

FINAL CRUISE INSTRUCTIONS

FOCI

R/V *KILO MOANA*, Cruise KM0305
April 17 – May 19, 2003
Chief Scientist Leg 1 – William J. Floering, NOAA
Chief Scientist Leg 2 – Nancy B. Kachel, NOAA

1.0 FINAL CRUISE INSTRUCTIONS

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

1.2 **Cruise Numbers**

1.2.1 **Cruise Number** – KM0305

1.2.2 **FOCI Number** – 1KM03 and 2KM03.

1.3 **Cruise Dates** – April 17 – May 19, 2003

1.3.1 **Departure – Leg 1** – Depart Kodiak, Alaska, at 1000 on Friday, April 18, 2003.

1.3.2 **Arrival – Leg 1** – Arrive Kodiak, Alaska, on Sunday, April 27, 2003. Unloading of some equipment and a change of scientific personnel will take place during the in-port.

1.3.3 **Departure – Leg 2** – Depart Kodiak, Alaska, on Tuesday, April 29, 2003.

1.3.4 **Touch-and-Go** – Seward, Alaska, on Sunday, May 11, 2003, to disembark scientists and some small equipment.

1.3.5 **Arrival – Leg 2** – Arrive Kodiak, Alaska, on Sunday, May 18, 2003.

1.4 **Operating Area** – Gulf of Alaska

2.0 CRUISE OVERVIEW

2.1 **Cruise Objectives** – Fisheries-Oceanography Coordinated Investigations (FOCI) is an effort by National Oceanic and Atmospheric Administration (NOAA) and associated academic scientists. 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. This cruise is in support of the United States Global Ocean Ecosystems Dynamics (U.S. GLOBEC) and the Steller Sea Lion Research Programs. This cruise is being undertaken by FOCI in support of research into the physical, chemical, and biological mechanisms acting in the coastal Gulf of Alaska making it one of the most productive ecosystems on earth.

We will focus our efforts on the physical, chemical and biological processes occurring in particular areas of this region. These include: several troughs of differing size, banks, the area near Kennedy – Stevenson Entrances, as well as one of the large offshore eddies, that typically impact this area between April and July and contribute to on and offshore fluxes.

Approximately ten ARGOS satellite-tracked drifters will be deployed during the course of the two legs, six on Leg 1 and four on Leg 2.

- 2.1.1 Leg 1** – Leg 1 will involve the recovery and re-deployment of 11 moorings (which includes one 2.3-meter diameter surface fiberglass-over-foam toroid mooring), recovery only of two moorings, deployment only of two moorings (one for Scripps), and attempted dragging and recovery of a lost mooring at the FATE site and possibly the Shelikof Strait site 3 (SSP-3). In addition to the mooring work we will conduct Conductivity, Temperature, and Depth (CTD) profile operations at each mooring site and other selected sites as time allows.
- 2.1.2 Leg 2a** – Leg 2a, from Tuesday, April 29, through Sunday, May 11, will involve nearly continuous operations at CTD/Marine Assessment Monitoring and Prediction (MARMAP) Bongo stations. Water samples will be taken for salinity calibrations, nutrients, chlorophyll, and occasionally for phytoplankton identification. All of our studies are targeted to investigate a variety of processes and pathways affecting the productivity of the western coastal Gulf of Alaska. We plan to first sample a box of stations east and north of Kodiak Island, Alaska, repeating this box at the end of the cruise. We will then proceed to sample transects across Chiniak, Stevenson, and Amatuli Troughs. Leg 2a will conclude with a line of station parallel to the Kenai coast, in support of U.S. GLOBEC program. We will then proceed to Seward, Alaska, to disembark some scientists and embark another scientist.
- 2.1.3 Leg 2b** – On Leg 2b, we plan to study one of the eddies that regularly impinge on the shelf in this region. The position of eddies can be tracked via satellite altimetry data. Altimetry data in Section [9.4.3 TOPEX POSEIDON Altimetry Data from June 1, 2002](#) illustrates the position of such an eddy collected last year by the Altimetry Research in Ocean Circulation (TOPEX POSEIDON), conducted jointly by the National Aeronautics and Space Administration (NASA) and the French agency Centre Nationale d'Études Spatiales (CNES). Scientists at PMEL will track a candidate eddy's position and keep us apprised of its position. We are interested in studying an eddy located as far east as Kayak Island, although a position similar to 2001 or 2002 is more likely in May. As of April 2, 2003, this year's eddy is centered at 58° 15' N, 145° W.

After that, we plan to return to the box of stations near Kennedy and Stevenson Entrances, before ending the cruise in Kodiak, Alaska, on Sunday, May 18, 2003.

2.2 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

2.3 Personnel

2.3.1 Chief Scientists

2.3.1.1 Leg 1

Name	Gender	Affiliation	E-mail Address
William J. Floering (206) 526-6480	Male	PMEL	William.Floering@noaa.gov

2.3.1.2 Leg 2

Name	Gender	Affiliation	E-mail Address
Nancy B. Kachel (206) 526-6780	Female	PMEL	Nancy.Kachel@noaa.gov

2.3.2 Participating Scientists

2.3.2.1 Leg 1

Name	Gender	Affiliation	E-mail Address
William J. Floering	Male	PMEL	William.Floering@noaa.gov
Dr. Calvin W. Mordy	Male	PMEL	Calvin.W.Mordy@noaa.gov
Carol DeWitt	Female	PMEL	Carol.Dewitt@noaa.gov
Earl Roskie	Male	PMEL	Earl.Roskie@noaa.gov
Rick Miller	Male	PMEL	Hendrick.V.Miller@noaa.gov
Steve Smith	Male	PMEL	Stephen.A.Smith@noaa.gov
Lisa Munger	Female	Scripps	LMunger@UCSD.edu

2.3.2.2 Leg 2a

Name	Gender	Affiliation	E-mail Address
Nancy B. Kachel	Female	PMEL	Nancy.Kachel@noaa.gov
Dr. Calvin W. Mordy	Male	PMEL	Calvin.W.Mordy@noaa.gov
Dr. Carol Ladd	Female	PMEL	Carol.Ladd@noaa.gov
David Kachel	Male	PMEL	Dave.Kachel@noaa.gov
Peter Proctor	Male	PMEL	Peter.Proctor@noaa.gov
Dylan Righi	Male	PMEL	Dylan.Righi@noaa.gov
Doug Jongeward	Male	PMEL	Doug.Jongeward@noaa.gov
James A. Bunn	Male	PMEL	James.A.Bunn@noaa.gov
Jay Clark	Male	AFSC	Jay.Clark@noaa.gov

2.3.2.3 Leg 2b

Name	Gender	Affiliation	E-mail Address
Nancy B. Kachel	Female	PMEL	Nancy.Kachel@noaa.gov
Dr. Calvin W. Mordy	Male	PMEL	Calvin.W.Mordy@noaa.gov
David Kachel	Male	PMEL	Dave.Kachel@noaa.gov
Peter Proctor	Male	PMEL	Peter.Proctor@noaa.gov
Dylan Righi	Male	PMEL	Dylan.Righi@noaa.gov
James A. Bunn	Male	PMEL	James.A.Bunn@noaa.gov

2.4 Administrative

2.4.1 Ship Operations

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2.4.2 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 Responsibilities

3.1.1 Master – The ship's Master shall be in sole command of the vessel and shall be responsible for the welfare of all personnel on board. The Master shall be the final authority in matters relating to the safety, proper navigation, stability, and sailing condition of the vessel and shall execute each voyage with the utmost dispatch.

The Master shall inform the Chief Scientist as soon as possible of any changes in the program necessitated by events. In the case of emergency, nothing in these instructions shall be construed as preventing the Master from taking the most effective action which, in the Master's judgment, will rectify the situation causing the emergency, and; thereby, safeguard life, property, and the ship.

The Master will have the authority to abort operations temporarily on the basis of clear and present danger to life and property at sea, and will inform the Chief Scientist as soon as safe conditions permit. Full details of the action taken, rationale, and recommendations will be provided at the earliest opportunity. Under normal operating conditions, the Master shall not take any mission-aborting action without consultation with the Chief Scientist.

3.1.2 Chief Scientist – The Chief Scientist is responsible for executing the technical portion of the scientific mission specified by these instructions. Responsibilities also include:

1. Comportment of visiting scientists and technicians,
2. Disposition of data, feedback on data quality, and archiving of data and specimens collected,
3. Administration and physical handling of all scientific party hazardous materials,
4. Assignment of berthing for the scientific party,
5. Cleanliness of all berthing, laboratory, and storage spaces used by the scientific party,
6. Delivery of medical and emergency contact forms for the scientific party, and
7. With the Master, safe, efficient, and economical use of shipboard resources to support the embarked mission.

The Chief Scientist has the authority to revise or alter the technical portion of the instructions as work progresses provided that, after consultation with the Master, it is ascertained that the proposed changes will not:

1. Jeopardize the safety of personnel or the ship,
2. Exceed the overall time allotted for the project,
3. Result in undue additional expenses, or
4. Alter the general intent of these project instructions.

3.1.3 Scheduling – Scheduling of individual activities will depend upon weather conditions and progress of scientific work. Therefore, firm advance scheduling of events will not be possible, and a continual dialogue between scientific and ship's personnel will be important.

3.2 Data To Be Collected – The Chief Scientist is responsible for the disposition, feedback on data quality, and archiving of data and specimens collected on board the ship for the primary project. The Chief Scientist will be considered the representative of the Directors of PMEL and AFSC for purpose of data disposition. A single copy of all data gathered by the vessel shall be delivered to the Chief Scientist for forwarding to the Center and Laboratory Directors, who in turn will be responsible for distribution of data to other investigators desiring copies.

3.2.1 Data Logging – If the ship has a computer system that operates throughout the cruise acquiring and logging data from navigation, meteorological, and flow-through oceanographic sensors, it is requested that we receive a copy of the data at the end of the cruise. If the navigational data for stations are not recorded on such a system, it is requested that the ship maintain a Marine Observation Abstract (MOA) log provided by the scientists of times, positions, and meteorological conditions for each station.

At regular intervals, not to exceed every five days, the ship's computer manager will archive data from disk files to recordable compact diskettes (CD-R) for delivery to the Chief Scientist at the end of the cruise. Additional recording of processed data may be requested of the ship's computer manager. The ship's computer manager will ensure data quality. During the cruise, the scientific party may require the assistance of the ship's computer manager to determine if all sensors are functioning properly and to monitor some of the collected data in real time to make sampling strategy decisions.

3.2.2 Marine Observation Abstract (MOA) – If the navigational data for stations are not recorded on the ship's data logger, it is requested that the ship maintain a MOA form during the cruise. The critical information to be recorded at each station is:

- Coordinated Universal Time (UTC) date,
- UTC time,
- Position,
- Station number,
- Haul number,
- Gear type, and
- Bottom depth.

3.3 Staging Plan – Loading of scientific equipment is planned to occur in Kodiak, Alaska, on Thursday, April 17, 2003. The scientific party will be responsible for arranging vehicles and for moving their equipment from the airport and/or docks to the ship.

3.4 De-staging Plan – Some mooring equipment will be off-loaded in Kodiak, Alaska, at the end of Leg 1 on Monday, April 28, 2003. Any remaining gear will be offloaded in Seattle, Washington, at the end of Cruise KM0306 (Eble) on Wednesday, June 11, 2003. The scientific party will be responsible for arranging vehicles for moving their equipment.

3.5 Cruise Plan – The following mooring operations are planned for Leg 1:

1. Recover and re-deploy 11 moorings (which includes one 2.3-meter diameter surface fiberglass-over-foam toroid mooring),
2. Recovery only of two moorings (02-GBP-11B, 02-GBP-13B),
3. Deployment only of two moorings (acoustic recorder package (ARP), 02-GBP-3B), and
4. Attempted dragging and recovery of a lost mooring at the FATE site, and possible dragging and recovery of the mooring at Shelikof Strait site 3 (SSP-3).

In addition to the mooring work, we will conduct Conductivity, Temperature, and Depth (CTD) profile operations at each mooring site and at other selected sites as time allows. Most of the moorings are in water depths between 100 and 300 meters. Included among these moorings is one surface toroid to be recovered at the FATE (Fisheries and the Environment) site (58° 15.6' N, 147° 41.2' W) if dragging operations are possible and successful, and one surface toroid to be recovered and redeployed at the GLOBEC OSCAR site, GBM-3 (59° 18.0' N, 148° 58.2' W).

CTD/PAR/Fluorescence profiler casts will be done on both legs. The Uncontaminated Scientific Seawater System (USSW) with thermosalinograph, fluorometer, and a PMEL-supplied nitrate meter attached will be used throughout the entire cruise.

On Leg 2, Marine Assessment Monitoring and Prediction (MARMAP) Bongo tows will be taken at many of the CTD stations. Salinity, nutrient, and chlorophyll samples will be taken at up to 12 depths at most CTD stations. Nutrients need to be stored in a +4° Celsius refrigerator until they are processed on board the ship. Approximately 4 cubic feet are need for this storage. Chlorophyll samples will be filtered and the filters stored in a -20° Celsius freezer. After the Touch-and-Go on Sunday, May 11, nutrient samples will need to be fast-

frozen (at approximately -80°C) before being moved to a -20°C freezer. The freezer space needed for these samples is approximately 2 cubic feet at -80°C . The combined space needed in the -20°C freezer is 12-16 cubic feet.

Approximately ten ARGOS satellite-tracked drifter buoys will be deployed during the 2 legs of the cruise.

3.5.1 Leg 1 – See Section [9.4.1 KM0305 Leg 1 – Mooring Location](#) for a chartlet of Leg 1. We plan to depart from Kodiak, Alaska, at 1000 on Friday, April 18, 2003. Generally, we plan to deploy moorings during day light hours. Before recoveries and after deployments, calibration CTD casts will be taken.

3.5.1.1 Chiniak Bay – We will begin operations on Friday, April 18, 2003, by recovering and re-deploying one subsurface mooring in the trough east of Chiniak Bay (CB-1).

3.5.1.2 Acoustic Recorder Package (ARP) Mooring – One subsurface mooring will be deployed for Scripps.

3.5.1.3 FATE Site – We will attempt to drag and recover one surface mooring at the FATE site.

3.5.1.4 GLOBEC Line – Seven subsurface moorings will be recovered and six deployed along the GLOBEC mooring line, along with the recovery and re-deployment of one surface toroid at the GLOBEC OSCAR site, and the deployment of six drifters at the mooring sites.

3.5.1.5 Gore Point – Three subsurface moorings will be recovered and redeployed at sites GP-32, GP-34, and GP-36.

3.5.1.6 Shelikof Strait

3.5.1.6.1 Line 8 – One mooring will be recovered and redeployed at Shelikof site 3 (SSP-3), along with a line of CTD casts across the Strait.

3.5.1.6.2 Line 2 – Complete a line of CTD casts across the Northern section of the Strait.

3.5.1.7 Stevenson/ Kennedy Entrance – Complete a line of CTD casts across Stevenson Entrance, then north across Kennedy Entrance to the Kenai Peninsula.

3.5.2 Leg 2 – See Section [9.4.2 KM0305 Leg 2 – Transect Lines](#) for a chartlet of transects for Leg 2. The work on Leg 2 will consist of around the clock CTD casts and MARMAP Bongo tow stations. Full complements of sample bottles will be fired during most casts, to sample for nutrients, chlorophyll, and salinity, as well as phytoplankton samples for preservation.

3.5.2.1 Leg 2a – Sampling will begin with 3 transects that form a box north and east of Afognak Island to measure mixing and transport across the Alaskan Coastal Current as well as mixing in Kennedy and Stevenson Entrances. At this time of year, the circulation pattern of the Alaska Coastal Current in the vicinity of Kennedy-Stevenson Entrances changes, and we hope to document that change. To do so we plan to occupy of this box of CTD stations both at the beginning and end of the cruise.

This study will be followed by several transects across Chiniak, Stevenson, and Amatuli troughs. These will investigate the role of the troughs as conduits for nutrient-rich water from offshore to the inner shelves of Kodiak Island. They are also pathways for some types of fish larvae to move from the spawning region on the slope inshore to the bays, while juveniles of other species use the troughs as pathways to move offshore. The same transects should measure mixing processes occurring on the banks.

We will conclude Leg 2a with a transect parallel to the coast to sample differences in water properties and biological processes along this shelf that are seen in satellite data as a surface chlorophyll “wall” with high values on one side, and much lower values on the other. The exact location of this wall is variable during the spring. We will be seeking assistance from PMEL via email to locate its position.

We plan to go to Seward, Alaska, for a touch and go on the morning of Sunday, May 11, to drop off and pick up scientists.

3.5.2.2 Leg 2b – After the touch and go in Seward, Alaska, will primarily involve only CTD operations. An intensive eddy experiment involving ARGOS satellite-tracked drifters and CTD stations will be conducted. A large anti-cyclonic eddy feature has formed in the northern Gulf of Alaska and is currently centered at 58° 50'N, 144° W. It is beginning to move west. Commonly, by May such eddies abut the slope between Middleton and Kodiak Islands. We will be notified by email of its location and movements in order to plan the positions of our transects. The positions included in the appended itinerary are the station locations sampled last year, when we had just two days to sample that eddy. This year we anticipate doing a more comprehensive study. CTD sampling will be to a depth of 2,000 meters, and consist of transects extending across the feature to its outer edge, then a line perpendicular to the first, parallel to the slope. These will be followed with several short lines across the zone where the eddy impinges on the slope.

After the eddy experiment we plan to reoccupy the set of transects forming a box of stations northeast of Afognak Island.

3.5.3 Station Locations – See Section [9.3 Tables](#) for a full listing of station locations. Chartlets of the proposed cruise track for each leg are found in Section [9.4 Figures](#).

3.6 Station Operations – The following are operations to be conducted on this cruise:

3.6.1 CTD/Water Sample Operations – A Sea-Bird Electronics' SBE 911*plus* Conductivity, Temperature, and Depth (CTD) profiler with dual temperature and conductivity sensors will be the primary system. The primary 911*plus* CTD system is requested to be provided by the vessel. A backup will be provided and maintained by Pacific Marine Environmental Laboratory (PMEL). When available, and where possible, FOCI's fluorometer and PAR light meter should be mounted on the CTD stand for all casts; however, these instruments cannot exceed the following depths:

- WETLabs' WETStar fluorometer cannot exceed 600 meters, and
- Biospherical Instruments' QSP-200L4S light meter cannot exceed 1,000 meters.

Samples will be collected using the vessel's 9.5-liter Niskin bottles, backed up by 5- and 10-liter Niskin bottles provided by PMEL.

Once the CTD has been deployed, it should be lowered to 10 meters, and then the deck unit should be turned on. After 45 seconds, the CTD can be returned to just below the surface. Then the data acquisition program and VHS cassette CTD tape backup system should be started. The CTD should descend at a rate of 30 meters per minute for the first 200 meters and 45 meters per minute below that. The ascent rate should be 50 meters per minute. An entry in the Marine Observation Abstract (MOA) should be made for each CTD cast at the maximum cast depth.

Scientists will keep the **CTD Cast Information/Rosette Log**. Pressure, primary salinity, secondary salinity, primary temperature, secondary temperature, fluorescence, and light levels will be recorded on the **CTD Cast Information/Rosette Log** for all water bottle samples.

3.6.1.1 CTD Calibration – Salinity samples will be taken on every other cast, or as specified by the Chief Scientist. No reversing thermometers will be required. The CTD systems will be equipped with dual temperature and conductivity sensors. Salinity samples will be returned to Seattle for analysis.

3.6.2 MARMAP Bongo Tows – A 60-cm aluminum bongo frame with 0.505-mm mesh nets, or 0.333-mm before mid-May, hard plastic cod-ends, and a 40-kg lead weight for a depressor will be used in standard Marine Assessment Monitoring and Prediction (MARMAP) Bongo tows. The nets will be deployed at a constant wire speed of 40-45 meters per minute to a maximum depth of 100 meters, or 200 meters before mid-May, or 5-10 meters off bottom in shallower waters.

A Sea-Bird Electronics SBE 19 SEACAT Profiler will be attached to the wire above the bongo frame(s) to provide real-time tow data.

After the bridge gives permission, ship's personnel and one or two scientists will deploy the bongo array. A scientist will monitor the depth of the Bongo nets using SeaCat software and inform the ship's winch operator when the desired gear depth is reached. The bridge will then be instructed by the scientist to enter the position in the Marine Observation Abstract (MOA). Afterwards, the winch operator will be instructed by the scientist to retrieve the nets at a wire speed of 20 meters per minute.

The ship's speed should be adjusted to maintain a wire angle of 45° during the entire tow, which is accomplished by relaying wire angles to the bridge by radio, so that the bridge personnel can speed up or slow down the vessel's speed to increase or reduce the towing angle. When the nets reach the surface, the SeaCat and nets will be recovered. After the nets are brought aboard, they are hosed down with saltwater to wash the sample into the cod-end. In some cases, larvae are sorted and preserved separately. Flow meters in the nets record the amount of water filtered, and the SBE 19 SEACAT records the depth history of the tow. The scientists on watch are responsible for recording times, maximum depth, wire outs, and flow meter counts on the Cruise Operations Database (COD) forms. Tows not meeting specifications may be repeated at the discretion of the scientific watch (i.e. hit bottom, poor wire angles, nets tangled, etc.)

3.6.3 Chlorophyll/Nutrient Sampling Operations – Chlorophyll samples will be collected simultaneously with Conductivity, Temperature, and Depth (CTD) profiler casts from the 10-liter Niskin bottles. The scientists will be responsible for collection, filtration, and preservation of samples. Sampling depths depend on the fluorescence profile. A typical strategy would be samples at 0, 10, 20, 30, 40, and 50 or 60 meters, depending upon which of the latter two depths is closest to the fluorescence maximum. If the maximum is deeper than 60 meters, sampling should be moved deeper with fewer samples in the mixed layer. Nutrient samples will be collected from all Niskin bottles, both near-surface and from depth. Nutrient samples will be taken from bottles fired throughout the water column.

The -20° Celsius freezer is required for sample storage of the chlorophyll filters. The +4°C refrigerator is required for storage of nutrient samples before they are analyzed. Until May 11, all nutrient samples will be analyzed onboard ship. After that, they need to be flash frozen (-80°C freezer is best) and then stored in the -20°C freezer. It is requested that samples stay aboard ship until it arrives in Seattle on or about June 11th.

3.6.4 ARGOS Satellite-Tracked Drifter Buoy Deployments – Two to three working days before deployment, the Chief Scientist, or designee, will secure the drifter on the back deck. The drifter buoy is then turned on, usually by removing the magnet, and an e-mail message will be sent by the Chief Scientist, or designee, to Dr. Phyllis Stabeno at Phyllis.Stabeno@noaa.gov, stating the serial number that is stamped on the drifter and the time that it was turned on. This lead-time is necessary to ensure that telemetry from the buoy is being received and transmitted by the Advanced Research and Global Observation Satellite (ARGOS). The method of deployment of the drifter is dependent upon the particular make of drifter and is to be directed by the Chief Scientist, or designee.

3.7 Underway Operations – Underway operations that will be performed during this cruise include thermosalinograph, fluorometer, nitrate meter, bathymetry up to 3,000 meters at all mooring sites, meteorological data, and a log of operations.

3.8 Data Logging – The ship's data logger, shall operate throughout the cruise, acquiring, and logging data from navigation, meteorological, oceanographic, and bathymetric sensors. If a method for observing data acquisition is available, please provide project scientists with the capability of monitoring sensor acquisition via text and graphic displays. A data processing node should be made available to project scientists throughout the cruise for the above-mentioned purpose.

At regular intervals, not to exceed every five days, the ship's computer manager will archive data from disk files to recordable compact diskettes (CD-R) for delivery to the project representative at the end of the cruise. Additional recording of processed data may be requested of the ship's computer manager. The ship's computer manager will ensure data quality. During the cruise, the scientific party may require the assistance of the ship's computer manager to determine if all sensors are functioning properly and to monitor some of the collected data in real time to make sampling strategy decisions.

3.9 Seachest and Uncontaminated Seawater – Sea surface temperature and conductivity will be continuously monitored. Uncontaminated seawater from the Uncontaminated Scientific Seawater System (USSS) will be continuously pumped through the thermosalinograph, fluorometer, and nitrate monitor. Data from these instruments should be sent to the data logger, if possible. Approximately 2 square feet of bench space will be required near a sink with uncontaminated seawater to install the underway nitrate monitor.

The ship's complement will be responsible for inspecting, and when required, cleaning the seachest and conductivity cells. The scientists will be responsible for regularly cleaning the cuvette, inside the fluorometer, and obtaining and processing the calibration samples. Calibration samples will be taken after each MARMAP Bongo station.

Data logger files will be included in the periodic backup of collected data for distribution at the end of the cruise.

During the cruise, the ship's personnel will be responsible for ensuring that data streams from the instruments are correctly logged by the data logger, checking the logger status display once per watch to determine that the instruments are functioning.

The scientists also request that the fluorometer be interfaced to the ship's data logger, if possible, and the data logger should be configured to log one-minute data throughout each FOCI cruise, including:

- GPS Time,
- GPS Latitude,
- GPS Longitude,
- Water Depth, in meters,
- Seawater (seachest) Temperature,
- Seawater (seachest) Salinity, and
- Laboratory Fluorometer Voltage

3.10 Small Boat Operations – The small boat will be used to tag the two surface moorings during recovery operations.

4.0 FACILITIES

4.1 Equipment and Capabilities Provided by Ship

- Oceanographic winch with 0.322" electro-mechanical cable with slip rings terminated for CTD operations,
- Oceanographic winch with 0.322" electro-mechanical cable with slip rings terminated for MARMAP Bongo tows,
- Winch with minimum of 6,000 meters of 9/16" wire
- A-Frame(s),
- Ability to connect a PAR and Fluorometer, provided by the project, to the CTD,
- Provide termination kits and ship support personnel to do the terminations,
- Wire speed indicators and readout for winches,
- Meter block for plankton tows,
- Electrical connection between winch and Deck computer system,
- Sea-Bird Electronics' SBE 911*plus* CTD system with dual sensors, 12-bottle rosette, stand, deck unit, and weights,
- Sea-Bird Electronics' SBE 911*plus* CTD system without sensors, 24-bottle rosette, stand, deck unit, and weights,
- (16) 9.6-liter sampling bottles for use with rosette (11 plus 5 spares),
- Refrigerator and freezer space for storage of biological and chemical samples, +4° C (4-cu ft) for nutrients and -20° C (~12-16-cu ft) for chlorophyll samples and frozen nutrients, respectively,
- Flash freezer ~-80°C (4 cu ft) to freeze nutrient samples during the last week of the cruise,
- For meteorological observations: Anemometers, calibrated air thermometer (wet-and dry-bulb) and a calibrated barometer and/or barograph, interfaced to the data logger if possible,
- Bench space for PCs, monitor, and printer,
- Laboratory space with exhaust hood, sink, lab tables, and storage space,
- Sea-water hoses and nozzles to wash nets and recovered mooring equipment at CTD and Bongo stations,
- Adequate deck lighting for night-time operations,
- Navigational equipment including GPS and radar,
- Depth sounder good to at least 3,000 meters
- Safety harnesses for working on quarterdeck and fantail,
- Ship's crane(s) used for loading and/or deploying,
- (2) Hand-held radios for scientific/winch/bridge communications,
- VHF radio with external antenna at CTD computer station,
- Thermosalinograph and fluorometer interfaced with the data logger,
- Continuous uncontaminated seawater sampling system with debubbler piped from bow into labs,
- Benthos acoustic transducer and deck box,
- EdgeTech 8011AT deck box and transducer (hull-mounted),
- Capability to transfer ship's data to CD-ROM disks,
- Barnstead NANOpure Diamond Analytical System (18MΩ) Projected use (volume/day), and
- Capability to transfer ship's data to Iomega Zip disks or CD-ROM.

4.2 Equipment and Capabilities Provided by Scientists

- Sea-Bird Electronics' SBE 911*plus* CTD system with dual sensors (for backup),
- (2) Sea-Bird Electronics' SBE-19 SEACAT systems,
- Photosynthetically Active Radiation (PAR) and Fluorometer to be mounted on CTD,
- CTD stand modified for attachment of fluorometer,
- CTD carousel sampler,
- (12) 5-liter sample bottles,
- Lanyard material and nicropress sleeves,
- 150 salinity sample bottles,
- Fluorometer (spare) to be mounted to the Uncontaminated Scientific Seawater System (USSS),
- Debubbler for the fluorometer,
- Nitrate meter to be mounted to the Uncontaminated Scientific Seawater System (USSS),
- 60-cm MARMAP Bongo sampling arrays,
- 20-cm MARMAP Bongo arrays,
- Spare wire angle indicator,
- (1) Surface mooring (FOCI biophysical platforms),
- 13 Subsurface moorings,
- Benthos acoustic release deck-set and transducer,
- EdgeTech 8011-A acoustic release deck-set and transducer,
- Approximately 11 railroad wheel sets to be used as anchors,
- Chain, wire rope, rope, assorted hardware for moorings,
- 10 ARGOS satellite tracked drifter buoys,
- (2) Hand held grapple hooks,
- Dragging gear
- Iridium phone
- (2) Hand-held radios for scientific/winch/bridge communications,
- Miscellaneous scientific sampling and processing equipment,
- Cruise Operations Database (COD) and forms,
- Marine Observation Abstract (MOA) log,
- PMEL CTD Weather Observation Logs, and
- CTD Cast Information/Rosette Log.

5.0 DISPOSITION OF DATA AND REPORTS

5.1 The following data products will be provided by the ship and included in the data package at the end of the cruise:

- Calibration Sheets for all ship's instruments used,
- Files from data logger,
- Electronic Navigation suite's export files on disk,
- Marine Operations Abstracts (MOA), and
- PMEL CTD Weather Observation Logs.

5.2 The following data products will be completed by the scientific party:

- CTD Cast Information/Rosette Log,
- Cruise Operations Database (COD) log sheets, and
- Mooring logs.

6.0 **Pre-cruise Meeting** – A pre-cruise meeting between the ship's representative and the Chief Scientist will be held before the start of the cruise. Its purpose is to identify the day-to-day requirements of the project in order to best utilize shipboard personnel resources and to identify overtime requirements. A brief meeting of all scientific personnel, the ship's officers, deck and marine tech departments, and other relevant ship's personnel should be held before the vessel reaches the operations area for the purposes of:

1. Introducing scientific personnel to ship's procedures, proper channels, etc.,
2. Discuss operating procedures for deploying various pieces of sampling equipment, and
3. Coordinating scientific watch assignments.

7.0 HAZARDOUS MATERIALS

7.1 **Definition** – Hazardous scientific materials are any substance, which because of its chemical properties can cause the deterioration of the materials or injury to living organisms. Rules for the stowage, labeling, and protection of flammables and other hazardous scientific stores on inspected vessels are given in ***Subchapter U, Title 46 CFR, Part 194***.

7.2 Standards

7.2.1 **Storage Containers** – Storage containers should be marked, labeled, and stored in a ventilated and protected area under the supervision of the Chief Scientist with the knowledge and approval of the Master. Consideration should be given to transporting and storing hazardous materials, normally shipped in glass containers, in special, non-breakable containers.

7.2.2 **Working Quantities** – Working quantities only should be stored in the laboratory. A reasonable working quantity would be a one-day supply, considering the hazard posed by the material. Containers should be marked with the material's chemical and common names, type, and classification.

7.2.3 **Storerooms** – Storerooms for chemicals and flammables, where practicable, should be protected by fixed CO₂ or Halon systems, and used for no other purpose. Where it is not practical to provide such a storeroom, consideration should be given to a hazardous material locker appropriate for the type and quantity of material being stored.

7.2.4 **Incompatible Materials** – Because of the limited shipboard storage for hazardous materials, particular attention must be made to avoid storing incompatible materials together. A close review of the Material Safety Data Sheets (MSDS) will show if two chemicals are incompatible.

- 7.3 Transportation and Disposal** – The Chief Scientist is responsible for the proper transportation, shipping, and disposal of hazardous materials, including empty containers, associated with their project. Transportation and disposal must be carried out in accordance with Federal, State, and Local regulations. In no case will this responsibility be passed to the ship's crew or operating institution unless specifically arranged in advance.
- 7.4 Chemical Spill Response** – The scientific party is responsible for supplying neutralizing agents, buffers, and/or absorbents in the amounts adequate to address spills of a size equal to the amount of any chemicals brought aboard. This spill response material must accompany the chemicals when they come aboard.
- 7.5 Inventory List** – See Section [9.2 KM0305 HAZMAT Inventory](#).
- 7.6 Material Data Safety Sheets (MSDS)** – Submitted separately as electronic attachments.
- 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 Satellite Communications** – INMARSAT (voice and facsimile) communications are available aboard ship and may be used for personal or business related calls. Arrangements to pay for the calls must be made before calling. Credit card calls are the preferred method of payment. INMARSAT calls can be extremely expensive and the exact cost may not be known until you receive your bill.
- 8.2 Electronic Mail (E-mail)** – FOCI requests that *R/V KILO MOANA* transmit e-mail at least twice a day. Each embarked personnel will have an e-mail account and address established in their name by the ship.
- 8.3 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, IRIDIUM phone (PMEL provided), or over the Internet via e-mail from PMEL.
- 8.4 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.
- 8.5 Important Telephone and Facsimile Numbers and E-mail Addresses**
- 8.5.1 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)

8.5.2 Alaska Fisheries Science Center (AFSC)

FOCI – Resource Assessment and Conservation Engineering (RACE):

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

8.5.3 R/V KILO MOANA

INMARSAT C:

- 011-872-336-956-510 (voice)
- 011-872-336-956-513 (fax)

8.5.4 University of Hawaii – University Marine Center

8.5.4.1 Marine Superintendent – Stan Winslow

- (808) 847-2661 (voice)
- (808) 848-5451 (fax)
- swinslow@soest.hawaii.edu

8.5.4.2 Shipboard Support Facility Supervisor – Steve Poulos

- (808) 956-6650 (voice)
- (808) 956-9971 (fax)
- poulos@soest.hawaii.edu

9.0 APPENDICES

9.1 KM0305 Equipment Inventory

ITEM	NUMBER	WEIGHT EACH	TOTAL WEIGHT
ANCHORS			
1600#	4	1600	6400
1800#	3	1800	5400
1900#	2	1900	3800
2200#	1	2200	2200
RELEASE BOXES			
	11	110	1210
DRIFTER BOXES			
	2	230	460
GREY BOXES			
MOORING WIRE	1	1350	1350
MTR CAGES	1	480	480
MTR CAGES/NISKENS	1	447	447
MORDY SHORT	1	300	300
BUOY - F.2.03			
	1	800	800
TOWER - F.2.03			
	1	250	250
STEEL FLOATS			
30"	4	230	920
MOORING - ON REELS			
03GB.1A	1	340	340
03GB.2A	1	340	340
03GB.4A	1	340	340
PLASTIC FOOTLOCKERS			
POLYOLFIN/RELEASE HOOK	1	25	25
GRAPPLING HOOKS/STRAPS	1	25	25
RUBBERMAID TOOLBOX	1	50	50
WOODEN FOOTLOCKER			
TIEDOWN CHAIN/BINDERS	1	500	500
MISCELLANEOUS			
CARDBOARD BOX TIEDOWN LINE	1	10	10
MORDY CARDBOARD BOX	1	5	5
MARINE MAMMALS			
LISA MUNGER LARGE METAL SHIPPING CONTAINER	1	50	50
LISA MUNGER SMALL METAL SHIPPING CONTAINER	1	30	30

ITEM	NUMBER	WEIGHT EACH	TOTAL WEIGHT
NMFS-FOCI			
F15 - MISC. SUPPLIES	1	25	25
G1 - MISC SUPPLIES	1	25	25
B2 - FLOATCOAT/GLOVES	1	20	20
SPILL KIT	1	15	15
LARGE CLEAR PLASTIC BOX	1	35	35
SEACAT DECK UNIT	1	30	30
BUCKETS		5	
SBE39	1	10	10
BONGO FRAME - 60CM	1	40	40
BONGO FRAME - 20CM	1	15	15
BONGO WEIGHT	1	50	50
SEACAT BOX	1	40	40
WEIGHT IN CONTAINER 1			26,037
ANCHORS			
SURFACE MOORING	1	3950	3950
DRIFTER BOXES			
	6	268	1608
FLOATS			
41"	3	479	1437
30"	4	230	920
28"	4	222	888
ADCP FLOAT - 36"	1	487	487
LARGE WOODEN BOX			
	1	795	795
CAROL DEWITT PALLET #1			
	1	432	432
CAROL DEWITT PALLET #2			
	1	548	548
GLASS BALL BASKET W/GEAR			
	1	450	450
CTD			
	1	900	900
ADCP W/ BATTERY			
	1	420	420
MARINE MAMMAL INSTRU.			
	1	510	510
REEL STAND			
	1	25	25
SURFACE MOORING BOX			
	1	3462	3462
PB'S			
	3	120	360

ITEM	NUMBER	WEIGHT EACH	TOTAL WEIGHT
DRAGGING GEAR	1	1200	1200
3/4" POLYPROPYLENE WORKING LINE	1	50	50
WEIGHT IN CONTAINER 2			18,392
WISEGARVER LARGE GREY BOX	1	735	735
PALLET AANDARAA BOXES	1	537	537
NUTRIENT METER FRAMES	2	392	784
WEIGHT ON BARGE			2,056
TOTAL WEIGHT			46,485

9.2 KM0305 HAZMAT Inventory

Chemical	CAS Number	Resp.	Qty	H	F	R	Storage Color Code	Hazard Class	Packing Group Number	UN	Rep. Qty.	Rep. Indices
Acetone	67-64-1	Mordy	1.0-l	1	3	0	Flammable	3	II	1090	350 Lb	1
Ammonium Chloride	12125-02-9	Mordy	544.0-g	2	0	0	General	Not regulated		9085	5000 Lb	2
Battery, Alkaline	mix	DeWitt	7-cells				General	Not regulated			None	None
Battery, Lithium, Bromine Chloride	mix	DeWitt	92-cells	1	1	2	General	9	II	3090	None	None
Battery, Lithium, Tadiran	mix	DeWitt	140-cells	1	1	2	General	9	II	3090	None	None
Brij	9002-92-0	Mordy	250.0-ml	0	1	0	General	Not regulated			None	3
Cadmium	7440-43-9	Mordy	20.0-g				Toxic	4.1	III	3178	None	4
Copper Sulfate	7758-99-8	Mordy	40.0-g	2	0	0	Hazardous	9	III	3077	400 Lb	5
Dowfax	mix	Mordy	200.0-ml				General	Not regulated			None	None
Formaldehyde, 37%	mix		2-gal	3	2	2	Flammable	3 & 8	III	1198	100 Lb	1
Hydrazine Sulfate	10034-93-2	Mordy	25.0-g	3	1	0	Toxic	8	III	3260	200 Lb	5
Hydrochloric Acid, Solution	7647-01-0	Mordy	5.0-l	3	0	0	Corrosive	8	II	1789	5000 Lb	6
Imidazole	288-32-4	Mordy	136.0-g	3	1	0	Corrosive	8	III	3263	5 Kg	7
Magnesium Sulfate Heptahydrate	10034-99-8	Mordy	213.0-g	1	0	0	General	Not regulated			None	2
N-1-Napthylethylenediamine Dihydrochloride	1465-25-4	Mordy	15.0-g	2	1	0	General	Not regulated			None	8
Nitric Acid	7697-37-2	Mordy	150.0-ml	3	0	0	Corrosive	8	II	2031	150 Lb	6
Potassium Iodine (Lugols Solution)	mix	Mordy	2.0-l				General	Not regulated				
Potassium Nitrate	7757-79-1	Mordy	21.0-g	1	0	0	Reactive	5.1	III	1486	100 Kg	7
Potassium Phosphate	7778-77-0	Mordy	3.0-g	1	0	0	General	Not regulated			None	2
Sodium Bicarbonate	144-55-8	Mordy	5.04-g	1	0	0	General	Not regulated			None	9
Sodium Chloride	7647-14-5	Mordy	963.0-g	1	0	0	General	Not regulated			None	9
Sodium Fluorosilicate	16893-85-9	Mordy	2.4-g	3	0	0	Toxic	6.1	III	2674	None	10
Sodium Hydroxide, 10N	1310-73-2	Mordy	500.0-ml	3	0	1	Store Separately	8	II	1823	1000 Lb	11
Sodium Nitrite	7632-00-0	Mordy	0.5-g	2	0	1	Reactive	5.1 & 6.1	III	1500	100 Lb	12
Stannous Chloride	7772-99-8	Mordy	100.0-g	1	0	0	General	Not regulated		1759	100 Lb	2
Sulfanilamide	63-74-1	Mordy	250.0-g	1	1	0	General	Not regulated			None	2
Sulfuric Acid	7664-93-9	Mordy	6.0-l	3	0	2	Corrosive	8	II	1830	1000 Lb	6
Tributyltin Oxide	56-35-9	DeWitt	30-pairs	3	1	0	Poison	6.1	II	3020	None	13

<p>Spill Response 1: Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, or earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures. 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.</p>
<p>Spill Response 2: 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.</p>
<p>Spill Response 3: Ventilate area of leak or spill. Wear appropriate personal protective equipment. Contain and recover liquid when possible. Collect liquid in an appropriate container or 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!</p>
<p>Spill Response 4: Evacuate area. Wear Self-Contained Breathing Apparatus (SCBA), rubber boots, and heavy rubber gloves. Wear disposable coveralls and discard them after use. Sweep up, place in bag and hold for waste disposal. Ventilate area and wash spill site after material pickup is complete. Avoid raising dust.</p>
<p>Spill Response 5: 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.</p>
<p>Spill Response 6: 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.</p>
<p>Spill Response 7: 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.</p>
<p>Spill Response 8: 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.</p>
<p>Spill Response 9: Ventilate area of leak or spill. Wear appropriate personal protective equipment. Sweep up and containerize for reclamation or disposal.</p>

<p>Vacuuuming or wet sweeping may be used to avoid dust dispersal. Small amounts of residue may be flushed to sewer with plenty of water.</p>
<p>Spill Response 10: Keep unnecessary people away. Stay upwind, keep out of low areas. Isolate hazard area and deny entry. Ventilate closed spaces before entering them. Employees should be trained in safety procedures for storage and handling this product. Any personnel in area should wear a National Institute for Occupational Safety and Health (NIOSH) approved breathing apparatus and protective clothing. Isolate product spill area. Carefully shovel material and place in clean, dry container and cover. Remove container from spill site and dispose of in accordance with federal, state and local regulations.</p>
<p>Spill Response 11: 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. Do not flush caustic residues to the sewer! Residues from spills can be diluted with water, neutralized with dilute acid such as acetic, hydrochloric or sulfuric. Absorb neutralized caustic residue on clay, vermiculite or other inert substance and package in a suitable container for disposal. 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.</p>
<p>Spill Response 12: 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.</p>
<p>Spill Response 13: 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.</p>

9.3 Tables

9.3.1 KM0305 Leg 1 – Mooring Station Locations

Activity	Latitude	Longitude	Dist. (nm)	Spd (kts)	Trans (hrs)	Approx Bott Depth (m)	On Stn (hrs)	Arrive (Local) Date/Time	Depart (Local) Date/Time
Depart Kodiak	57° 45.00' N	152° 29.60' W							4/18/2003 10:00
CTD CB-1	57° 43.33' N	152° 17.65' W	6.6	10	0.7	190	0.5	4/18/2003 10:39	4/18/2003 11:12
Recover 02CB-1C	57° 43.33' N	152° 17.65' W	0.0	10	0	190	1	4/18/2003 11:12	4/18/2003 12:12
Deploy 03CB-1A	57° 43.33' N	152° 17.65' W	0.0	10	0	190	2	4/18/2003 12:12	4/18/2003 14:12
CTD CB-1	57° 43.33' N	152° 17.65' W	0.0	10	0	190	0.5	4/18/2003 14:12	4/18/2003 14:44
Deploy ARP	56° 57.00' N	151° 00.00' W	62.5	12	5.2	1000	2	4/18/2003 19:57	4/18/2003 21:57
Drag for 02FATE	58° 15.61' N	147° 41.21' W	132.3	12	11	2400	8	4/19/2003 8:59	4/19/2003 16:59
Night Ops	58° 41.00' N	148° 50.94' W	44.4	12	3.7	198	11.3	4/19/2003 20:41	4/20/2003 8:00
CTD at GBP-12	58° 41.00' N	148° 50.94' W	0.0	10	0	198	0.6	4/20/2003 8:00	4/20/2003 8:33
Recover 02GBP-12B	58° 41.00' N	148° 50.94' W	0.0	10	0	198	1	4/20/2003 8:33	4/20/2003 9:33
Deploy 03GBP-12A	58° 41.00' N	148° 50.94' W	0.0	10	0	198	2	4/20/2003 9:33	4/20/2003 11:33
CTD at GBP-12	58° 41.00' N	148° 50.94' W	0.0	10	0	198	0.6	4/20/2003 11:33	4/20/2003 12:06
CTD at GBP-11	58° 55.28' N	148° 37.18' W	16.0	10	1.6	256	0.6	4/20/2003 13:42	4/20/2003 14:15
Recover 02GBP-11B	58° 55.28' N	148° 37.18' W	0.0	10	0	256	1	4/20/2003 14:15	4/20/2003 15:15
Deploy drifter	58° 55.28' N	148° 37.18' W	0.0	10	0	256	0	4/20/2003 15:15	4/20/2003 15:15
CTD at GBP-5	59° 02.58' N	148° 41.66' W	7.7	10	0.8	197	0.6	4/20/2003 16:01	4/20/2003 16:34
Recover 02GBP-5B	59° 02.58' N	148° 41.66' W	0.0	10	0	197	1	4/20/2003 16:34	4/20/2003 17:34
Deploy 03GBP-5A	59° 02.58' N	148° 41.66' W	0.0	10	0	197	2	4/20/2003 17:34	4/20/2003 19:34
CTD at GBP-5	59° 02.58' N	148° 41.66' W	0.0	10	0	197	0.6	4/20/2003 19:34	4/20/2003 20:07
Deploy drifter	59° 02.58' N	148° 41.66' W	0.0	10	0	197	0	4/20/2003 20:07	4/20/2003 20:07
Night Ops	59° 07.72' N	148° 47.18' W	5.9	10	0.6	144	11.3	4/20/2003 20:42	4/21/2003 8:00
CTD at GB-4	59° 07.72' N	148° 47.18' W	0.0	10	0	144	0.5	4/21/2003 8:00	4/21/2003 8:30
Recover 02GB-4B	59° 07.72' N	148° 47.18' W	0.0	10	0	144	1	4/21/2003 8:30	4/21/2003 9:30
Deploy 03GB-4A	59° 07.72' N	148° 47.18' W	0.0	10	0	144	2	4/21/2003 9:30	4/21/2003 11:30
CTD at GB-4	59° 07.72' N	148° 47.18' W	0.0	10	0	144	0.5	4/21/2003 11:30	4/21/2003 12:00

Activity	Latitude	Longitude	Dist. (nm)	Spd (kts)	Trans (hrs)	Approx Bott Depth (m)	On Stn (hrs)	Arrive (Local) Date/Time	Depart (Local) Date/Time
Deploy drifter	59° 07.72' N	148° 47.18' W	0.0	10	0	144	0	4/21/2003 12:00	4/21/2003 12:00
CTD at GBP-3	59° 17.01' N	148° 57.63' W	10.7	10	1.1	183	0.5	4/21/2003 13:04	4/21/2003 13:36
Deploy 03GBP-3A	59° 17.01' N	148° 57.63' W	0.0	10	0	183	2	4/21/2003 13:36	4/21/2003 15:36
Recover 02GBM-3B	59° 18.00' N	148° 58.20' W	1.0	10	0.1	186	4	4/21/2003 15:42	4/21/2003 19:42
Deploy 03GBM-3A	59° 18.00' N	148° 58.20' W	0.0	10	0	186	4	4/21/2003 19:42	4/21/2003 23:42
CTD at GBM-3	59° 18.00' N	148° 58.20' W	0.0	10	0	186	0.5	4/21/2003 23:42	4/22/2003 0:15
Deploy drifter	59° 18.00' N	148° 58.20' W	0.0	10	0	186	0	4/22/2003 0:15	4/22/2003 0:15
Night Ops	59° 34.10' N	149° 12.69' W	17.7	10	1.8	212	8	4/22/2003 2:01	4/22/2003 10:01
CTD at GB-2	59° 34.10' N	149° 12.69' W	0.0	10	0	212	0.5	4/22/2003 10:01	4/22/2003 10:32
Recover 02GB-2B	59° 34.10' N	149° 12.69' W	0.0	10	0	212	1	4/22/2003 10:32	4/22/2003 11:32
Deploy 03GB-2A	59° 34.10' N	149° 12.69' W	0.0	10	0	212	2	4/22/2003 11:32	4/22/2003 13:32
CTD at GB-2	59° 34.10' N	149° 12.69' W	0.0	10	0	212	0.5	4/22/2003 13:32	4/22/2003 14:03
Deploy drifter	59° 34.10' N	149° 12.69' W	0.0	10	0	212	0	4/22/2003 14:03	4/22/2003 14:03
CTD at GB-1	59° 41.66' N	149° 21.49' W	8.8	10	0.9	238	0.5	4/22/2003 14:56	4/22/2003 15:28
Recover 02GB-1B	59° 41.66' N	149° 21.49' W	0.0	10	0	238	1	4/22/2003 15:28	4/22/2003 16:28
Deploy 03GB-1A	59° 41.66' N	149° 21.49' W	0.0	10	0	238	2	4/22/2003 16:28	4/22/2003 18:28
CTD at GB-1	59° 41.66' N	149° 21.49' W	0.0	10	0	238	0.5	4/22/2003 18:28	4/22/2003 19:01
Deploy drifter	59° 41.66' N	149° 21.49' W	0.0	10	0	238	0	4/22/2003 19:01	4/22/2003 19:01
Night Ops	59° 06.56' N	150° 04.90' W	41.5	12	3.5	163	9.5	4/22/2003 22:28	4/23/2003 8:00
CTD at GBP-13	59° 06.56' N	150° 04.90' W	0.0	10	0	163	0.5	4/23/2003 8:00	4/23/2003 8:31
Recover 02GBP-13B	59° 06.56' N	150° 04.90' W	0.0	10	0	163	1	4/23/2003 8:31	4/23/2003 9:31
CTD at GP-32	59° 06.29' N	150° 59.52' W	28.0	11	2.5	151	0.5	4/23/2003 12:04	4/23/2003 12:34
Recover 02GP-32B	59° 06.29' N	150° 59.52' W	0.0	10	0	151	1	4/23/2003 12:34	4/23/2003 13:34
Deploy 03GP-32A	59° 06.29' N	150° 59.52' W	0.0	10	0	151	2	4/23/2003 13:34	4/23/2003 15:34
CTD at GP-32	59° 06.29' N	150° 59.52' W	0.0	10	0	151	0.5	4/23/2003 15:34	4/23/2003 16:04
CTD at GP-34	58° 57.78' N	150° 56.00' W	8.7	10	0.9	144	0.5	4/23/2003 16:56	4/23/2003 17:26
Recover 02GP-34B	58° 57.78' N	150° 56.00' W	0.0	10	0	144	1	4/23/2003 17:26	4/23/2003 18:26
Deploy 03GP-34A	58° 57.78' N	150° 56.00' W	0.0	10	0	144	2	4/23/2003 18:26	4/23/2003 20:26
CTD at GP-34	58° 57.78' N	150° 56.00' W	0.0	10	0	144	0.5	4/23/2003 20:26	4/23/2003 20:55

Activity	Latitude	Longitude	Dist. (nm)	Spd (kts)	Trans (hrs)	Approx Bott Depth (m)	On Stn (hrs)	Arrive (Local) Date/Time	Depart (Local) Date/Time
Night Ops	58° 45.00' N	150° 52.00' W	12.9	10	1.3	183	9.8	4/23/2003 22:13	4/24/2003 8:01
CTD at GPP-36	58° 45.00' N	150° 52.00' W	0.0	10	0	183	0.5	4/24/2003 8:01	4/24/2003 8:33
Recover 02GPP-36B	58° 45.00' N	150° 52.00' W	0.0	10	0	183	1	4/24/2003 8:33	4/24/2003 9:33
Deploy 03GPP-36A	58° 45.00' N	150° 52.00' W	0.0	10	0	183	2	4/24/2003 9:33	4/24/2003 11:33
CTD at GPP-36	58° 45.00' N	150° 52.00' W	0.0	10	0	183	0.5	4/24/2003 11:33	4/24/2003 12:05
WP	58° 45.00' N	152° 42.00' W	57.1	12	4.8		0	4/24/2003 16:51	4/24/2003 16:51
CTD at Line 8, Station 61	57° 43.20' N	155° 15.60' W	101.8	11.5	8.8	300	0.6	4/25/2003 1:41	4/25/2003 2:16
CTD at Line 8, Station 60	57° 41.00' N	155° 10.00' W	3.7	10	0.4	284	0.6	4/25/2003 2:39	4/25/2003 3:13
CTD at Line 8, Station 59	57° 38.50' N	155° 04.20' W	4.0	10	0.4	248	0.5	4/25/2003 3:37	4/25/2003 4:09
CTD at Line 8, Station 58	57° 36.30' N	155° 00.50' W	3.0	10	0.3	237	0.5	4/25/2003 4:27	4/25/2003 4:59
CTD at Line 8, Station 57	57° 33.10' N	154° 52.50' W	5.4	10	0.5	232	0.5	4/25/2003 5:32	4/25/2003 6:04
CTD at Line 8, Station 56	57° 30.90' N	154° 47.00' W	3.7	10	0.4	208	0.5	4/25/2003 6:26	4/25/2003 6:57
CTD at Line 8, Station 55	57° 28.50' N	154° 42.00' W	3.6	10	0.4	60	0.4	4/25/2003 7:18	4/25/2003 7:42
CTD at SSP-3	57° 29.02' N	154° 48.44' W	3.5	10	0.4	198	0.6	4/25/2003 8:03	4/25/2003 8:36
Recover 02SSP-3B	57° 29.02' N	154° 48.44' W	0.0	10	0	198	4	4/25/2003 8:36	4/25/2003 12:36
Deploy 03SSP-3A	57° 29.02' N	154° 48.44' W	0.0	10	0	198	2	4/25/2003 12:36	4/25/2003 14:36
CTD at SSP-3	57° 29.02' N	154° 48.44' W	0.0	10	0	198	0.6	4/25/2003 14:36	4/25/2003 15:10
CTD- Shelikof Strait Line 2	58° 43.50' N	153° 16.20' W	89.0	12	7.4	180	0.5	4/25/2003 22:35	4/25/2003 23:07
CTD- Shelikof Strait Line 2	58° 42.00' N	153° 10.80' W	3.2	10	0.3	180	0.5	4/25/2003 23:26	4/25/2003 23:58
CTD- Shelikof Strait Line 2	58° 40.50' N	153° 05.40' W	3.2	10	0.3	180	0.5	4/26/2003 0:17	4/26/2003 0:49
CTD- Shelikof Strait Line 2	58° 39.00' N	153° 00.00' W	3.2	10	0.3	180	0.5	4/26/2003 1:08	4/26/2003 1:40
CTD- Shelikof Strait Line 2	58° 37.50' N	152° 54.00' W	3.5	10	0.3	180	0.5	4/26/2003 2:01	4/26/2003 2:33
CTD- Shelikof Strait Line 2	58° 36.00' N	152° 49.20' W	2.9	10	0.3	180	0.5	4/26/2003 2:50	4/26/2003 3:22
CTD- Shelikof Strait Line 2	58° 34.50' N	152° 44.40' W	2.9	10	0.3	180	0.5	4/26/2003 3:40	4/26/2003 4:12
CTD- Stevenson Entr SE5	58° 39.50' N	152° 25.00' W	11.3	10	1.1	180	0.5	4/26/2003 5:19	4/26/2003 5:51
CTD- SE4	58° 42.20' N	152° 23.60' W	2.8	10	0.3	180	0.5	4/26/2003 6:08	4/26/2003 6:40
CTD- SE3	58° 44.60' N	152° 22.60' W	2.5	10	0.2	180	0.5	4/26/2003 6:55	4/26/2003 7:27
CTD- SE2	58° 47.00' N	152° 21.80' W	2.4	10	0.2	180	0.5	4/26/2003 7:42	4/26/2003 8:14
CTD- SE1	58° 49.70' N	152° 20.50' W	2.8	10	0.3	180	0.5	4/26/2003 8:30	4/26/2003 9:02

Activity	Latitude	Longitude	Dist. (nm)	Spd (kts)	Trans (hrs)	Approx Bott Depth (m)	On Stn (hrs)	Arrive (Local) Date/Time	Depart (Local) Date/Time
CTD- KE7	58° 59.00' N	152° 18.00' W	9.4	10	0.9	180	0.5	4/26/2003 9:59	4/26/2003 10:31
CTD- KE6	59° 01.20' N	152° 14.30' W	2.9	10	0.3	180	0.5	4/26/2003 10:48	4/26/2003 11:20
CTD- KE5	59° 03.60' N	152° 12.20' W	2.6	10	0.3	180	0.5	4/26/2003 11:36	4/26/2003 12:08
CTD- KE4	59° 06.60' N	152° 09.50' W	3.3	10	0.3	180	0.5	4/26/2003 12:28	4/26/2003 13:00
CTD- KE3	59° 08.30' N	152° 07.50' W	2.0	10	0.2	180	0.5	4/26/2003 13:12	4/26/2003 13:44
CTD- KE2	59° 11.60' N	152° 04.50' W	3.6	10	0.4	180	0.5	4/26/2003 14:05	4/26/2003 14:37
CTD- KE1	59° 14.00' N	152° 02.00' W	2.7	10	0.3	180	0.5	4/26/2003 14:54	4/26/2003 15:26
WX delays	58° 45.01' N	152° 00.00' W	29.0	12	2.4		8.5	4/26/2003 17:51	4/27/2003 2:21
Arrive Kodiak	57° 45.00' N	152° 29.60' W	13.2	11	1.2			4/27/2003 9:10	

9.3.2 KM0305 Leg 2 – Transect Station Locations

Station ID	Transect	Activity	Latitude	Longitude	Dist. (nm)	Spd (kts)	Transit (hrs)	Water Depth (m)	CTD Depth (m)	CTD Time (min)	Net Time (min)	Arrive Local Date/Time	Depart Local Date/Time
Kodiak Island, Alaska		Embark SCI	57° 43.72' N	152° 31.24' W		2							4/29/2003 8:00
SE5 - Stevenson Entrance (S-N)		ctd/bongo	58° 39.50' N	152° 25.00' W	3.0	10	0.3	55	50	23	30	4/29/2003 18:01	4/29/2003 18:54
SE4		ctd/bongo	58° 42.20' N	152° 23.60' W	2.8	10	0.3	142	137	29	26	4/29/2003 19:11	4/29/2003 20:06
SE3		ctd/bongo	58° 44.60' N	152° 22.60' W	2.5	10	0.2	100	95	26	26	4/29/2003 20:21	4/29/2003 21:13
SE2		ctd/bongo	58° 47.00' N	152° 21.80' W	2.4	10	0.2	133	128	29	26	4/29/2003 21:28	4/29/2003 22:22
SE1		ctd/bongo	58° 49.70' N	152° 20.50' W	2.8	10	0.3	69	59	24	26	4/29/2003 22:39	4/29/2003 23:29
KE7		ctd/bongo	58° 59.00' N	152° 18.00' W	2.3	10	0.2	87	77	25	26	4/30/2003 0:43	4/30/2003 1:34
KE6		ctd/bongo	59° 01.20' N	152° 14.30' W	2.9	10	0.3	122	112	27	26	4/30/2003 1:51	4/30/2003 2:45
KE5		ctd/bongo	59° 03.60' N	152° 12.20' W	2.6	10	0.3	131	121	28	26	4/30/2003 3:01	4/30/2003 3:55
KE4		ctd/bongo	59° 06.60' N	152° 09.50' W	3.3	10	0.3	149	139	29	26	4/30/2003 4:14	4/30/2003 5:10
KE3		ctd/bongo	59° 08.30' N	152° 07.50' W	2.0	10	0.2	140	130	29	26	4/30/2003 5:22	4/30/2003 6:16
KE2		ctd/bongo	59° 11.60' N	152° 04.50' W	3.6	10	0.4	95	85	26	26	4/30/2003 6:38	4/30/2003 7:30
KE1		ctd/bongo	59° 14.00' N	152° 02.00' W	2.7	10	0.3	73	63	24	26	4/30/2003 7:46	4/30/2003 8:36
GP0 - Gore Point (N-S)		ctd/bongo/calvet	59° 09.60' N	151° 00.50' W	14.2	10	1.4	82	77	25	26	4/30/2003 12:48	4/30/2003 13:39

Station ID	Transect	Activity	Latitude	Longitude	Dist. (nm)	Spd (kts)	Transit (hrs)	Water Depth (m)	CTD Depth (m)	CTD Time (min)	Net Time (min)	Arrive Local Date/Time	Depart Local Date/Time
GP1		ctd/bongo calvet	59° 06.00' N	150° 59.40' W	3.6	10	0.4	82	77	25	26	4/30/2003 14:01	4/30/2003 14:52
GP2		ctd/bongo calvet	59° 00.60' N	150° 57.60' W	5.5	10	0.5	82	77	25	26	4/30/2003 15:25	4/30/2003 16:16
GP3		ctd/bongo calvet	58° 57.00' N	150° 55.80' W	3.7	10	0.4	82	77	25	26	4/30/2003 16:38	4/30/2003 17:29
GP4		ctd/bongo calvet	58° 52.80' N	150° 54.00' W	4.3	10	0.4	82	77	25	26	4/30/2003 17:55	4/30/2003 18:46
GP5		ctd/bongo	58° 49.20' N	150° 52.80' W	3.7	10	0.4	82	77	25	26	4/30/2003 19:08	4/30/2003 19:59
GP6		ctd/bongo	58° 45.00' N	150° 52.00' W	4.2	10	0.4	82	77	25	26	4/30/2003 20:25	4/30/2003 21:16
GP6a		ctd/bongo	58° 40.20' N	150° 50.00' W	4.9	10	0.5	82	77	25	26	4/30/2003 21:45	4/30/2003 22:36
GP7		ctd/bongo	58° 35.40' N	150° 48.00' W	4.9	10	0.5	82	77	25	26	4/30/2003 23:06	4/30/2003 23:57
GP7a		ctd/bongo	58° 32.16' N	150° 46.57' W	3.3	10	0.3	82	77	25	26	5/1/2003 0:17	5/1/2003 1:08
GP7b/AP11 - Afognak-Portlock (E-W)		ctd/bongo	58° 28.92' N	150° 45.14' W	3.3	10	0.3	82	77	25	26	5/1/2003 1:28	5/1/2003 2:19
AP10		ctd/bongo	58° 28.13' N	150° 56.83' W	6.2	10	0.6	80	75	25	26	5/1/2003 2:56	5/1/2003 3:47
AP9		ctd/bongo	58° 27.34' N	151° 08.51' W	6.2	10	0.6	67	62	24	26	5/1/2003 4:24	5/1/2003 5:14
AP8		ctd/bongo	58° 26.54' N	151° 20.20' W	6.2	10	0.6	64	59	24	26	5/1/2003 5:51	5/1/2003 6:41
AP7		ctd/bongo	58° 25.75' N	151° 31.88' W	6.2	10	0.6	95	90	26	26	5/1/2003 7:18	5/1/2003 8:10
AP6		ctd/bongo	58° 24.96' N	151° 43.57' W	6.2	10	0.6	109	104	27	26	5/1/2003 8:47	5/1/2003 9:40
CBA9 - Outer (NE-SW)		ctd/bongo	57° 32.50' N	151° 02.00' W	56.9	10	5.7	76	66	24	26	5/1/2003 15:21	5/1/2003 16:12
CBA8		ctd/bongo	57° 30.00' N	151° 10.00' W	5.0	10	0.5	76	81	25	26	5/1/2003 16:42	5/1/2003 17:33
CBA7		ctd/bongo calvet	57° 27.30' N	151° 16.20' W	4.3	10	0.4	91	127	28	26	5/1/2003 17:59	5/1/2003 18:53
CBA6		ctd/bongo calvet	57° 25.80' N	151° 18.60' W	2.0	10	0.2	137	172	31	26	5/1/2003 19:05	5/1/2003 20:03
CBA5		ctd/bongo	57° 24.20' N	151° 21.70' W	2.3	10	0.2	182	127	28	26	5/1/2003 20:17	5/1/2003 21:11
CBA4		ctd/bongo	57° 22.50' N	151° 25.00' W	2.5	10	0.2	137	81	25	26	5/1/2003 21:26	5/1/2003 22:17
CBA3		ctd/bongo	57° 20.70' N	151° 28.50' W	2.6	10	0.3	91	57.34	24	26	5/1/2003 22:33	5/1/2003 23:23
CBA2		ctd/bongo	57° 18.30' N	151° 33.00' W	3.4	10	0.3	67	52	23	26	5/1/2003 23:43	5/2/2003 0:33
CBA1		ctd/bongo	57° 16.80' N	151° 37.20' W	2.7	10	0.3	62	57	24	26	5/2/2003 0:49	5/2/2003 1:39
CBB1	SW-NE	ctd/bongo	57° 22.70' N	151° 43.00' W	6.7	10	0.7	67	65	24	26	5/2/2003 2:19	5/2/2003 3:09
CBB2		ctd/bongo	57° 24.89' N	151° 38.55' W	3.2	10	0.3	75	83	26	26	5/2/2003 3:29	5/2/2003 4:20
CBB3		ctd/bongo	57° 26.49' N	151° 35.46' W	2.3	10	0.2	93	117	28	26	5/2/2003 4:34	5/2/2003 5:28
CBB4		ctd/bongo	57° 28.01' N	151° 32.77' W	2.1	10	0.2	127	139	29	26	5/2/2003 5:40	5/2/2003 6:36
CBB5		ctd/bongo	57° 29.20' N	151° 30.50' W	1.7	10	0.2	149	139	29	26	5/2/2003 6:46	5/2/2003 7:41
CBB6		ctd/bongo	57° 30.70' N	151° 28.20' W	1.9	10	0.2	124	114	28	26	5/2/2003 7:53	5/2/2003 8:46
CBB7		ctd/bongo	57° 31.50' N	151° 26.50' W	1.2	10	0.1	91	81	25	26	5/2/2003 8:54	5/2/2003 9:45
CBB8		ctd/bongo	57° 34.30' N	151° 21.20' W	4.0	10	0.4	62	52	23	26	5/2/2003 10:09	5/2/2003 10:58
CBB9		ctd/bongo	57° 36.00' N	151° 17.30' W	2.7	10	0.3	56	46	23	26	5/2/2003 11:15	5/2/2003 12:04

Station ID	Transect	Activity	Latitude	Longitude	Dist. (nm)	Spd (kts)	Transit (hrs)	Water Depth (m)	CTD Depth (m)	CTD Time (min)	Net Time (min)	Arrive Local Date/Time	Depart Local Date/Time
CBC9	NE-SW	ctd/bongo	57° 43.00' N	151° 34.50' W	11.6	10	1.2	67	57	24	26	5/2/2003 13:13	5/2/2003 14:03
CBC8		ctd/bongo	57° 40.30' N	151° 38.00' W	3.3	10	0.3	75	65	24	26	5/2/2003 14:23	5/2/2003 15:13
CBC7		ctd/bongo	57° 37.00' N	151° 41.30' W	3.7	10	0.4	93	83	26	26	5/2/2003 15:35	5/2/2003 16:27
CBC6		ctd/bongo	57° 35.20' N	151° 43.00' W	2.0	10	0.2	127	117	28	26	5/2/2003 16:39	5/2/2003 17:33
CBC5		ctd/bongo	57° 33.70' N	151° 45.00' W	1.8	10	0.2	149	139	29	26	5/2/2003 17:44	5/2/2003 18:39
CBC4		ctd/bongo	57° 31.80' N	151° 47.00' W	2.2	10	0.2	64	54	24	26	5/2/2003 18:52	5/2/2003 19:42
CBC3		ctd/bongo	57° 30.30' N	151° 49.00' W	1.8	10	0.2	91	81	25	26	5/2/2003 19:53	5/2/2003 20:44
CBC2		ctd/bongo	57° 26.92' N	151° 52.39' W	3.8	10	0.4	60	50	23	26	5/2/2003 21:07	5/2/2003 21:57
CBC1		ctd/bongo	57° 22.50' N	151° 56.20' W	4.9	10	0.5	56	46	23	26	5/2/2003 22:26	5/2/2003 23:15
CC1 - Cape Chiniak (W-E)		ctd/bongo	57° 39.00' N	152° 04.80' W	17.1	10	1.7	27	40	23	26	5/3/2003 0:58	5/3/2003 1:47
CC2		ctd/bongo	57° 39.60' N	152° 03.00' W	1.1	10	0.1	91	90	26	26	5/3/2003 1:53	5/3/2003 2:45
CC3		ctd/bongo	57° 40.28' N	152° 00.45' W	1.5	10	0.2	182	80	25	26	5/3/2003 2:54	5/3/2003 3:46
CC4		ctd/bongo	57° 40.80' N	151° 58.20' W	1.3	10	0.1	164	55	24	26	5/3/2003 3:54	5/3/2003 4:43
CC5		ctd/bongo	57° 41.50' N	151° 56.40' W	1.2	10	0.1	118	40	23	26	5/3/2003 4:50	5/3/2003 5:39
CC6		ctd/bongo	57° 42.00' N	151° 54.30' W	1.2	10	0.1	91	16	21	26	5/3/2003 5:47	5/3/2003 6:34
CC7		ctd/bongo	57° 43.20' N	151° 49.80' W	2.7	10	0.3	47	18	21	26	5/3/2003 6:50	5/3/2003 7:37
CC8		ctd/bongo	57° 45.00' N	151° 43.00' W	4.1	10	0.4	51	41	23	26	5/3/2003 8:01	5/3/2003 8:50
MA8 - Marmot-Albatross (SE-NW)		ctd/bongo	57° 52.60' N	151° 36.10' W	8.4	10	0.8		-10	19	26	5/3/2003 9:41	5/3/2003 10:26
MA7		ctd/bongo	57° 55.20' N	151° 37.30' W	2.7	10	0.3		-10	19	26	5/3/2003 10:42	5/3/2003 11:27
MA6		ctd/bongo	57° 57.80' N	151° 40.00' W	3.0	10	0.3		-10	19	26	5/3/2003 11:45	5/3/2003 12:30
MA5		ctd/bongo	57° 59.70' N	151° 42.00' W	2.2	10	0.2		-10	19	26	5/3/2003 12:44	5/3/2003 13:29
MA4		ctd/bongo	58° 01.80' N	151° 43.70' W	2.3	10	0.2		-10	19	26	5/3/2003 13:43	5/3/2003 14:28
MA3		ctd/bongo	58° 04.20' N	151° 45.60' W	2.6	10	0.3		-10	19	26	5/3/2003 14:44	5/3/2003 15:29
MA2		ctd/bongo	58° 07.50' N	151° 47.50' W	3.4	10	0.3		-10	19	26	5/3/2003 15:50	5/3/2003 16:35
MA1		ctd/bongo	58° 08.30' N	151° 48.80' W	1.1	10	0.1		-10	19	26	5/3/2003 16:41	5/3/2003 17:27
UST1 - Upper Stevenson Tr. (W-E)		ctd/bongo	58° 18.00' N	151° 11.10' W	22.1	10	2.2	76	66	24	26	5/3/2003 19:39	5/3/2003 20:30
UST2		ctd/bongo	58° 16.00' N	151° 06.00' W	3.3	10	0.3	91	81	25	26	5/3/2003 20:50	5/3/2003 21:41
UST3		ctd/bongo	58° 17.40' N	151° 01.50' W	2.7	10	0.3	127	117	28	26	5/3/2003 21:58	5/3/2003 22:51
UST4		ctd/bongo	58° 18.30' N	150° 59.70' W	1.3	10	0.1	91	81	25	26	5/3/2003 22:59	5/3/2003 23:51
UST5		ctd/bongo	58° 20.90' N	150° 57.00' W	3.0	10	0.3	55	45	23	26	5/4/2003 0:08	5/4/2003 0:57
pbb12/PBST1	N-S	ctd/bongo	58° 39.00' N	150° 33.80' W	21.8	10	2.2	217	207	31	26	5/4/2003 3:08	5/4/2003 4:05
STD2		ctd/bongo	58° 34.00' N	150° 34.50' W	5.0	10	0.5	182	172	31	26	5/4/2003 4:35	5/4/2003 5:33
STD3		ctd/bongo	58° 29.70' N	150° 37.00' W	4.5	10	0.4	91	81	25	26	5/4/2003 5:59	5/4/2003 6:51

Station ID	Transect	Activity	Latitude	Longitude	Dist. (nm)	Spd (kts)	Transit (hrs)	Water Depth (m)	CTD Depth (m)	CTD Time (min)	Net Time (min)	Arrive Local Date/Time	Depart Local Date/Time
STD4		ctd/bongo	58° 25.20' N	150° 39.00' W	4.6	10	0.5	69	59	24	26	5/4/2003 7:19	5/4/2003 8:09
STD5	N-S	ctd/bongo	58° 19.40' N	150° 41.50' W	5.9	10	0.6	60	50	23	26	5/4/2003 8:44	5/4/2003 9:34
STD6		ctd/bongo	58° 15.10' N	150° 42.20' W	4.3	10	0.4	67	57	24	26	5/4/2003 9:59	5/4/2003 10:49
STD7		ctd/bongo	58° 12.00' N	150° 44.30' W	3.3	10	0.3	91	81	25	26	5/4/2003 11:09	5/4/2003 12:00
STD8		ctd/bongo	58° 07.60' N	150° 46.00' W	4.5	10	0.4	135	125	28	26	5/4/2003 12:27	5/4/2003 13:22
STD9		ctd/bongo	58° 04.00' N	150° 47.30' W	3.7	10	0.4	169	159	31	26	5/4/2003 13:44	5/4/2003 14:40
STD10		ctd/bongo	58° 00.00' N	150° 49.30' W	4.1	10	0.4	140	130	29	26	5/4/2003 15:05	5/4/2003 16:00
STD11		ctd/bongo	57° 55.50' N	150° 51.00' W	4.6	10	0.5	91	81	25	26	5/4/2003 16:27	5/4/2003 17:19
STD12		ctd/bongo	57° 51.50' N	150° 52.00' W	4.0	10	0.4	80	70	25	26	5/4/2003 17:43	5/4/2003 18:34
STD13		ctd/bongo	57° 43.50' N	150° 55.00' W	8.2	10	0.8	80	70	25	26	5/4/2003 19:23	5/4/2003 20:13
PBA13	S-N	ctd/bongo	57° 48.60' N	150° 30.00' W	14.3	10	1.4	49	39	23	26	5/4/2003 21:39	5/4/2003 22:27
PBA12		ctd/bongo	57° 52.70' N	150° 27.50' W	4.3	10	0.4	91	81	25	26	5/4/2003 22:53	5/4/2003 23:45
PBA11		ctd/bongo	57° 56.90' N	150° 25.70' W	4.3	10	0.4	98	88	26	26	5/5/2003 0:11	5/5/2003 1:02
PBA10		ctd/bongo	58° 01.00' N	150° 24.00' W	4.2	10	0.4	158	148	30	26	5/5/2003 1:28	5/5/2003 2:24
PBA7		ctd/bongo	58° 13.30' N	150° 20.00' W	12.5	10	1.2	0	-10	19	26	5/5/2003 3:38	5/5/2003 4:24
PBA8		ctd/bongo	58° 09.10' N	150° 21.30' W	4.3	10	0.4	218	208	31	26	5/5/2003 4:49	5/5/2003 5:46
PBA9		ctd/bongo	58° 06.90' N	150° 22.00' W	2.2	10	0.2	182	172	31	26	5/5/2003 6:00	5/5/2003 6:57
PBA7		ctd/bongo	58° 13.30' N	150° 20.00' W	6.5	10	0.6	91	81	25	26	5/5/2003 7:36	5/5/2003 8:27
PBA6		ctd/bongo	58° 18.00' N	150° 18.00' W	4.8	10	0.5	80	70	25	26	5/5/2003 8:56	5/5/2003 9:47
PBA5		ctd/bongo	58° 21.80' N	150° 16.90' W	3.8	10	0.4	49	39	23	26	5/5/2003 10:10	5/5/2003 10:59
STB1	N-S	ctd/bongo	58° 13.50' N	149° 36.30' W	22.9	10	2.3	40	30	22	26	5/5/2003 13:16	5/5/2003 14:04
STB2		ctd/bongo	58° 10.40' N	149° 40.00' W	3.7	10	0.4	50	40	23	26	5/5/2003 14:26	5/5/2003 15:15
STB3		ctd/bongo	58° 07.20' N	149° 44.30' W	3.9	10	0.4	100	90	26	26	5/5/2003 15:38	5/5/2003 16:30
STB4		ctd/bongo	58° 03.10' N	149° 49.00' W	4.8	10	0.5	1220	1210	73	26	5/5/2003 16:59	5/5/2003 18:38
STB5		ctd/bongo	57° 58.80' N	149° 54.40' W	5.2	10	0.5	130	120	28	26	5/5/2003 19:09	5/5/2003 20:03
STB6		ctd/bongo	57° 54.20' N	150° 00.00' W	5.5	10	0.5	130	120	28	26	5/5/2003 20:36	5/5/2003 21:30
STB7		ctd/bongo	57° 50.00' N	150° 05.10' W	5.0	10	0.5	118	108	27	26	5/5/2003 22:00	5/5/2003 22:53
STB8		ctd/bongo	57° 46.80' N	150° 09.30' W	3.9	10	0.4	100	90	26	26	5/5/2003 23:17	5/6/2003 0:09
STB9/STA1	SW-NE	ctd/bongo	57° 42.29' N	150° 14.34' W	5.3	10	0.5	70	60	24	26	5/6/2003 0:40	5/6/2003 1:30
STA2		ctd/bongo	57° 44.20' N	150° 07.00' W	4.4	10	0.4	100	90	26	26	5/6/2003 1:57	5/6/2003 2:49
STA3		ctd/bongo	57° 48.50' N	149° 52.80' W	8.7	10	0.9	145	135	29	26	5/6/2003 3:41	5/6/2003 4:36
STA4		ctd/bongo	57° 52.70' N	149° 41.00' W	7.6	10	0.8	100	90	26	26	5/6/2003 5:21	5/6/2003 6:13
STA5		ctd/bongo	57° 55.00' N	149° 34.70' W	4.1	10	0.4	65	55	24	26	5/6/2003 6:37	5/6/2003 7:27

Station ID	Transect	Activity	Latitude	Longitude	Dist. (nm)	Spd (kts)	Transit (hrs)	Water Depth (m)	CTD Depth (m)	CTD Time (min)	Net Time (min)	Arrive Local Date/Time	Depart Local Date/Time
STA6		ctd/bongo	57° 57.00' N	149° 28.20' W	4.0	10	0.4	200	190	33	26	5/6/2003 7:51	5/6/2003 8:50
STA7		ctd/bongo	57° 59.00' N	149° 25.00' W	2.6	10	0.3	300	290	34	26	5/6/2003 9:05	5/6/2003 10:06
STA8		ctd/bongo	58° 01.30' N	149° 17.20' W	4.7	10	0.5	100	90	26	26	5/6/2003 10:34	5/6/2003 11:26
STA9		ctd/bongo calvet	58° 03.80' N	149° 10.20' W	4.5	10	0.4	73	63	24	26	5/6/2003 11:53	5/6/2003 12:43
STA10/SAB1		ctd/bongo calvet	58° 06.00' N	149° 04.30' W	3.8	10	0.4	47	37	22	26	5/6/2003 13:06	5/6/2003 13:55
SAB2		ctd/bongo	58° 13.60' N	149° 01.50' W	7.7	10	0.8	70	60	24	26	5/6/2003 14:41	5/6/2003 15:31
SAB3		ctd/bongo	58° 21.20' N	148° 58.70' W	7.7	10	0.8	70	60	24	26	5/6/2003 16:18	5/6/2003 17:08
SAB4		ctd/bongo	58° 28.40' N	148° 55.90' W	7.3	10	0.7	70	60	24	26	5/6/2003 17:52	5/6/2003 18:42
ATB7 - Amatuli-B (S-N)		ctd/bongo	58° 36.75' N	148° 53.00' W	8.5	10	0.8	70	60	24	26	5/6/2003 19:33	5/6/2003 20:23
GB-12		ctd/bongo	58° 42.00' N	148° 51.00' W	5.4	10	0.5	70	60	24	26	5/6/2003 20:55	5/6/2003 21:45
ATB5		ctd/bongo	58° 47.75' N	148° 49.00' W	5.8	10	0.6	70	60	24	26	5/6/2003 22:20	5/6/2003 23:10
GB-11		ctd/bongo	58° 53.50' N	148° 47.00' W	5.8	10	0.6	70	60	24	26	5/6/2003 23:45	5/7/2003 0:35
ATB3		ctd/bongo	58° 58.00' N	148° 44.25' W	4.7	10	0.5	70	60	24	26	5/7/2003 1:03	5/7/2003 1:53
GB5/GAK6i=ATB1		ctd/bongo	59° 02.50' N	148° 41.50' W	4.7	10	0.5	70	60	24	26	5/7/2003 2:21	5/7/2003 3:11
ATB1		ctd/bongo	59° 07.00' N	148° 38.90' W	4.7	10	0.5	70	60	24	26	5/7/2003 3:40	5/7/2003 4:30
ATB0	N-S	ctd/bongo	59° 11.50' N	148° 36.20' W	4.7	10	0.5	70	60	24	26	5/7/2003 4:58	5/7/2003 5:48
ATB1		ctd/bongo	59° 07.00' N	148° 38.90' W	4.7	10	0.5	70	60	24		5/7/2003 6:16	5/7/2003 6:40
GB5/GAK6i=ATB1		ctd/bongo	59° 02.50' N	148° 41.50' W	4.7	10	0.5	70	60	24		5/7/2003 7:08	5/7/2003 7:32
ATB3		ctd/bongo	58° 58.00' N	148° 44.25' W	4.7	10	0.5	70	60	24		5/7/2003 8:01	5/7/2003 8:25
GB-11		ctd/bongo	58° 53.50' N	148° 47.00' W	4.7	10	0.5	70	60	24		5/7/2003 8:53	5/7/2003 9:17
ATB5		ctd/bongo	58° 47.75' N	148° 49.00' W	5.8	10	0.6	70	60	24		5/7/2003 9:52	5/7/2003 10:16
GB-12		ctd/bongo	58° 42.00' N	148° 51.00' W	5.8	10	0.6	70	60	24		5/7/2003 10:51	5/7/2003 11:15
ATB7		ctd/bongo	58° 36.75' N	148° 53.00' W	5.4	10	0.5	70	60	24		5/7/2003 11:47	5/7/2003 12:11
SAB4	S-N	ctd/bongo	58° 28.40' N	148° 55.90' W	8.5	10	0.8	70	60	24		5/7/2003 13:02	5/7/2003 13:26
ATB7		ctd/bongo	58° 36.75' N	148° 53.00' W	8.5	10	0.8	70	60	24		5/7/2003 14:17	5/7/2003 14:41
GB-12		ctd/bongo	58° 42.00' N	148° 51.00' W	5.4	10	0.5	70	60	24		5/7/2003 15:13	5/7/2003 15:37
ATB5		ctd/bongo	58° 47.75' N	148° 49.00' W	5.8	10	0.6	70	60	24		5/7/2003 16:12	5/7/2003 16:36
GB-11		ctd/bongo	58° 53.50' N	148° 47.00' W	5.8	10	0.6	70	60	24		5/7/2003 17:11	5/7/2003 17:35
ATB3		ctd/bongo	58° 58.00' N	148° 44.25' W	4.7	10	0.5	70	60	24		5/7/2003 18:04	5/7/2003 18:28
GB5/GAK6i=ATB1		ctd/bongo	59° 02.50' N	148° 41.50' W	4.7	10	0.5	70	60	24		5/7/2003 18:56	5/7/2003 19:20
ATB1		ctd/bongo	59° 07.00' N	148° 38.90' W	4.7	10	0.5	70	60	24		5/7/2003 19:48	5/7/2003 20:12
ATB0		ctd/bongo	59° 11.50' N	148° 36.20' W	4.7	10	0.5	70	60	24		5/7/2003 20:40	5/7/2003 21:04
ATD10 - Amatuli-D (N-S)		ctd/bongo	59° 14.10' N	149° 40.00' W	32.8	10	3.3	70	60	24	26	5/8/2003 0:21	5/8/2003 1:11

Station ID	Transect	Activity	Latitude	Longitude	Dist. (nm)	Spd (kts)	Transit (hrs)	Water Depth (m)	CTD Depth (m)	CTD Time (min)	Net Time (min)	Arrive Local Date/Time	Depart Local Date/Time
ATD9		ctd/bongo calvet	59° 09.70' N	149° 38.50' W	4.5	10	0.4	70	60	24	26	5/8/2003 1:38	5/8/2003 2:28
ATD8		ctd/bongo calvet	59° 06.80' N	149° 37.30' W	3.0	10	0.3	70	60	24	26	5/8/2003 2:45	5/8/2003 3:35
ATD7		ctd/bongo calvet	59° 02.00' N	149° 35.80' W	4.9	10	0.5	70	60	24	26	5/8/2003 4:05	5/8/2003 4:55
ATD6		ctd/bongo	58° 56.60' N	149° 34.10' W	5.5	10	0.5	70	60	24	26	5/8/2003 5:27	5/8/2003 6:17
ATD5		ctd/bongo	58° 51.40' N	149° 32.00' W	5.3	10	0.5	70	60	24	26	5/8/2003 6:49	5/8/2003 7:39
ATD4		ctd/bongo	58° 47.00' N	149° 30.00' W	4.5	10	0.5	70	60	24	26	5/8/2003 8:06	5/8/2003 8:56
ATD3		ctd/bongo	58° 42.50' N	149° 28.00' W	4.6	10	0.5	70	60	24	26	5/8/2003 9:24	5/8/2003 10:14
ATD2		ctd/bongo	58° 39.00' N	149° 27.00' W	3.5	10	0.4	70	60	24	26	5/8/2003 10:35	5/8/2003 11:25
ATD1	S-N	ctd/bongo	58° 34.50' N	149° 25.80' W	4.5	10	0.5	70	60	24	26	5/8/2003 11:53	5/8/2003 12:43
ATD2		ctd/bongo	58° 39.00' N	149° 27.00' W	4.5	10	0.5	70	60	24		5/8/2003 13:10	5/8/2003 13:34
ATD3		ctd/bongo	58° 42.50' N	149° 28.00' W	3.5	10	0.4	70	60	24		5/8/2003 13:55	5/8/2003 14:19
ATD4		ctd/bongo	58° 47.00' N	149° 30.00' W	4.6	10	0.5	70	60	24		5/8/2003 14:47	5/8/2003 15:11
ATD5		ctd/bongo	58° 51.40' N	149° 32.00' W	4.5	10	0.5	70	60	24		5/8/2003 15:38	5/8/2003 16:02
ATD6		ctd/bongo	58° 56.60' N	149° 34.10' W	5.3	10	0.5	70	60	24		5/8/2003 16:34	5/8/2003 16:58
ATD7		ctd/bongo calvet	59° 02.00' N	149° 35.80' W	5.5	10	0.5	70	60	24		5/8/2003 17:31	5/8/2003 17:55
ATD8		ctd/bongo calvet	59° 06.80' N	149° 37.30' W	4.9	10	0.5	70	60	24		5/8/2003 18:24	5/8/2003 18:48
ATD9		ctd/bongo calvet	59° 09.70' N	149° 38.50' W	3.0	10	0.3	70	60	24		5/8/2003 19:06	5/8/2003 19:30
ATD10	N-S	ctd/bongo	59° 14.10' N	149° 40.00' W	4.5	10	0.4	70	60	24		5/8/2003 19:56	5/8/2003 20:20
ATD9		ctd/bongo calvet	59° 09.70' N	149° 38.50' W	4.5	10	0.4	70	60	24		5/8/2003 20:47	5/8/2003 21:11
ATD8		ctd/bongo calvet	59° 06.80' N	149° 37.30' W	3.0	10	0.3	70	60	24		5/8/2003 21:29	5/8/2003 21:53
ATD7		ctd/bongo calvet	59° 02.00' N	149° 35.80' W	4.9	10	0.5	70	60	24		5/8/2003 22:22	5/8/2003 22:46
ATD6		ctd/bongo	58° 56.60' N	149° 34.10' W	5.5	10	0.5	70	60	24		5/8/2003 23:19	5/8/2003 23:43
ATD5		ctd/bongo	58° 51.40' N	149° 32.00' W	5.3	10	0.5	70	60	24		5/9/2003 0:15	5/9/2003 0:39
ATD4		ctd/bongo	58° 47.00' N	149° 30.00' W	4.5	10	0.5	70	60	24		5/9/2003 1:06	5/9/2003 1:30
ATD3		ctd/bongo	58° 42.50' N	149° 28.00' W	4.6	10	0.5	70	60	24		5/9/2003 1:58	5/9/2003 2:22
ATD2		ctd/bongo	58° 39.00' N	149° 27.00' W	3.5	10	0.4	70	60	24		5/9/2003 2:43	5/9/2003 3:07
ATD1		ctd/bongo	58° 34.50' N	149° 25.80' W	4.5	10	0.5	70	60	24		5/9/2003 3:34	5/9/2003 3:58
ATE5 - Amatuli-E (S-N)		ctd/bongo	58° 45.67' N	150° 09.71' W	25.4	10	2.5	70	60	24	26	5/9/2003 6:31	5/9/2003 7:21
ATE4		ctd/bongo	58° 51.10' N	150° 08.24' W	5.5	10	0.5	70	60	24	26	5/9/2003 7:54	5/9/2003 8:44
ATE3		ctd/bongo	58° 56.53' N	150° 06.76' W	5.5	10	0.5	70	60	24	26	5/9/2003 9:16	5/9/2003 10:06
ATE2		ctd/bongo	59° 01.97' N	150° 05.28' W	5.5	10	0.5	70	60	24	26	5/9/2003 10:39	5/9/2003 11:29
ATE1 - Amatuli-E (N-S)		ctd/bongo	59° 07.40' N	150° 03.80' W	5.5	10	0.5	70	60	24	26	5/9/2003 12:02	5/9/2003 12:52
ATE2		ctd/bongo	59° 01.97' N	150° 05.28' W	5.5	10	0.5	70	60	24	26	5/9/2003 13:25	5/9/2003 14:15

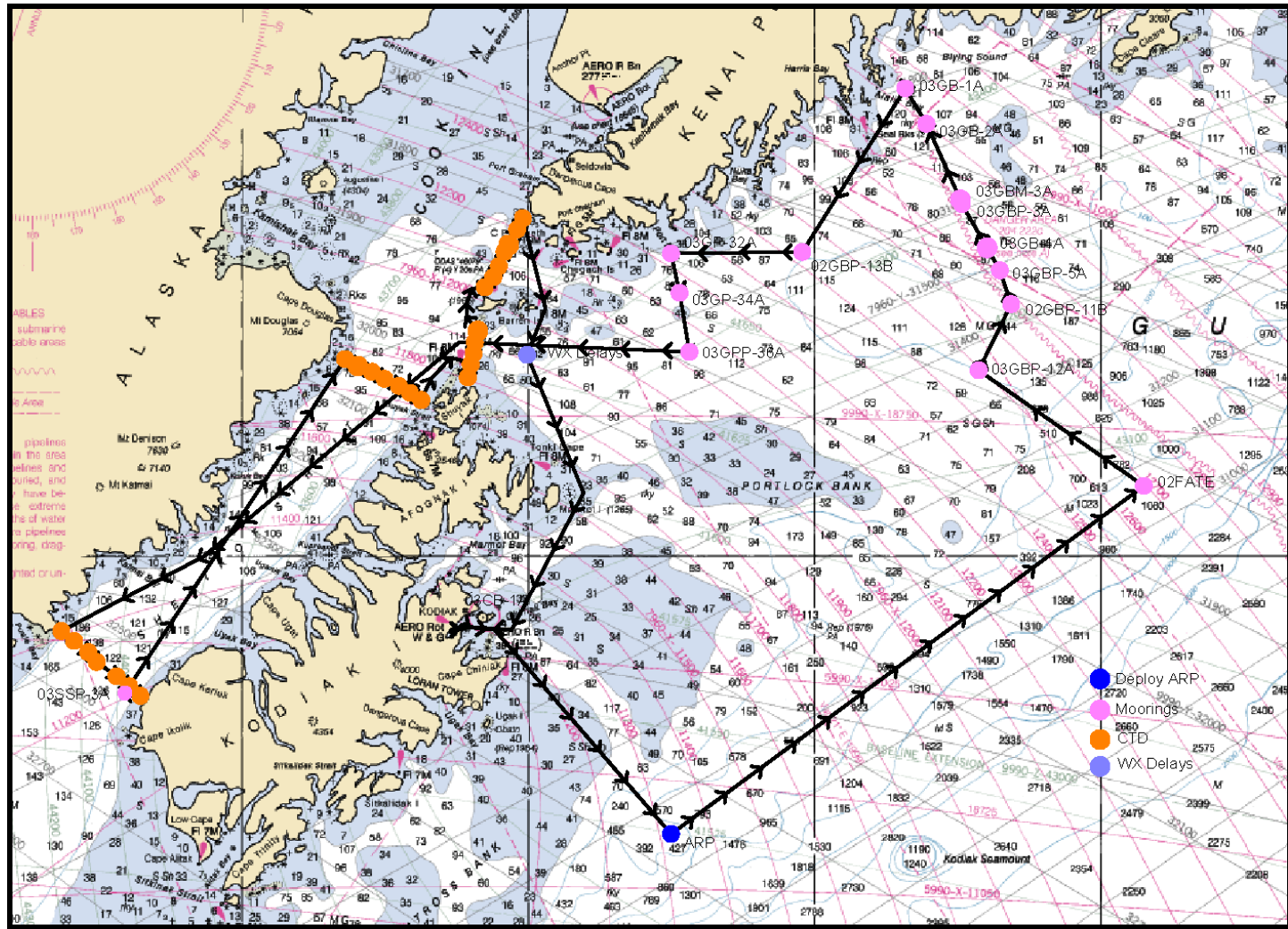
Station ID	Transect	Activity	Latitude	Longitude	Dist. (nm)	Spd (kts)	Transit (hrs)	Water Depth (m)	CTD Depth (m)	CTD Time (min)	Net Time (min)	Arrive Local Date/Time	Depart Local Date/Time
ATE3		ctd/bongo	58° 56.53' N	150° 06.76' W	5.5	10	0.5	70	60	24	26	5/9/2003 14:48	5/9/2003 15:38
ATE4		ctd/bongo	58° 51.10' N	150° 08.24' W	5.5	10	0.5	70	60	24	26	5/9/2003 16:11	5/9/2003 17:01
ATE5 - Amatuli-E (S-N)		ctd/bongo	58° 45.67' N	150° 09.71' W	5.5	10	0.5	70	60	24	26	5/9/2003 17:34	5/9/2003 18:24
ATE4		ctd/bongo	58° 51.10' N	150° 08.24' W	5.5	10	0.5	70	60	24	26	5/9/2003 18:57	5/9/2003 19:47
ATE3		ctd/bongo	58° 56.53' N	150° 06.76' W	5.5	10	0.5	70	60	24	26	5/9/2003 20:20	5/9/2003 21:10
ATE2		ctd/bongo	59° 01.97' N	150° 05.28' W	5.5	10	0.5	70	60	24	26	5/9/2003 21:43	5/9/2003 22:33
ATE1		ctd/bongo	59° 07.40' N	150° 03.80' W	5.5	10	0.5	70	60	24	26	5/9/2003 23:06	5/9/2003 23:56
KCW1 - Kenai-Chloro Wall (W-E)		ctd/bongo	58° 39.40' N	150° 48.28' W	36.2	10	3.6	70	60	24	24	5/10/2003 3:33	5/10/2003 4:21
KCW2		ctd/bongo	58° 41.62' N	150° 37.19' W	6.2	10	0.6	70	60	24	24	5/10/2003 4:58	5/10/2003 5:46
KCW3		ctd/bongo	58° 43.83' N	150° 26.09' W	6.2	10	0.6	70	60	24	24	5/10/2003 6:23	5/10/2003 7:11
KCW4		ctd/bongo	58° 46.05' N	150° 14.98' W	6.2	10	0.6	70	60	24	24	5/10/2003 7:48	5/10/2003 8:36
KCW5		ctd/bongo	58° 48.27' N	150° 03.86' W	6.2	10	0.6	70	60	24	24	5/10/2003 9:13	5/10/2003 10:01
KCW6		ctd/bongo	58° 50.48' N	149° 52.73' W	6.2	10	0.6	70	60	24	24	5/10/2003 10:38	5/10/2003 11:26
KCW7		ctd/bongo	58° 52.70' N	149° 41.58' W	6.2	10	0.6	70	60	24	200	5/10/2003 12:03	5/10/2003 15:47
KCW8		ctd/bongo	58° 54.91' N	149° 30.42' W	6.2	10	0.6	70	60	24	24	5/10/2003 16:24	5/10/2003 17:12
KCW9		ctd/bongo	58° 57.13' N	149° 19.25' W	6.2	10	0.6	70	60	24	24	5/10/2003 17:49	5/10/2003 18:37
KCW10		ctd/bongo	58° 59.35' N	149° 08.07' W	6.2	10	0.6	70	60	24	24	5/10/2003 19:14	5/10/2003 20:02
KCW11		ctd/bongo	59° 01.56' N	148° 56.88' W	6.2	10	0.6	70	60	24	24	5/10/2003 20:39	5/10/2003 21:27
KCW12		ctd/bongo	59° 03.78' N	148° 45.68' W	6.2	10	0.6	70	60	24	24	5/10/2003 22:05	5/10/2003 22:53
KCW13	End Chl-Wall	ctd/bongo	59° 06.00' N	148° 34.46' W	6.2	10	0.6	70	60	24	100	5/10/2003 23:30	5/11/2003 1:34
Seward	Touch and Go		60° 06.30' N	149° 25.27' W	0.8	2	0.4				120	5/11/2003 8:55	5/11/2003 10:55
Start of eddy study-ENW1	Last Years EDDY- for an example	ctd	58° 17.30' N	148° 49.50' W	89.1	10	8.9	50	40	23		5/11/2003 22:17	5/11/2003 22:39
ENW2		ctd	58° 10.90' N	148° 40.50' W	8.0	10	0.8	90	80	25		5/11/2003 23:27	5/11/2003 23:53
ENW3		ctd	58° 07.70' N	148° 30.00' W	6.4	10	0.6	2010	2000	107		5/12/2003 0:31	5/12/2003 2:18
ENW4		ctd	58° 03.20' N	148° 17.00' W	8.2	10	0.8	2010	2000	107		5/12/2003 3:07	5/12/2003 4:54
ENW5	Drifter	ctd	57° 58.50' N	147° 57.00' W	11.6	10	1.2	2010	2000	107		5/12/2003 6:03	5/12/2003 7:50
ENW6	center Drifter	ctd	57° 55.00' N	147° 43.00' W	8.2	10	0.8	2010	2000	107		5/12/2003 8:39	5/12/2003 10:26
ENW7		ctd	57° 52.23' N	147° 31.83' W	6.6	10	0.7	2010	2000	107		5/12/2003 11:05	5/12/2003 12:52
ENW8		ctd	57° 49.45' N	147° 20.66' W	6.6	10	0.7	2010	2000	107		5/12/2003 13:31	5/12/2003 15:18
ENW9		ctd	57° 46.68' N	147° 09.50' W	6.6	10	0.7	2010	2000	107		5/12/2003 15:57	5/12/2003 17:44
ENW10		ctd	57° 43.90' N	146° 58.33' W	6.6	10	0.7	2010	2000	107		5/12/2003 18:23	5/12/2003 20:10
EO1	Eddy-outer	ctd	57° 41.13' N	146° 47.16' W	6.6	10	0.7	2010	2000	107		5/12/2003 20:49	5/12/2003 22:36

Station ID	Transect	Activity	Latitude	Longitude	Dist. (nm)	Spd (kts)	Transit (hrs)	Water Depth (m)	CTD Depth (m)	CTD Time (min)	Net Time (min)	Arrive Local Date/Time	Depart Local Date/Time
EN2 then add stations for full X-pattern		ctd	58° 15.20' N	147° 41.00' W	44.5	10	4.4	2010	2000	107	600	5/13/2003 3:03	5/13/2003 14:49
EN3	Eddy N	ctd	58° 30.16' N	147° 41.00' W	15.0	10	1.5	2010	2000	107		5/13/2003 16:19	5/13/2003 18:06
EN4		ctd	58° 45.13' N	147° 41.00' W	15.0	10	1.5	2010	2000	107		5/13/2003 19:36	5/13/2003 21:22
EN5		ctd	59° 00.09' N	147° 41.00' W	15.0	10	1.5	2010	2000	107		5/13/2003 22:52	5/14/2003 0:39
EN6		ctd	59° 10.07' N	147° 41.00' W	10.0	10	1	2010	2000	107		5/14/2003 1:39	5/14/2003 3:25
EN7		ctd	59° 20.04' N	147° 41.00' W	10.0	10	1	2010	1980	106		5/14/2003 4:25	5/14/2003 6:11
~2.0 Days more of Eddy Study											2800	5/14/2003 6:11	5/16/2003 4:51
SE5 - Stevenson Entrance (S-N)		ctd	58° 39.50' N	152° 25.00' W	151.8	10	15.2	55	50	23		5/16/2003 20:02	5/16/2003 20:25
SE4		ctd	58° 42.20' N	152° 23.60' W	2.8	10	0.3	142	137	29		5/16/2003 20:42	5/16/2003 21:11
SE3		ctd	58° 44.60' N	152° 22.60' W	2.5	10	0.2	100	95	26		5/16/2003 21:25	5/16/2003 21:52
SE2		ctd	58° 47.00' N	152° 21.80' W	2.4	10	0.2	133	128	29		5/16/2003 22:06	5/16/2003 22:35
SE1	S-N	ctd	58° 49.70' N	152° 20.50' W	2.8	10	0.3	69	59	24		5/16/2003 22:52	5/16/2003 23:16
KE7		ctd	58° 59.00' N	152° 18.00' W	2.3	10	0.2	87	77	25		5/17/2003 0:30	5/17/2003 0:55
KE6		ctd	59° 01.20' N	152° 14.30' W	2.9	10	0.3	122	112	27		5/17/2003 1:12	5/17/2003 1:40
KE5		ctd	59° 03.60' N	152° 12.20' W	2.6	10	0.3	131	121	28		5/17/2003 1:55	5/17/2003 2:23
KE4		ctd	59° 06.60' N	152° 09.50' W	3.3	10	0.3	149	139	29		5/17/2003 2:43	5/17/2003 3:13
KE3		ctd	59° 08.30' N	152° 07.50' W	2.0	10	0.2	140	130	29		5/17/2003 3:25	5/17/2003 3:53
KE2		ctd	59° 11.60' N	152° 04.50' W	3.6	10	0.4	95	85	26		5/17/2003 4:15	5/17/2003 4:41
KE1		ctd	59° 14.00' N	152° 02.00' W	2.7	10	0.3	73	63	24		5/17/2003 4:57	5/17/2003 5:21
GP0		ctd	59° 09.60' N	151° 00.50' W	14.2	10	1.4	82	77	25		5/17/2003 9:33	5/17/2003 9:58
GP1		ctd	59° 06.00' N	150° 59.40' W	3.6	10	0.4	82	77	25		5/17/2003 10:20	5/17/2003 10:45
GP2		ctd	59° 00.60' N	150° 57.60' W	5.5	10	0.5	82	77	25		5/17/2003 11:18	5/17/2003 11:43
GP3		ctd	58° 57.00' N	150° 55.80' W	3.7	10	0.4	82	77	25		5/17/2003 12:05	5/17/2003 12:30
GP4		ctd	58° 52.80' N	150° 54.00' W	4.3	10	0.4	82	77	25		5/17/2003 12:56	5/17/2003 13:21
GP5		ctd	58° 49.20' N	150° 52.80' W	3.7	10	0.4	82	77	25		5/17/2003 13:43	5/17/2003 14:08
GP6		ctd	58° 45.00' N	150° 52.00' W	4.2	10	0.4	82	77	25		5/17/2003 14:34	5/17/2003 14:59
GP6a		ctd	58° 40.20' N	150° 50.00' W	4.9	10	0.5	82	77	25		5/17/2003 15:28	5/17/2003 15:53
GP7		ctd	58° 35.40' N	150° 48.00' W	4.9	10	0.5	82	77	25		5/17/2003 16:23	5/17/2003 16:48
GP7a		ctd	58° 32.16' N	150° 46.57' W	3.3	10	0.3	82	77	25		5/17/2003 17:08	5/17/2003 17:33
GP7b/AP11		ctd	58° 28.92' N	150° 45.14' W	3.3	10	0.3	82	77	25		5/17/2003 17:53	5/17/2003 18:18
AP10		ctd	58° 28.13' N	150° 56.83' W	6.2	10	0.6	80	75	25		5/17/2003 18:55	5/17/2003 19:20
AP9		ctd	58° 27.34' N	151° 08.51' W	6.2	10	0.6	67	62	24		5/17/2003 19:57	5/17/2003 20:21
AP8		ctd	58° 26.54' N	151° 20.20' W	6.2	10	0.6	64	59	24		5/17/2003 20:58	5/17/2003 21:22

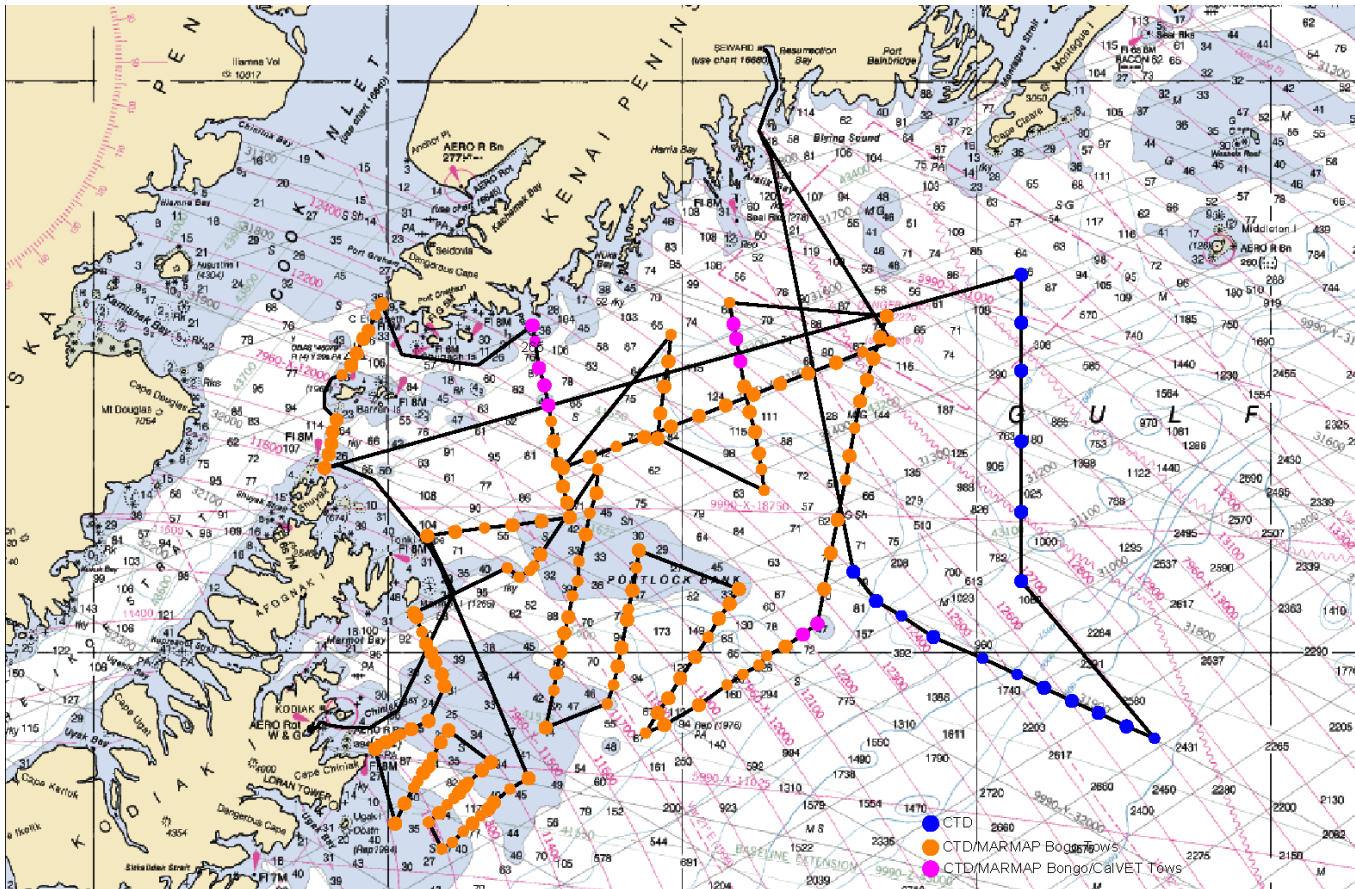
Station ID	Transect	Activity	Latitude	Longitude	Dist. (nm)	Spd (kts)	Transit (hrs)	Water Depth (m)	CTD Depth (m)	CTD Time (min)	Net Time (min)	Arrive Local Date/Time	Depart Local Date/Time
AP7		ctd	58° 25.75' N	151° 31.88' W	6.2	10	0.6	95	90	26		5/17/2003 21:59	5/17/2003 22:25
AP6		ctd	58° 24.96' N	151° 43.57' W	6.2	10	0.6	109	104	27	60	5/17/2003 23:02	5/18/2003 0:29
Womens Bay, Kodiak Island, Alaska		Debark Scientists	57° 43.72' N	152° 31.24' W	0.5	2	0.2					5/18/2003 7:55	

9.4 Figures

9.4.1 KM0305 Leg 1 – Mooring Locations



9.4.2 KM0305 Leg 2 – Transect Lines



9.4.3 TOPEX POSEIDON Altimetry Data from June 1, 2002 – Showing the position of a Gulf of Alaska eddy impinging on the study area. The recurrence of such an eddy near this location would alter the cruise plan, so we may study it.

TOPEX/ERS-2 Analysis Jun 1 2002

