibration CTD (with nutrient and chlorophyll samples), a MARMAP Bongo tow and triplicate CalVET tows will be completed. Mooring operations will consist of recovering and redeploying two subsurface moorings. After the completion of all mooring operations, a CTD will be completed. A CTD, with nutrient and chlorophyll samples, a MARMAP Bongo tow and triplicate CalVET tows will be completed at the four stations surrounding Site 5.

3.5 Station Locations – See Table 1.

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 Oscar Dyson** (SOI). Operations not addressed in the SOI and changes to standard procedures are addressed below.

- CTD/Water Sample Operations (SOI 3.2.1)
- Chlorophyll Sampling Operations (SOI 3.2.10)
- SIMRAD EK-60 and 12 Khz Simrad ES-60 Scientific Echosounder Monitoring (SOI 3.2.12)
- Simrad ME-70 Downward-Facing Multi-Beam Sonar
- Recovery and deployment of surface and subsurface moorings

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 Oscar Dyson**(SOI). Operations not addressed in the SOI and changes to standard procedures are addressed below.

- Scientific Computer System (SCS) data acquisition (SOI 5.2)
- Fluorometer monitoring (SOI 5.3)
- Thermosalinograph monitoring (SOI 5.3)
- The newly installed underway sampling station

3.8 Applicable Restrictions - None

3.9 Small Boat Operations – n/a

4.0 FACILITIES

4.1 Equipment and Capabilities Provided by Ship

- Oceanographic winch with slip rings and 2-conductor cable terminated for CTD
- 12 Khz hull mounted Edgetech Acoustic release transducer
- Manual wire-angle indicator
- Oceanographic winch with slip rings and 2-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 a deck unit for the system
- 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
- Wire speed indicators and readout for oceo 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 chemical samples (blast and storage freezers indicate desired temperatures)
- SIMRAD EK-60 echosounder
- Simrad ME-70 Downward-Facing Multi-Beam Sonar

- JRC JFV-200R color sounder recorder
- RD Instruments' ADCP written to CD
- Use of PCs in laboratories for data analysis
- Scientific Computer System (SCS)
- Minimum of 2 computers with internet and e-mail access
- Removable stern platform (in place)
- Laboratory space with storage space
- Aft leading non-conductive wire winch
- 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

4.2 Equipment and Capabilities Provided by Scientists

- Fluorometer light meter and dual oxygen sensors 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)
- IAPSO standard water
- Surface moorings (FOCI biophysical platforms)
- Subsurface moorings
- Miscellaneous scientific sampling and processing equipment
- Chlorophyll and nutrient sampling equipment
- Niskin bottles for the CTD rosette

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
- Calibration Sheets for all ship's instruments used
- CTD Cast Information/Rosette Log
- Autosalinometer Logs
- ADCP Log Sheets
- ADCP CD (CD-RW)
- 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 Oscar Dyson** (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 The field party chief shall be responsible for complying with MOCDOC 15, Fleet Environmental Compliance #07, Hazardous Material and Hazardous Waste Management Requirements of Visiting Scientists. July 2002

7.1 Inventory

Haz-mat inventory to be provided on next revision of FINAL instructions.

7.2 Material Safety Data Sheet (MSDS)

(Provide an electronic MSDS for each hazardous material that will be brought aboard the ship. These may be included as part of the Appendix of these instructions. If so, refer here to that section of the Appendix. Otherwise, state that MSDSs will be forwarded separately.)

8.0 MISCELLANEOUS

8.1 Communications - Specific information on how to contact the **NOAA Ship *Oscar Dyson*** 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 Oscar Dyson - Telephone methods listed in order of increasing expense:

United States Coast Guard - Kodiak, Alaska

- (907) 486-0553 USCG Operations

Cellular:

- CO 206-403-8433
- XO 206-295-0775
- OPS/OOD 206-295-0550

Iridium:

- 808-659-0050

INMARSAT B

- 011-872-336-995-921 (fax)
- 011-872-336-995-920 (voice)
-
- Dutch Harbor Cell CO 907-359-1801
- Dutch Harbor Cell XO 907-359-1802

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

8.3 Foreign National Access and Deemed Export Controls on NMAO Vessels
None

9.0 APPENDICES

9.1 Equipment Inventory

Two surface mooring donuts, bridle and tower. 1500 lbs each 8ft wide 16 feet tall.

Two anchors for surface moorings 4ft X 3 feet 4500 lbs each.

Surface mooring chain 4500 lbs X 2

Subsurface mooring anchors (railroad wheels)

1 X 600 lbs

2 X 1600 lbs

2 X 2100 lbs

2 X 1600 lbs

300 Khz ADCP in syn. Foam float 600 lbs X 3
Tapps instrument package in Syn foam float 1000 lbs X 2
Steel floats for subsurface moorings 1000 lbs
Acoustic releases 150 lbs X 8 or 9
Aurals, 100 lbs X 3
Rain gauge, 50 lbs X 1 or 2
AWCP, 300 lbs X 2
Misc instruments and cages 1500 lbs
Equipment footlockers, shackles, chain...2X 200 lbs each
Mooring chain on spools 3 X 400 lbs each
Grapple hooks and chains 300 lbs
Drifters – 3 or 4

9.2 HAZMAT Inventory

8.1.1 Hazmat Inventory, DeWitt:

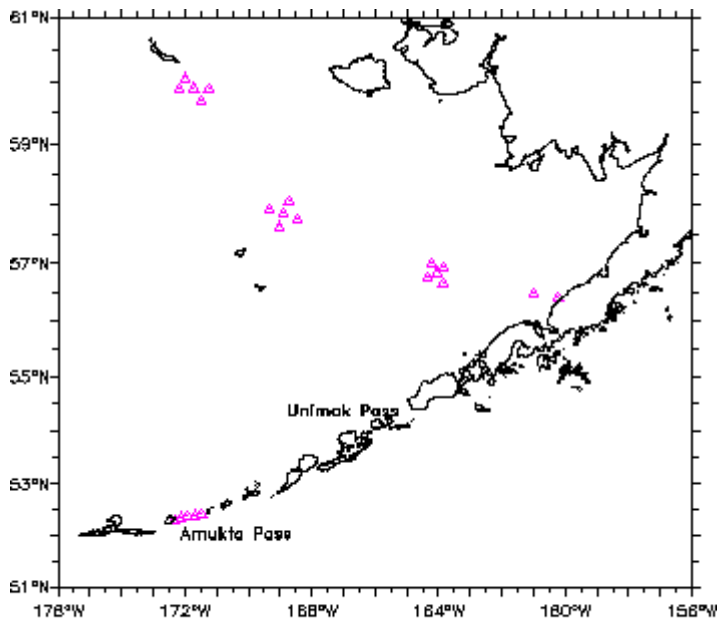
Chemical	CAS Number	Respondee	Org	Qty	H	F	R	Storage Color Code	Hazard Class	Packing Group Number	UN #	Response Indices
Battery, Lithium	mixture	DeWitt	PMEL	*	2	2	3	General	9	II	3090	
Tributyltin Oxide	56-35-9	DeWitt	PMEL	6 oz.	3	1	0	Poison	N. R.			1
Battery, Lithium Tadiran	mixture	Strausz	PMEL	384	1	1	2	General	9	II	3090	
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:

- 34 - SBE-39 (9-V lithium battery)
- 10 - Microcat (6 lithium battery sticks and anti-fouling on conductivity cells)
- 7 - ECO-fluorometer (6 9-V lithium batteries)
- 9 - Seacat (9 D alkaline cells and antifouling cylinders on conductivity cells)
- 384 – Lithium Tadiran TL-5930 “D” cell sized batteries
(In 12 32 cell battery packs)
- 48 – Hybrid Layer Capacitors (4 in each 32 cell battery pack)

- Spare batteries, in a hazmat can:
- 6 9-V lithium batteries
 - 12 9-V alkaline batteries
 - 12 lithium battery sticks
 - 2 packs of anti-fouling cylinders

9.3 Figures



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Activity	Latitude	Longitude	Approx Bottom Depth (m)
Search for 07AMP-1A	52° 25.979' N	171° 27.000' W	414
CTDs across Amukta Pass (east) (nuts: 0, 10, 20, 30, 40, 50, 75, 100, 150 and 10m off bottom)- DEPTH DEPENDENT (given location is approximate)	52° 25.840' N	171° 23.660' W	180
CTDs across Amukta Pass (nuts: 0, 10, 20, 30, 50, 75, 100, 175, 350 and 10m off bottom)	52° 26.700' N	171° 27.600' W	414
CTDs across Amukta Pass (nuts: 0, 10, 20, 30, 50, 75, 100, 175, 350 and 10m off bottom)	52° 25.000' N	171° 40.800' W	456
CTDs across Amukta Pass (nuts: 0, 10, 20, 30, 50, 75, 100, 175, 250 and 10m off bottom)	52° 24.000' N	171° 54.200' W	298
CTDs across Amukta Pass (nuts: 0, 10, 20, 30, 50, 75, 100, 175, 250 and 10m off bottom)	52° 23.000' N	172° 06.200' W	366
CTDs across Amukta Pass (west) (nuts: 0, 10, 20, 30, 40, 50, 75, 100, 150 and 10m off bottom)- DEPTH DEPENDENT (given location approx)	52° 19.000' N	172° 20.000' W	180 - 200
Touch-and-go Dutch Harbor	53° 54.000' N	166° 31.200' W	
CTD at 08KC-2A	56° 30.00 N	161° 1.00 W	67
Recover 08KC-2A	56° 29.94 N	161° 0.06 W	67
Deploy 09KC-2A	56° 30.00 N	161° 0.00 W	67
CTD at 07KC-1A	56° 25.10 N	160° 13.00 W	16
Recover 07KC-1A	56° 25.61 N	160° 13.12 W	16
CTD - site 2/east (chlor: 0,10,20,30,40,50 m)	56 56.50 N	163 50.01 W	69
CTD - site 2/south (chlor: 0,10,20,30,40,50 m)	56 40.00 N	163 52.00 W	75
CTD - site 2/west (chlor: 0,10,20,30,40,50 m)	56 46.00 N	164 20.00 W	75
CTD - site 2/north (chlor: 0,10,20,30,40,50 m)	57 01.00 N	164 13.00 W	69
CTD at site 2 chlor: 40, 50 m nuts: 40, 50, 60(x3) m 0.5 mi away fm mrg site	56° 52.500' N	164° 03.000' W	72

Activity	Latitude	Longitude	Approx Bottom Depth (m)
CTD at site 2 chlor: 0, 11(x3), 20, 30, 32(x3) m nuts: 0, 11(x3), 20, 30 m 0.5 mi away fm mrg site	56° 52.500' N	164° 03.000' W	72
Recover 08BSP-2B	56° 51.989' N	164° 03.002' W	73
Recover 08BS-2C	56° 51.825' N	164° 03.052' W	72
Deploy 09BSM-2A	56° 51.928' N	164° 03.185' W	72
Deploy 09BSP-2A	56° 51.989' N	164° 03.002' W	72
Deploy 09BST-2A	56° 51.989' N	164° 03.002' W	72
CTD at site 2 chlor: 44(x3), 50, 57(x3) m; nuts: 50, 61(x3) m 0.5 mi away fm mrg site	56° 52.500' N	164° 03.000' W	72
CTD at site 2 (chlor: 20(x3), 24(x3), 30, 40 m nuts: 20, 30, 40 m 0.5 mi away fm mrg site	56° 52.500' N	164° 03.000' W	72
CTD at site 2 (chlor: 0, 12(x3) m nuts: 0, 12(x3) m 0.5 mi away fm mrg site	56° 52.500' N	164° 03.000' W	72
Search for 08BSP-2A	56° 51.928' N	164° 03.185' W	73
CTD - site 4 south (chlor: 0, 10,20,30,40,50 m)	57° 39.200 N	169° 1.200 W	71
CTD - site 4 west (chlor: 0, 10,20,30,40,50 m)	57° 55.600 N	169° 19.300 W	71
CTD - site 4 east (chlor: 0, 10,20,30,40,50 m)	57° 46.000 N	168° 28.000 W	71
CTD - site 4 north (chlor: 0, 10,20,30,40,50 m)	58° 4.000 N	168° 43.800 W	71
CTD at site 4 chlor: 16(x3), 20,30,40,50, 56(x3) m nuts:20, 30, 40, 50, 56(x3) m 0.5 mi away fm mrg site	57° 52.200' N	168° 53.000' W	72
CTD at site 4 chlor: 0, 10 m nuts: 0, 10 m (0.5 mi away fm mrg site	57° 52.200' N	168° 53.000' W	72
Recover 08BSP-4B	57° 51.768' N	168° 52.616' W	71
Recover 08BS-4B	57° 51.452' N	168° 52.852' W	71
Deploy 09BSP-4A	57° 51.210' N	168° 52.211' W	72

Activity	Latitude	Longitude	Approx Bottom Depth (m)
Deploy 09BSM-4A	57° 51.210' N	168° 52.211' W	72
CTD at site 4 chlor: 30, 40, 44(x3), 50 m nuts: 30, 40, 50 m 0.5 mi away fm mrg site	57° 51.500' N	168° 53.000' W	72
CTD at site 4 chlor: 0, 10, 12(x3), 20, 24.5(x3) m nuts: 0, 10(x3), 20 m 0.5 mi away fm mrg site	57° 51.500' N	168° 53.000' W	72
Search for 08BS-4A	57° 51.418' N	168° 52.562' W	72
CTD - site 5 south (chlor: 0, 10,20,30,40,50 m)	59° 42.00 N	171° 30.00 W	70
CTD - site 5 east (chlor: 0, 10,20,30,40,50 m)	59° 53.88 N	171° 15.50 W	70
CTD - site 5 north (chlor: 0, 10,20,30,40,50 m)	60° 4.50 N	172° 0.00 W	70
CTD - site 5 west (chlor: 0, 10,20,30,40,50 m)	59° 53.88 N	172° 10.00 W	70
CTD at site 5 (chlor: 0, 10,20(x3),30,40,50 m; nuts: 0,10,20,30(x3),40,50,60m) (0.5 mi away fm mrg site)	59° 54.578' N	171° 42.472' W	72
Recover 08BSP-5B	59° 54.285' N	171° 42.285' W	71
Recover 08BS-5B	59° 54.585' N	171° 42.469' W	70
Deploy 09BS-5A	59° 54.578' N	171° 42.472' W	73
Deploy 09BSP-5A	59° 54.578' N	171° 42.472' W	73
CTD at site 5 (chlor: 0, 11(x3),20,30,40,50 m; nuts: 0,12(x3),20,30,40,50,59(x3)m) (0.5 mi away fm mrg site)	59° 54.578' N	171° 42.472' W	72