FINAL CRUISE INSTRUCTIONS
FOCI

R/V *MAURICE EWING*, Cruise EW0205
May 12 – June 10, 2002
Chief Scientist Leg 1 – William Floering
Chief Scientist Leg 2 – Nancy B. Kachel

1.0 DRAFT CRUISE INSTRUCTIONS

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

1.2 Cruise Numbers

1.2.1 Cruise Number – EW0205

1.2.2 FOCI Number – 1EW02

1.3 Cruise Dates

1.3.1 Departure – Leg 1 – Depart Dutch Harbor, Alaska, at 1000 on Sunday, May 12, 2002.

1.3.2 Touch-and-Go – Seward, Alaska, on Wednesday, May 22, 2002, to embark additional scientists.

1.3.3 Arrival – Leg 1 – Arrive Kodiak, Alaska, on Sunday, May 26, 2002, to debark some scientific personnel, and embark new scientific complement.

1.3.4 Departure – Leg 2 – Depart Kodiak, Alaska, on Sunday, May 26, 2002, approximately four hours after arrival in Kodiak, Alaska, upon completing Leg 1.

1.3.5 Arrival – Leg 2 – Arrive Kodiak, Alaska, Monday, June 10, 2002.

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.

The first leg will involve the recovery of 16 moorings, the deployment of 25 moorings, which includes two 2.3-meter diameter surface fiberglass-over-foam toroid moorings, in addition to

Conductivity, Temperature, and Depth (CTD) profile operations at each mooring site and at night.

The second leg will involve nearly continuous operations at CTD/Bongo stations, with some with CalVET tows at selected sites, plus four MOCNESS tows. If time and conditions permit an eddy experiment involving ARGOS satellite tracked drifters and CTD/Bongo stations will be conducted. Approximately 16 satellite-tracked drifters will be deployed during the course of the two legs of the cruise.

2.2 Operating Area – Gulf of Alaska

2.3 Participating Organizations

NOAA – Pacific Marine Environmental Laboratory (PMEL)
7600 Sand Point Way N.E., Seattle, Washington 98115-6439

NOAA – Alaska Fisheries Science Center (AFSC)
7600 Sand Point Way N.E., Seattle, Washington 98115-0070

2.4 Personnel

2.4.1 Chief Scientists

2.4.1.1 Leg 1

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

2.4.1.2 Leg 2

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

2.4.2 Participating Scientists

2.4.2.1 Leg 1

Name	Gender	Affiliation	E-mail Address
William Floering	Male	PMEL	William.Floering@noaa.gov
Dr. Calvin Mordy	Male	PMEL	Calvin.W.Mordy@noaa.gov
Carol DeWitt	Female	PMEL	Carol.Dewitt@noaa.gov
Allen Macklin	Male	PMEL	Allen.Macklin@noaa.gov
David Wisegarver	Male	PMEL	David.Wisgarver@noaa.gov
James Bunn	Male	PMEL	James.A.Bunn@noaa.gov
Stephen Smith	Male	PMEL	Stephen.A.Smith@noaa.gov

Name	Gender	Affiliation	E-mail Address
Timothy Nesseth	Male	PMEL	Timothy.J.Nesseth@noaa.gov
Doug Jongeward	Male	PMEL	Doug.Jongeward@noaa.gov

2.4.2.2 Leg 1 – Joining Cruise in Seward, Alaska, May 22, 2002

Name	Gender	Affiliation	E-mail Address
Dr. Jeff Napp	Male	AFSC	Jeff.Napp@noaa.gov
Jennifer Lanksbury	Female	AFSC	Jennifer.Lanksbury@noaa.gov
Charles Greenlaw	Male	BAESystems	

2.4.2.3 Leg 2

Name	Gender	Affiliation	E-mail Address
Dr. Nancy Kachel	Female	PMEL	Nancy.Kachel@noaa.gov
Dr. Calvin Mordy	Male	PMEL	Calvin.W.Mordy@noaa.gov
William Floering	Male	PMEL	William.Floering@noaa.gov
Christine Baier	Female	AFSC	Christine.Baier@noaa.gov
James Bunn	Male	PMEL	James.A.Bunn@noaa.gov
Jennifer Lanksbury	Female	AFSC	Jennifer.Lanksbury@noaa.gov
Rachael Cartwright	Female	AFSC	Rachael.Cartwright@noaa.gov
Peter Proctor	Male	PMEL	Proctor@pmel.noaa.gov
Dylan Righi	Male	PMEL	Righi@pmel.noaa.gov
Elizabeth Dobbins	Female	PMEL/AFSC	Elizabeth.Dobbins@noaa.gov

2.5 Administrative

2.5.1 Ship Operations

Lamont-Doherty Earth Observatory of Columbia University
Office of Marine Affairs
P.O. Box 1000, 61 Route 9W,
Palisades, New York, 10964-8000
Fax: (845) 359-6817

John Diebold
Marine Science Coordinator
(845) 365-8367
marscico@ldeo.columbia.edu

Paul Ljunggren
Marine Superintendant
(845) 365-8845
marsupt@ldeo.columbia.edu

2.5.2 Scientific Operations

Dr. Phyllis J. Stabeno, PMEL
Telephone: (206) 526-6453
E-mail: Phyllis.Stabeno@noaa.gov

Dr. Jeffrey Napp, AFSC
Telephone: (206) 526-4148
E-mail: Jeff.Napp@noaa.gov

3.0 OPERATIONS

3.1 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,
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. To insure fulfillment of all scientific objectives, the ship is asked to steam at maximum cruising speed whenever time in transit, or between stations, is greater than one hour.

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 upon request 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** – It is requested, if the ship has a computer system that operates throughout the cruise acquiring and logging data from navigation, meteorological, and flow-through oceanographic sensors, 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 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.

3.2.2 **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 recorded at each station is:

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

3.2.3 **Navigation** – Observations and reliable fixes shall be plotted and identified by date/time group, or equivalent by ship's officers. Fixes shall be evaluated for course and/or speed made good. Global Positioning Satellite (GPS), radar range and bearing, and/or visual fixes shall provide primary navigational control.

3.3 **Staging Plan** – Loading of scientific equipment is planned to occur in Dutch Harbor, Alaska, on May 11, 2002. 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** – The MOCNESS equipment, all samples, and any other equipment deemed by the subsequent party to be in their way, will be offloaded from the ship in Kodiak, Alaska, at the end of Leg 2 on June 10, 2002. The scientific party will be responsible for arranging vehicles for moving their equipment to the airport and/or docks. All the remaining gear will be offloaded in Astoria, Oregon, after the ship arrives on July 3, 2002.

3.5 **Cruise Plan** – On the first leg of the cruise, we plan to recover 16 and deploy 25 current meter/biophysical moorings. Most of these will be in water depths between 100 and 300 meters. Included among these moorings are two surface toroids to be recovered and deployed, one at the FATE (Fisheries and the Environment) site and the other at GB3. At the FATE site both the surface mooring, and one subsurface mooring, will be deployed in water depths of approximately 2,200 meters.

CTD/PAR/Fluorescence profiler casts will be done on both legs. On the second leg, MARMAP Bongo tows will be taken at most CTD stations, and CalVET net tows will be taken at selected stations. There will also be four MOCNESS zooplankton tows. 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 2-4 cubic feet are need for this storage. Chlorophyll samples will be filtered and the filters stored in a -20° Celsius freezer. Some frozen nutrient samples will be transferred to the ship from **NOAA Ship *MILLER FREEMAN*** in Dutch Harbor, Alaska, for analysis during this cruise. The freezer space needed for these samples is approximately 2-4 cubic feet at –20°C. Satellite-tracked drifting buoys will be launched during both legs of the cruise.

3.5.1 **Leg 1** – See Section **8.4.1 Stations for EW0205 – Leg 1** for a chartlet of Leg 1. We plan that this cruise will depart from Dutch Harbor, Alaska, at 1000 on May 12, 2002, then sail through Unimak Pass en route to the south side of Kodiak Island, Alaska. At Unimak Pass, we will recover a short, subsurface mooring.

Generally, on this leg we plan to deploy moorings during the day, and usually, occupy CTD stations at night. Section **8.3.1 Calculated Alaska Daylight Times (ADT) for Mooring Operations** shows a table with sunrise, sunset, and daylight times for four days during the cruise. ARGOS satellite tracked drifter buoys will be deployed at approximately six sites per cruise leg. We will begin operations on May 14, 2002, by deploying moorings in the area of Barnabus Canyon. As part of operations in that area we plan to occupy a series of CTD stations before proceeding on to the trough east of Chiniak Bay, where we plan to deploy two more subsurface moorings on May 15, 2002, before transiting to the FATE mooring site.

On May 16 and 17, 2002, we plan to work at the FATE site in water depths between 2,200 and 2, 400 meters to recover and re-deploy a surface mooring and then deploy a subsurface ADCP mooring. After completion of the work at FATE, the pattern of operations will be to deploy subsurface moorings during the day, and occupy CTD stations at night. The order of these operations is laid out in Section **8.3.2 EW0205 Leg 1, May 12 - May 26, 2002 – Moorings and CTD Station Locations**.

On the morning of May 22, 2002, we plan a “Touch-and-Go” in Seward, Alaska, in Resurrection Bay, at the University of Alaska’s Marine Facility, in order to pick up three members of the science party, who will be involved in deploying zooplankton-sampling devices. One is a representative of BAESystems who will be aboard to ensure successful deployments of these new instruments. Tom Smith at the Seward Marine Facility is working with Paul Ljunggren, the Marine Superintendent for **R/V *MAURICE EWING***, to arrange for this small boat operation.

After departing Seward, Alaska, we plan to proceed to site GB3 to recover both the surface and subsurface moorings. On May 23, 2002, we plan to deploy a new surface mooring and two subsurface moorings. The next day we will go to the Gore Point line to recover and redeploy the last three moorings. The MOCNESS termination will be prepared and electronics tested in the course of other operations between May 24 and May 26, 2002.

A weather day has been added to the schedule to ensure enough time to complete the mooring work. If the work is completed without using the weather day, we plan to arrive on May 25, 2002, in Kodiak, Alaska, where the scientists for the next leg will be waiting. During the "Touch-and-Go" in Kodiak, Alaska, there will be a change in scientific personnel, and four boxes containing the ARGOS satellite-tracked drifters will be loaded.

3.5.2 **Leg 2** – See Sections **8.4.2 CTD/Bongo Stations for EW0205 – Leg 2** and **8.4.3 CTD/Bongo Stations for EW0205 – Leg 2 Amatouli Trough Study** for chartlets of Leg 2. The work on Leg 2 will consist of around the clock CTD casts and MARMAP Bongo tow stations. Full complements of Niskin bottles will be fired during most casts, to sample for nutrients, chlorophyll, and salinity. Approximately eight ARGOS satellite tracked drifter buoys will be deployed during this leg. CalVET tows will be taken only at those stations on the Barnabus Canyon, Albatross Bank, and Chiniak Bay grids

We plan first to sample the troughs and banks to the south and southeast of Kodiak Island, Alaska, as a part of Steller Sea Lion studies. We will then proceed to sample five lines of stations stretching south-southeast from the Kenai Peninsula, Alaska, in support of U.S. GLOBEC. We shall make a series of MOCNESS tows, two during daylight and two at night, near the GB3 location to calibrate the two zooplankton samplers deployed there on Leg 1. After that, we shall resume station work in the area of Amatouli Trough. The order of operations is laid out in Section **8.3.3 EW0205 Leg 2, May 26 - June 10, 2002 – CTD, MARMAP Bongo, CalVET, and MOCNESS Station Locations**.

At the completion of the above stations, we will most probably proceed to sample 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 **8.4.4 TOPEX POSEIDON Altimetry Data from June 30, 2001** 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. The exact positions will be unavailable until some time during the latter portion of Leg 2. If an eddy is found to be in the operations area, the Chief Scientist may exercise the option to implement this experiment and rearrange the rest of the cruise schedule accordingly. The experiment will involve the deployment of ARGOS satellite tracked drifter buoys, followed by occupation of a series of CTD and MARMAP Bongo stations spaced 15 to 20 kilometers apart between the eddy core and the continental shelf. Water for nutrients and chlorophyll samples will also be collected at each station and nutrients will be analyzed on board the ship. The cruise will then return to Kodiak, Alaska, where the scientists will de-stage.

3.6 **Station Locations** – A list of the proposed order of stations and operations for both legs is provided in Sections **8.3.2 EW0205 Leg 1, May 12 - May 26, 2002 – Moorings and CTD Station Locations** and **8.3.3 EW0205 Leg 2, May 26 - June 10, 2002 – CTD, MARMAP Bongo, CalVET, and MOCNESS Station Locations**. Chartlets of the proposed cruise track for each leg are found in Sections **8.4.1 Stations for EW0205 – Leg 1**, **8.4.2 CTD/Bongo Stations for EW0205 – Leg 2**, and **8.4.3 CTD/Bongo Stations for EW0205 – Leg 2 Amatouli Trough Study**. Additional CTD and MARMAP Bongo stations will be added to the south of the area of operations, if conditions permit in order to study an eddy that could impinge on the primary area.

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

3.7.1 **CTD/Water Sample Operations** – A Sea-Bird Electronics' SBE 911*plus* Conductivity, Temperature, and Depth (CTD) profiler with dual thermistor and conductivity cells will be the primary system. The primary system will be provided and maintained by Pacific Marine Environmental Laboratory (PMEL). A backup SBE 911*plus* CTD is requested to be provided by the vessel. When available, and where possible, FOCI's fluorometer and 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 10-liter Niskin bottles.

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.

CTD data will be acquired on a PMEL provided computer using SBE's SEASOFT application. 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.

3.7.1.1 **CTD Calibration** – Salinity samples will be taken on every cast, or as specified by the Chief Scientist. No reversing thermometers will be required. The CTD systems will be equipped with dual thermistors. One of the scientists with experience will be assigned to run Autosal salinometer analyses during the cruise and record the readings on an Autosal log.

3.7.2 **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 or SBE 39 Temperature and Pressure Recorder will be attached to the wire above the bongo frame(s) to provide tow data, which will be downloaded after the completion of the cast. The Pacific Marine Environmental Laboratory (PMEL) will provide the primary SEACAT, or SBE 39

After the bridge gives permission, ship's personnel and one or two scientists will deploy and recover the bongo array. A scientist will monitor the depth of the Bongo nets using a ScanMar (hydrophone) system 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. When the nets reach the surface, first the ScanMar, then the nets will be recovered. After the nets are brought aboard, they are hosed 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, or SBE 39, records the depth history of the tow. Data from the SEACAT will be downloaded onto a computer. 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.)

3.7.2 **CalVET Net Tows** - California Cooperative Oceanic Fisheries Investigation (CalCOFI) Vertical Egg Tow (CalVET) net tows to collect microzooplankton and free-floating copepod eggs will be conducted, sometimes in conjunction with Conductivity, Temperature, and Depth (CTD) profiler and Niskin water bottle casts. Scientists will require the assistance of the ship's complement for deploying and recovering the CalVET net. The CalVET is clamped to the wire on winch and a "book clamp" is placed on the wire where the cod-ends hang to keep the net taut. When used with a Sea-Bird Electronic SBE 19 SEACAT, the SEACAT is placed below the cod-ends. The ship is requested to maintain a constant vertical wire angle during the entire cast. After descent to the desired depth, usually 60 meters, the net will then be retrieved at a rate of 60 meters per minute. The samples will be washed into the cod-ends, and then preserved in 32-ounce jars with Formalin for later analysis.

3.7.3 **MOCNESS Tows**

3.7.3.1 **Deck Machinery** – The Multiple Opening/Closing Net and Environmental Sensing System (MOCNESS) is deployed whenever possible using the ship's winch equipped with 600 to 1,500 meters of electromechanical wire with at least a 0.680" wire and the A-frame. In addition, a set of slip rings is requested for the winch. The manufacturer states that the maximum drag observed on a 1-m^2 MOCNESS system was 3,000 pounds.

3.7.3.2 **Electronics** – The MOCNESS telemeters, in real time, conductivity, temperature, depth, and flow meter data to the surface. FOCI owns two separate electronic systems for the MOCNESS frame, which will both be

aboard, so as to have a backup system. The older system consists of two 6-inch outer diameter (OD) pressure cases that sit in separate cradles on the net frame and telemeters data to the ship at one frame every four seconds. The signal is received by a data acquisition deck box and simultaneously routes the data to a computer and a Video Cassette Recorder (VCR) for analog signal backup. A dot matrix printer is used to print data from every other scan. RS-232 serial input from the ship's scientific Global Positioning System (GPS) receiver is required to obtain continuous position data for the data stream. The Data Acquisition System (DAS) software requires an NMEA-0183 $GPGLL Sentence Set for input to the computer's COM2 serial port. All acquisition programs are written in Borland TurboPascal version 5.0 and exist as both source code and compiled executable code.

The newer system consists of two 4-inch OD pressure cases that sit in the same cradle on the MOCNESS frame and telemeter data to the ship as fast as one frame per second. The signal is received by a serial modem and is routed to a Pentium-based personal computer. With this newer system, the signal from the underwater unit is digital instead of analog. The MOCNESS acquisition station shares a monitor with the Sea-Bird Electronics SBE 19 SEACAT data acquisition system. Serial input of GPS data is required, as for the older system. The data acquisition software is written in Microsoft Visual Basic running under Windows 3.1; however, we only have the compiled executable file on board. Data scans and tow summaries require a color printer.

3.7.3.3 **Launch, Fishing, and Recovery** – The movable MOCNESS support frame (cart) will be used. When the weather is rough, a member of the deck crew may be requested to assist in the deployment and recovery.

A scientist designated as the MOCNESS pilot will relay instructions to the winch operator and the bridge to control the descent and ascent rate of the net system. It is essential that the ship maintain a constant speed through the water during the tow. Wire payout and haul back rates must be available to the winch operator and should be displayed as well. The MOCNESS is deployed and recovered while under way cruising at 1.5 knots. Height off the bottom should be 10 meters in the Gulf of Alaska. Wire is paid out at a rate of 5-25 meters per minute and is retrieved at 5-20 meters per minute under the direction of the pilot. If GPS signal is not available to the DAS, then the MOCNESS pilot will inform the bridge as each net is closed and request that the bridge record the position in the Marine Observation Abstract (MOA). After recovery, the MOCNESS nets are washed down on deck. It may be necessary to remain on a course that minimizes waves coming over the side during net washing.

3.7.4 **Chlorophyll 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.

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.

3.7.5 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.

3.8 Underway Operations – Underway operations that will be performed during this cruise include thermosalinograph, fluorometer, ADCP, bathymetry, meteorological data and a log of operations with meteorological data at times of those operations.

3.8.1 Acoustic Doppler Current Profiler (ADCP) Operations

3.8.1.1 ADCP Observations – The RD Instruments (RDI) 150-kHz narrow band ADCP should operate during the entire cruise to measure currents below the moving vessel. Successful ADCP measurements require that four instruments work in concert:

1. The ADCP and its dedicated PC,
2. The ship's gyrocompass,
3. A Global Positioning System (GPS) receiver, and
4. A GPS Attitude Determination Unit (ADU) such as an Ashtech 3DF.

3.8.1.2 Data Logging – The ADCP should be connected to a dedicated Personal Computer (PC) and controlled by RDI's Data Acquisition System (DAS) version 2.48 software. DAS should be configured to use the user-exit programs AGCAVE.COM and UE4.EXE. AGCAVE.COM is used to average automatic gain control (AGC) data for acoustic backscatter calculations. UE4.EXE comes from Dr. Eric Firing's group at the University of Hawaii and is used to integrate the ADU input into DAS screen display and output files.

The ADCP PC should be interfaced to the ship's gyrocompass, primary scientific GPS receiver, and ADU. The navigation GPS receiver shall be configured to send NMEA-0183 $GPGGA and $GPVTG sentence sets at the maximum fix update rate for that receiver (usually a 1- or 2-second rate) and with the maximum number of decimal places for position precision (optimally 4). The ADU shall be configured to send the NMEA-0183 $PASHR sentence set to the PC once per second. The user-exit program UE4.EXE shall be configured to control acquisition and processing of GPS and ADU sentence sets, and to synchronize the PC clock with the time reported by the primary GPS receiver.

The ADCP PC logs data from the profiler to one of its disk drives, often an Iomega Zip drive. If 100-Kb Zip disks are used, each cruise leg should require

no more than one. At cruise end, the ADCP data should be backed up and a copy given to the Chief Scientist.

3.8.1.3 Subsidiary Data Logging – Detailed post-cruise processing of ADCP data can take advantage of a larger quantity of navigation data than is retained by the ADCP acquisition software. Thus, the ship's data logger should log gyro, GPS, and ADU navigation data at their acquisition rates of 1-2 Hz.

3.8.1.4 ADCP Underway Operations – PMEL has used ADCPs on several ships and has developed some check sheets to ensure consistent set-up and data quality. At the start of a cruise, the marine technician, in coordination with the scientists, should configure and start the ADCP system according to the provided check sheets ***Before Leaving Port*** and ***Underway to Operations Area***. The ADCP and its interface to the gyro and navigation must be checked daily by completing the ***ADCP Daily Log*** and at the end of the cruise with the ship tied to the pier.

PMEL will provide DAS configuration (.CFG) files with the appropriate bin sizes, averaging rates, *etc*. for data collection. The ADCP should operate in bottom-track mode when the water depth is less than about 500 meters for more than a few hours. This gives currents that are better compensated for transducer misalignment but somewhat lower in statistical significance because the number of pings is reduced. For extended periods in deeper water, an ADCP configuration without bottom tracking should be used.

3.9 Data Logging – The ship's data logger, if available, 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.

3.10 Seachest and Uncontaminated Seawater – Sea surface temperature and conductivity will be continuously monitored. Data from these instruments should be sent to the data logger, if possible. Uncontaminated seawater from this chest will be continuously pumped through fluorometer and nitrate meters, provided by PMEL.

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.

American Standard Code for Information Exchange (ASCII) logger files will be included in the periodic backup of collected data for distribution at the end of the cruise. The Chief Scientist may request that these data be made available on DOS-formatted media at the completion 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, and for taking salinity calibration samples every other day.

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 averaged 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

3.11 Small Boat Operations – The small boat will be used to tag the two surface moorings during recovery operations. This boat may also be needed for embarking scientists in Seward, Alaska, if a dock is unavailable.

4.0 FACILITIES

4.1 Equipment and Capabilities Provided by Ship

- Oceanographic winch with 0.320" electro-mechanical cable with slip rings terminated for CTD operations,
- Oceanographic winch with 0.680" electromechanical wire with slip rings terminated MOCNESS tows,
- Winch with either 0.250” or 9/16” wire for MARMAP Bongo and CalVET tows,
- A-Frame(s),
- Ability to connect a PAR and Fluorometer provided by the project,
- 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 stand, each CTD system should include underwater CTD, weights (BACKUP to PMEL-provided system). There should be one deck unit for the two systems,
- (14) 10-Liter Niskin sampling bottles for use with rosette (10 plus 4 spares),
- AUTOSAL salinometer, for CTD field corrections,
- Refrigerator and freezer space for storage of biological and chemical samples, +4° C (~2-4-cft) for nutrients and -20° C (~2-4-cft) for chlorophyll samples, respectively,
- RD Instruments’ ADCP written to disk,

- 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, printer, and VCR to fly MOCNESS,
- 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,
- (3-4) Hand-held radios for scientific/winch/bridge communications,
- Thermosalinograph with debubbler,
- Continuous uncontaminated Seawater sampling system piped from bow into labs,
- US Filter Purelab Plus UV 1.5 L/m water purification system, 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 to be used with PMEL stand (**primary system**),
- Sea-Bird Electronics' SBE-19 SEACAT system (**primary system**),
- PMEL PC with SEASOFT software for CTD data collection and processing,
- Photosynthetically Active Radiation (PAR), Fluorometer, and light meter to be mounted on CTD,
- CTD stand modified for attachment of fluorometer,
- Conductivity and temperature sensor package providing dual sensors on the primary CTD,
- CTD rosette sampler,
- IAPSO standard water, if AUTOSAL is available. Otherwise, four cases of salinity sample bottles,
- Fluorometer to be mounted to the Flow-Through system,
- Debubbler for the fluorometer,
- Nitrate meter to be mounted to the Flow-Through system,
- 60-cm MARMAP Bongo sampling arrays,
- 20-cm MARMAP Bongo arrays,
- CalVET Nets,
- Spare wire angle indicator,
- ScanMar Model S40 acoustical depth sensor, deck units, charger, and hydrophone,
- MOCNESS, with TAPS,
- (2) Surface moorings (FOCI biophysical platforms),
- Subsurface moorings,
- ARGOS satellite tracked drifter buoys,
- Miscellaneous scientific sampling and processing equipment,
- Cruise Operations Database (COD), and
- (2) Dual 4 acoustic instruments (for zooplankton sampling).

5.0 DISPOSITION OF DATA AND REPORTS

5.1 The following data products will be included in the cruise data package:

- Marine Operations Abstracts (MOA),
- Calibration Sheets for all ship's instruments used,
- PMEL CTD Weather Observation Logs,
- CTD Cast Information/Rosette Log maintained by PMEL scientists,
- Autosalinometer Log, if AUTOSAL is aboard,
- ADCP Log Sheets,
- ADCP Iomega Zip and/or recordable compact diskette (CD-RW),
- Electronic Navigation suite's export files on diskette, and

5.2 **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 new 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.

6.0 HAZARDOUS MATERIALS

6.1 **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***.

6.2 **Standards**

6.2.1 **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.

6.2.2 **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.

6.2.3 **Storerooms** – Storerooms for chemicals and flammables, where practicable, should be protected by fixed CO_2 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.

6.2.4 **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.

6.3 **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.

6.4 **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.

6.5 **Inventory List** – See Section **8.2 EW0205 HAZMAT Inventory**.

6.6 **Material Data Safety Sheets (MSDS)** – Submitted separately as electronic attachments.

7.0 **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. Whenever possible, it is requested that direct payment be used as opposed to after-the-fact reimbursement, such as credit or calling card, etc.

7.1 **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.

7.2 **Electronic Mail (E-mail)** – FOCI requests that **R/V *MAURICE EWING*** transmits 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. The accounts are set up when the ship receives the cruise roster and the general format for a user's e-mail address is:

LastName@ewing.ldeo.columbia.edu.

7.3 **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 or over the Internet via email from PMEL.

7.4 **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.

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

7.6 Important Telephone and Facsimile Numbers and E-mail Addresses

7.6.1 Pacific Marine Environmental Laboratory (PMEL)

FOCI – Ocean Environmental Research Division (OERD2):
- (206) 526-4700 (voice)
- (206) 526-6485 (fax)

Administration:
- (206) 526-6810 (voice)
- (206) 526-6815 (fax)

E-Mail: FirstName.LastName@noaa.gov

7.6.2 Alaska Fisheries Science Center (AFSC)

FOCI – Resource Assessment and Conservation Engineering (RACE):
- (206) 526-4171 (voice)
- (206) 526-6723 (fax)

E-Mail: FirstName.LastName@noaa.gov

7.6.3 R/V *MAURICE EWING*

INMARSAT
- 011-872-150-0231 (voice)
- 011-872-150-0231 (fax)

7.6.4 Lamont-Doherty Earth Observatory of Columbia University:

Office of Marine Affairs
- (845) 359-6817 (facsimile)
- (845) 365-8367 – Marine Science Coordinator
- (845) 365-8845 – Marine Superintendant
- (845) 365-8824 – Administrative Aide, Marine Operations
- (845) 365-8846 – Financial Assistant/Marine Personnel

8.0 APPENDICES

8.1 Equipment Inventory

Equipment	Qty	Weight	Total
Anchor, Railroad Wheel (2-3 wheels)	2	1300	2600
Anchor, Railroad Wheel (2-3 wheels)	19	1600	30400
Anchor, Railroad Wheel (2-3 wheels)	3	1800	5400
Anchor, Railroad Wheel (4-6 wheels)	1	3100	3100
Anchor, Railroad Wheel (4-6 wheels)	1	4200	4200
Anchor, Cement, (2-3 wheels, encased)	1	3800	3800
Box, Hardware, Mooring (4' x 4' x 3')	2	5000	10000
Box, Hardware, Mooring (3' x 2' x 2')	3	500	1500
Bridal and Tower, Buoy, Surface	2	3000	6000
Float, Subsurface, Mooring	TBD	TBD	
		TOTAL	**67000**

8.2 EW0205 HAZMAT Inventory

Chemical	Number of Vials	Total Amount	Neutralizer	Respondee
Ammonium Molybdate	10 x 2.3g	23.0-g	Spill Kit	Mordy
Antimony Potassium Tartrate	2 x 3.0-g	6.0-g	Spill Kit	Mordy
Ascorbic Acid	10 x 5.0-g	50.0-g	Spill Kit	Mordy
Brij	1 x 250-ml	250-ml	Baking Soda	Mordy
Cadmium	1 x 20.0-g	20.0-g	Spill Kit	Mordy
Copper Sulfate	2 x 20.0-g	40.0-g	Spill Kit	Mordy
Dowfax	1 x 200-ml	200-ml	See Note 1	Mordy
Formaldehyde, 37%	1 x 20-l	20-l	Spill Kit	Lanksbury
Hydrochloric Acid	4 x 500-ml	2-l	Baking Soda	Mordy
Imidazole	10 x 13.6-g	136.0-g	Spill Kit	Mordy
Magnesium Sulfate	1 x 160.0-g	160.0-g	Spill Kit	Mordy
Methanol	1 x 500-ml	500-ml	Baking Soda	Mordy
N-1-Hapthylethylenediamine Dihydrochloride	12 x 1.0-g	12.0-g	Spill Kit	Mordy
Nitric Acid	6 x 30-ml	180-ml	Baking Soda	Mordy
Nitrogen, Compressed Gas	1 x 30-cft	30-cft	Ventilate	Mordy
Potassium Nitrate	6 x 3.5-g	21.0-g	Spill Kit	Mordy
Potassium Phosphate	6 x 0.5-g	3.0-g	Spill Kit	Mordy
Saturated Sodium Borate Solution	1 x 20-l	20-l	See Note 1	Lanksbury
Sodium Bicarbonate	1 x 3.0-g	3.0-g	Spill Kit	Mordy
Sodium Chloride	1 x 600.0-g	600.0-g	Spill Kit	Mordy
Sodium Fluorosilicate	6 x 0.4-g	2.4-g	Spill Kit	Mordy
Sodium Hydroxide, 10N	1 x 500-ml	500-ml	Baking Soda	Mordy
Sodium Nitrite	8 x 0.1-g	0.8-g	Spill Kit	Mordy
Stannous Chloride	10 x 10.0-g	100-g	Spill Kit	Mordy
Sulfanilamide	14 x 10.0-g	140-g	Spill Kit	Mordy
Sulfuric Acid	2 x 500-ml	1-L	Baking Soda	Mordy
Tartaric Acid	5 x 150.0-g	750-g	Spill Kit	Mordy

Note 1 – Dowfax and Saturated Sodium Borate Solution are non-regulated substances by the Department of Transportation (DOT) and do not have Material Data Safety Sheets (MSDS).

8.3 Tables

8.3.1 Calculated Alaska Daylight Times (ADT) for Mooring Operations

Wednesday, May 15, 2002		**Monday, May 20, 2002**	
SUN		**SUN**	
Begin Civil Twilight	4:51 AM May 15	Begin Civil Twilight	4:39 AM May 20
Sunrise	5:46 AM	Sunrise	5:37 AM
Meridian Passage	2:06 PM	Meridian Passage	2:06 PM
Sunset	10:28 PM	Sunset	10:38 PM
End Civil Twilight	11:23 PM	End Civil Twilight	11:36 PM
MOON		**MOON**	
Moonrise	7:04 AM May 14	Moonrise	12:43 PM May 19
Moonset	1:37 AM May 15	Moonset	4:32 AM May 20
Moonrise	7:40 AM	Moonrise	2:16 PM
Meridian Passage	5:08 PM	Meridian Passage	9:42 PM
Moonset	2:39 AM May 16	Moonset	4:44 AM May 21
Saturday, May 25, 2002		**Saturday, June 1, 2002**	
SUN		**SUN**	
Begin Civil Twilight	4:27 AM May 25	Begin Civil Twilight	4:12 AM June 1
Sunrise	5:28 AM	Sunrise	5:18 AM
Meridian Passage	2:07 PM	Meridian Passage	2:07 PM
Sunset	10:47 PM	Sunset	10:58 PM
End Civil Twilight	11:49 PM	End Civil Twilight	12:05 AM June 2
MOON		**MOON**	
Moonrise	8:33 PM May 24	Moonset	10:22 AM May 31
Meridian Passage	1:08 AM May 25	Moonrise	3:28 AM June 1
Moonset	5:28 AM	Meridian Passage	7:29 AM
Moonrise	10:09 PM	Moonset	11:41 AM
Moonset	5:47 AM May 26	Moonrise	3:40 AM June 2
Wednesday, June 5, 2002		**Monday, June 10, 2002**	
SUN		**SUN**	
Begin Civil Twilight	4:06 AM June 5	Begin Civil Twilight	3:59 AM June 10
Sunrise	5:14 AM	Sunrise	5:10 AM
Meridian Passage	2:08 PM	Meridian Passage	2:09 PM
Sunset	11:04 PM	Sunset	11:09 PM
End Civil Twilight	12:13 AM June 6	End Civil Twilight	12:21 AM June 11
MOON		**MOON**	
Moonset	3:30 PM June 4	Moonset	10:03 PM June 9
Moonrise	4:05 AM June 5	Moonrise	5:06 AM June 10
Meridian Passage	10:16 AM	Meridian Passage	2:05 PM
Moonset	4:45 PM	Moonset	11:23 PM
Moonrise	4:12 AM June 6	Moonrise	5:38 AM June 11

8.3.2 EW0205 Leg 1, May 12 - May 26, 2002 – Moorings and CTD Station Locations

Activity	Transect	Latitude	Longitude	Dist (NM)	Spd (kt)	Transit (Hrs)	z (fm)	Water Depth (m)	CTD Depth (m)	CTD Time (min)	Net Times (min)	Arrival Date (Local)	Arrival Time (Local)	Depart Date (Local)	Depart Time (Local)
Depart Dutch Harbor	Dutch Harbor	53° 54.500' N	166° 30.900' W		11									12-May-02	8:00 AM
UP Mooring	Recover Mooring	54° 30.000' N	165° 20.000' W	54.59	11	4.96	0	0.0	-10	26	120	12-May-02	12:57 PM	12-May-02	3:24 PM
UP South	UP South	54° 18.070' N	164° 44.630' W	23.80	11	2.16	0	0.0	-10		21	12-May-02	5:33 PM	12-May-02	5:55 PM
Shumagins	Near Shumagins	55° 20.000' N	159° 20.000' W	196.97	11	17.91	0	0.0	-10		21	13-May-02	11:49 AM	13-May-02	12:11 PM
Chirikov	Near Chirikov	56° 16.000' N	154° 00.000' W	188.33	11	17.12	0	0.0	-10		21	14-May-02	5:18 AM	14-May-02	5:39 AM
BC-2	Deploy Mooring	56° 43.800' N	152° 32.500' W	55.72	11	5.07	80	145.6	136		180	14-May-02	10:43 AM	14-May-02	1:43 PM
BC-3	Deploy Mooring	56° 56.500' N	152° 39.500'W	13.26	9	1.47	70	127.4	117		90	14-May-02	3:12 PM	14-May-02	4:42 PM
BC-4	Deploy Mooring	56° 59.000' N	152° 27.500'W	7.00	9	0.78	80	145.6	136		90	14-May-02	5:29 PM	14-May-02	6:59 PM
BC-1	Deploy Mooring	56° 40.800' N	152° 22.500' W	18.40	9	2.04	80	145.6	136		90	14-May-02	9:01 PM	14-May-02	10:31 PM
BC-1 (Outer 5)	CTD	56° 40.800' N	152° 22.500' W	0.00	8	0.00	80	145.6	136	35		14-May-02	10:31 PM	14-May-02	11:06 PM
BC Outer 4	CTD	56° 41.550' N	152° 25.000' W	1.56	8	0.20	80	145.6	136	35		14-May-02	11:18 PM	14-May-02	11:53 PM
BC Outer 3	CTD	56° 42.300' N	152° 27.500'W	1.56	8	0.20	80	145.6	136	35		15-May-02	12:05 AM	15-May-02	12:40 AM
BC Outer 2	CTD	56° 43.050' N	152° 30.000'W	1.56	8	0.20	80	145.6	136	35		15-May-02	12:52 AM	15-May-02	1:27 AM
BC-2 (Outer 1)	CTD	56° 43.800' N	152° 32.500' W	1.56	8	0.20	80	145.6	136	35		15-May-02	1:39 AM	15-May-02	2:14 AM
CB-2A	Deploy Mooring	57 27.606' N	151° 34.751'W	53.88	11	4.90		112.5			120	15-May-02	7:08 AM	15-May-02	9:08 AM
CB-2A	CTD	57 27.606' N	151° 34.751'W	0.00	8	0.00		112.5	103	33		15-May-02	9:08 AM	15-May-02	9:41 AM

Activity	Transect	Latitude	Longitude	Dist (NM)	Spd (kt)	Transit (Hrs)	z (fm)	Water Depth (m)	CTD Depth (m)	CTD Time (min)	Net Times (min)	Arrival Date (Local)	Arrival Time (Local)	Depart Date (Local)	Depart Time (Local)
CB-3A	Deploy Mooring	57 30.879' N	151° 26.597'W	5.47	9	0.61		143.6			120	15-May-02	10:18 AM	15-May-02	12:18 PM
CB-2A	CTD	57 27.606' N	151° 34.751'W	5.47	9	0.61		112.5	103	33		15-May-02	12:54 PM	15-May-02	1:28 PM
FATE 1MB	CTD & Wait	58° 14.000' N	147° 40.000'W	133.24	11	12.11		2400.0	2390	148	180	16-May-02	1:34 AM	16-May-02	7:02 AM
FATE 1MB	Recover Mooring	58° 15.514' N	147° 40.774'W	1.57	8	0.20			-10	300		16-May-02	7:14 AM	16-May-02	12:14 PM
FATE P2A	Deploy Mooring	58° 16.629' N	147° 41.124'W	1.13	8	0.14		2200.0	2190	240		16-May-02	12:22 PM	16-May-02	4:22 PM
FATE P2A	CTD	58° 16.629' N	147° 41.124'W	0.00	8	0.00		2200.0	2190	138		16-May-02	4:22 PM	16-May-02	6:40 PM
CTD	WNW of FATE	58° 18.362' N	147° 50.083'W	5.02	8	0.63		1944.3	1934	125		16-May-02	7:18 PM	16-May-02	9:23 PM
CTD	NNE of FATE	58° 20.540' N	147° 39.572'W	5.93	8	0.74		2083.3	2073	132		16-May-02	10:07 PM	17-May-02	12:19 AM
CTD	ESE of FATE	58° 15.899' N	147° 32.172'W	6.05	8	0.76		2084.7	2075	132		17-May-02	1:05 AM	17-May-02	3:17 AM
CTD	SSW of FATE	58° 13.094' N	147° 44.381'W	7.01	8	0.88		2336.6	2327	144		17-May-02	4:09 AM	17-May-02	6:34 AM
FATE 2MA	Deploy Mooring	58° 15.514' N	147° 40.774'W	3.08	11	0.28		2400.0	0	380		17-May-02	6:51 AM	17-May-02	1:11 PM
FATE 2MA	CTD to 250	58° 15.514' N	147° 40.774'W	0.00	9	0.00		250.0	240	42		17-May-02	1:11 PM	17-May-02	1:52 PM
ATB8	CTD	58° 31.500' N	148° 55.000'W	42.06	9	4.67	70	127.4	117	22		17-May-02	6:33 PM	17-May-02	6:55 PM
ATB7	CTD	58° 36.750' N	148° 53.000'W	5.35	9	0.59	75	136.5	127	23		17-May-02	7:31 PM	17-May-02	7:53 PM
BG-12	CTD	58° 42.000' N	148° 51.000'W	5.35	9	0.59	120	218.4	208	28		17-May-02	8:29 PM	17-May-02	8:57 PM
ATB5	CTD	58° 47.750' N	148° 49.000'W	5.84	9	0.65	140	254.8	245	30		17-May-02	9:36 PM	17-May-02	10:06 PM
GB-11	CTD	58° 53.500' N	148° 47.000'W	5.84	9	0.65	150	273.0	263	31		17-May-02	10:45 PM	17-May-02	11:16 PM
ATB3	CTD	58° 58.031' N	148° 44.303'W	4.74	9	0.53	130	236.6	227	29		17-May-02	11:47 PM	18-May-02	12:16 AM
GB5 GAK6i ATB2	CTD	59° 02.561' N	148° 41.606'W	4.74	9	0.53	105	191.1	181	26		18-May-02	12:48 AM	18-May-02	1:14 AM
ATB1i	CTD	59° 04.750' N	148° 40.253'W	2.30	9	0.26	100	182.0	172	26		18-May-02	1:29 AM	18-May-02	1:55 AM

Activity	Transect	Latitude	Longitude	Dist (NM)	Spd (kt)	Transit (Hrs)	z (fm)	Water Depth (m)	CTD Depth (m)	CTD Time (min)	Net Times (min)	Arrival Date (Local)	Arrival Time (Local)	Depart Date (Local)	Depart Time (Local)
ATB1	CTD	59° 07.000' N	148° 38.900'W	2.35	9	0.26	90	163.8	154	24		18-May-02	2:10 AM	18-May-02	2:35 AM
ATB0	CTD & Wait	59° 11.500' N	148° 36.200'W	4.71	8	0.59	70	127.4	117	22	180	18-May-02	3:10 AM	18-May-02	6:32 AM
GB-5B GAK6i	CTD	59° 02.561' N	148° 41.606'W	9.36	9	1.04		196.5	187	26		18-May-02	7:35 AM	18-May-02	8:01 AM
GB-5B GAK6i	Recover Mooring	59° 02.561' N	148° 41.606'W	0.00	9	0.00		196.5	187	120		18-May-02	8:01 AM	18-May-02	10:01 AM
GB-5 GAK6i	Deploy Mooring	59° 02.561' N	148° 41.606'W	0.00	9	0.00		196.5		180		18-May-02	10:01 AM	18-May-02	1:01 PM
GB-6B GAK7-7i	CTD	58° 55.481' N	148° 34.113'W	8.06	9	0.90		145.0	135	23		18-May-02	1:55 PM	18-May-02	2:18 PM
GB-6B GAK7-7i	Recover Mooring	58° 55.481' N	148° 34.113'W	0.00	9	0.00		247.6		120		18-May-02	2:18 PM	18-May-02	4:18 PM
GB11	Deploy Mooring	58° 53.500' N	148° 47.000'W	6.94	11	0.63		185.0	175	120		18-May-02	4:56 PM	18-May-02	6:56 PM
GB12	Deploy Mooring	58° 42.000' N	148° 51.000'W	11.69	11	1.06		185.0	175	120		18-May-02	8:00 PM	18-May-02	10:00 PM
ATB8	CTD	58° 31.500' N	148° 55.000'W	10.70	11	0.97	70	127.4	117	22		18-May-02	10:58 PM	18-May-02	11:20 PM
ATB7	CTD	58° 36.750' N	148° 53.000'W	5.35	11	0.49	75	136.5	127	23		18-May-02	11:49 PM	19-May-02	12:12 AM
BG-12	CTD	58° 42.000' N	148° 51.000'W	5.35	9	0.59	120	218.4	208	28		19-May-02	12:48 AM	19-May-02	1:15 AM
ATB5	CTD	58° 47.750' N	148° 49.000'W	5.84	9	0.65	140	254.8	245	30		19-May-02	1:54 AM	19-May-02	2:24 AM
GB-11	CTD	58° 53.500' N	148° 47.000'W	5.84	9	0.65	150	273.0	263	31		19-May-02	3:03 AM	19-May-02	3:34 AM
ATB3	CTD	58° 58.031' N	148° 44.303'W	4.74	9	0.53	130	236.6	227	29		19-May-02	4:06 AM	19-May-02	4:35 AM
GB5 GAK6i ATB2	CTD	59° 02.561' N	148° 41.606'W	4.74	9	0.53	105	191.1	181	26		19-May-02	5:06 AM	19-May-02	5:32 AM
ATB1	CTD	59° 07.000' N	148° 38.900'W	4.65	9	0.52	90	163.8	154	24		19-May-02	6:03 AM	19-May-02	6:28 AM
ATB0	CTD	59° 11.500' N	148° 36.200'W	4.71	8	0.59	70	127.4	117	22		19-May-02	7:03 AM	19-May-02	7:25 AM
GB-9A	CTD	59° 21.978' N	148° 14.622'W	15.21	11	1.38		173.0	163	25		19-May-02	8:48 AM	19-May-02	9:13 AM
GB-9A	Recover Mooring	59° 21.978' N	148° 14.622'W	0.00	10	0.00		173.0		60		19-May-02	9:13 AM	19-May-02	10:13 AM
GB-9A	Deploy Mooring	59° 21.978' N	148° 14.622'W	0.00	10	0.00		173.0		120		19-May-02	10:13 AM	19-May-02	12:13 PM

Activity	Transect	Latitude	Longitude	Dist (NM)	Spd (kt)	Transit (Hrs)	z (fm)	Water Depth (m)	CTD Depth (m)	CTD Time (min)	Net Times (min)	Arrival Date (Local)	Arrival Time (Local)	Depart Date (Local)	Depart Time (Local)
GB-9A	CTD	59° 21.978' N	148° 14.622'W	0.00	10	0.00		173.0	163	25		19-May-02	12:13 PM	19-May-02	12:38 PM
GB-8A	CTD	59° 38.677' N	148° 39.359'W	20.89	10	2.09		171.4	161	25		19-May-02	2:44 PM	19-May-02	3:08 PM
GB-8A	Recover Mooring	59° 38.677' N	148° 39.359'W	0.00	10	0.00		171.4		60		19-May-02	3:08 PM	19-May-02	4:08 PM
GB-8A	Deploy Mooring	59° 38.677' N	148° 39.359'W	0.00	10	0.00		171.4		120		19-May-02	4:08 PM	19-May-02	6:08 PM
GB-8A	CTD	59° 38.677' N	148° 39.359'W	0.00	10	0.00		171.4	161	25		19-May-02	6:08 PM	19-May-02	6:33 PM
GB-7A	CTD	59° 45.939' N	148° 58.661'W	12.15	10	1.21	70	192.0	182	26		19-May-02	7:46 PM	19-May-02	8:12 PM
GB-7A	Recover Mooring	59° 45.939' N	148° 58.661'W	0.00	10	0.00		192.0		60		19-May-02	8:12 PM	19-May-02	9:12 PM
GB-7A	Deploy Mooring	59° 45.939' N	148° 58.661'W	0.00	10	0.00		192.0		120		19-May-02	9:12 PM	19-May-02	11:12 PM
GB-7A	CTD	59° 45.939' N	148° 58.661'W	0.00	10	0.00	70	192.0	182	26		19-May-02	11:12 PM	19-May-02	11:38 PM
	Transit and Wait	59° 07.689' N	148° 47.146'W	38.70	11	3.52					300	20-May-02	3:10 AM	20-May-02	8:10 AM
GB-4B GAK6	CTD	59° 07.689' N	148° 47.146'W	0.00	9	0.00		145.0	135	23		20-May-02	8:10 AM	20-May-02	8:33 AM
GB-4B GAK6	Recover Mooring	59° 07.689' N	148° 47.146'W	0.00	9	0.00		145.4			60	20-May-02	8:33 AM	20-May-02	9:33 AM
GB-4 GAK6	Deploy Mooring	59° 07.689' N	148° 47.146'W	0.00	9	0.00		145.4			120	20-May-02	9:33 AM	20-May-02	11:33 AM
GB-4 GAK6	CTD	59° 07.689' N	148° 47.146'W	0.00	9	0.00		145.4	135	23		20-May-02	11:33 AM	20-May-02	11:56 AM
GB-10A	CTD	59° 09.605' N	149° 07.790'W	10.76	11	0.98		169.2	159	25		20-May-02	12:55 PM	20-May-02	1:19 PM
GB-10A	Recover Mooring	59° 09.605' N	149° 07.790'W	0.00	9	0.00		169.2			90	20-May-02	1:19 PM	20-May-02	2:49 PM
GB-10A	Deploy Mooring	59° 09.605' N	149° 07.790'W	0.00	9	0.00		169.2			120	20-May-02	2:49 PM	20-May-02	4:49 PM
GB-10A	CTD	59° 09.605' N	149° 07.790'W	0.00	9	0.00		169.2	159	25		20-May-02	4:49 PM	20-May-02	5:14 PM
GB-13	Survey and Deploy Mooring	58° 58.000' N	150° 05.000'W	31.62	11	2.87		190.0			120	20-May-02	8:07 PM	20-May-02	10:07 PM
GB-13	CTD	58° 58.000' N	150° 05.000'W	0.00	11	0.00		190.0	180	26		20-May-02	10:07 PM	20-May-02	10:33 PM

Activity	Transect	Latitude	Longitude	Dist (NM)	Spd (kt)	Transit (Hrs)	z (fm)	Water Depth (m)	CTD Depth (m)	CTD Time (min)	Net Times (min)	Arrival Date (Local)	Arrival Time (Local)	Depart Date (Local)	Depart Time (Local)
ATD5	CTD	58° 38.500' N	149° 39.000'W	23.70	9	2.63	85	154.7	145	24		21-May-02	1:11 AM	21-May-02	1:34 AM
ATD4	CTD	58° 46.516' N	149° 35.866'W	8.18	9	0.91	130	236.6	227	29		21-May-02	2:29 AM	21-May-02	2:58 AM
ATD3	CTD	58° 54.532' N	149° 32.719' W	8.18	9	0.91	130	236.6	227	29		21-May-02	3:52 AM	21-May-02	4:21 AM
ATD2	CTD	59° 02.547' N	149° 29.561' W	8.18	9	0.91	124	225.7	216	28		21-May-02	5:16 AM	21-May-02	5:44 AM
ATD1	CTD	59° 10.563' N	149° 26.390' W	8.18	9	0.91	80	145.6	136	23		21-May-02	6:38 AM	21-May-02	7:02 AM
GB-2B GAK3	CTD	59° 34.388' N	149° 15.918'W	24.42	11	2.22	90	163.8	154	24		21-May-02	9:15 AM	21-May-02	9:39 AM
GB-2B GAK3	Recover Mooring	59° 34.388' N	149° 15.918'W	0.00	11	0.00	90	163.8	154		150	21-May-02	9:39 AM	21-May-02	12:09 PM
GB-2B GAK3	Deploy Mooring	59° 34.388' N	149° 15.918'W	0.00	11	0.00	90	163.8	154		180	21-May-02	12:09 PM	21-May-02	3:09 PM
GB-2B GAK3	CTD	59° 34.388' N	149° 15.918'W	0.00	11	0.00	90	163.8	154	24		21-May-02	3:09 PM	21-May-02	3:34 PM
GB1B GAK2	CTD	59° 41.514' N	149° 22.040'W	7.77	11	0.71		232.0	222	29		21-May-02	4:16 PM	21-May-02	4:45 PM
GB1B GAK2	Recover Mooring	59° 41.514' N	149° 22.040'W	0.00	11	0.00		231.6			180	21-May-02	4:45 PM	21-May-02	7:45 PM
GB1B GAK2	Deploy Mooring	59° 41.514' N	149° 22.040'W	0.00	11	0.00		231.6			180	21-May-02	7:45 PM	21-May-02	10:45 PM
GAK 1	CTD and Wait	59° 50.700' N	149° 28.000' W	9.66	11	0.88		290.0	280	32	240	21-May-02	11:37 PM	22-May-02	4:09 AM
Seward Alaska	Small Boat Ops as early as possible	60° 06.000' N	149° 26.000'W	15.33	7	2.19					120	22-May-02	6:21 AM	22-May-02	8:21 AM
GBM-3B GAK5	CTD	59° 16.464' N	148° 58.123'W	51.49	11	4.68		185.7	176	38		22-May-02	1:02 PM	22-May-02	1:40 PM
GBM-3B GAK5	Recover Mooring	59° 16.464' N	148° 58.123'W	0.00	8	0.00		185.7	176		240	22-May-02	1:40 PM	22-May-02	5:40 PM
GBP-3B GAK5	Recover Mooring	59° 16.727' N	148° 57.706'W	0.34	8	0.04		184.8	175		180	22-May-02	5:42 PM	22-May-02	8:42 PM
ATD5	CTD	58° 38.500' N	149° 39.000'W	43.76	9	4.86	85	154.7	145	24		23-May-02	1:34 AM	23-May-02	1:58 AM
ATD4	CTD	58° 46.516' N	149° 35.866'W	8.18	9	0.91	130	236.6	227	29		23-May-02	2:52 AM	23-May-02	3:21 AM

Activity	Transect	Latitude	Longitude	Dist (NM)	Spd (kt)	Transit (Hrs)	z (fm)	Water Depth (m)	CTD Depth (m)	CTD Time (min)	Net Times (min)	Arrival Date (Local)	Arrival Time (Local)	Depart Date (Local)	Depart Time (Local)
ATD3	CTD	58° 54.532' N	149° 32.719' W	8.18	9	0.91	130	236.6	227	29		23-May-02	4:16 AM	23-May-02	4:44 AM
ATD2	CTD	59° 02.547' N	149° 29.561' W	8.18	9	0.91	124	225.7	216	28		23-May-02	5:39 AM	23-May-02	6:07 AM
ATD1	CTD	59° 10.563' N	149° 26.390' W	8.18	9	0.91	80	145.6	136	23		23-May-02	7:02 AM	23-May-02	7:25 AM
GBM-3 GAK5	Deploy Mooring	59° 16.464' N	148° 58.123'W	15.62	8	1.95		185.7	176		240	23-May-02	9:22 AM	23-May-02	1:22 PM
GBZoop-3 GAK5	Deploy Mooring	59° 17.000' N	148° 58.000'W	0.54	11	0.05		184.8			180	23-May-02	1:25 PM	23-May-02	4:25 PM
GBP-3 GAK5	Deploy Mooring	59° 16.727' N	148° 57.706'W	0.31	11	0.03		184.8			120	23-May-02	4:27 PM	23-May-02	6:27 PM
ATE1	CTD	59° 07.400' N	150° 03.800' W	35.10	11	3.19		151.0	141	24		23-May-02	9:38 PM	23-May-02	10:02 PM
ATE2	CTD	59° 01.967' N	150° 05.283' W	5.49	9	0.61		205.0	195	27		23-May-02	10:38 PM	23-May-02	11:05 PM
ATE3	CTD	58° 56.534' N	150° 06.763' W	5.49	9	0.61		211.0	201	27		23-May-02	11:42 PM	24-May-02	12:09 AM
ATE4	CTD	58° 51.101' N	150° 08.238' W	5.49	9	0.61		172.0	162	25		24-May-02	12:46 AM	24-May-02	1:11 AM
ATE5	CTD	58° 55.700' N	150° 09.720'W	4.66	9	0.52		135.0	125	23		24-May-02	1:42 AM	24-May-02	2:04 AM
GP6	CTD	58° 45.000' N	150° 52.000' W	24.35	11	2.21	95	173.4	163	37		24-May-02	4:17 AM	24-May-02	4:54 AM
GP4	CTD	58° 52.800' N	150° 54.000' W	7.87	8	0.98	82	149.7	140	36		24-May-02	5:53 AM	24-May-02	6:29 AM
GP2	CTD	59° 00.600' N	150° 57.600' W	8.02	8	1.00	86	157.0	147	36		24-May-02	7:29 AM	24-May-02	8:05 AM
GP-32	Recover Mooring	59° 06.300' N	150° 59.500'W	5.78	9	0.64		153.0	153		90	24-May-02	8:43 AM	24-May-02	10:13 AM
GP-32	Deploy Mooring	59° 06.300' N	150° 59.500'W	0.00	9	0.00		153.0	153		180	24-May-02	10:13 AM	24-May-02	1:13 PM
GP-34	Recover Mooring	58° 57.300' N	150° 55.500'W	9.23	9	1.03		142.0	142		90	24-May-02	2:15 PM	24-May-02	3:45 PM
GP-34	Deploy Mooring	58° 57.300' N	150° 55.500'W	0.00	9	0.00		142.0	142		180	24-May-02	3:45 PM	24-May-02	6:45 PM
GP-36	Recover Mooring	58° 45.000' N	150° 52.000'W	12.43	11	1.13		185.0	185		90	24-May-02	7:53 PM	24-May-02	9:23 PM
GP-36	Deploy Mooring	58° 45.000' N	150° 52.000'W	0.00	9	0.00		185.0	185		180	24-May-02	9:23 PM	25-May-02	12:23 AM
CB-3A	Bad Weather	57° 30.879' N	151° 26.597'W	76.34	11	6.94		143.6			1300	25-May-02	7:19 AM	26-May-02	4:59 AM
Kodiak Island	Kodiak Island	57° 43.430' N	152° 31.530'W	36.97	11	3.36						26-May-02	8:21 AM		

8.3.3 EW0205 Leg 2, May 26 - June 10, 2002 – CTD, MARMAP Bongo, CalVET, and MOCNESS Station Locations

Station Number	Activity	Transect	Station ID	Latitude	Longitude	Dist (NM)	Spd (kt)	Transit (Hrs)	z (fm)	Water Depth (m)	CTD Depth (m)	CTD Time (min)	Net Times (min)	Arrival Date (Local)	Arrival Time (Local)	Depart Date (Local)	Depart Time (Local)
	Change Science Party	Kodiak Island	Kodiak	57° 43.430' N	152° 31.530'W		9									26-May-02	12:00 PM
	Waypt			57° 45.000' N	152° 00.000'W	16.90	11	1.54						26-May-02	1:32 PM	26-May-02	1:32 PM
	WayPt			57° 30.000' N	152° 00.000'W	15.00	11	1.36						26-May-02	2:54 PM	26-May-02	2:54 PM
1	CTD/Bongo	BCA1	BC-1 (Outer 5)	56° 40.800' N	152° 22.500'W	50.70	8	6.34	80	145.6	136	35		26-May-02	9:14 PM	26-May-02	9:49 PM
2	CTD/Bongo	BCA2	BC Outer 4	56° 41.550' N	152° 25.000'W	1.56	8	0.20	80	145.6	136	35		26-May-02	10:01 PM	26-May-02	10:36 PM
3	CTD/Bongo	BCA3	BC Outer 3	56° 42.300' N	152° 27.500'W	1.56	8	0.20	80	145.6	136	35		26-May-02	10:48 PM	26-May-02	11:23 PM
4	CTD/Bongo	BCA4	BC Outer 2	56° 43.050' N	152° 30.000'W	1.56	8	0.20	80	145.6	136	35		26-May-02	11:35 PM	27-May-02	12:10 AM
5	CTD/Bongo	BCA5	BC-2 (Outer 1)	56° 43.800' N	152° 32.500'W	1.56	8	0.20	80	145.6	136	35		27-May-02	12:22 AM	27-May-02	12:57 AM
6	CTD/Bongo	BCB4	BC - Inner CTDs	56° 56.500' N	152° 39.500'W	13.26	11	1.21	80	145.6	136	35	37	27-May-02	2:09 AM	27-May-02	3:22 AM
7	CTD/Bongo	BCB3	BC - Inner CTDs	56° 57.333' N	152° 35.500'W	2.34	8	0.29	80	145.6	136	35	37	27-May-02	3:39 AM	27-May-02	4:51 AM
8	CTD/Bongo	BCB2	BC - Inner CTDs	56° 58.167' N	152° 31.500'W	2.33	8	0.29	80	145.6	136	35	37	27-May-02	5:09 AM	27-May-02	6:21 AM
9	CTD/Bongo	BCB1	BC - Inner CTDs	56° 59.000' N	152° 27.500'W	2.33	8	0.29	75	136.5	127	35	36	27-May-02	6:39 AM	27-May-02	7:49 AM
10	CTD/Bongo	BCA1 (Omit if done on Leg 1)	BC-1 (Outer 5)	56° 40.800' N	152° 22.500'W	18.40	8	2.30	80	145.6	136	35		27-May-02	10:07 AM	27-May-02	10:43 AM
11	CTD/Bongo	BCA2 (Omit if done on Leg 1)	BC Outer 4	56° 41.550' N	152° 25.000'W	1.56	8	0.20	80	145.6	136	35		27-May-02	10:54 AM	27-May-02	11:30 AM
12	CTD/Bongo	BCA3 (Omit if done on Leg 1)	BC Outer 3	56° 42.300' N	152° 27.500'W	1.56	8	0.20	80	145.6	136	35		27-May-02	11:41 AM	27-May-02	12:17 PM

Station Number	Activity	Transect	Station ID	Latitude	Longitude	Dist (NM)	Spd (kt)	Transit (Hrs)	z (fm)	Water Depth (m)	CTD Depth (m)	CTD Time (min)	Net Times (min)	Arrival Date (Local)	Arrival Time (Local)	Depart Date (Local)	Depart Time (Local)
13	CTD/Bongo	BCA4 (Omit if done on Leg 1)	BC Outer 2	56° 43.050' N	152° 30.000'W	1.56	8	0.20	80	145.6	136	35		27-May-02	12:28 PM	27-May-02	1:04 PM
14	CTD/Bongo	BCA4 (Omit if done on Leg 1)	BC-2 (Outer 1)	56° 43.800' N	152° 32.500'W	1.56	8	0.20	80	145.6	136	35		27-May-02	1:15 PM	27-May-02	1:51 PM
15	CTD/Bongo	ABA1	Along Albatross Bank Inner	56° 56.300' N	152° 04.500'W	19.77	9	2.20	42	76.4	66	31	30	27-May-02	4:03 PM	27-May-02	5:03 PM
16	CTD/Bongo	ABA2		57° 00.100' N	152° 13.375'W	6.15	9	0.68	42	76.4	66	31	30	27-May-02	5:44 PM	27-May-02	6:45 PM
17	CTD/Bongo	ABA3		57° 03.900' N	151° 22.250'W	28.08	9	3.12	42	76.4	66	31	30	27-May-02	9:52 PM	27-May-02	10:53 PM
18	CTD/Bongo	ABA4		57° 07.700' N	151° 31.125'W	6.14	9	0.68	42	76.4	66	31	30	27-May-02	11:34 PM	28-May-02	12:34 AM
19	CTD/Bongo	ABA5		57° 11.500' N	151° 40.000'W	6.13	9	0.68	42	76.4	66	31	30	28-May-02	1:15 AM	28-May-02	2:16 AM
20	CTD/Bongo	ABB1	Along Albatross Bank Outer	57° 03.500' N	152° 04.250'W	15.40	9	1.71	38	69.2	59	31	29	28-May-02	3:58 AM	28-May-02	4:58 AM
21	CTD/Bongo	ABB2		57° 06.000' N	151° 58.500'W	4.00	9	0.44	38	69.2	59	31	29	28-May-02	5:25 AM	28-May-02	6:24 AM
22	CTD/Bongo	ABB3		57° 08.500' N	151° 52.750'W	4.00	9	0.44	38	69.2	59	31	29	28-May-02	6:51 AM	28-May-02	7:50 AM
23	CTD/Bongo	ABB4		57° 11.000' N	151° 47.000'W	4.00	9	0.44	38	69.2	59	31	29	28-May-02	8:17 AM	28-May-02	9:16 AM
24	CTD/Bongo	ABB5		57° 13.500' N	151° 42.500'W	3.49	9	0.39	38	69.2	59	31	29	28-May-02	9:39 AM	28-May-02	10:39 AM
25	CTD/Bongo	CBA1	CB SW-NE	57° 20.000' N	151° 30.000'W	9.38	11	0.85	80	145.6	136	35	37	28-May-02	11:30 AM	28-May-02	12:42 PM
26	CTD/Bongo	CBA2		57° 22.000' N	151° 25.750'W	3.04	9	0.34	80	145.6	136	35	37	28-May-02	1:02 PM	28-May-02	2:15 PM
27	CTD/Bongo	CBA3		57° 24.000' N	151° 21.500'W	3.04	9	0.34	80	145.6	136	35	37	28-May-02	2:35 PM	28-May-02	3:47 PM
28	CTD/Bongo	CBA4		57° 26.000' N	151° 17.250'W	3.04	9	0.34	80	145.6	136	35	37	28-May-02	4:07 PM	28-May-02	5:20 PM
29	CTD/Bongo	CBA5		57° 28.000' N	151° 13.000'W	3.04	9	0.34	80	145.6	136	35	37	28-May-02	5:40 PM	28-May-02	6:52 PM
30	CTD/Bongo	CBB5	Start NE-SW	57° 34.000' N	151° 22.000'W	7.70	9	0.86	80	145.6	136	35	37	28-May-02	7:43 PM	28-May-02	8:56 PM
31	CTD/Bongo	CBB4	CB-3A (140m)	57° 31.000' N	151° 26.500'W	3.85	9	0.43	80	145.6	136	35	37	28-May-02	9:21 PM	28-May-02	10:33 PM
32	CTD/Bongo	CBB3		57° 29.300' N	151° 30.500'W	2.74	9	0.30	80	145.6	136	35	37	28-May-02	10:52 PM	29-May-02	12:04 AM
33	CTD/Bongo	CBB2	CB-2A (120m)	57° 27.600' N	151° 34.500'W	2.74	9	0.30	80	145.6	136	35	37	29-May-02	12:22 AM	29-May-02	1:34 AM
34	CTD/Bongo	CBB1		57° 25.900' N	151° 39.000'W	2.96	9	0.33	80	145.6	136	35	37	29-May-02	1:54 AM	29-May-02	3:06 AM
35	CTD/Bongo	CBA1	SW-NE	57° 20.000' N	151° 30.000'W	7.64	9	0.85	80	145.6	136	35		29-May-02	3:57 AM	29-May-02	4:32 AM
36	CTD/Bongo	CBA2		57° 22.000' N	151° 25.750'W	3.04	9	0.34	80	145.6	136	35		29-May-02	4:53 AM	29-May-02	5:28 AM
37	CTD/Bongo	CBA3		57° 24.000' N	151° 21.500'W	3.04	9	0.34	80	145.6	136	35		29-May-02	5:48 AM	29-May-02	6:24 AM

Station Number	Activity	Transect	Station ID	Latitude	Longitude	Dist (NM)	Spd (kt)	Transit (Hrs)	z (fm)	Water Depth (m)	CTD Depth (m)	CTD Time (min)	Net Times (min)	Arrival Date (Local)	Arrival Time (Local)	Depart Date (Local)	Depart Time (Local)
38	CTD/Bongo	CBA4		57° 26.000' N	151° 17.250'W	3.04	9	0.34	65	118.3	108	34		29-May-02	6:44 AM	29-May-02	7:18 AM
39	CTD/Bongo	CBA5		57° 28.000' N	151° 13.000'W	3.04	9	0.34	65	118.3	108	34		29-May-02	7:38 AM	29-May-02	8:11 AM
40	CTD/Bongo	GP13	GORE POINT Line	58° 06.238' N	151° 43.041'W	41.46	11	3.77	65	118.6	109	34	34	29-May-02	11:57 AM	29-May-02	1:05 PM
41	CTD/Bongo	GP12		58° 06.238' N	151° 20.425'W	11.95	11	1.09	70	127.8	118	34	35	29-May-02	2:10 PM	29-May-02	3:20 PM
42	CTD/Bongo	GP11		58° 06.238' N	150° 57.810'W	11.95	11	1.09	65	118.6	109	34	34	29-May-02	4:25 PM	29-May-02	5:32 PM
43	CTD/Bongo	GP10i		58° 06.238' N	150° 46.502'W	5.97	11	0.54	85	155.1	145	36	38	29-May-02	6:05 PM	29-May-02	7:19 PM
44	CTD/Bongo	GP10		58° 06.238' N	150° 35.194'W	5.97	11	0.54	90	164.3	154	36	39	29-May-02	7:51 PM	29-May-02	9:07 PM
45	CTD/Bongo	GP9i		58° 11.060' N	150° 37.299'W	4.95	9	0.55	58	105.9	96	33	33	29-May-02	9:40 PM	29-May-02	10:45 PM
46	CTD/Bongo	GP9		58° 15.959' N	150° 39.443'W	5.03	9	0.56	35	63.9	54	30	28	29-May-02	11:19 PM	30-May-02	12:17 AM
47	CTD/Bongo	GP8		58° 25.680' N	150° 43.712'W	9.98	11	0.91	40	73.0	63	31	29	30-May-02	1:12 AM	30-May-02	2:12 AM
48	CTD/Bongo	GP7		58° 35.400' N	150° 48.000'W	9.98	11	0.91	90	164.3	154	36	39	30-May-02	3:06 AM	30-May-02	4:22 AM
49	CTD/Bongo	GP6		58° 45.000' N	150° 52.000'W	9.82	11	0.89	95	173.4	163	37	40	30-May-02	5:15 AM	30-May-02	6:32 AM
50	CTD/Bongo	GP5		58° 49.200' N	150° 52.800'W	4.22	9	0.47	84	153.3	143	36	38	30-May-02	7:00 AM	30-May-02	8:14 AM
51	CTD/Bongo	GP4		58° 52.800' N	150° 54.000'W	3.65	9	0.41	82	149.7	140	36	37	30-May-02	8:38 AM	30-May-02	9:51 AM
52	CTD/Bongo	GP3		58° 57.000' N	150° 55.800'W	4.30	9	0.48	70	127.8	118	34	35	30-May-02	10:19 AM	30-May-02	11:29 AM
53	CTD/Bongo	GP2		59° 00.600' N	150° 57.600'W	3.72	9	0.41	86	157.0	147	36	38	30-May-02	11:53 AM	30-May-02	1:08 PM
54	CTD/Bongo	GP1		59° 06.000' N	150° 59.400'W	5.48	9	0.61	50	91.3	81	32	31	30-May-02	1:44 PM	30-May-02	2:47 PM
55	CTD/Bongo	PR1	PYE REEF Line	59° 16.300' N	150° 20.000'W	22.66	11	2.06	68	123.8	114	22	35	30-May-02	4:51 PM	30-May-02	5:47 PM
56	CTD/Bongo	PR2		59° 10.290' N	150° 16.416'W	6.28	9	0.70	70	127.4	117	22	35	30-May-02	6:29 PM	30-May-02	7:26 PM
57	CTD/Bongo	PR3		59° 04.281' N	150° 12.842'W	6.28	9	0.70	90	163.8	154	24	39	30-May-02	8:08 PM	30-May-02	9:12 PM
58	CTD/Bongo	PR4		58° 58.271' N	150° 09.279'W	6.28	9	0.70	90	163.8	154	24	39	30-May-02	9:53 PM	30-May-02	10:57 PM
59	CTD/Bongo	PR5		58° 52.261' N	150° 05.726'W	6.28	9	0.70	90	163.8	154	24	39	30-May-02	11:39 PM	31-May-02	12:42 AM
60	CTD/Bongo	PR6		58° 43.294' N	150° 00.444'W	9.38	11	0.85	78	142.0	132	23	37	31-May-02	1:33 AM	31-May-02	2:33 AM
61	CTD/Bongo	PR7		58° 34.326' N	149° 55.184'W	9.38	11	0.85	78	142.0	132	23	37	31-May-02	3:24 AM	31-May-02	4:23 AM
62	CTD/Bongo	PR8		58° 25.358' N	149° 49.947'W	9.38	11	0.85	80	145.6	136	23	37	31-May-02	5:14 AM	31-May-02	6:15 AM
63	CTD/Bongo	PR9		58° 19.415' N	149° 46.488'W	6.21	9	0.69	50	91.0	81	20	31	31-May-02	6:56 AM	31-May-02	7:47 AM
64	CTD/Bongo	PR10		58° 14.644' N	149° 43.719'W	4.99	9	0.55	32	58.2	48	18	28	31-May-02	8:20 AM	31-May-02	9:06 AM
65	CTD/Bongo	PR11		58° 08.701' N	149° 40.277'W	6.21	9	0.69	80	145.6	136	23	37	31-May-02	9:47 AM	31-May-02	10:48 AM
66	CTD/Bongo	PR12		58° 02.757' N	149° 36.845'W	6.21	9	0.69	120	218.4	208	28	45	31-May-02	11:29 AM	31-May-02	12:41 PM
67	CTD/Bongo	PR13		57° 56.813' N	149° 33.423'W	6.21	9	0.69	150	273.0	263	31	50	31-May-02	1:23 PM	31-May-02	2:44 PM
68	CTD/Bongo	PR14		57° 50.869' N	149° 30.010'W	6.21	9	0.69	220	400.4	390	38	54	31-May-02	3:26 PM	31-May-02	4:57 PM
69	CTD/Bongo	PR15		57° 44.924' N	149° 26.606'W	6.21	9	0.69	300	546.0	536	45	54	31-May-02	5:39 PM	31-May-02	7:17 PM
70	CTD/Bongo	PR16		57° 38.980' N	149° 23.211'W	6.21	9	0.69	800	1456.0	1446	89	54	31-May-02	7:59 PM	31-May-02	10:22 PM
71	CTD/Bongo	SR15	SEAL ROCK Line	57° 59.761' N	148° 21.115'W	39.06	11	3.55	68	1256.0	1246	80	54	01-Jun-02	1:55 AM	01-Jun-02	4:08 AM

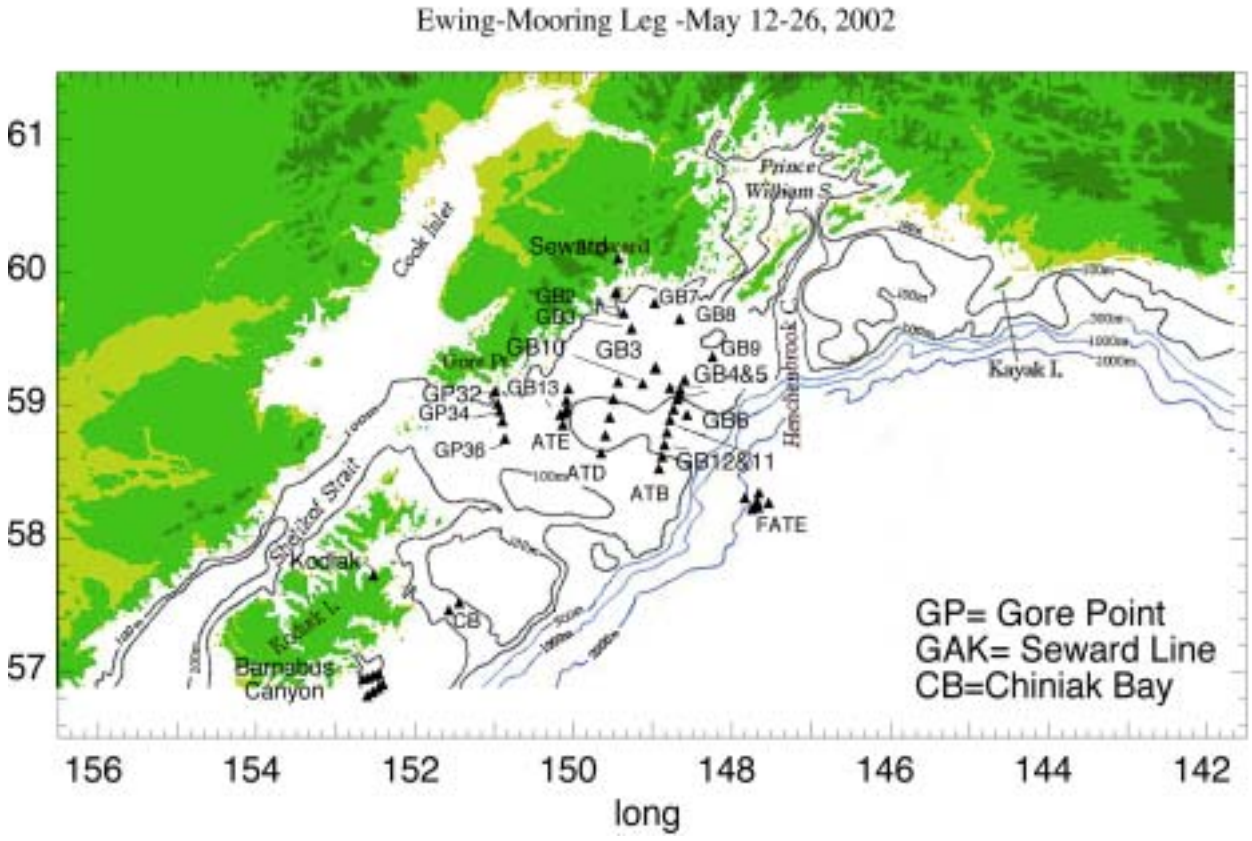
Station Number	Activity	Transect	Station ID	Latitude	Longitude	Dist (NM)	Spd (kt)	Transit (Hrs)	z (fm)	Water Depth (m)	CTD Depth (m)	CTD Time (min)	Net Times (min)	Arrival Date (Local)	Arrival Time (Local)	Depart Date (Local)	Depart Time (Local)
72	CTD/Bongo	SR14		58° 08.090' N	148° 29.123'W	9.34	9	1.04	68	1201.0	1191	77	54	01-Jun-02	5:11 AM	01-Jun-02	7:21 AM
73	CTD/Bongo	SR13		58° 16.419' N	148° 37.163'W	9.34	9	1.04	68	329.0	319	34	54	01-Jun-02	8:24 AM	01-Jun-02	9:52 AM
74	CTD/Bongo	SR13i		58° 20.580' N	148° 41.200'W	4.67	9	0.52	68	250.0	240	30	48	01-Jun-02	10:23 AM	01-Jun-02	11:41 AM
75	CTD/Bongo	SR12		58° 24.748' N	148° 45.234'W	4.67	9	0.52	68	129.0	119	22	35	01-Jun-02	12:12 PM	01-Jun-02	1:09 PM
76	CTD/Bongo	SR11		58° 33.077' N	148° 53.337'W	9.34	9	1.04	60	117.0	107	22	34	01-Jun-02	2:12 PM	01-Jun-02	3:07 PM
77	CTD/Bongo	SR10		58° 41.405' N	149° 01.472'W	9.34	9	1.04	100	153.0	143	24	38	01-Jun-02	4:09 PM	01-Jun-02	5:11 PM
78	CTD/Bongo	SR9		58° 46.961' N	149° 06.916'W	6.23	9	0.69	120	221.0	211	28	45	01-Jun-02	5:52 PM	01-Jun-02	7:05 PM
79	CTD/Bongo	SR8		58° 52.516' N	149° 12.375'W	6.23	9	0.69	120	203.0	193	27	43	01-Jun-02	7:47 PM	01-Jun-02	8:56 PM
80	CTD/Bongo	SR7		58° 58.071' N	149° 17.848'W	6.23	9	0.69	130	210.0	200	27	44	01-Jun-02	9:38 PM	01-Jun-02	10:49 PM
81	CTD/Bongo	SR6		59° 03.626' N	149° 23.336'W	6.23	9	0.69	120	133.0	123	23	36	01-Jun-02	11:30 PM	02-Jun-02	12:29 AM
82	CTD/Bongo	SR5		59° 09.181' N	149° 28.839'W	6.23	9	0.69	85	148.0	138	23	37	02-Jun-02	1:10 AM	02-Jun-02	2:11 AM
83	CTD/Bongo	SR4		59° 14.736' N	149° 34.357'W	6.23	9	0.69	75	133.0	123	23	36	02-Jun-02	2:52 AM	02-Jun-02	3:50 AM
84	CTD/Bongo	SR3		59° 20.291' N	149° 39.889'W	6.23	9	0.69	75	128.0	118	22	35	02-Jun-02	4:32 AM	02-Jun-02	5:29 AM
85	CTD/Bongo	SR2		59° 25.845' N	149° 45.437'W	6.23	9	0.69	65	202.0	192	27	43	02-Jun-02	6:11 AM	02-Jun-02	7:20 AM
86	CTD/Bongo	SR1		59° 31.000' N	149° 49.000'W	5.46	9	0.61	65	204.0	194	27	43	02-Jun-02	7:57 AM	02-Jun-02	9:07 AM
87	CTD/Bongo	GAK 1	SEWARD GAK Line	59° 50.700' N	149° 28.000'W	36.97	11	3.36		290.0	280	32	52	02-Jun-02	12:28 PM	02-Jun-02	1:53 PM
88	CTD/Bongo	GAK 2	GAK 2	59° 41.500' N	149° 19.600'W	10.13	11	0.92		230.0	220	28	46	02-Jun-02	2:48 PM	02-Jun-02	4:02 PM
89	ARGOS Drifter			59° 41.500' N	149° 19.600'W	0.00	11	0.00					5	02-Jun-02	4:02 PM	02-Jun-02	4:07 PM
90	CTD/Bongo	GAK 3	GAK 3	59° 33.200' N	149° 11.300'W	9.30	11	0.85		215.0	205	28	44	02-Jun-02	4:58 PM	02-Jun-02	6:10 PM
91	ARGOS Drifter			59° 33.200' N	149° 11.300'W	0.00	11	0.00					5	02-Jun-02	6:10 PM	02-Jun-02	6:15 PM
92	CTD/Bongo	GAK 4	GAK 4	59° 24.500' N	149° 02.900'W	9.69	11	0.88		200.0	190	27	43	02-Jun-02	7:08 PM	02-Jun-02	8:17 PM
93	ARGOS Drifter			59° 24.500' N	149° 02.900'W	0.00	11	0.00					5	02-Jun-02	8:17 PM	02-Jun-02	8:22 PM
94	CTD/Bongo	GAK 5	GAK 5	59° 15.700' N	148° 54.500'W	9.79	11	0.89		170.0	160	25	40	02-Jun-02	9:15 PM	02-Jun-02	10:20 PM
95	CTD/Bongo	GAK 6	GAK 6	59° 07.000' N	148° 46.200'W	9.68	11	0.88		154.0	144	24	38	02-Jun-02	11:12 PM	03-Jun-02	12:14 AM
96	CTD/Bongo	GAK6i	GAK6i	59° 03.650' N	148° 42.000'W	3.98	9	0.44		182.0	172	26	41	03-Jun-02	12:41 AM	03-Jun-02	1:47 AM
97	ARGOS Drifter			59° 03.650' N	148° 37.800'W	2.16	9	0.24					5	03-Jun-02	2:01 AM	03-Jun-02	2:06 AM
98	CTD/Bongo	GAK 7	GAK 7	58° 58.300' N	148° 37.800'W	5.35	9	0.59		274.0	264	31	51	03-Jun-02	2:42 AM	03-Jun-02	4:04 AM
99	CTD/Bongo	GAK 7i	GAK 7i	58° 52.900' N	148° 33.600'W	5.82	9	0.65		303.0	293	33	54	03-Jun-02	4:42 AM	03-Jun-02	6:09 AM
100	ARGOS Drifter			58° 46.850' N	148° 27.300'W	6.87	9	0.76					5	03-Jun-02	6:55 AM	03-Jun-02	7:00 AM
101	CTD/Bongo	GAK 8	GAK 8	58° 47.500' N	148° 29.400'W	1.27	9	0.14		294.0	284	32	53	03-Jun-02	7:08 AM	03-Jun-02	8:33 AM
102	CTD/Bongo	GAK 9	GAK 9	58° 40.800' N	148° 21.000'W	7.99	9	0.89		285.0	275	32	52	03-Jun-02	9:26 AM	03-Jun-02	10:50 AM

Station Number	Activity	Transect	Station ID	Latitude	Longitude	Dist (NM)	Spd (kt)	Transit (Hrs)	z (fm)	Water Depth (m)	CTD Depth (m)	CTD Time (min)	Net Times (min)	Arrival Date (Local)	Arrival Time (Local)	Depart Date (Local)	Depart Time (Local)
103	ARGOS Drifter			58° 40.800' N	148° 21.000'W	0.00	9	0.00					5	03-Jun-02	10:50 AM	03-Jun-02	10:55 AM
104	CTD/Bongo	GAK 10	GAK 10	58° 32.500' N	148° 12.700'W	9.36	9	1.04		1476.0	1466	90	54	03-Jun-02	11:57 AM	03-Jun-02	2:21 PM
105	CTD/Bongo	GAK 11	GAK 11	58° 23.300' N	148° 04.300'W	10.20	11	0.93		1435.0	1425	88	54	03-Jun-02	3:17 PM	03-Jun-02	5:39 PM
106	CTD/Bongo	FF10	Fairfield P	58° 44.288' N	147° 42.806'W	23.79	11	2.16		2160.0	1500	92	54	03-Jun-02	7:49 PM	03-Jun-02	10:15 PM
107	CTD/Bongo	FF9	Fairfield P	58° 52.616' N	147° 50.984'W	9.34	9	1.04		1165.0	1155	75	54	03-Jun-02	11:17 PM	04-Jun-02	1:26 AM
108	CTD/Bongo	FF8	Fairfield P	59° 00.944' N	147° 59.196'W	9.34	9	1.04		170.0	160	25	40	04-Jun-02	2:28 AM	04-Jun-02	3:33 AM
109	CTD/Bongo	FF7	Fairfield P	59° 09.272' N	148° 07.441'W	9.34	9	1.04		141.0	131	23	36	04-Jun-02	4:35 AM	04-Jun-02	5:34 AM
110	CTD/Bongo	FF6	Fairfield P	59° 17.600' N	148° 15.719'W	9.34	9	1.04		124.0	114	22	35	04-Jun-02	6:37 AM	04-Jun-02	7:33 AM
111	CTD/Bongo	FF5	Fairfield P	59° 25.928' N	148° 24.031'W	9.34	9	1.04		143.0	133	23	37	04-Jun-02	8:36 AM	04-Jun-02	9:35 AM
112	CTD/Bongo	FF4	Fairfield P	59° 31.482' N	148° 29.594'W	6.23	9	0.7		98.0	88	20	32	04-Jun-02	10:17 AM	04-Jun-02	11:09 AM
113	CTD/Bongo	FF3	Fairfield P	59° 37.037' N	148° 35.172'W	6.23	9	0.69		95.0	85	20	32	04-Jun-02	11:51 AM	04-Jun-02	12:42 PM
114	CTD/Bongo	FF2	Fairfield P	59° 42.591' N	148° 40.766'W	6.23	9	0.69		196.0	186	26	42	04-Jun-02	1:24 PM	04-Jun-02	2:33 PM
115	CTD/Bongo	FF1	Fairfield P	59° 48.146' N	148° 46.375'W	6.23	9	0.69		185.0	175	26	41	04-Jun-02	3:14 PM	04-Jun-02	4:21 PM
116	CTD/Bongo	ATE1	Amatouli E	59° 07.400' N	150° 03.800'W	56.64	11	5.15		151.0	141	24	37	04-Jun-02	9:30 PM	04-Jun-02	10:31 PM
117	CTD/Bongo	ATE2	Amatouli E	59° 01.967' N	150° 05.283'W	5.49	9	0.61		205.0	195	27	43	04-Jun-02	11:07 PM	05-Jun-02	12:18 AM
118	CTD/Bongo	ATE3	Amatouli E	58° 56.534' N	150° 06.763'W	5.49	9	0.61		211.0	201	27	44	05-Jun-02	12:54 AM	05-Jun-02	2:05 AM
119	CTD/Bongo	ATE4	Amatouli E	58° 51.101' N	150° 08.238'W	5.49	9	0.6		172.0	162	25	40	05-Jun-02	2:42 AM	05-Jun-02	3:47 AM
120	CTD/Bongo	ATD5	Amatouli D	58° 38.500' N	149° 39.000'W	19.72	9	2.2		135.0	125	23	36	05-Jun-02	5:58 AM	05-Jun-02	6:56 AM
121	CTD/Bongo	ATD4	Amatouli D	58° 46.516' N	149° 35.866'W	8.18	9	0.9		204.0	194	27	43	05-Jun-02	7:51 AM	05-Jun-02	9:01 AM
122	CTD/Bongo	ATD3	Amatouli D	58° 54.532' N	149° 32.719'W	8.18	9	0.9		243.0	233	29	47	05-Jun-02	9:55 AM	05-Jun-02	11:12 AM
123	CTD/Bongo	ATD2	Amatouli D	59° 02.547' N	149° 29.561'W	8.18	9	0.9		230.0	220	28	46	05-Jun-02	12:06 PM	05-Jun-02	1:21 PM
124	CTD/Bongo	ATD1	Amatouli D	59° 10.563' N	149° 26.390'W	8.18	9	0.9		137.0	127	23	36	05-Jun-02	2:15 PM	05-Jun-02	3:14 PM
125	CTD/Bongo	ATC1	Amatouli C	59° 05.300' N	149° 08.800'W	17.83	11	1.62		125.0	115	22	35	05-Jun-02	4:51 PM	05-Jun-02	5:48 PM
126	CTD/Bongo	ATC2	Amatouli C	58° 59.160' N	149° 10.901'W	6.23	9	0.7		226.0	216	28	45	05-Jun-02	6:30 PM	05-Jun-02	7:43 PM
127	CTD/Bongo	ATC3	Amatouli C	58° 56.066' N	149° 11.957'W	3.14	9	0.3		2221.0	1500	92	54	05-Jun-02	8:04 PM	05-Jun-02	10:30 PM
128	CTD/Bongo	ATC4	Amatouli C	58° 52.971' N	149° 13.012'W	3.14	9	0.3		206.0	196	27	43	05-Jun-02	10:51 PM	06-Jun-02	12:01 AM
129	CTD/Bongo	ATC5	Amatouli C	58° 46.831' N	149° 15.100'W	6.23	9	0.7		182.0	172	26	41	06-Jun-02	12:43 AM	06-Jun-02	1:49 AM
130	CTD/Bongo	ATC6	Amatouli C	58° 40.691' N	149° 17.182'W	6.23	9	0.7		133.0	123	23	36	06-Jun-02	2:31 AM	06-Jun-02	3:29 AM
131	CTD/Bongo	ATB7	Amatouli B	58° 36.750' N	148° 53.000'W	13.19	11	1.2	75	136.5	127	23	36	06-Jun-02	4:41 AM	06-Jun-02	5:39 AM
132	CTD/Bongo	BG-12	Amatouli B	58° 42.000' N	148° 51.000'W	5.35	9	0.6	120	218.4	208	28	45	06-Jun-02	6:15 AM	06-Jun-02	7:27 AM
133	CTD/Bongo	ATB5	Amatouli B	58° 47.750' N	148° 49.000'W	5.84	9	0.6	140	254.8	245	30	48	06-Jun-02	8:06 AM	06-Jun-02	9:25 AM
134	CTD/Bongo	GB-11	Amatouli B	58° 53.500' N	148° 47.000'W	5.84	9	0.6	150	273.0	263	31	50	06-Jun-02	10:04 AM	06-Jun-02	11:25 AM
135	CTD/Bongo	ATB3	Amatouli B	58° 58.000' N	148° 44.250'W	4.72	9	0.5	130	236.6	227	29	47	06-Jun-02	11:57 AM	06-Jun-02	1:12 PM
136	CTD/Bongo	GB5 GAK6i ATB1	Amatouli B	59° 02.500' N	148° 41.500'W	4.72	9	0.52	105	191.1	181	26	42	06-Jun-02	1:44 PM	06-Jun-02	2:51 PM

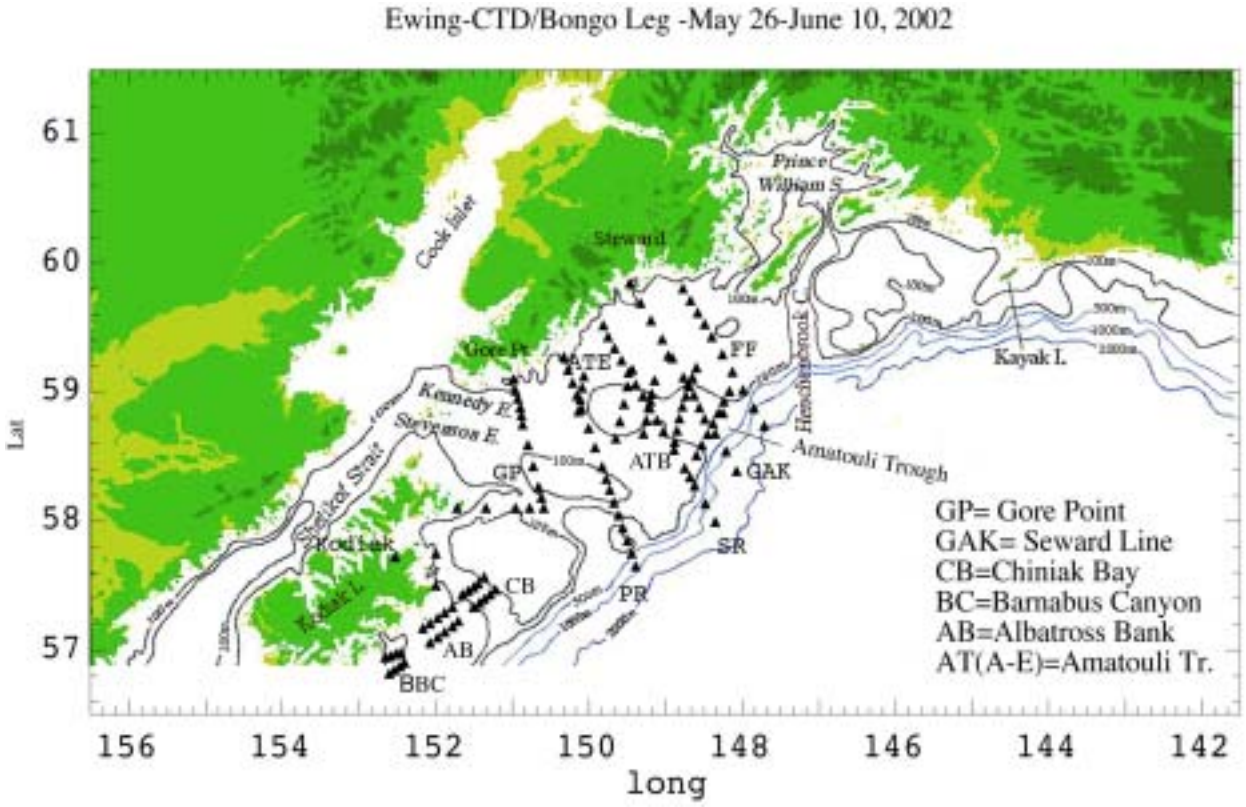
Station Number	Activity	Transect	Station ID	Latitude	Longitude	Dist (NM)	Spd (kt)	Transit (Hrs)	z (fm)	Water Depth (m)	CTD Depth (m)	CTD Time (min)	Net Times (min)	Arrival Date (Local)	Arrival Time (Local)	Depart Date (Local)	Depart Time (Local)
137	CTD/Bongo	ATB1	Amatouli B	59° 07.000' N	148° 38.900'W	4.69	9	0.52	90	163.8	154	24	39	06-Jun-02	3:23 PM	06-Jun-02	4:26 PM
138	CTD/Bongo	ATB0	Amatouli B	59° 11.500' N	148° 36.200'W	4.71	9	0.52	70	127.4	117	22	35	06-Jun-02	4:57 PM	06-Jun-02	5:54 PM
139	CTD/Bongo	ATA1	Amatouli A	59° 00.500' N	148° 10.000'W	17.38	11	1.58		185.0	175	26	41	06-Jun-02	7:29 PM	06-Jun-02	8:36 PM
140	CTD/Bongo	ATA2	Amatouli A	58° 55.488' N	148° 14.321'W	5.48	9	0.61		185.0	175	26	41	06-Jun-02	9:13 PM	06-Jun-02	10:19 PM
141	CTD/Bongo	ATA3	Amatouli A	58° 50.476' N	148° 18.631'W	5.48	9	0.61		277.0	267	31	51	06-Jun-02	10:56 PM	07-Jun-02	12:18 AM
142	CTD/Bongo	ATA4	Amatouli A	58° 45.463' N	148° 22.931'W	5.48	9	0.61		270.0	260	31	50	07-Jun-02	12:55 AM	07-Jun-02	2:16 AM
143	CTD/Bongo	ATA5	Amatouli A	58° 40.451' N	148° 27.221'W	5.49	9	0.61		280.0	270	32	51	07-Jun-02	2:52 AM	07-Jun-02	4:15 AM
144	CTD/Bongo	ATA6	Amatouli A	58° 35.439' N	148° 31.500'W	5.49	9	0.61		522.0	512	44	54	07-Jun-02	4:52 AM	07-Jun-02	6:29 AM
145	CTD/Bongo	ATA7	Amatouli A	58° 30.426' N	148° 35.770'W	5.49	9	0.61		800.0	790	57	54	07-Jun-02	7:06 AM	07-Jun-02	8:57 AM
146	CTD/Bongo	ATX5	Amatouli Trough Axis Line	58° 50.240' N	148° 14.947'W	22.58	11	2.05		279.0	269	31		07-Jun-02	11:00 AM	07-Jun-02	11:31 AM
147	CTD/Bongo	ATX4	Amatouli Trough Axis Line	58° 53.922' N	148° 39.866'W	13.40	11	1.22		275.0	265	31		07-Jun-02	12:44 PM	07-Jun-02	1:16 PM
148	CTD/Bongo	ATX3	Amatouli Trough Axis Line	58° 56.066' N	149° 11.957'W	16.71	11	1.52		272.0	262	31		07-Jun-02	2:47 PM	07-Jun-02	3:18 PM
149	CTD/Bongo	ATX2	Amatouli Trough Axis Line	58° 54.532' N	149° 32.719'W	10.83	11	0.98		219.0	209	28		07-Jun-02	4:17 PM	07-Jun-02	4:45 PM
150	CTD/Bongo	ATX1	Amatouli Trough Axis Line	58° 56.534' N	150° 06.763'W	17.69	11	1.61		252.0	242	30		07-Jun-02	6:21 PM	07-Jun-02	6:51 PM
151	MOCHNESS	GBZoop-3 GAK5	MOCNESS	59° 17.000' N	148° 58.000'W	40.80	11	3.71		184.8		180		07-Jun-02	10:33 PM	08-Jun-02	1:33 AM
152	MOCNESS	GBZoop-3 GAK5	MOCNESS	59° 17.000' N	148° 58.000'W	0.00	11	0.00		184.8		180		08-Jun-02	1:33 AM	08-Jun-02	4:33 AM
153	MOCNESS	GBZoop-3 GAK5	MOCNESS	59° 17.000' N	148° 58.000'W	0.00	11	0.00		184.8		150		08-Jun-02	4:33 AM	08-Jun-02	7:03 AM
154	MOCNESS	GBZoop-3 GAK5	MOCNESS	59° 17.000' N	148° 58.000'W	0.00	11	0.00		184.8		90		08-Jun-02	7:03 AM	08-Jun-02	8:33 AM
155	EDDY STUDY		EDDY STUDY	58° 56.534' N	150° 06.763'W	40.80	9	4.53					2400	08-Jun-02	1:05 PM	10-Jun-02	5:05 AM
	Kodiak Island	Kodiak Island	Kodiak	57° 43.430' N	152° 31.531'W	105.44	12	8.79						10-Jun-02	1:53 PM		

8.4 Figures

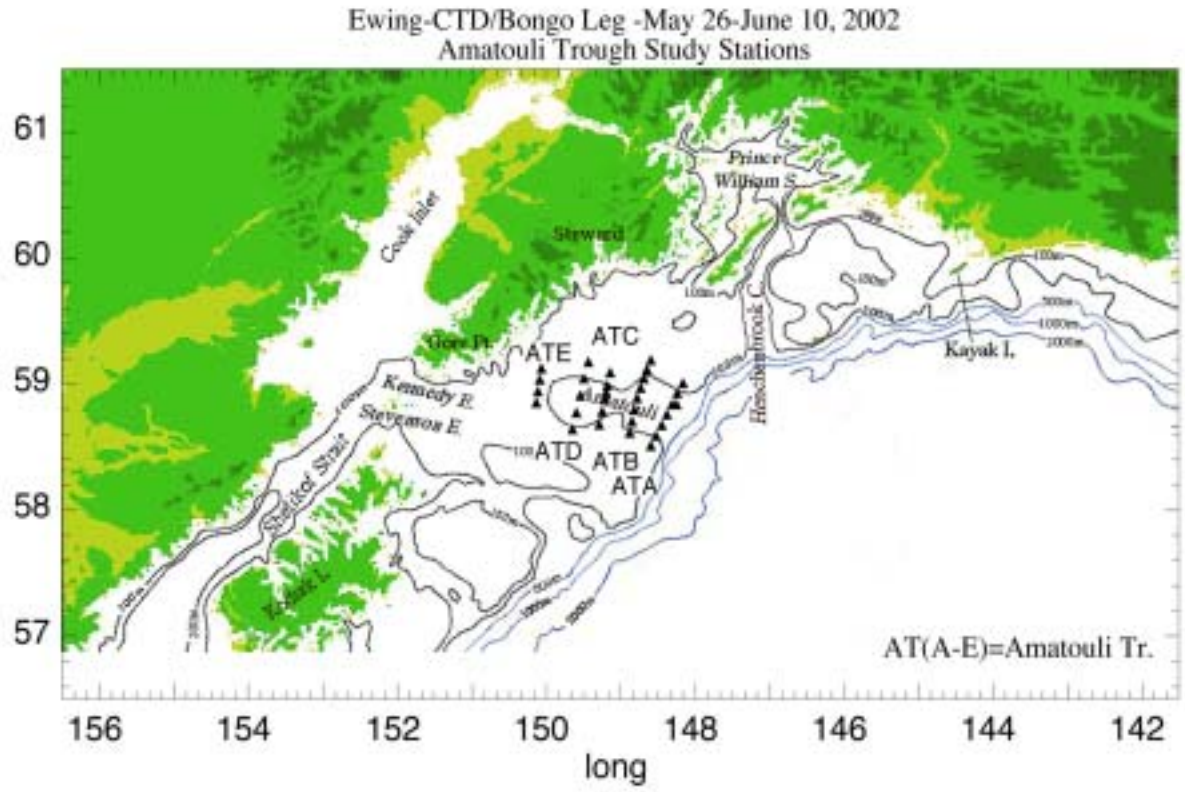
8.4.1 Stations for EW0205 – Leg 1 – ATB, ATD, and ATE refer to named CTD lines.



8.4.2 <u>CTD/Bongo Stations for EW0205 – Leg 2</u>. Letter IDs refer to named station lines.



8.4.3 CTD/Bongo Stations for EW0205 – Leg 2 Amatouli Trough Study



8.4.4 **<u>TOPEX POSEIDON Altimetry Data from June 30, 2001</u>** – 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.