GLOBEC Northeast Pacific, Coastal Gulf of Alaska

Cruise Report, R/V *Maurice Ewing* (EW0409)

28 September - 9 October 2004

This cruise was
sponsored by the

National Science Foundation

and the

National Oceanic and
Atmospheric Administration

GLOBEC Northeast Pacific, Coastal Gulf of Alaska

Cruise Report, R/V *Maurice Ewing* (EW0409)

28 September - 9 October 2004

Chief Scientist:
Nancy Kachel
NOAA/PMEL
206-526-6780
FAX: 206-526-6815
Nancy.Kachel@noaa.gov

Port of Departure: Kodiak, Alaska
Port of Return: Seward, Alaska

Cruise Objectives

1. Conduct CTD survey of two eddies located off the continental slope south of Kodiak Island, AK.
2. Recover and deploy moorings in support of US GLOBEC Research Program and PMEL/FOCI (Fisheries Oceanography Coordinated Investigations).

Summaries of each of the GLOBEC projects may be found at the web site: http://globec.coas.oregonstate/edu/groups/nep/projs.html.

Table 1. GLOBEC Cruise Participants

Dr. Nancy Kachel	NOAA/PMEL	
Bill Floering, co-Chief Scientist	NOAA/PMEL	Leg 2 (October 6-9)
Carol DeWitt	NOAA/PMEL	Leg 2 (October 6-9)
Peter Proctor	NOAA/PMEL	
Dylan Righi	NOAA/PMEL	
Sigrid Salo	NOAA/PMEL	
Stephen Smith	NOAA/PMEL	Leg 2 (October 6-9)
Margaret Sullivan	NOAA/PMEL	Leg 1 (September 28 - October 6)

PMEL = Pacific Marine Environmental Laboratory; NOAA = National Oceanic and Atmospheric Administration.

Summary of Cruise

See Appendix 1 (Event Log).

Daily Cruise Summary (Narrative)

28 September. Departed Kodiak, Alaska at 0930 (local time; note, however, that event log entries are in GMT). We proceeded to the nearest location identified as having water depths in excess of 1000m near the mouth of Chiniak Trough for the purpose of doing a test CTD cast to let out the CTD wire, so it could be carefully rewound on its drum. The ship had been having problems with the line leveling device, and continued to do so for several more days.

We then began a CTD transect across the mouth of Chiniak Trough. By the third station, we realized that there was no power getting to the pump on the CTD, a situation that degrades conductivity measurements. Because of the time taken to diagnose the problem, this line of stations was abandoned. We proceeded to the edge of the shelf to begin a CTD transect across the large eddy positioned just off the slope. This eddy originated in early spring of 2004. It was previously sampled on cruises on the R/V *Alpha Helix* in May and July (HX285 and HX287). The approximate location of the center of the eddy was identified via sea-surface altimetry analyses, and drifter positions. While in the vicinity of the center we pinpointed it by taking 3 casts across the center and noting the depth of water properties in the core. This indicated that our transect was less than 10km southwest of the center.

All CTD casts were taken to a depth of 1500m (or the bottom, if shallower). The R/V *Maurice Ewing's* internally recording SBE 19 (pumped) was attached to the Rosette frame to give us another set of conductivity measurements to supplement those from the FOCI SBE911+. Data was downloaded ~ every third station. Samples for nutrients were taken and frozen for analysis at PMEL. Samples taken above the thermocline were filtered as they were drawn, to improve the quality of the phosphate results. Chlorophyll samples were taken, filtered and frozen for analysis at AFSC laboratory. Bongo tows were taken at stations near the center and at the outer edge of the eddy (maximum depth 300m). At the last bongo station (station 23) on this line, the 20cm diameter frames and nets were lost during a cast.

We next proceeded to near the identified center of the Yakutat eddy formed in 2004. This eddy was previously occupied in May and September 2003 (KM0309 and KM01313 cruises) and May 2004 (HX285 cruise). In late September, this eddy appeared to have split into two parts, based on both the altimetry and drifter data. We occupied a north-south line of five stations near the center of the eastern (larger) sub-eddy. These five casts (ED3N00 - ED3N3) were taken to a depth of 500m. This allowed us to pinpoint its position. We than transited to its eastern edge, and began a transect of 1000m CTD casts through the centers of both sub-eddies.

5 October. On Tuesday morning, we were forced by storm winds and choppy seas to abandon the transect approximately 30 km before the western edge of the western gyre south of Sheilikof Sea Valley. Figure 1 shows the locations of all the CTD casts. Figure 2 shows those station where MARMAP bongo tows were made.

6 October. We transited to Kodiak, AK, where we debarked one scientist and embarked three mooring technicians. We immediately proceeded to the line of moorings off Gore Pt., and recovered all three moorings that night by making use of night-vision goggles in relatively calm seas (Figure 1). We then occupied the first 7 stations of the Gore Pt. CTD line. Next we went to the GB3 site on the Seward Line, the site of both surface and subsurface moorings. We made another MARMAP bongo tow, for the purpose of calibrating the TAPS optical plankton counter moored there. A special surface mooring was then deployed for the engineering division of PMEL to measure stresses on the mooring over the winter. Then, we recovered the surface mooring at GB3. We proceeded to GB12 on the south side of Amatouli Trough and attempted to recover the subsurface mooring there. The mooring would not release, indicating that it was on its side. We chose to go and pick up the mooring at GB5, two moorings at GB4, and the subsurface mooring at GB3, and then returned to GB12 for another attempt at recovery. On this second visit, the release did not respond at all. We tried querying it at several positions around the deployment site, and again at 5 and 10 miles to the northeast.

9 October. In the morning, we picked up the mooring with the iron meter at GB2 before coming in to Seward, AK, where the entire scientific party debarked.

Table 2: Cruise Statistics for FOCI Cruise 1EW04 (EW0409)

Gear Used	No. Tows
CTD casts (Table 4)	69
Bongos, 20 cm, 153mm nets (Table 5)	4
Bongos, 60 cm, 333mm nets (Table 6)	12
Mooring deployments (Table 7)	1
Mooring recoveries (Table 7)	9

Table 3: Samples Collected for FOCI Cruise 1EW04 (EW0409)

	Samples
Chlorophyll samples	~330
Nutrient samples	698
Plankton samples	16

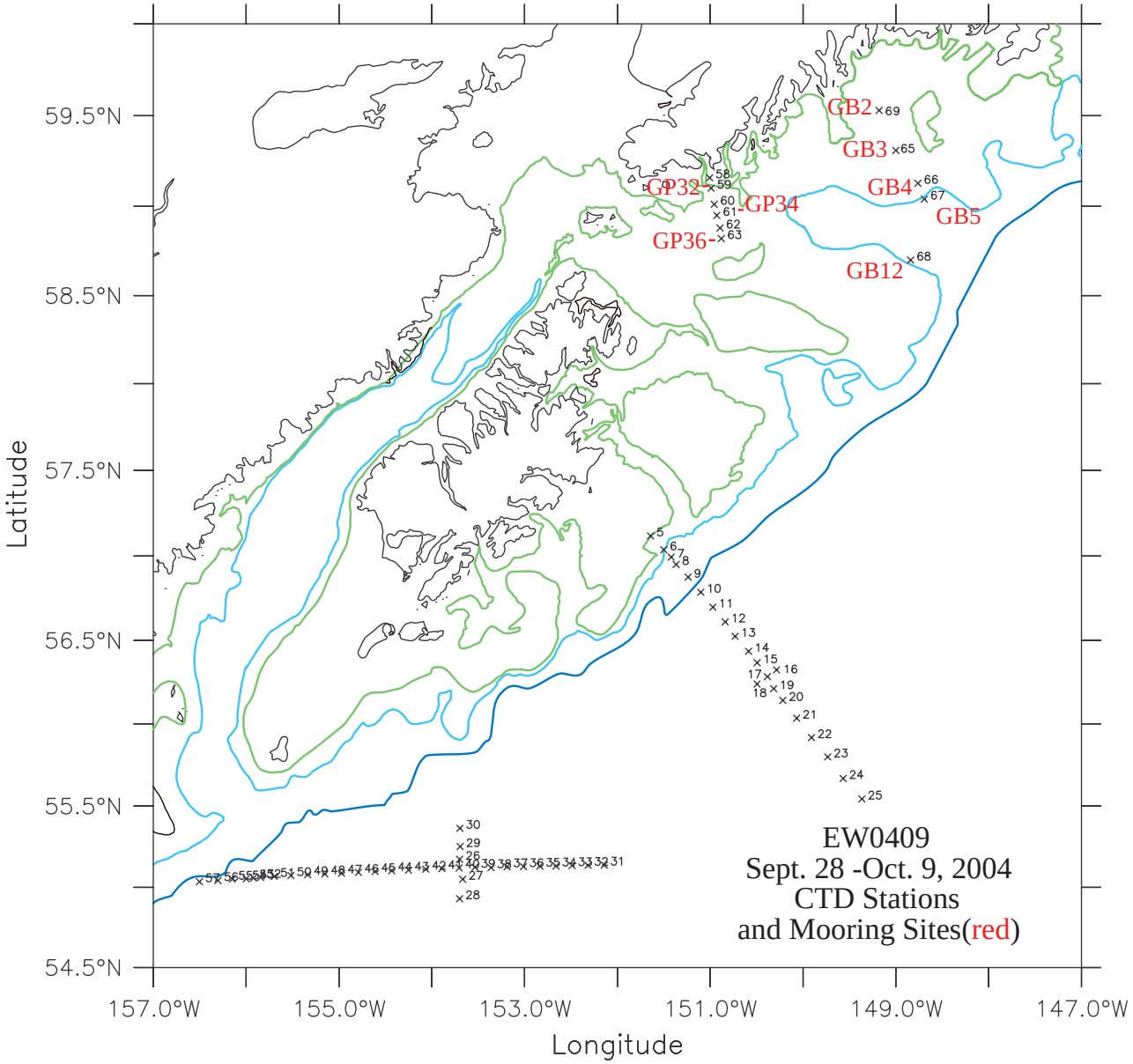

Figure 1. Map of CTDs and Mooring Sites

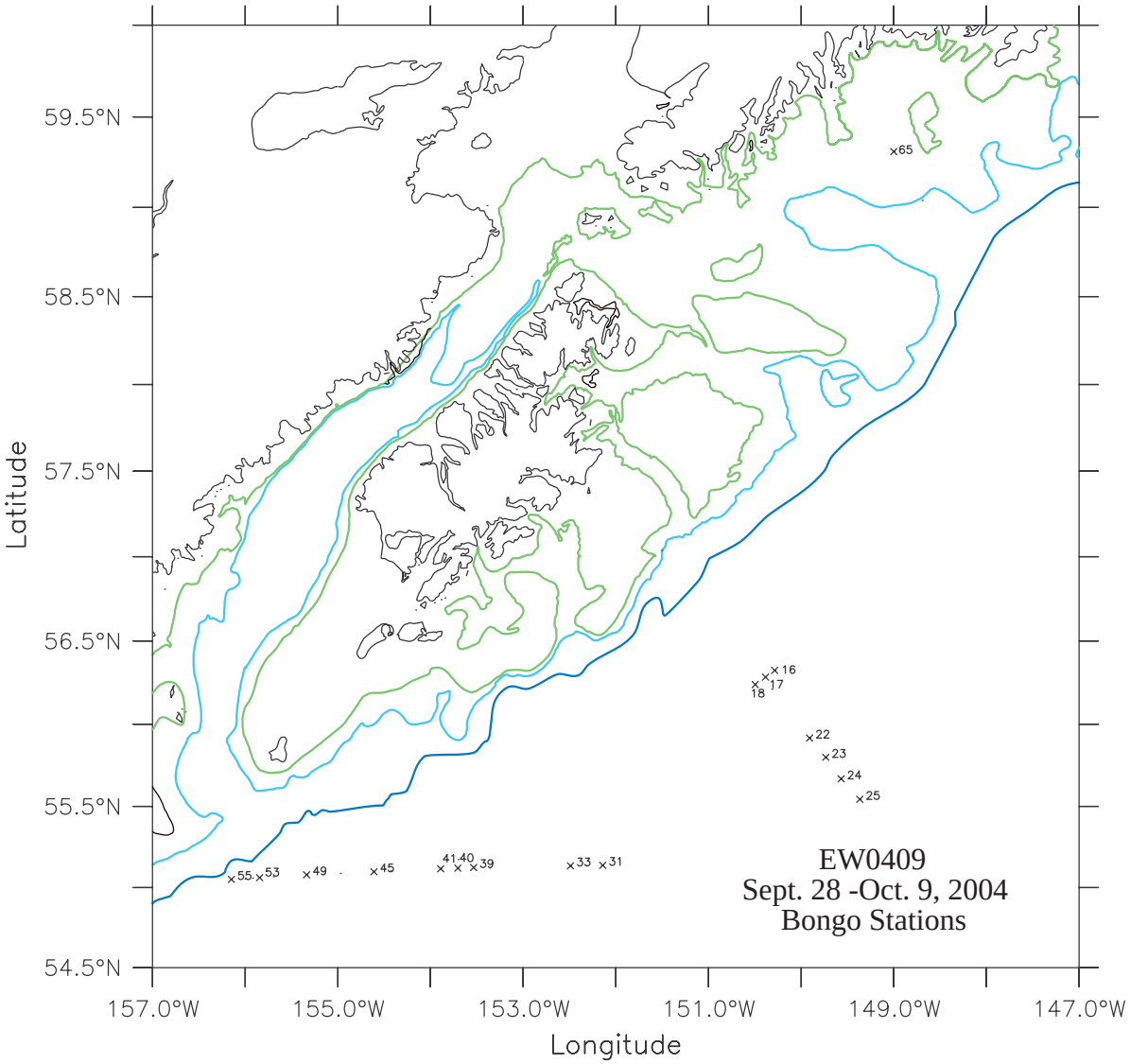

Figure 2. Map of MARMAP Bongo Tows

Table 4: Seabird SeaCAT CTD

Event#	Instr	Cast	Sta	Sta std	Day	Mos	Time	Lat	Long	Water Depth	Comments
EW27304.01	CTDB	1	1	TEST	29	9	0335	57.1167	-150.9217	nd	Test cast for CTDB.
EW27304.02	CTDB	2	2	CBA1	29	9	0508	57.3473	-151.1848	1500	Chlorophyll, nutrients.
EW27304.03	CTDB	3	3	CBA2	29	9	0558	57.3383	-151.2423	1500	Chlorophyll, nutrients.
EW27304.04	CTDB	4	4	CBA3	29	9	0720	57.3212	-151.3033	1500	Chlorophyll, nutrients; CTD problems, no power to the pump on the SBE911. This cannot be repaired at sea.
EW27304.05	CTDB	5	5	ED402	29	9	1632	57.1183	-151.6433	1500	Chlorophyll, nutrients; both the SBE 911 and a self-contained SBE19(pumped instrument will be used).
EW27304.06	CTDB	6	6	ED403	29	9	0149	57.0367	-151.5000	1500	Chlorophyll, nutrients; both the SBE 911 and a self-contained SBE19 (pumped instrument will be used).
EW27304.07	CTDB	7	7	ED404	29	9	1754	56.9933	-151.4200	1500	Chlorophyll, nutrients.
EW27304.08	CTDB	8	8	ED405	29	9	2158	56.9555	-151.3627	1500	Chlorophyll, nutrients.
EW27404.01	CTDB	9	9	ED406	30	9	0014	56.8745	-151.2337	1500	Chlorophyll, nutrients.
EW27404.02	CTDB	10	10	ED407	30	9	0241	56.7867	-151.1050	1500	Chlorophyll, nutrients.
EW27404.03	CTDB	11	11	ED408	30	9	0521	56.6983	-150.9758	1500	Chlorophyll, nutrients.
EW27404.04	CTDB	12	12	ED409	30	9	0733	56.6117	-150.8467	1500	Chlorophyll, nutrients.
EW27404.05	CTDB	13	13	ED410	30	9	1026	56.5233	-150.7183	1500	Chlorophyll, nutrients.
EW27404.06	CTDB	14	14	ED411	30	9	1327	56.4350	-150.5883	1500	Chlorophyll, nutrients.
EW27404.07	CTDB	15	15	ED412	30	9	1645	56.3683	-150.4950	1500	Chlorophyll, nutrients.
EW27404.08	CTDB	16	16	ED4X1	30	9	1835	56.3233	-150.2833	1500	Chlorophyll, nutrients.
EW27404.11	CTDB	17	17	ED413	30	9	2258	56.3000	-150.4000	1500	Chlorophyll, nutrients.
EW27504.05	CTDB	18	18	ED4X2	1	10	0340	56.2283	-150.5267	1500	Chlorophyll, nutrients.
EW27504.06	CTDB	19	19	ED414	1	10	0616	56.2117	-150.3167	1500	Chlorophyll, nutrients.
EW27504.07	CTDB	20	20	ED415	1	10	0750	56.1417	-150.2167	1500	Chlorophyll, nutrients.
EW27504.08	CTDB	21	21	ED416	1	10	1046	56.0333	-150.0667	1500	Chlorophyll, nutrients.
EW27504.09	CTDB	22	22	ED417	1	10	1328	55.9167	-149.9100	1500	Chlorophyll, nutrients.
EW27504.12	CTDB	23	23	ED418	1	10	1655	55.8000	-149.7333	1500	Chlorophyll, nutrients.
EW27504.14	CTDB	24	24	ED419	1	10	2123	55.6667	-149.5667	1500	Chlorophyll, nutrients.
EW27604.01	CTDB	25	25	ED420	2	10	0027	55.5417	-149.3667	1500	Chlorophyll, nutrients.
EW27604.02	CTDB	26	26	ED3N1	2	10	1530	55.1700	-153.7000	500	Nutrients.
EW27604.03	CTDB	27	27	ED3N2	2	10	1704	55.0500	-153.7000	500	Nutrients.
EW27604.04	CTDB	28	28	ED3N3	2	10	1837	54.9300	-153.7000	500	Nutrients.
EW27604.05	CTDB	29	29	ED3N0	2	10	2152	55.2500	-153.7000	500	Nutrients.
EW27604.06	CTDB	30	30	ED3N00	2	10	2327	55.3500	-153.7000	500	Nutrients.
EW27704.01	CTDB	31	31	ED301	3	10	0559	55.1383	-152.1417	1000	Chlorophyll, nutrients.
EW27704.02	CTDB	32	32	ED302	3	10	0805	55.1364	-152.3159	1000	Chlorophyll, nutrients.
EW27704.03	CTDB	33	33	ED303	3	10	1003	55.1344	-152.4902	1000	Chlorophyll, nutrients.
EW27704.05	CTDB	34	34	ED304	3	10	1307	55.1325	-152.6645	1000	Chlorophyll, nutrients.
EW27704.06	CTDB	35	35	ED305	3	10	1457	55.1306	-152.8388	1000	Chlorophyll, nutrients.
EW27704.07	CTDB	36	36	ED306	3	10	1648	55.1286	-153.0130	1000	Chlorophyll, nutrients.
EW27704.08	CTDB	37	37	ED307	3	10	1841	55.1267	-153.1873	1000	Chlorophyll, nutrients.
EW27704.09	CTDB	38	38	ED308	3	10	2106	55.1247	-153.3616	1000	Chlorophyll, nutrients.
EW27704.10	CTDB	39	39	ED309	3	10	2300	55.1228	-153.5359	1000	Chlorophyll, nutrients.
EW27804.01	CTDB	40	40	ED310	4	10	0222	55.1208	-153.7101	1000	Chlorophyll, nutrients; ED310 – Center.
EW27804.02	CTDB	41	41	ED311	4	10	0407	55.1162	-153.8903	1000	Chlorophyll, nutrients.
EW27804.04	CTDB	42	42	ED312	4	10	0632	55.1116	-154.0704	1000	Chlorophyll, nutrients.
EW27804.05	CTDB	43	43	ED313	4	10	0801	55.1070	-154.2506	1000	Chlorophyll, nutrients.
EW27804.06	CTDB	44	44	ED314	4	10	0947	55.1023	-154.4307	1000	Chlorophyll, nutrients.

Table 4: Seabird SeaCAT CTD (cont'd)

Event#	Instr	Cast	Sta	Sta std	Day	Mos	Time	Lat	Long	Water Depth	Comments
EW27804.07	CTDB	45	45	ED315	4	10	1138	55.0977	-154.6108	1000	Chlorophyll, nutrients.
EW27804.09	CTDB	46	46	ED316	4	10	1432	55.0931	-154.7910	1000	Chlorophyll, nutrients.
EW27804.10	CTDB	47	47	ED317	4	10	1600	55.0885	-154.9711	1000	Chlorophyll, nutrients.
EW27804.11	CTDB	48	48	ED318	4	10	1752	55.0839	-155.1513	1000	Chlorophyll, nutrients.
EW27804.12	CTDB	49	49	ED319	4	10	1940	55.0792	-155.3314	1000	Chlorophyll, nutrients.
EW27804.14	CTDB	50	50	ED320	4	10	2239	55.0746	-155.5115	1000	Chlorophyll, nutrients.
EW27904.01	CTDB	51	51	ED321	5	10	0027	55.0700	-155.6917	1000	Chlorophyll, nutrients; ED321 – Center.
EW27904.02	CTDB	52	52	ED322	5	10	0215	55.0633	-155.8444	1000	Chlorophyll, nutrients.
EW27904.03	CTDB	53	53	ED323	5	10	0338	55.0600	-155.9208	1000	Chlorophyll, nutrients.
EW27904.05	CTDB	54	54	ED324	5	10	0559	55.0567	-155.9972	1000	Chlorophyll, nutrients.
EW27904.06	CTDB	55	55	ED325	5	10	0801	55.0500	-156.1500	1000	Chlorophyll, nutrients.
EW27904.07	CTDB	56	56	ED326	5	10	0919	55.0433	-156.3000	1000	Chlorophyll, nutrients.
EW27904.08	CTDB	57	57	ED327	5	10	1127	55.0350	-156.5000	1000	Chlorophyll, nutrients.
EW28104.04	CTDB	58	58	GP0	7	10	0804	59.1600	-151.0083	73	Chlorophyll, nutrients; Gore Point (N-S).
EW28104.05	CTDB	59	59	GP1	7	10	0930	59.1000	-150.9900	160	Chlorophyll, nutrients.
EW28104.06	CTDB	60	60	GP2	7	10	1036	59.0100	-150.9600	157	Chlorophyll, nutrients.
EW28104.07	CTDB	61	61	GP3	7	10	1126	58.9500	-150.9300	148	Chlorophyll, nutrients.
EW28104.08	CTDB	62	62	GP4	7	10	1216	58.8800	-150.9000	155	Chlorophyll, nutrients.
EW28104.09	CTDB	63	63	GP5	7	10	1257	58.8200	-150.8800	182	Chlorophyll, nutrients.
EW28104.10	CTDB	64	64	GP6	7	10	1344	58.7500	-150.8667	180	Chlorophyll, nutrients; SBE 911 data for this cast subsequently lost.
EW28204.02	CTDB	65	65	04GBM-3A	8	10	0217	59.3082	-148.9959	185	Chlorophyll, nutrients.
EW28204.05	CTDB	66	66	04GB-4A	8	10	0714	59.1277	-148.7608	142	Chlorophyll, nutrients.
EW28204.06	CTDB	67	67	04GBP-5A	8	10	0818	59.0413	-148.6934	206	Chlorophyll, nutrients.
EW28204.07	CTDB	68	68	04GBP-12A	8	10	1512	58.6836	-148.8475	196	Chlorophyll, nutrients.
EW28304.03	CTDB	69	69	04GBI-2A	9	10	1507	59.5138	-149.1623	nd	Chlorophyll, nutrients.

Table 5: 20cm Bongo Net

Event#	Instr	Cast	Sta	Sta std	Day	Mos	Time	Lat	Long	Water Depth	Comments
EW27404.09	20Bon	1	16	ED4X1	30	9	2037	56.3233	-150.2833	300	MARMAP Bongo Tow with two 20 cm, .153mm and two 60 cm, .333mm nets.
EW27504.01	20Bon	2	17	ED413	1	10	0025	56.3000	-150.4000	300	MARMAP Bongo Tow with two 20 cm, .153mm and two 60 cm, .333mm nets.
EW27504.03	20Bon	3	18	ED4X2	1	10	0202	56.2283	-150.5267	300	MARMAP Bongo Tow with two 20 cm, .153mm and two 60 cm, .333mm nets.
EW27504.10	20Bon	4	22	ED417	1	10	1500	55.9167	-149.9100	300	MARMAP Bongo Tow with two 20 cm, 153mm and two 60 cm, 333mm nets.

Table 6: 60cm Bongo Net

Event#	Instr	Cast	Sta	Sta std	S/E flag	Lat	Long	Water Depth	Day	Mos	Time	Reg	Comments
EW27404.10	60Bon	1	16	ED4X1	30	9	2037	56.3233	-150.2833		300	MARMAP	Bongo Tow with two 20cm, .153mm and two 60cm, .333mm nets.
EW27504.02	60Bon	2	17	ED413	1	10	0025	56.3000	-150.4000		300		
EW27504.04	60Bon	3	18	ED4X2	1	10	0202	56.2283	-150.5267		300		
EW27504.11	60Bon	4	22	ED417	1	10	1500	55.9167	-149.9100		300	MARMAP	Bongo Tow with two 20cm, .153mm and two 60cm, .333mm nets.
EW27504.13	60Bon	5	23	ED418	1	10	1924	55.8000	-149.7333		300	MARMAP	Bongo Tow with .153mm and .333mm nets; 20cm bongo with .153mm nets lost during tow.
EW27704.04	60Bon	6	33	ED303	3	10	1110	55.1344	-152.4902		300		
EW27704.11	60Bon	7	39	ED309	3	10	2348	55.1228	-153.5359		300	MARMAP	Bongo Tow with 60cm, .333mm nets.
EW27804.03	60Bon	8	41	ED311	4	10	0446	55.1162	-153.8903		300	MARMAP	Bongo Tow with 60cm, .333mm nets.
EW27804.08	60Bon	9	45	ED315	4	10	1306	55.0977	-154.6108		300	MARMAP	Bongo Tow with 60cm, .333mm nets.
EW27804.13	60Bon	10	49	ED319	4	10	2057	55.0792	-155.3314		300	MARMAP	Bongo Tow with 60cm, .333mm nets.
EW27904.04	60Bon	11	53	ED323	5	10	0419	55.0600	-155.9208		300	MARMAP	Bongo Tow with 60cm, .333mm nets.
EW28204.03	60Bon	12	65	04GBM-3A	8	10	0245	59.3082	-148.9959		300	MARMAP	Bongo Tow with 60cm, .333mm nets.

Table 7: Mooring Deployments and Recoveries

Event#	Instr	Cast	Sta	Sta std	Day	Mos	Time	Lat	Long	Water Depth	Comments
EW28104.01	Mooring recover	1	nd	GP36	7	10	0022	58.7503	-150.8668	nd	Recover subsurface mooring 03GPP-36B.
EW28104.02	Mooring recover	2	nd	GP34	7	10	0510	58.9630	-150.9330	nd	Recover subsurface mooring 03GP-34B.
EW28104.03	Mooring recover	3	nd	GP32	7	10	0710	59.1005	-150.9900	nd	Recover subsurface mooring 03GP-32B.
EW28204.01	Mooring deploy	1	nd	04GBM-3E	8	10	0137	59.3082	-148.9959	nd	Surface mooring.
EW28204.04	Mooring recover	4	nd	04GBM-3A	8	10	0327	59.3082	-148.9959	nd	Recover surface mooring.
EW28204.08	Mooring recover	5	nd	04GBP-12A	8	10	1718	58.6836	-148.8475	nd	Recover subsurface mooring; release responded but did not come to the surface-- believed to be on its side.
EW28204.09	Mooring recover	6	nd	04GBP-5A	8	10	1841	59.0413	-148.6934	nd	Recover subsurface mooring.
EW28204.10	Mooring recover	7	nd	04GB-4AT	8	10	2042	59.1277	-148.7608	nd	Recover subsurface mooring 04GBP-4A; near-surface temp sensor.
EW28204.11	Mooring recover	8	nd	04GB-4A	8	10	2123	59.1277	-148.7608	nd	Recover subsurface mooring 04GBP-4A; other sensors.
EW28304.01	Mooring recover	9	nd	04GBP3A	9	10	0307	59.2838	-148.9590	nd	Recover subsurface mooring.
EW28304.02	Mooring recover	10	nd	04GBP-12A	9	10	0715	58.6836	-148.8475	nd	Recover subsurface mooring; release did not respond. Checked two sites 5 miles away--no response.
EW28304.04	Mooring recover	11	nd	04GBI-2A	9	10	1547	59.5138	-149.1623	nd	Recover subsurface mooring with Iron sensor.

APPENDIX I

EW0409 EVENT LOG

EVENT LOG CONTENTS

Column Label	**Description**
Event#	Unique identifier for each line of event log
Instrument (Instr)	CTD: Conductivity Temperature Depth profile collected with Seabird SBE with 5 liter rosette, fluorescence; 20cm Bongo net: 0.120mm mesh; 60cm Bongo net: 0.330mm mesh;
Cast	Sequence # for a particular instrument
Station (Sta)	
Station Standard (Sta std)	
Day	GMT time basis
Month (Mos)	GMT time basis
Time	Time (GMT)
Latitude (Lat)	Decimal degrees; north is positive
Longitude (Long)	Decimal degrees; east is positive
Water Depth	Depth of bottom
Comments	

Appendix I: Event Log

Event#	Instr	Cast	Sta	Sta std	Day	Mos	Time	Lat	Long	Water Depth	Comments
EW27204.01	nd	nd	nd	nd	28	9	nd	57.7238	-152.5255	nd	Depart Kodiak.
EW27304.01	CTDB	1	1	TEST	29	9	0335	57.1167	-150.9217	nd	Test cast for CTDB.
EW27304.02	CTDB	2	2	CBA1	29	9	0508	57.3473	-151.1848	1500	Chlorophyll, nutrients.
EW27304.03	CTDB	3	3	CBA2	29	9	0558	57.3383	-151.2423	1500	Chlorophyll, nutrients.
EW27304.04	CTDB	4	4	CBA3	29	9	0720	57.3212	-151.3033	1500	Chlorophyll, nutrients; CTD problems. No power to the pump on the SBE911. This cannot be repaired at sea.
EW27304.05	CTDB	5	5	ED402	29	9	1632	57.1183	-151.6433	1500	Chlorophyll, nutrients; both the SBE 911 and a self-contained SBE19(pumped instrument will be used).
EW27304.06	CTDB	6	6	ED403	29	9	0149	57.0367	-151.5000	1500	Chlorophyll, nutrients; both the SBE 911 and a self-contained SBE19(pumped instrument will be used).
EW27304.07	CTDB	7	7	ED404	29	9	1754	56.9933	-151.4200	1500	Chlorophyll, nutrients.
EW27304.08	CTDB	8	8	ED405	29	9	2158	56.9555	-151.3627	1500	Chlorophyll, nutrients.
EW27404.01	CTDB	9	9	ED406	30	9	0014	56.8745	-151.2337	1500	Chlorophyll, nutrients.
EW27404.02	CTDB	10	10	ED407	30	9	0241	56.7867	-151.1050	1500	Chlorophyll, nutrients.
EW27404.03	CTDB	11	11	ED408	30	9	0521	56.6983	-150.9758	1500	Chlorophyll, nutrients.
EW27404.04	CTDB	12	12	ED409	30	9	0733	56.6117	-150.8467	1500	Chlorophyll, nutrients.
EW27404.05	CTDB	13	13	ED410	30	9	1026	56.5233	-150.7183	1500	Chlorophyll, nutrients.
EW27404.06	CTDB	14	14	ED411	30	9	1327	56.4350	-150.5883	1500	Chlorophyll, nutrients.
EW27404.07	CTDB	15	15	ED412	30	9	1645	56.3683	-150.4950	1500	Chlorophyll, nutrients.
EW27404.08	CTDB	16	16	ED4X1	30	9	1835	56.3233	-150.2833	1500	Chlorophyll, nutrients.
EW27404.09	20Bon	1	16	ED4X1	30	9	2037	56.3233	-150.2833	300	MARMAP Bongo Tow with two 20cm,.153mm and two 60cm, .333mm nets.
EW27404.10	60Bon	1	16	ED4X1	30	9	2037	56.3233	-150.2833	300	MARMAP Bongo Tow with two 20cm, .153mm and two 60cm, .333mm nets.
EW27404.11	CTDB	17	17	ED413	30	9	2258	56.3000	-150.4000	1500	Chlorophyll, nutrients.
EW27504.01	20Bon	2	17	ED413	1	10	0025	56.3000	-150.4000	300	MARMAP Bongo Tow with two 20cm, .153mm and two 60cm, .333mm nets.
EW27504.02	60Bon	2	17	ED413	1	10	0025	56.3000	-150.4000	300	MARMAP Bongo Tow with two 20cm, .153mm and two 60cm, .333mm nets.
EW27504.03	20Bon	3	18	ED4X2	1	10	0202	56.2283	-150.5267	300	MARMAP Bongo Tow with two 20cm, .153mm and two 60cm, .333mm nets.
EW27504.04	60Bon	3	18	ED4X2	1	10	0202	56.2283	-150.5267	300	MARMAP Bongo Tow with two 20cm, .153mm and two 60cm, .333mm nets.
EW27504.05	CTDB	18	18	ED4X2	1	10	0340	56.2283	-150.5267	1500	Chlorophyll, nutrients
EW27504.06	CTDB	19	19	ED414	1	10	0616	56.2117	-150.3167	1500	Chlorophyll, nutrients.
EW27504.07	CTDB	20	20	ED415	1	10	0750	56.1417	-150.2167	1500	Chlorophyll, nutrients.
EW27504.08	CTDB	21	21	ED416	1	10	1046	56.0333	-150.0667	1500	Chlorophyll, nutrients.
EW27504.09	CTDB	22	22	ED417	1	10	1328	55.9167	-149.9100	1500	Chlorophyll, nutrients
EW27504.10	20Bon	4	22	ED417	1	10	1500	55.9167	-149.9100	300	MARMAP Bongo Tow with two 20cm, .153mm and two 60cm, .333mm nets.
EW27504.11	60Bon	4	22	ED417	1	10	1500	55.9167	-149.9100	300	MARMAP Bongo Tow with two 20cm, .153mm and two 60cm, .333mm nets.
EW27504.12	CTDB	23	23	ED418	1	10	1655	55.8000	-149.7333	1500	Chlorophyll, nutrients.
EW27504.13	60Bon	5	23	ED418	1	10	1924	55.8000	-149.7333	300	MARMAP Bongo Tow with .153mm and .333mm nets; 20cm bongo with 153mm nets

Appendix I: Event Log

Event#	Instr	Cast	Sta	Sta std	Day	Mos	Time	Lat	Long	Water Depth	Comments
											lost during tow.
EW27504.14	CTDB	24	24	ED419	1	10	2123	55.6667	-149.5667	1500	Chlorophyll, nutrients.
EW27604.01	CTDB	25	25	ED420	2	10	0027	55.5417	-149.3667	1500	Chlorophyll, nutrients.
EW27604.02	CTDB	26	26	ED3N1	2	10	1530	55.1700	-153.7000	500	Nutrients.
EW27604.03	CTDB	27	27	ED3N2	2	10	1704	55.0500	-153.7000	500	Nutrients.
EW27604.04	CTDB	28	28	ED3N3	2	10	1837	54.9300	-153.7000	500	Nutrients.
EW27604.05	CTDB	29	29	ED3N0	2	10	2152	55.2500	-153.7000	500	Nutrients.
EW27604.06	CTDB	30	30	ED3N00	2	10	2327	55.3500	-153.7000	500	Nutrients.
EW27704.01	CTDB	31	31	ED301	3	10	0559	55.1383	-152.1417	1000	Chlorophyll, nutrients.
EW27704.02	CTDB	32	32	ED302	3	10	0805	55.1364	-152.3159	1000	Chlorophyll, nutrients.
EW27704.03	CTDB	33	33	ED303	3	10	1003	55.1344	-152.4902	1000	Chlorophyll, nutrients.
EW27704.04	60Bon	6	33	ED303	3	10	1110	55.1344	-152.4902	300	
EW27704.05	CTDB	34	34	ED304	3	10	1307	55.1325	-152.6645	1000	Chlorophyll, nutrients.
EW27704.06	CTDB	35	35	ED305	3	10	1457	55.1306	-152.8388	1000	Chlorophyll, nutrients.
EW27704.07	CTDB	36	36	ED306	3	10	1648	55.1286	-153.0130	1000	Chlorophyll, nutrients.
EW27704.08	CTDB	37	37	ED307	3	10	1841	55.1267	-153.1873	1000	Chlorophyll, nutrients.
EW27704.09	CTDB	38	38	ED308	3	10	2106	55.1247	-153.3616	1000	Chlorophyll, nutrients.
EW27704.10	CTDB	39	39	ED309	3	10	2300	55.1228	-153.5359	1000	Chlorophyll, nutrients.
EW27704.11	60Bon	7	39	ED309	3	10	2348	55.1228	-153.5359	300	MARMAP Bongo Tow with 60cm, .333mm nets.
EW27804.01	CTDB	40	40	ED310	4	10	0222	55.1208	-153.7101	1000	Chlorophyll, nutrients; ED310 – center.
EW27804.02	CTDB	41	41	ED311	4	10	0407	55.1162	-153.8903	1000	Chlorophyll, nutrients.
EW27804.03	60Bon	8	41	ED311	4	10	0446	55.1162	-153.8903	300	MARMAP Bongo Tow with 60cm, .333mm nets.
EW27804.04	CTDB	42	42	ED312	4	10	0632	55.1116	-154.0704	1000	Chlorophyll, nutrients.
EW27804.05	CTDB	43	43	ED313	4	10	0801	55.1070	-154.2506	1000	Chlorophyll, nutrients.
EW27804.06	CTDB	44	44	ED314	4	10	0947	55.1023	-154.4307	1000	Chlorophyll, nutrients.
EW27804.07	CTDB	45	45	ED315	4	10	1138	55.0977	-154.6108	1000	Chlorophyll, nutrients.
EW27804.08	60Bon	9	45	ED315	4	10	1306	55.0977	-154.6108	300	MARMAP Bongo Tow with 60cm, .333mm nets.
EW27804.09	CTDB	46	46	ED316	4	10	1432	55.0931	-154.7910	1000	Chlorophyll, nutrients.
EW27804.10	CTDB	47	47	ED317	4	10	1600	55.0885	-154.9711	1000	Chlorophyll, nutrients.
EW27804.11	CTDB	48	48	ED318	4	10	1752	55.0839	-155.1513	1000	Chlorophyll, nutrients.
EW27804.12	CTDB	49	49	ED319	4	10	1940	55.0792	-155.3314	1000	Chlorophyll, nutrients.
EW27804.13	60Bon	10	49	ED319	4	10	2057	55.0792	-155.3314	300	MARMAP Bongo Tow with 60cm, .333mm nets.
EW27804.14	CTDB	50	50	ED320	4	10	2239	55.0746	-155.5115	1000	Chlorophyll, nutrients.
EW27904.01	CTDB	51	51	ED321	5	10	0027	55.0700	-155.6917	1000	Chlorophyll, nutrients; ED321 – center.
EW27904.02	CTDB	52	52	ED322	5	10	0215	55.0633	-155.8444	1000	Chlorophyll, nutrients.
EW27904.03	CTDB	53	53	ED323	5	10	0338	55.0600	-155.9208	1000	Chlorophyll, nutrients.
EW27904.04	60Bon	11	53	ED323	5	10	0419	55.0600	-155.9208	300	MARMAP Bongo Tow with 60cm, .333mm nets.
EW27904.05	CTDB	54	54	ED324	5	10	0559	55.0567	-155.9972	1000	Chlorophyll, nutrients.
EW27904.06	CTDB	55	55	ED325	5	10	0801	55.0500	-156.1500	1000	Chlorophyll, nutrients.
EW27904.07	CTDB	56	56	ED326	5	10	0919	55.0433	-156.3000	1000	Chlorophyll, nutrients.
EW27904.08	CTDB	57	57	ED327	5	10	1127	55.0350	-156.5000	1000	Chlorophyll, nutrients.
EW28004.01	SMALL BOAT	nd	nd	nd	6	10	0900	57.7238	-152.5255	nd	KODIAK, AK
EW28104.01	Mooring recover	1	nd	GP36	7	10	0022	58.7503	-150.8668	nd	Recover subsurface mooring 03GPP-36B.

Appendix I: Event Log

Event#	Instr	Cast	Sta	Sta std	Day	Mos	Time	Lat	Long	Water Depth	Comments
EW28104.02	Mooring recover	2	nd	GP34	7	10	0510	58.9630	-150.9330	nd	Recover subsurface mooring 03GP-34B.
EW28104.03	Mooring recover	3	nd	GP32	7	10	0710	59.1005	-150.9900	nd	Recover subsurface mooring 03GP-32B.
EW28104.04	CTDB	58	58	GP0	7	10	0804	59.1600	-151.0083	73	Chlorophyll, nutrients; Gore Point (N-S).
EW28104.05	CTDB	59	59	GP1	7	10	0930	59.1000	-150.9900	160	Chlorophyll, nutrients
EW28104.06	CTDB	60	60	GP2	7	10	1036	59.0100	-150.9600	157	Chlorophyll, nutrients.
EW28104.07	CTDB	61	61	GP3	7	10	1126	58.9500	-150.9300	148	Chlorophyll, nutrients.
EW28104.08	CTDB	62	62	GP4	7	10	1216	58.8800	-150.9000	155	Chlorophyll, nutrients.
EW28104.09	CTDB	63	63	GP5	7	10	1257	58.8200	-150.8800	182	Chlorophyll, nutrients.
EW28104.10	CTDB	64	64	GP6	7	10	1344	58.7500	-150.8667	180	Chlorophyll, nutrients; SBE 911 data for this cast subsequently lost.
EW28204.01	Mooring deploy	1	nd	04GBM-3E	8	10	0137	59.3082	-148.9959	nd	Surface mooring.
EW28204.02	CTDB	65	65	04GBM-3A	8	10	0217	59.3082	-148.9959	185	Chlorophyll, nutrients.
EW28204.03	60Bon	12	65	04GBM-3A	8	10	0245	59.3082	-148.9959	300	MARMAP Bongo Tow with 60cm, .333mm nets.
EW28204.04	Mooring recover	4	nd	04GBM-3A	8	10	0327	59.3082	-148.9959	nd	Recover surface mooring.
EW28204.05	CTDB	66	66	04GB-4A	8	10	0714	59.1277	-148.7608	142	Chlorophyll, nutrients.
EW28204.06	CTDB	67	67	04GBP-5A	8	10	0818	59.0413	-148.6934	206	Chlorophyll, nutrients.
EW28204.07	CTDB	68	68	04GBP-12A	8	10	1512	58.6836	-148.8475	196	Chlorophyll, nutrients.
EW28204.08	Mooring recover	5	nd	04GBP-12A	8	10	1718	58.6836	-148.8475	nd	Recover subsurface mooring; release responded but did not come to the surface - believed to be on its side.
EW28204.09	Mooring recover	6	nd	04GBP-5A	8	10	1841	59.0413	-148.6934	nd	Recover subsurface mooring.
EW28204.10	Mooring recover	7	nd	04GB-4AT	8	10	2042	59.1277	-148.7608	nd	Recover subsurface mooring 04GBP-4A; near-surface temp sensor.
EW28204.11	Mooring recover	8	nd	04GB-4A	8	10	2123	59.1277	-148.7608	nd	Recover subsurface mooring 04GBP-4A; other sensors.
EW28304.01	Mooring recover	9	nd	04GBP3A	9	10	0307	59.2838	-148.9590	nd	Recover subsurface mooring
EW28304.02	Mooring recover	10	nd	04GBP-12A	9	10	0715	58.6836	-148.8475	nd	Recover subsurface mooring; release did not respond. Checked two sites 5 miles away--no response.
EW28304.03	CTDB	69	69	04GBI-2A	9	10	1507	59.5138	-149.1623	nd	Chlorophyll, nutrients.
EW28304.04	Mooring recover	11	nd	04GBI-2A	9	10	1547	59.5138	-149.1623	nd	Recover subsurface mooring with Iron sensor.
EW28304.05	nd	nd	nd	SEWARD	9	10	2019	60.1050	-149.4211	nd	