**Draft Cruise Instructions**

***ECO-FOCI***

**NOAA Ship *MILLER FREEMAN*, Cruise MF10-06**

**September 18 – October 3, 2010**

**Chief Scientist – Wm. Floering NOAA/PMEL/AFSC**

1. **DRAFT CRUISE INSTRUCTIONS**
	1. **Cruise Title –** Ecosystem and Fisheries-Oceanography Coordinated Investigations (Eco-FOCI)
	2. **Cruise Numbers:**
		1. **Cruise Number** – MF10-06
		2. **Eco-FOCI Number** – 2MF10
	3. **Cruise Dates:**
		1. **Departure** – September 18, 2010, 1500, Dutch Harbor
		2. **Arrival** - October 3, 2010, 0800, Dutch Harbor
	4. **Operating Area** - Bering Sea Shelf north to near St. Lawrence Island
2. **CRUISE OVERVIEW**
	1. **Cruise Objectives** – The continuation of a long term time series of observations describing the physical and biological properties of the Bering Sea shelf. Information will be collected through surface and subsurface mooring instrumentation, CTD casts and water sampling, underway shipboard measurements and plankton tows.
	2. **Applicability** - These instructions, with ***FOCI Standard Operating Instructions for NOAA Ship MILLER FREEMAN***, dated March 1, 2005, present complete information for this cruise.
	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

* 1. **Personnel**
		1. **Chief Scientist**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name** | **Gender** | Nationality | **Affiliation** | **E-mail Address** |
| Wm. Floering | M | U.S.A. | PMEL | William.Floering@noaa.gov |
|  |  |  |  |  |

* + 1. **Other Participating Scientists**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name** | **Gender** | **Nationality** | **Affiliation** | **E-mail Address** |
| Peter Proctor | M | USA | PMEL | Peter.Proctor@noaa.gov |
| Dan Naber | M | USA | UAF | ddnaber@alaska.edu |
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| Aaron Lang | M | USA | FWS | birdingak@gmail.com |
| Carol DeWitt | F | USA | PMEL | Carol.DeWitt@noaa.gov |

* 1. **Administration**
		1. **Ship Operations**

Marine Operations Center, Pacific

1801 Fairview Avenue East, Seattle, Washington 98102-3767

Telephone: (206) 553-4548

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LCDR Demian Bailey, NOAA

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* + 1. **Scientific Operations**

Dr. Phyllis J. Stabeno, PMEL Dr. Jeffrey Napp, AFSC

Telephone: (206) 526-6453 Telephone: (206) 526-4148

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1. **OPERATIONS**
	1. **Data To Be Collected** – The standard set of SCS sensors will be monitored and recorded. TSG, weather, GPS and depth soundings are some of the instruments required for this cruise. The CTD should be equipped with dual temperature and conductivity sensors. PMEL will provide dual oxygen sensors, a PAR and a fluorometer to be installed on the CTD for this cruise. Oxygen, salinity, chlorophyll and nutrient samples will be collected from the rosette so a full rosette of 5 and 10 liter Niskin bottles will be needed. Bongo and CalVET tows will be completed along the 70 meter lines and at the mooring sites. Data from the mooring instruments will be downloaded as we recover them.
		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.
	2. **Staging Plan** - It is our hope that prior to the ship’s departure from Seattle in late August, we will be able to load all the necessary steel floats needed for this cruise. There are a number of additional mooring related items that could also be loaded aboard the vessel prior to their departure from Seattle if space is available. Most if not all of the plankton gear needed for this cruise will be on board in support of the AFSC plankton cruise just prior to ours. The bulk of the equipment will be shipped to Dutch Harbor via Horizon Lines in a 40 foot container. The equipment will be trucked to the pier for loading onto the vessel in Dutch Harbor. Final logistics will depend upon the facilities available at the chosen pier.
	3. **De-staging Plan** - Since this is the final cruise of the field season for the Miller Freeman it is our intent to leave the recovered mooring equipment, scientific equipment and samples (frozen or preserved) aboard the vessel for transport to Seattle. PMEL will offload the vessel upon arrival in Seattle.
	4. **Cruise Plan** - Operations will consist of many CTD and bongo stations along with mooring deployments at several historical sites in the Bering Sea and Gulf of Alaska. The Bering Sea operations will center around the 70m line. This is a line of CTD and bongo stations that has several mooring sites strategically placed along it. It extends from just west of Bristol Bay at mooring site BS-2 to just southwest of St Laurence Island at mooring site BS-8. In addition to the 70m line, several CTD/bongo lines perpendicular to it (which cross at mooring sites) will be completed. These lines are (from S to N) the CN, MN, and SL lines. A general timeline of operations for the Bering Sea section of the cruise is listed below:
* Head from Dutch Harbor to site BS-2. At BS-2, recover 2 subsurface and 1 surface mooring. Deploy 2 subsurface moorings. Complete CTD/Bongo “box” around BS-2 and begin 70m CTD line
* At site BS-4, recover 2 subsurface moorings, deploy 2 subsurface moorings. Complete CTD/Bongo “box” around BS-4 and continue 70m CTD line to site BS-5
* At site BS-5, recover 4 subsurface moorings, deploy 2 subsurface moorings. Complete CTD/Bongo “box” around BS-5 and continue 70m CTD line to site BS-8
* At site BS-8, recover 2 subsurface and deploy 2 subsurface moorings. Complete CTD/Bongo “box” around BS-8
* Head to MN line (crosses E-W with site BS-5) and complete CTD stations
* Head to CTD “L” line
* At Chiniak Bay, recover 1 subsurface mooring. Deploy 1 subsurface mooring

Upon completion of the Bering Sea operations, the majority of the scientific party will depart the ship in Dutch Harbor. Chief Scientist William Floering will remain on the ship as she heads towards Kodiak to recover and deploy a mooring. The mooring is located just offshore of Kodiak in Chiniak Bay. Bering Sea operations will be halted with enough time remaining to complete this final mooring operation without impacting the ship’s arrival date in Seattle. The Chief Scientist will be dropped off in Kodiak prior to the ship’s transit back to Seattle.

* 1. **Station Locations** – See appendix 9.4
	2. **Station Operations** - The following are operations to be conducted on this cruise. The procedures for these operations are listed in the ***FOCI Standard Operating Instructions for NOAA Ship MILLER FREEMAN*** (SOI). Operations not addressed in the SOI and changes to standard procedures are addressed below.
* CTD/Water Sample Operations (SOI 3.2.1)
* MARMAP Bongo Tows (SOI 3.2.2)
* CalVET Net Tows (SOI 3.2.6)
* Chlorophyll Sampling Operations (SOI 3.2.10)
* Dissolved oxygen sampling
* Mooring recovery and mooring deployment operations
	1. **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)
* Scientific Computer System (SCS) data acquisition (SOI 5.2)
* Fluorometer monitoring (SOI 5.3)
* Thermosalinograph monitoring (SOI 5.3)
	1. **Applicable Restrictions** - None
	2. **Small Boat Operations** – To assist in the recovery on the BS-2 surface mooring
1. **FACILITIES**
	1. **Equipment and Capabilities Provided by Ship**
* Oceanographic winch with slip rings and 3-conductor cable terminated for CTD
* 12 Khz hull mounted Edgetech Acoustic release transducer
* 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 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)
* Sea-Bird Electronics’ SBE-19 SEACAT system for plankton tows
* 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)
* RD Instruments’ ADCP written to disk
* Use of PC in DataPlot 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 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
	1. **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, 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)
* 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
* Cruise Operations Database (COD)
1. **DISPOSITION OF DATA AND REPORTS**
	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
* PMEL CTD Weather Observation Logs
* CTD Cast Information/Rosette Log
* ADCP Log Sheets
* ADCP CD (CD-RW)
* Ultra-cold Freezer Temperature Daily Log (SOI 5.4)
	1. **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).
1. **ADDITIONAL PROJECTS**
	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.
	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***.
	3. **Piggyback Projects**
		1. **North Pacific Pelagic Seabird Observer Program:** The U.S. Fish and Wildlife Service has a cooperative agreement with NOAA to conduct seabird and marine mammal surveys from ships of opportunity. This project will provide data for the North Pacific Pelagic Seabird Database. The data will eventually be used to examine seabird and marine mammal distribution relative to oceanographic and biological features. A single observer will operate from the inside bridge, port side, and will require space for a laptop computer. The observer will conduct surveys opportunistically during daylight hours when the vessel is underway. The observer will be following standard FWS protocol to record all birds and mammals within a 300-m arc, extending 90° from bow to beam.
		2. **Equipment and Capabilities Provided by the Scientists:** The observer will bring his own equipment for conducting surveys, including laptop computer, binoculars, rangefinder, and backup hand-held GPS. The observer will require a cable feed to the ship's GPS (serial port). While conducting seabird/marine mammal surveys, the observer will require access to the console providing data on ship's speed, wind speed, SST, SSS, and air temperature.
2. **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
	1. **Inventory**

See appendix 9.2

* 1. **Material Safety Data Sheet (MSDS)**

MSDS will be available from the Chief Scientist.

1. **MISCELLANEOUS**
	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**

* 1. **Important Telephone and Facsimile Numbers and E-mail Addresses**
		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: PMEL.Dir.Ops@noaa.gov

* + 1. **Alaska Fisheries Science Center (AFSC)**:

FOCI - Resource Assessment and Conservation Engineering (RACE):

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

E-Mail: Janet Duffy Anderson: Janet.Duffy-Anderson@noaa.gov

Jeff Napp: Jeff.Napp@noaa.gov

* + 1. **NOAA Ship *MILLER FREEMAN*** - Telephone methods listed in order of increasing expense:

United States Coast Guard - Kodiak, Alaska

* (907) 487-9752
* (907) 487-9753
* (907) 487-4397
* (907) 487-4398

Cellular:

* (206) 790-7594

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:

 • OPS.Miller.Freeman@noaa.gov

* + 1. **Marine Operations Center, Pacific (MOP)**:

Operations Division (MOP1)

* (206) 553-4548 (voice)
* (206) 553-1109 (facsimile)
* E-Mail: ChiefOps.MOP@noaa.gov
1. **APPENDICES**
	1. **Equipment Inventory**

To be provided in final cruise instructions.

* 1. **HAZMAT Inventory**

 To be provided in final cruise instructions.

* 1. **Figures**



* 1. **Tables**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Activity** |  **Latitude**  |  |  **Longitude**  |  | **Dist.(nm)** | **Spd(kts)** | **Trans(hrs)** | **Approx BottomDepth (m)** | **On Sta(hrs)** | **Approx Arrival (Local)Date / Time** | **Approx Departure (Local)Date / Time** |
| Depart Dutch Harbor | 53° | 54.000' | N | 166° | 31.200' | W |  |  |  |  |   |   | 18-Sep 15:00 |
| CTD at site 2 (1 of 2)chlorophylls, nutrients (0.5 mi away fm mrg site) | 56° | 51.820' | N | 164° | 02.730' | W | 196.8 | 10 | 19.7 | 23 | 0.5 | 19-Sep 10:40 | 19-Sep 11:10 |
| CTD at site 2 (2 of 2)chlorophylls, nutrients (0.5 mi away fm mrg site) | 56° | 51.820' | N | 164° | 02.730' | W | 0.0 | 10 | 0.0 | 72 | 0.5 | 19-Sep 11:10 | 19-Sep 11:40 |
| Recover 10BSM-2A | 56° | 51.820' | N | 164° | 03.735' | W | 0.5 | 10 | 0.1 | 72 | 4.0 | 19-Sep 11:43 | 19-Sep 15:43 |
| Recover 10BSP-2A | 56° | 51.546' | N | 164° | 03.828' | W | 0.3 | 10 | 0.0 | 72 | 1.0 | 19-Sep 15:45 | 19-Sep 16:45 |
| Recover 10BST-2A | 56° | 51.870' | N | 164° | 03.840' | W | 0.3 | 10 | 0.0 | 72 | 1.0 | 19-Sep 16:47 | 19-Sep 17:47 |
| Deploy 09BS-2C | 56° | 52.000' | N | 164° | 04.000' | W | 0.2 | 10 | 0.0 | 73 | 2.0 | 19-Sep 17:48 | 19-Sep 19:48 |
| Deploy 09BSP-2B | 56° | 52.000' | N | 164° | 05.000' | W | 0.5 | 10 | 0.1 | 73 | 1.0 | 19-Sep 19:51 | 19-Sep 20:51 |
| CTD at site 2 (1 of 2)chlorophylls, nutrients (0.5 mi away fm mrg site) | 56° | 52.000' | N | 164° | 06.000' | W | 0.5 | 10 | 0.1 | 72 | 0.4 | 19-Sep 20:55 | 19-Sep 21:19 |
| CTD at site 2 (2 of 2)chlorophylls, nutrients (0.5 mi away fm mrg site) | 56° | 52.000' | N | 164° | 06.000' | W | 0.0 | 10 | 0.0 | 72 | 0.4 | 19-Sep 21:19 | 19-Sep 21:44 |
| CalVET (triplicate) - site 2 | 56° | 52.000' | N | 164° | 06.000' | W | 0.0 | 10 | 0.0 | 72 | 0.6 | 19-Sep 21:44 | 19-Sep 22:20 |
| 20/60 cm bongo (150/333 nets) - site 2 | 56° | 52.000' | N | 164° | 06.000' | W | 0.0 | 10 | 0.0 | 72 | 0.3 | 19-Sep 22:20 | 19-Sep 22:38 |
| CTD - site 2/south (chlor: 0,10,20,30,40,50 m) | 56° | 40.000' | N | 163° | 52.000' | W | 14.2 | 10 | 1.4 | 75 | 0.4 | 20-Sep 0:04 | 20-Sep 0:28 |
| 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 | 20-Sep 0:28 | 20-Sep 0:46 |
| 20/60 cm bongo (150/333 nets) - site 2/east | 56° | 56.500' | N | 163° | 50.010' | W | 16.5 | 10 | 1.7 | 69 | 0.4 | 20-Sep 2:25 | 20-Sep 2:49 |
| CTD - site 2/east (chlor: 0,10,20,30,40,50 m) | 56° | 56.500' | N | 163° | 50.010' | W | 0.0 | 10 | 0.0 | 69 | 0.4 | 20-Sep 2:49 | 20-Sep 3:13 |
| CTD - site 2/north (chlor: 0,10,20,30,40,50 m) | 57° | 01.000' | N | 164° | 13.000' | W | 13.3 | 10 | 1.3 | 69 | 0.4 | 20-Sep 4:33 | 20-Sep 4:57 |
| 20/60 cm bongo (150/333 nets) - site 2/north | 57° | 01.000' | N | 164° | 13.000' | W | 0.0 | 10 | 0.0 | 69 | 0.4 | 20-Sep 4:57 | 20-Sep 5:21 |
| 20/60 cm bongo (150/333 nets) - site 2/west | 56° | 46.000' | N | 164° | 20.000' | W | 15.5 | 10 | 1.5 | 75 | 0.4 | 20-Sep 6:54 | 20-Sep 7:18 |
| CTD - site 2/west (chlor: 0,10,20,30,40,50 m) | 56° | 46.000' | N | 164° | 20.000' | W | 0.0 | 10 | 0.0 | 75 | 0.3 | 20-Sep 7:18 | 20-Sep 7:36 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 56° | 54.000' | N | 164° | 01.980' | W | 12.7 | 10 | 1.3 | 70 | 0.4 | 20-Sep 8:52 | 20-Sep 9:16 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 56° | 49.920' | N | 164° | 18.660' | W | 10.0 | 10 | 1.0 | 70 | 0.4 | 20-Sep 10:16 | 20-Sep 10:41 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 56° | 51.000' | N | 164° | 34.260' | W | 8.6 | 10 | 0.9 | 70 | 0.4 | 20-Sep 11:33 | 20-Sep 11:57 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 56° | 54.540' | N | 164° | 50.100' | W | 9.4 | 10 | 0.9 | 70 | 0.4 | 20-Sep 12:53 | 20-Sep 13:18 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 56° | 53.640' | N | 165° | 08.220' | W | 9.9 | 10 | 1.0 | 70 | 0.4 | 20-Sep 14:18 | 20-Sep 14:42 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 57° | 00.000' | N | 165° | 22.740' | W | 10.2 | 10 | 1.0 | 70 | 0.4 | 20-Sep 15:43 | 20-Sep 16:08 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 57° | 06.480' | N | 165° | 36.780' | W | 10.0 | 10 | 1.0 | 70 | 0.4 | 20-Sep 17:08 | 20-Sep 17:33 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 57° | 15.720' | N | 165° | 44.820' | W | 10.2 | 10 | 1.0 | 70 | 0.4 | 20-Sep 18:34 | 20-Sep 18:59 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 57° | 19.200' | N | 166° | 00.600' | W | 9.2 | 10 | 0.9 | 70 | 0.4 | 20-Sep 19:54 | 20-Sep 20:19 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 57° | 19.200' | N | 166° | 19.560' | W | 10.2 | 10 | 1.0 | 70 | 0.4 | 20-Sep 21:20 | 20-Sep 21:45 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 57° | 26.580' | N | 166° | 31.380' | W | 9.7 | 10 | 1.0 | 70 | 0.4 | 20-Sep 22:43 | 20-Sep 23:08 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 57° | 25.440' | N | 166° | 48.420' | W | 9.2 | 10 | 0.9 | 70 | 0.4 | 21-Sep 0:03 | 21-Sep 0:28 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 57° | 31.320' | N | 167° | 02.400' | W | 9.5 | 10 | 1.0 | 70 | 0.4 | 21-Sep 1:25 | 21-Sep 1:50 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 57° | 30.000' | N | 167° | 20.940' | W | 10.0 | 10 | 1.0 | 70 | 0.4 | 21-Sep 2:50 | 21-Sep 3:15 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 57° | 30.000' | N | 167° | 40.020' | W | 10.3 | 10 | 1.0 | 70 | 0.4 | 21-Sep 4:16 | 21-Sep 4:41 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 57° | 30.000' | N | 167° | 59.100' | W | 10.3 | 10 | 1.0 | 70 | 0.4 | 21-Sep 5:43 | 21-Sep 6:07 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 57° | 30.000' | N | 168° | 18.180' | W | 10.3 | 10 | 1.0 | 70 | 0.4 | 21-Sep 7:09 | 21-Sep 7:33 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 57° | 31.380' | N | 168° | 36.720' | W | 10.1 | 10 | 1.0 | 70 | 0.4 | 21-Sep 8:34 | 21-Sep 8:58 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 57° | 37.680' | N | 168° | 49.320' | W | 9.2 | 10 | 0.9 | 70 | 0.4 | 21-Sep 9:54 | 21-Sep 10:18 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 57° | 47.820' | N | 168° | 51.780' | W | 10.2 | 10 | 1.0 | 70 | 0.4 | 21-Sep 11:20 | 21-Sep 11:45 |
| CTD at site 4 (1 of 2)chlorophylls, nutrients (0.5 mi away fm mrg site) | 57° | 50.777' | N | 168° | 52.500' | W | 3.0 | 10 | 0.3 | 72 | 0.4 | 21-Sep 12:02 | 21-Sep 12:27 |
| CTD at site 4 (2 of 2)chlorophylls, nutrients (0.5 mi away fm mrg site) | 57° | 50.777' | N | 168° | 52.500' | W | 0.0 | 10 | 0.0 | 72 | 0.3 | 21-Sep 12:27 | 21-Sep 12:45 |
| Recover 09BS-4B | 57° | 50.777' | N | 168° | 51.652' | W | 0.5 | 10 | 0.0 | 72 | 2.0 | 21-Sep 12:48 | 21-Sep 14:48 |
| Recover 09BSP-4B | 57° | 50.966' | N | 168° | 51.970' | W | 0.3 | 10 | 0.0 | 72 | 1.0 | 21-Sep 14:49 | 21-Sep 15:49 |
| Recover 10BS-4A | 57° | xx.xxx' | N | 168° | xx.xxx' | W | 0.0 | 10 | 0.0 | 72 | 2.0 | 21-Sep 15:49 | 21-Sep 17:49 |
| Recover 10BSP-4A | 57° | xx.xxx' | N | 168° | xx.xxx' | W | 0.0 | 10 | 0.0 | 72 | 1.0 | 21-Sep 17:49 | 21-Sep 18:49 |
| Deploy 10BSP-4A | 57° | 51.000' | N | 168° | 52.000' | W | 0.0 | 10 | 0.0 | 72 | 1.0 | 21-Sep 18:49 | 21-Sep 19:49 |
| Deploy 10BS-4A | 57° | 51.000' | N | 168° | 53.000' | W | 0.5 | 10 | 0.1 | 72 | 2.0 | 21-Sep 19:53 | 21-Sep 21:53 |
| CTD at site 4 (1 of 2)chlorophylls, nutrients (0.5 mi away fm mrg site) | 57° | 51.500' | N | 168° | 53.000' | W | 0.5 | 10 | 0.1 | 72 | 0.4 | 21-Sep 21:56 | 21-Sep 22:20 |
| CTD at site 4 (2 of 2)chlorophylls, nutrients (0.5 mi away fm mrg site) | 57° | 51.500' | N | 168° | 53.000' | W | 0.0 | 10 | 0.0 | 72 | 0.4 | 21-Sep 22:20 | 21-Sep 22:45 |
| CalVET (triplicate) - site 4 | 57° | 51.500' | N | 168° | 53.000' | W | 0.0 | 10 | 0.0 | 72 | 1.0 | 21-Sep 22:45 | 21-Sep 23:45 |
| 20/60 cm bongo (150/333 nets) - site 4 | 57° | 51.500' | N | 168° | 53.000' | W | 0.0 | 10 | 0.0 | 72 | 0.5 | 21-Sep 23:45 | 22-Sep 0:15 |
| 20/60 bongo - site 4 south | 57° | 39.200' | N | 169° | 01.200' | W | 13.1 | 10 | 1.3 | 71 | 0.5 | 22-Sep 1:34 | 22-Sep 2:04 |
| CTD - site 4 south (chlor: 0, 10,20,30,40,50m) | 57° | 39.200' | N | 169° | 01.200' | W | 0.0 | 10 | 0.0 | 71 | 0.5 | 22-Sep 2:04 | 22-Sep 2:34 |
| 20/60 bongo - site 4 east | 57° | 46.000' | N | 168° | 28.000' | W | 19.0 | 10 | 1.9 | 71 | 0.3 | 22-Sep 4:28 | 22-Sep 4:43 |
| CTD - site 4 east (chlor: 0, 10,20,30,40,50m) | 57° | 46.000' | N | 168° | 28.000' | W | 0.0 | 10 | 0.0 | 71 | 0.3 | 22-Sep 4:43 | 22-Sep 4:58 |
| 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 | 0.3 | 22-Sep 6:57 | 22-Sep 7:12 |
| 20/60 bongo - site 4 north | 58° | 04.000' | N | 168° | 43.800' | W | 0.0 | 10 | 0.0 | 71 | 0.3 | 22-Sep 7:12 | 22-Sep 7:27 |
| CTD - site 4 west (chlor: 0, 10,20,30,40,50m) | 57° | 55.600' | N | 169° | 19.300' | W | 20.6 | 10 | 2.1 | 71 | 0.4 | 22-Sep 9:30 | 22-Sep 9:54 |
| 20/60 bongo - site 4 west | 57° | 55.600' | N | 169° | 19.300' | W | 0.0 | 10 | 0.0 | 71 | 0.3 | 22-Sep 9:54 | 22-Sep 10:12 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 57° | 54.540' | N | 169° | 03.660' | W | 8.4 | 10 | 0.8 | 70 | 0.4 | 22-Sep 11:03 | 22-Sep 11:27 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 57° | 58.440' | N | 169° | 21.540' | W | 10.3 | 10 | 1.0 | 70 | 0.4 | 22-Sep 12:29 | 22-Sep 12:53 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 58° | 02.820' | N | 169° | 39.000' | W | 10.2 | 10 | 1.0 | 70 | 0.4 | 22-Sep 13:55 | 22-Sep 14:20 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 58° | 08.700' | N | 169° | 54.840' | W | 10.2 | 10 | 1.0 | 70 | 0.4 | 22-Sep 15:21 | 22-Sep 15:46 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 58° | 16.980' | N | 170° | 05.280' | W | 9.9 | 10 | 1.0 | 70 | 0.4 | 22-Sep 16:45 | 22-Sep 17:10 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 58° | 26.820' | N | 170° | 10.800' | W | 10.3 | 10 | 1.0 | 70 | 0.4 | 22-Sep 18:11 | 22-Sep 18:36 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 58° | 36.660' | N | 170° | 16.260' | W | 10.2 | 10 | 1.0 | 70 | 0.4 | 22-Sep 19:38 | 22-Sep 20:02 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 58° | 46.980' | N | 170° | 17.580' | W | 10.3 | 10 | 1.0 | 70 | 0.4 | 22-Sep 21:04 | 22-Sep 21:29 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 58° | 57.060' | N | 170° | 19.560' | W | 10.1 | 10 | 1.0 | 70 | 0.4 | 22-Sep 22:30 | 22-Sep 22:54 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 59° | 06.600' | N | 170° | 14.400' | W | 9.9 | 10 | 1.0 | 70 | 0.4 | 22-Sep 23:54 | 23-Sep 0:18 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 59° | 15.540' | N | 170° | 22.620' | W | 9.9 | 10 | 1.0 | 70 | 0.4 | 23-Sep 1:18 | 23-Sep 1:42 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 59° | 19.740' | N | 170° | 39.960' | W | 9.8 | 10 | 1.0 | 70 | 0.4 | 23-Sep 2:41 | 23-Sep 3:06 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 59° | 25.920' | N | 170° | 53.340' | W | 9.2 | 10 | 0.9 | 70 | 0.4 | 23-Sep 4:01 | 23-Sep 4:26 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 59° | 35.880' | N | 170° | 55.020' | W | 10.0 | 10 | 1.0 | 70 | 0.4 | 23-Sep 5:26 | 23-Sep 5:50 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 59° | 43.140' | N | 171° | 08.340' | W | 9.9 | 10 | 1.0 | 70 | 0.4 | 23-Sep 6:50 | 23-Sep 7:14 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 59° | 46.860' | N | 171° | 27.060' | W | 10.1 | 10 | 1.0 | 70 | 0.4 | 23-Sep 8:15 | 23-Sep 8:40 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 59° | 49.800' | N | 171° | 46.200' | W | 10.1 | 10 | 1.0 | 70 | 0.4 | 23-Sep 9:40 | 23-Sep 10:05 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 59° | 50.760' | N | 172° | 06.300' | W | 10.1 | 10 | 1.0 | 70 | 0.4 | 23-Sep 11:06 | 23-Sep 11:31 |
| CTD at site 5 (1 of 2)chlorophylls, nutrients (0.5 mi away fm mrg site) | 59° | 54.998' | N | 171° | 43.200' | W | 12.3 | 10 | 1.2 | 72 | 0.4 | 23-Sep 12:45 | 23-Sep 13:09 |
| Recover 09BS-5B | 59° | 54.998' | N | 171° | 42.244' | W | 0.5 | 10 | 0.0 | 70 | 3.0 | 23-Sep 13:30 | 23-Sep 16:30 |
| Recover 09BSP-5B | 59° | 54.595' | N | 171° | 42.500' | W | 0.4 | 10 | 0.0 | 70 | 1.0 | 23-Sep 16:33 | 23-Sep 17:33 |
| Deploy 10BSP-5A | 59° | 55.000' | N | 171° | 42.000' | W | 0.5 | 10 | 0.0 | 70 | 1.0 | 23-Sep 17:36 | 23-Sep 18:36 |
| Deploy 10BS-5A | 59° | 55.000' | N | 171° | 43.000' | W | 0.5 | 10 | 0.1 | 70 | 2.0 | 23-Sep 18:39 | 23-Sep 20:39 |
| CTD at site 5 (1 of 2)chlorophylls, nutrients (0.5 mi away fm mrg site) | 59° | 54.998' | N | 171° | 42.000' | W | 0.5 | 10 | 0.1 | 72 | 0.4 | 23-Sep 20:42 | 23-Sep 21:06 |
| CTD at site 5 (2 of 2)chlorophylls, nutrients (0.5 mi away fm mrg site) | 59° | 54.998' | N | 171° | 42.000' | W | 0.0 | 10 | 0.0 | 72 | 0.4 | 23-Sep 21:06 | 23-Sep 21:31 |
| CalVET (triplicate) - site 5 | 59° | 54.998' | N | 171° | 42.244' | W | 0.1 | 10 | 0.0 | 72 | 1.0 | 23-Sep 21:32 | 23-Sep 22:32 |
| 20/60 cm bongo (150/333 nets) - site 5 | 59° | 54.998' | N | 171° | 42.244' | W | 0.0 | 10 | 0.0 | 72 | 0.5 | 23-Sep 22:32 | 23-Sep 23:02 |
| 20/60 bongo - site 5 south | 59° | 42.000' | N | 171° | 30.000' | W | 14.4 | 10 | 1.4 | 71 | 0.5 | 24-Sep 0:28 | 24-Sep 0:58 |
| CTD - site 5 south (chlor: 0, 10,20,30,40,50m) | 59° | 42.000' | N | 171° | 30.000' | W | 0.0 | 10 | 0.0 | 71 | 0.5 | 24-Sep 0:58 | 24-Sep 1:28 |
| 20/60 bongo - site 5 east | 59° | 53.880' | N | 171° | 15.500' | W | 13.9 | 10 | 1.4 | 71 | 0.3 | 24-Sep 2:52 | 24-Sep 3:07 |
| CTD - site 5 east (chlor: 0, 10,20,30,40,50m) | 59° | 53.880' | N | 171° | 15.500' | W | 0.0 | 10 | 0.0 | 71 | 0.3 | 24-Sep 3:07 | 24-Sep 3:22 |
| CTD - site 5 north (chlor: 0, 10,20,30,40,50m) | 60° | 04.500' | N | 172° | 00.000' | W | 24.7 | 10 | 2.5 | 71 | 0.3 | 24-Sep 5:50 | 24-Sep 6:05 |
| 20/60 bongo - site 5 north | 60° | 04.500' | N | 172° | 00.000' | W | 0.0 | 10 | 0.0 | 71 | 0.3 | 24-Sep 6:05 | 24-Sep 6:20 |
| CTD - site 5 west (chlor: 0, 10,20,30,40,50m) | 59° | 53.880' | N | 172° | 10.000' | W | 11.7 | 10 | 1.2 | 71 | 0.4 | 24-Sep 7:30 | 24-Sep 7:54 |
| 20/60 bongo - site 5 west | 59° | 53.880' | N | 172° | 10.000' | W | 0.0 | 10 | 0.0 | 71 | 0.3 | 24-Sep 7:54 | 24-Sep 8:12 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 59° | 54.300' | N | 172° | 25.380' | W | 7.7 | 10 | 0.8 | 70 | 0.4 | 24-Sep 8:59 | 24-Sep 9:23 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 59° | 59.100' | N | 172° | 43.320' | W | 10.2 | 10 | 1.0 | 70 | 0.4 | 24-Sep 10:25 | 24-Sep 10:49 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 60° | 03.000' | N | 173° | 01.620' | W | 9.9 | 10 | 1.0 | 70 | 0.4 | 24-Sep 11:49 | 24-Sep 12:13 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 60° | 07.020' | N | 173° | 19.680' | W | 9.9 | 10 | 1.0 | 70 | 0.4 | 24-Sep 13:13 | 24-Sep 13:37 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 60° | 15.360' | N | 173° | 31.380' | W | 10.2 | 10 | 1.0 | 70 | 0.4 | 24-Sep 14:38 | 24-Sep 15:03 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 60° | 25.260' | N | 173° | 35.700' | W | 10.1 | 10 | 1.0 | 70 | 0.4 | 24-Sep 16:04 | 24-Sep 16:28 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 60° | 35.220' | N | 173° | 39.540' | W | 10.1 | 10 | 1.0 | 70 | 0.4 | 24-Sep 17:29 | 24-Sep 17:54 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 60° | 45.480' | N | 173° | 39.840' | W | 10.3 | 10 | 1.0 | 70 | 0.4 | 24-Sep 18:56 | 24-Sep 19:20 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 60° | 54.480' | N | 173° | 49.080' | W | 10.1 | 10 | 1.0 | 70 | 0.4 | 24-Sep 20:21 | 24-Sep 20:45 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 61° | 04.560' | N | 173° | 46.140' | W | 10.2 | 10 | 1.0 | 70 | 0.4 | 24-Sep 21:46 | 24-Sep 22:11 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 61° | 14.640' | N | 173° | 42.780' | W | 10.2 | 10 | 1.0 | 70 | 0.4 | 24-Sep 23:12 | 24-Sep 23:37 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 61° | 24.840' | N | 173° | 42.000' | W | 10.2 | 10 | 1.0 | 70 | 0.4 | 25-Sep 0:38 | 25-Sep 1:03 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 61° | 35.100' | N | 173° | 42.000' | W | 10.3 | 10 | 1.0 | 70 | 0.4 | 25-Sep 2:04 | 25-Sep 2:29 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 61° | 44.220' | N | 173° | 51.480' | W | 10.2 | 10 | 1.0 | 70 | 0.4 | 25-Sep 3:30 | 25-Sep 3:55 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 61° | 52.680' | N | 174° | 02.580' | W | 10.0 | 10 | 1.0 | 70 | 0.4 | 25-Sep 4:54 | 25-Sep 5:19 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 61° | 56.580' | N | 174° | 22.680' | W | 10.2 | 10 | 1.0 | 70 | 0.4 | 25-Sep 6:21 | 25-Sep 6:45 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 62° | 02.160' | N | 174° | 39.960' | W | 9.8 | 10 | 1.0 | 70 | 0.4 | 25-Sep 7:44 | 25-Sep 8:09 |
| CTD - 70 m isobath (chlor 0,10,20,30,40,50 m; nut 0,10,20,30,40,50,60 m) | 62° | 12.000' | N | 174° | 45.000' | W | 10.1 | 10 | 1.0 | 70 | 0.4 | 25-Sep 9:10 | 25-Sep 9:34 |
| CTD at site 8chlorophylls, nutrients (0.5 mi away fm mrg site) | 62° | 11.613' | N | 174° | 41.050' | W | 1.9 | 10 | 0.2 | 74 | 2.0 | 25-Sep 9:46 | 25-Sep 11:46 |
| Recover 09BS-8A | 62° | 11.613' | N | 174° | 40.050' | W | 0.5 | 10 | 0.0 | 74 | 2.0 | 25-Sep 11:48 | 25-Sep 13:48 |
| Recover 09BSP-8A | 62° | 11.749' | N | 174° | 39.543' | W | 0.3 | 10 | 0.0 | 74 | 1.0 | 25-Sep 13:50 | 25-Sep 14:50 |
| Deploy 10BSP-8A | 62° | 12.000' | N | 174° | 40.000' | W | 0.3 | 10 | 0.0 | 74 | 1.0 | 25-Sep 14:52 | 25-Sep 15:52 |
| Deploy 10BS-8A | 62° | 12.000' | N | 174° | 40.000' | W | 0.0 | 10 | 0.0 | 74 | 2.0 | 25-Sep 15:52 | 25-Sep 17:52 |
| CTD at site 8chlorophylls, nutrients (0.5 mi away fm mrg site) | 62° | 12.000' | N | 174° | 41.000' | W | 0.5 | 10 | 0.0 | 74 | 2.0 | 25-Sep 17:55 | 25-Sep 19:55 |
| CalVET (triplicate) - site 8 | 62° | 12.000' | N | 174° | 41.000' | W | 0.0 | 10 | 0.0 | 74 | 1.0 | 25-Sep 19:55 | 25-Sep 20:55 |
| 20/60 cm bongo (150/333 nets) - site 8 | 62° | 12.000' | N | 174° | 41.000' | W | 0.0 | 10 | 0.0 | 74 | 0.8 | 25-Sep 20:55 | 25-Sep 21:43 |
| CTD - site 8/south (chlor at: 0,10,20, 30,40,50 m) | 61° | 58.500' | N | 174° | 37.000' | W | 13.6 | 10 | 1.4 | 72 | 0.4 | 25-Sep 23:05 | 25-Sep 23:29 |
| 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 | 25-Sep 23:29 | 25-Sep 23:45 |
| CTD - site 8/west (chlor at: 0, 10,20,30,40,50 m) | 62° | 11.660' | N | 175° | 14.300' | W | 21.9 | 10 | 2.2 | 79 | 0.4 | 26-Sep 1:57 | 26-Sep 2:22 |
| 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 | 26-Sep 2:22 | 26-Sep 2:38 |
| CTD - site 8/north (chlor at: 0, 10,20,30,40,50 m) | 62° | 25.300' | N | 174° | 42.000' | W | 20.3 | 10 | 2.0 | 72 | 0.4 | 26-Sep 4:40 | 26-Sep 5:05 |
| 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 | 26-Sep 5:05 | 26-Sep 5:21 |
| CTD - site 8/east (chlor at: 0, 10,20,30,40,50 m) | 62° | 11.660' | N | 174° | 16.000' | W | 18.2 | 10 | 1.8 | 64 | 0.4 | 26-Sep 7:10 | 26-Sep 7:34 |
| 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 | 26-Sep 7:34 | 26-Sep 7:50 |
| CTD - MN20 | 59° | 53.890' | N | 179° | 23.570' | W | 202.7 | 10 | 20.3 | 2750 | 1.4 | 27-Sep 4:06 | 27-Sep 5:30 |
| CTD - MN19 | 59° | 53.900' | N | 178° | 45.750' | W | 19.0 | 10 | 1.9 | 140 | 0.5 | 27-Sep 7:24 | 27-Sep 7:53 |
| CTD - MN18 | 59° | 53.990' | N | 178° | 11.950' | W | 17.0 | 10 | 1.7 | 155 | 0.5 | 27-Sep 9:35 | 27-Sep 10:05 |
| CTD - MN17 | 59° | 53.980' | N | 177° | 36.000' | W | 18.0 | 10 | 1.8 | 137 | 0.5 | 27-Sep 11:53 | 27-Sep 12:23 |
| CTD - MN16 | 59° | 53.970' | N | 176° | 59.980' | W | 18.1 | 10 | 1.8 | 132 | 0.5 | 27-Sep 14:11 | 27-Sep 14:40 |
| CTD - MN15 | 59° | 54.030' | N | 176° | 23.850' | W | 18.1 | 10 | 1.8 | 139 | 0.5 | 27-Sep 16:28 | 27-Sep 16:58 |
| CTD - MN14 | 59° | 54.100' | N | 175° | 48.110' | W | 17.9 | 10 | 1.8 | 129 | 0.5 | 27-Sep 18:45 | 27-Sep 19:14 |
| CTD - MN13 | 59° | 54.300' | N | 175° | 11.940' | W | 18.1 | 10 | 1.8 | 111 | 0.5 | 27-Sep 21:03 | 27-Sep 21:30 |
| CTD - MN12 | 59° | 54.080' | N | 174° | 36.120' | W | 18.0 | 10 | 1.8 | 100 | 0.4 | 27-Sep 23:18 | 27-Sep 23:45 |
| CTD - MN11 | 59° | 54.000' | N | 173° | 59.980' | W | 18.1 | 10 | 1.8 | 100 | 0.4 | 28-Sep 1:33 | 28-Sep 2:00 |
| CTD - MN10 | 59° | 54.110' | N | 173° | 23.730' | W | 18.2 | 10 | 1.8 | 85 | 0.4 | 28-Sep 3:49 | 28-Sep 4:15 |
| CTD - MN9 | 59° | 54.020' | N | 172° | 47.980' | W | 17.9 | 10 | 1.8 | 72 | 0.4 | 28-Sep 6:02 | 28-Sep 6:27 |
| CTD - MN8 | 59° | 54.010' | N | 172° | 12.030' | W | 18.0 | 10 | 1.8 | 70 | 0.4 | 28-Sep 8:15 | 28-Sep 8:40 |
| CTD - MN7 | 59° | 54.010' | N | 171° | 35.810' | W | 18.2 | 10 | 1.8 | 71 | 0.4 | 28-Sep 10:29 | 28-Sep 10:54 |
| CTD - MN6 | 59° | 53.970' | N | 171° | 00.220' | W | 17.8 | 10 | 1.8 | 70 | 0.4 | 28-Sep 12:41 | 28-Sep 13:05 |
| CTD - MN5 | 59° | 54.120' | N | 170° | 23.810' | W | 18.3 | 10 | 1.8 | 63 | 0.4 | 28-Sep 14:55 | 28-Sep 15:19 |
| CTD - MN4 | 59° | 53.950' | N | 169° | 48.100' | W | 17.9 | 10 | 1.8 | 52 | 0.4 | 28-Sep 17:07 | 28-Sep 17:30 |
| CTD - MN3 | 59° | 53.790' | N | 169° | 12.530' | W | 17.8 | 10 | 1.8 | 41 | 0.4 | 28-Sep 19:17 | 28-Sep 19:40 |
| CTD - MN2 | 59° | 54.070' | N | 168° | 35.950' | W | 18.3 | 10 | 1.8 | 46 | 0.4 | 28-Sep 21:30 | 28-Sep 21:53 |
| CTD - MN1 | 59° | 53.910' | N | 167° | 59.330' | W | 18.4 | 10 | 1.8 | 31 | 0.4 | 28-Sep 23:43 | 29-Sep 0:05 |
| CTD - Cross-shelf | 56° | 37.82 | N | 164° | 36.00 | W | 223.3 | 10 | 22.3 | 64 | 0.4 | 29-Sep 22:25 | 29-Sep 22:49 |
| CTD - Cross-shelf | 56° | 30.63 | N | 165° | 0.00 | W | 15.1 | 10 | 1.5 | 81 | 0.4 | 30-Sep 0:20 | 30-Sep 0:45 |
| CTD - Cross-shelf | 56° | 23.54 | N | 165° | 23.17 | W | 14.6 | 10 | 1.5 | 89 | 0.4 | 30-Sep 2:13 | 30-Sep 2:39 |
| CTD - Cross-shelf | 56° | 16.48 | N | 165° | 46.32 | W | 14.6 | 10 | 1.5 | 96 | 0.4 | 30-Sep 4:07 | 30-Sep 4:33 |
| CTD - site 3 | 56° | 2.94 | N | 166° | 20.30 | W | 23.3 | 10 | 2.3 | 127 | 0.5 | 30-Sep 6:53 | 30-Sep 7:21 |
| CTD - Outer Shelf Domain | 55° | 54.00 | N | 166° | 54.00 | W | 20.9 | 10 | 2.1 | 120 | 0.5 | 30-Sep 9:26 | 30-Sep 9:54 |
| CTD - Outer Shelf Domain | 55° | 46.00 | N | 167° | 10.00 | W | 12.0 | 10 | 1.2 | 120 | 0.5 | 30-Sep 11:07 | 30-Sep 11:35 |
| CTD - Outer Shelf Domain | 55° | 39.00 | N | 167° | 30.02 | W | 13.3 | 10 | 1.3 | 120 | 0.5 | 30-Sep 12:54 | 30-Sep 13:22 |
| CTD - Outer Shelf Domain | 55° | 33.00 | N | 167° | 46.00 | W | 10.8 | 10 | 1.1 | 120 | 0.5 | 30-Sep 14:27 | 30-Sep 14:55 |
| CTD - Shelf Break (200m)  DEPTH DEPENDENT | 55° | 25.700' | N | 168° | 04.400' | W | 12.7 | 10 | 1.3 | 200 | 0.5 | 30-Sep 16:12 | 30-Sep 16:42 |
| CTD - Shelf Break (500m) DEPTH DEPENDENT | 55° | 22.300' | N | 168° | 10.500' | W | 4.9 | 10 | 0.5 | 500 | 0.7 | 30-Sep 17:11 | 30-Sep 17:55 |
| CTD - Shelf Break (1000m) DEPTH DEPENDENT | 55° | 20.500' | N | 168° | 15.200' | W | 3.2 | 10 | 0.3 | 1000 | 1.1 | 30-Sep 18:14 | 30-Sep 19:18 |
| CTD | 55° | 07.000' | N | 168° | 29.000' | W | 15.6 | 10 | 1.6 | 1735 | 1.4 | 30-Sep 20:52 | 30-Sep 22:16 |
| CTD | 54° | 58.000' | N | 168° | 45.000' | W | 12.8 | 10 | 1.3 | 2067 | 1.4 | 30-Sep 23:33 | 01-Oct 0:57 |
| CTD | 54° | 40.000' | N | 169° | 12.000' | W | 23.8 | 10 | 2.4 | 1730 | 1.4 | 01-Oct 3:20 | 01-Oct 4:44 |
| CTD | 54° | 20.000' | N | 169° | 50.000' | W | 29.8 | 10 | 3.0 | 1900 | 1.4 | 01-Oct 7:43 | 01-Oct 9:07 |
| CTD | 54° | 02.000' | N | 169° | 34.000' | W | 20.3 | 10 | 2.0 | 1840 | 1.4 | 01-Oct 11:08 | 01-Oct 12:32 |
| CTD | 53° | 47.000' | N | 169° | 16.000' | W | 18.4 | 10 | 1.8 | 1575 | 1.4 | 01-Oct 14:23 | 01-Oct 15:47 |
| CTD | 53° | 36.000' | N | 169° | 04.000' | W | 13.1 | 10 | 1.3 | 1870 | 1.4 | 01-Oct 17:05 | 01-Oct 18:29 |
| CTD | 53° | 31.000' | N | 168° | 55.000' | W | 7.3 | 10 | 0.7 | 1825 | 1.4 | 01-Oct 19:13 | 01-Oct 20:37 |
| CTD | 53° | 24.358' | N | 168° | 51.234' | W | 7.0 | 10 | 0.7 | 1020 | 1.1 | 01-Oct 21:19 | 01-Oct 22:25 |
| CTD | 53° | 22.000' | N | 168° | 42.000' | W | 6.0 | 10 | 0.6 | 700 | 0.9 | 01-Oct 23:00 | 01-Oct 23:52 |
| Weather day | 53° | 54.000' | N | 166° | 31.200' | W | 83.9 | 10 | 8.4 | 700 | 24.0 | 02-Oct 8:16 | 03-Oct 8:16 |
| Arrive Dutch Harbor | 53° | 54.000' | N | 166° | 31.200' | W | 0.0 | 10 | 0.0 | 200 |   | 03-Oct 8:16 | 03-Oct 8:16 |