GLOBEC Northeast Pacific, Coastal Gulf of Alaska

Cruise Report, R/V *Kilo Moana* (KM0313)

13 - 28 September 2003

This cruise was
sponsored by the

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and the

National Oceanic and
Atmospheric Administration

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13 - 28 September 2003

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

Cruise Objectives

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 FOCI base, and United States Global Ocean Ecosystems Dynamics (U.S. GLOBEC).

This cruise was undertaken by FOCI to support research into the physical, chemical, and biological mechanisms acting in the coastal Gulf of Alaska.

The first objective of this cruise was to recover and redeploy 10 moorings along two lines off Alaska's Kenai Peninsula located off Gore Point and Seward, AK The other objective was to occupy hydrological survey lines in several parts of the region to target specific processes and locations: in Kennedy and Stevenson Entrances to investigate mixing and transport; along the inner portion of the GLOBEC/NEP's Seward Line and FOCI's Gore Point Line to measure the characteristics of the Alaskan Coastal Current; across Amatuli and Stevenson Troughs to assess nutrient transport up troughs; and across the large warm-core eddy that impinged on the continental shelf between Kodiak and Seward during the spring and summer of 2003 to assess its effect on the GOA ecosystem both on and off-shelf.

Our experiment involved deployment of six ARGOS satellite tracked drifters: four along the Seward Line and two others within the eddy. The latter two replace (augment) data from one of the drifters deployed in May that continues to broadcast from near the center. The data from that drifter helped us to locate the center of the eddy for sampling on this cruise. Six MARMAP Bongo tows with 0.505-mm mesh were taken: two to characterize the fall zooplankton on Portlock Bank, two at the edge of the continental shelf nearest the eddy, and two to sample the center of the eddy to ascertain differences between the zooplankton populations inside and at the edge of the eddy. One hundred CTD stations were sampled to depths of 5m off the bottom on the CGOA shelf, banks and troughs, and to depths of 2000m within the eddy. Water samples were collected from the CTD rosette and analyzed for nutrient and chlorophyll concentration, as well as for salinity calibrations.

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

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PMEL = Pacific Marine Environmental Laboratory.

Summary of Cruise

See Appendix 1 (Event Log).

Daily Cruise Summary (Narrative)

13 September. The R/V *Kilo Moana* departed Kodiak, AK at 1330 (local) on the high tide. After departing Kodiak, the ship proceeded northward to occupy a transect between Afognak I. and Portlock Bank, part of a box of stations northeast of Kodiak Island, taken to assess mixing processes and transports in the ACC.

14 September. We proceeded to recover and re-deploy the three moorings on the Gore Point line (at GP32, GP34, and GP36 sites). We then proceeded to occupy the CTD transects across Kennedy and Stevenson Entrances. At the conclusion of those operations, we digressed to the Barren Islands, where we made an unsuccessful small boat operation in an attempt to recover some lost mooring equipment that had washed ashore there.

September 15. Forecasts of deteriorating weather conditions prompted us to revise the work plan, and proceed to GB3 to begin mooring and recovery operations with the recovery and re-deployment of the surface mooring. That night we occupied CTD transect ATB across Amatuli trough, the site of the next three moorings.

September 16. We successfully recovered and redeployed those moorings (GB4, GB5, and GB12). The need to re-terminate the CTD and worsening weather conditions precluded the usual post-deployment calibration casts at these sites. We proceeded to the mooring operations at GB2 and GB1. When we deployed the last mooring (at GB1), it became apparent that it was too long; the top 3 m with floats were on the surface. The reason was that the mooring design included an 18.5 m length of wire rope that should not have been there. A small boat operation was needed to attach a line from the A-frame to the surface flotation to correct the problem.

September 19. The weather on the evening of September 17 was too rough to launch the small boat, so we patrolled the area during the night, and did it the morning of September 19. After the successful re-deployment of the last mooring, we sailed to Seward, where 5 scientists and technicians debarked the R/V *Kilo Moana* via a small boat operation, and two others embarked. We then occupied 8 stations on the inside end of the Seward line from GAK 1-5 (GB3) across the ACC. Next, we began CTD operations along the Gore Point line, but after completing 5 casts from GP1-4, operations were halted due to gale conditions and the inability of the ship to hold station any longer. We decided to go to Nuka Bay in Kenai Fjords National Park to wait out the gale.

September 21. By noon we were back to work. We occupied 2 lines of CTD stations over Portlock Bank and Stevenson trough (STA and STB). Two MARMAP bongo tows using 0.505 mm mesh were taken on the bank crest. Next, we began to occupy stations on a line (ENW1) from the edge of the shelf out over the slope in the direction of the estimated center of a large warm-core eddy that impinged on the shelf during this summer. At that time, it was off the continental slope, centered at ~57.5°N, 147°W. Its diameter was approximately 200km. The location of the eddy was found from two sources: the sea surface altimetry analysis results distributed by Colorado Center for Astrodynamics Research at http://www-ccar.colorado.edu/~realtime/welcome/, and from the path of one satellite-tracked drifter we deployed in May. At the end of 6 stations, we were forced to cease operations in anticipation of the arrival of a severe storm with sustained winds exceeding 50kts and gusts of 65kts.

September 24. Approximately 34 hours later, we resumed operations. We re-started the transect across the eddy (ENW2) taking CTD casts to the bottom or to 2000 m depth in up to 4200 m of water. We sampled zooplankton at four sites along this line using MARMAP bongo tows: one site at the shelf edge, one over the slope, and two near the center of the eddy. There was a dramatic visual difference in the quantity and type of zooplankton found in the center compared to the other sites. We again found a core of slightly warmer, saltier water at ~100m depth in the center of the eddy. We were able to deploy 2 more satellite drifters near the eddy center, to continue and augment the data we have collected from the drifter deployed there in May. After completing the transect across the eddy, we returned to the center of the eddy, and concluded operations by sampling on a line of 6 stations from there to the southwest on a line parallel to the continental slope.

September 28. The R/V *Kilo Moana* returned to Kodiak, AK at 14:30.

Table 2: Summary of Operations:	**# Events**
60cm bongo (60Bon; 0.505-mm; Table 4)	6
Seabird SeaCat CTD (CAT; Table 5)	6
CTD with bottle samples (CTDB; Table 6)	100
Deployment of satellite buoy (SatBuoy; Table 7)	6
Bathymetry Data	~2000mi
Multiscan Hydrosweep Bathymetry	2000mi

Table 3: Samples Collected	**Number**
SeaBird CTD (CTDB casts)	100
SeaBird SeaCat CTD (CAT)	6
Extracted chlorophyll (Chlor)	~200
Stimulated fluorescence collected during CTD casts (Fluor)	all
Photosynthetically Active Radiation data during CTD casts (PAR)	75
Quantitative tow preserved in formalin (QTowF)	6
Water samples for nutrient analyses	~1200

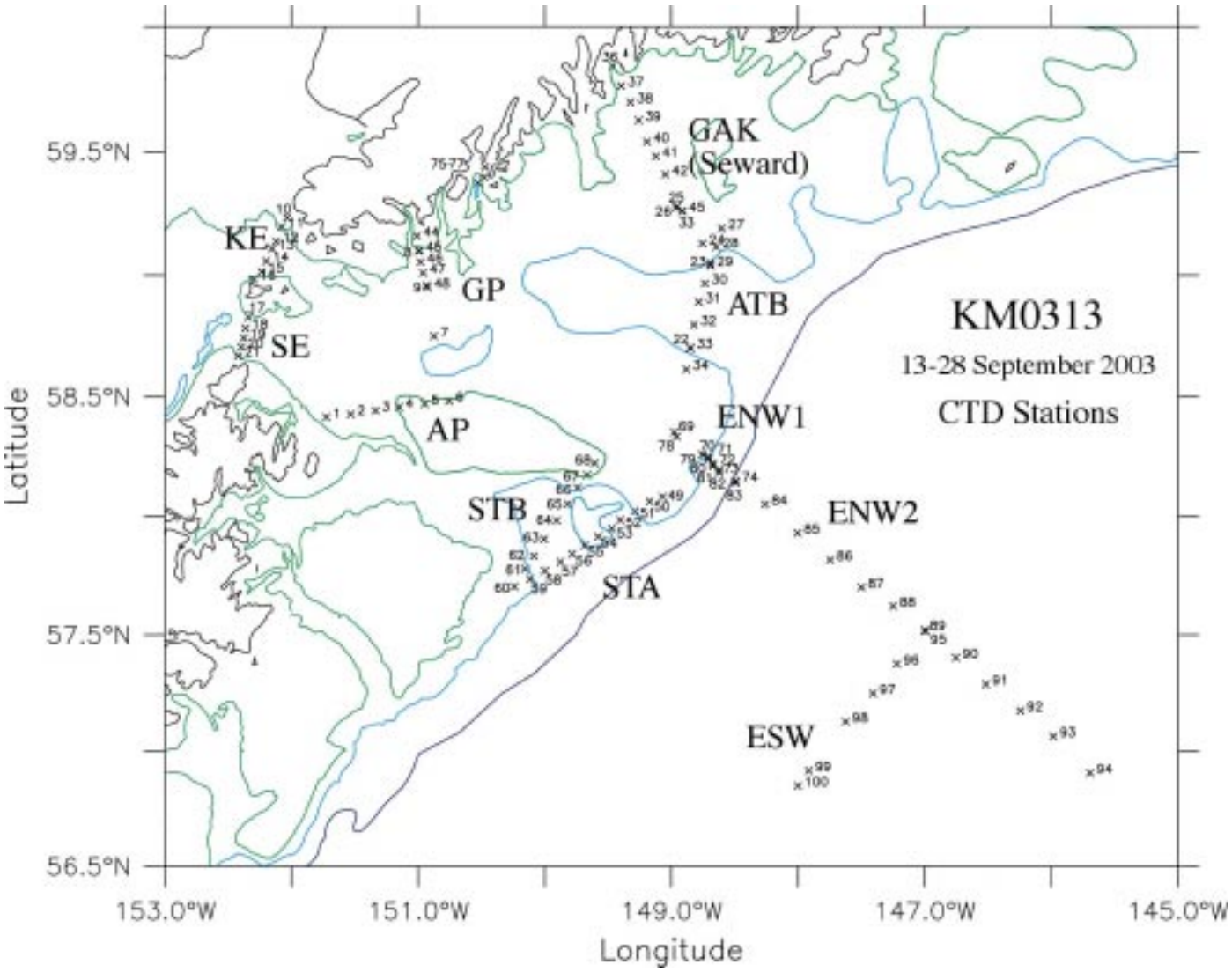

Figure 1. Map of CTD lines and stations for KM0313 for 13-28 September, 2003. Line AP crosses between Afognak I. and Portlock Bank. GP is the Gore Point line. SE and KE cross Stevenson and Kennedy Entrances, respectively. Line STA and STB cross the eastern end of Stevenson Trough. Line ATB crosses Amatuli Trough. Line ENW2 begins on the shelf and crosses the large warm-core eddy, past its outer edge. Data was taken to a depth of 2000m. Line ESW began back at the observed center of the eddy, and continued to the southwest, parallel to the alignment of the slope. Data was taken to 500 m on this transect. Line ENW1 consisted of the first 6 stations along the ENW line. It was occupied before a major storm, compared to ENW2, which occurred after the storm.

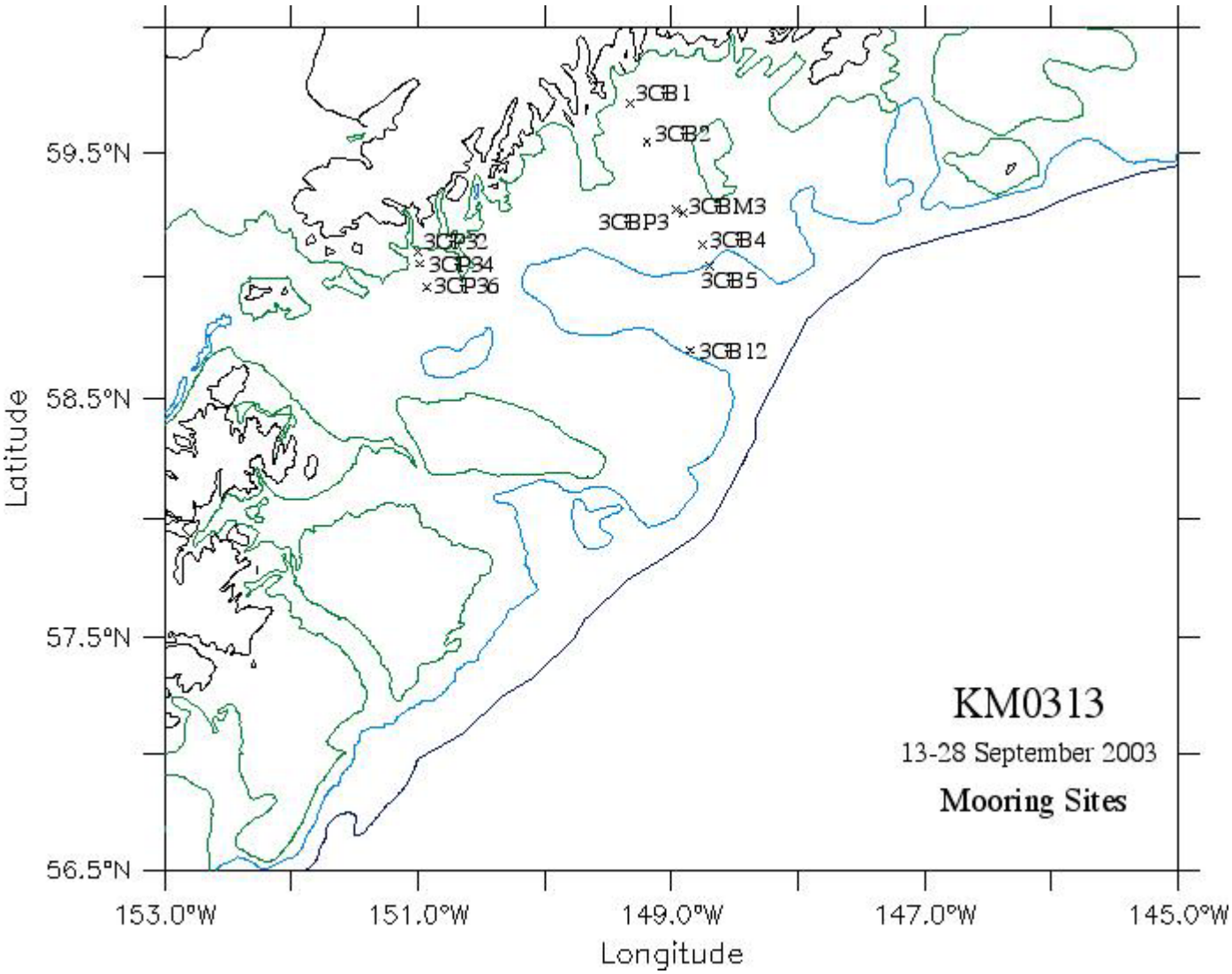

Figure 2. Sites of mooring operations from 14-19 September, 2003 aboard the R/V Kilo Moana

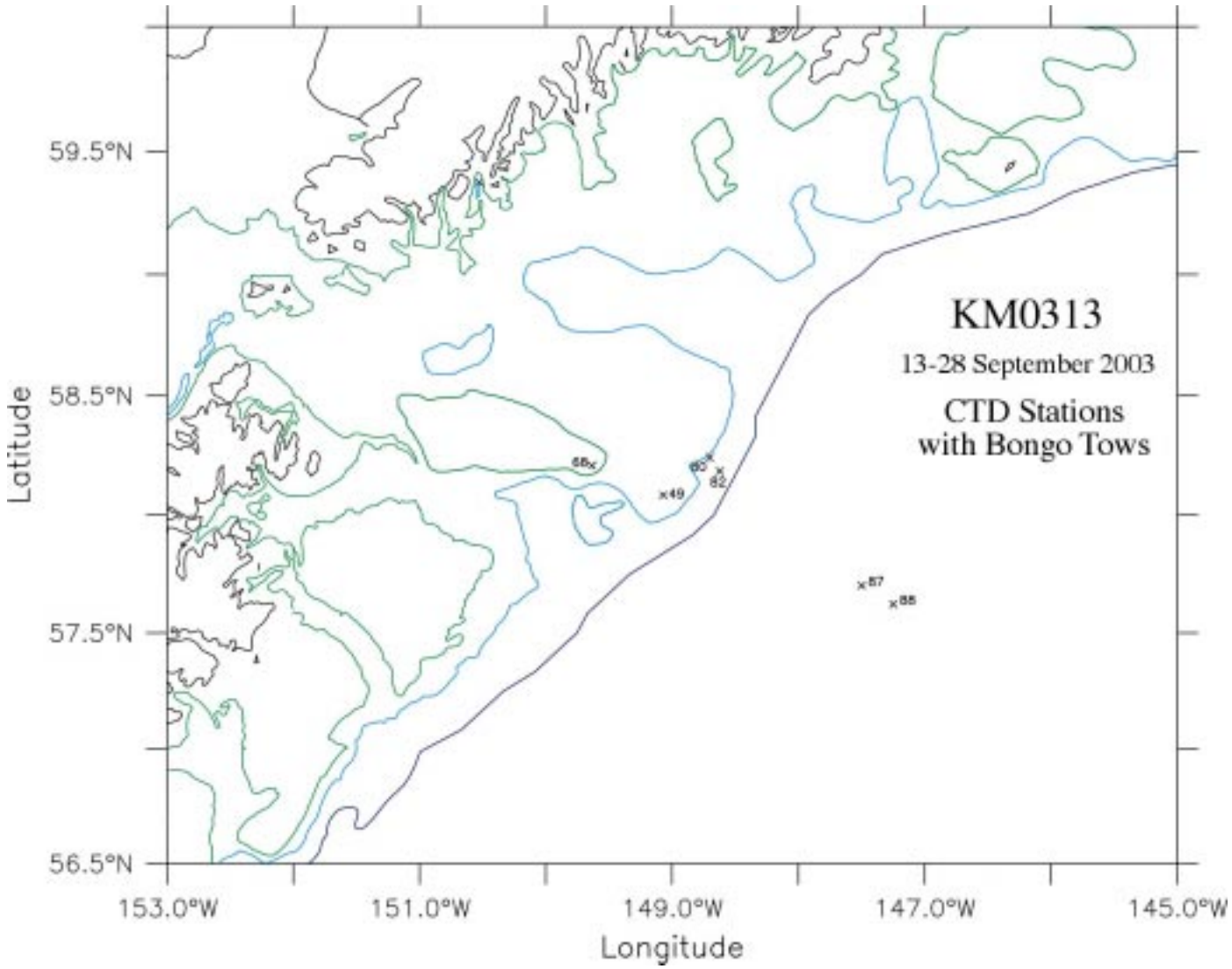

Figure 3. CTD stations with MARMAP bongo tows conducted aboard the R/V Kilo Moana (KM0313) from 13-28 September, 2003.

Table 4: 60 cm bongo Tows

Event#	Instr	Cast	Sta	Sta std	Day	Mos	Time	Lat	Long	Water Depth	Comments
KM26503.02	60Bon	1	60	STA10	22	9	0445	58.0835	-149.0703	82	
KM26503.23	60Bon	2	80	STB2	22	9	2342	58.2240	-149.6055	69	
KM26703.09	60Bon	3	92	ENW3	25	9	2325	58.2485	-148.7087	351	
KM26803.03	60Bon	4	94	ENW05	26	9	0325	58.1847	-148.6215	848	
KM26803.10	60Bon	5	99	ENW10	26	9	1815	57.7015	-147.4992	4922	
KM26803.13	60Bon	6	100	ENW11	26	9	2130	57.6223	-147.2488	4843	

Table 5: SeaBird SeaCat CTD

Event#	Instr	Cast	Sta	Sta std	Day	Mos	Time	Lat	Long	Water Depth	Comments
KM26503.03	CAT	1	60	STA10	22	9	0445	58.0835	-149.0703	82	
KM26503.24	CAT	2	80	STB2	22	9	2342	58.2240	-149.6055	69	
KM26703.10	CAT	3	92	ENW3	25	9	2325	58.2485	-148.7087	351	
KM26803.04	CAT	4	94	ENW05	26	9	0325	58.1847	-148.6215	848	
KM26803.11	CAT	5	99	ENW10	26	9	1815	57.7015	-147.4992	4922	
KM26803.14	CAT	6	100	ENW11	26	9	2130	57.6223	-147.2488	4843	

Table 6: CTD Casts with Bottles

Event#	Instr	Cast	Sta	Sta std	Day	Mos	Time	Lat	Long	Water Depth	Comments
KM25703.01	CTDB	1	1	AP1	14	9	0413	58.4153	-151.7247	167	
KM25703.02	CTDB	2	2	AP2	14	9	0530	58.4275	-151.5313	165	
KM25703.03	CTDB	3	3	AP3	14	9	0644	58.4428	-151.3363	130	
KM25703.04	CTDB	4	4	AP4	14	9	0758	58.4568	-151.1505	98	
KM25703.05	CTDB	5	5	AP5	14	9	0910	58.4702	-150.9485	73	
KM25703.06	CTDB	6	6	AP6	14	9	1021	58.4825	-150.7553	88	
KM25703.07	CTDB	7	7	GP6	14	9	1250	58.7508	-150.8752	178	
KM25703.08	CTDB	8	8	GP1	14	9	1534	59.0995	-150.9970	163	
KM25703.11	CTDB	9	10	GP34A	14	9	2126	58.9583	-150.9348	146	
KM25803.04	CTDB	10	13	KE1	15	9	1025	59.2340	-152.0353	84	
KM25803.05	CTDB	11	14	KE2	15	9	1134	59.1973	-152.0775	95	
KM25803.06	CTDB	12	15	KE3	15	9	1244	59.1380	-152.1205	158	
KM25803.07	CTDB	13	16	KE4	15	9	1336	59.1082	-152.1535	159	
KM25803.08	CTDB	14	17	KE5	15	9	1428	59.0572	-152.1990	134	
KM25803.09	CTDB	15	18	KE6	15	9	1514	59.0147	-152.2355	112	
KM25803.10	CTDB	16	19	KE7	15	9	1600	58.9835	-152.2995	81	
KM25803.11	CTDB	17	20	SE1	15	9	1748	58.8278	-152.3408	121	
KM25803.12	CTDB	18	21	SE2	15	9	1842	58.7832	-152.3633	134	
KM25803.13	CTDB	19	22	SE3	15	9	1927	58.7430	-152.3768	119	
KM25803.14	CTDB	20	23	SE4	15	9	2013	58.7050	-152.3970	151	
KM25803.15	CTDB	21	24	SE5	15	9	2100	58.6687	-152.4220	83	
KM25903.01	CTDB	22	25	GB12	16	9	1100	58.7000	-148.8500	193	
KM25903.02	CTDB	23	26	GB5	16	9	1321	59.0483	-148.6925	233	
KM25903.04	CTDB	24	28	GB4A	16	9	1436	59.1292	-148.7538	147	
KM25903.06	CTDB	25	29	GB3	16	9	1608	59.2802	-148.9557	182	
KM26003.03	CTDB	26	30	GB3B	17	9	0508	59.2750	-148.9628	185	
KM26003.04	CTDB	27	31	ATB0	17	9	0706	59.1917	-148.6023	128	
KM26003.05	CTDB	28	32	ATB1	17	9	0807	59.1158	-148.6455	161	
KM26003.06	CTDB	29	33	ATB2	17	9	0910	59.0400	-148.6902	197	
KM26003.07	CTDB	30	34	ATB3	17	9	1014	58.9665	-148.7350	248	
KM26003.08	CTDB	31	35	ATB4	17	9	1120	58.8908	-148.7837	288	
KM26003.09	CTDB	32	36	ATB5	17	9	1235	58.7972	-148.8212	251	
KM26003.10	CTDB	33	37	ATB6	17	9	1353	58.7025	-148.8515	210	
KM26003.11	CTDB	34	38	ATB7	17	9	1503	58.6138	-148.8818	115	
KM26103.04	CTDB	35	44	GB3	18	9	1015	59.2612	-148.9107	166	
KM26303.01	CTDB	36	47	GAK1	20	9	0102	59.8440	-149.4672	268	
KM26303.02	CTDB	37	48	GAK1I	20	9	0220	59.7648	-149.3965	257	
KM26303.03	CTDB	38	49	GB1A	20	9	0314	59.6995	-149.3230	222	
KM26303.04	CTDB	39	50	GAK2I	20	9	0417	59.6268	-149.2590	212	
KM26303.06	CTDB	40	51	GB2A	20	9	0538	59.5408	-149.1930	215	
KM26303.07	CTDB	41	52	GAK3I	20	9	0659	59.4823	-149.1228	203	
KM26303.08	CTDB	42	53	GAK4	20	9	0818	59.4093	-149.0475	199	
KM26303.09	CTDB	43	54	GAK5	20	9	0957	59.2608	-148.9145	167	
KM26303.11	CTDB	44	55	GP0	20	9	1604	59.1607	-151.0095	73	
KM26303.12	CTDB	45	56	GP1	20	9	1652	59.0995	-150.9895	270	
KM26303.13	CTDB	46	57	GP1.5	20	9	1735	59.0535	-150.9815	165	
KM26303.14	CTDB	47	58	GP2	20	9	1825	59.0095	-150.9605	158	
KM26303.15	CTDB	48	59	GP3	20	9	1916	58.9505	-150.9252	152	

Table 6: CTD Casts with Bottles (cont'd)

Event#	Instr	Cast	Sta	Sta std	Day	Mos	Time	Lat	Long	Water Depth	Comments
KM26503.01	CTDB	49	60	STA10	22	9	0420	58.0835	-149.0703	81	
KM26503.04	CTDB	50	61	STA9	22	9	0533	58.0637	-149.1725	110	
KM26503.05	CTDB	51	62	STA8	22	9	0633	58.0238	-149.2888	217	
KM26503.06	CTDB	52	63	STA7	22	9	0742	57.9858	-149.4042	197	
KM26503.07	CTDB	53	64	STA6	22	9	0837	57.9498	-149.4712	189	
KM26503.08	CTDB	54	65	STA5	22	9	0931	57.9160	-149.5787	125	
KM26503.09	CTDB	55	66	STA4	22	9	1026	57.8785	-149.6852	234	
KM26503.10	CTDB	56	67	STA3A	22	9	1122	57.8428	-149.7828	265	
KM26503.11	CTDB	57	68	STA3	22	9	1225	57.8087	-149.8765	254	
KM26503.12	CTDB	58	69	STA2A	22	9	1325	57.7722	-149.9987	178	
KM26503.13	CTDB	59	70	STA2	22	9	1420	57.7363	-150.1163	192	
KM26503.14	CTDB	60	71	STA1	22	9	1514	57.7048	-150.2398	131	
KM26503.15	CTDB	61	72	STB8	22	9	1613	57.7798	-150.1570	181	
KM26503.16	CTDB	62	73	STB7	22	9	1707	57.8338	-150.0857	208	
KM26503.17	CTDB	63	74	STB6	22	9	1815	57.9057	-150.0050	258	
KM26503.18	CTDB	64	75	STB5	22	9	1925	57.9837	-149.9062	262	
KM26503.19	CTDB	65	76	STB4	22	9	2030	58.0528	-149.8180	243	
KM26503.20	CTDB	66	77	STB3	22	9	2130	58.1215	-149.7400	218	
KM26503.21	CTDB	67	78	STB2	22	9	2223	58.1745	-149.6673	105	
KM26503.22	CTDB	68	79	STB1	22	9	2313	58.2240	-149.6055	69	
KM26603.01	CTDB	69	81	ENW1	23	9	0209	58.3530	-148.9770	123	
KM26603.02	CTDB	70	82	ENW2	23	9	0339	58.2607	-148.7530	157	
KM26603.03	CTDB	71	83	ENW3	23	9	0433	58.2412	-148.7028	390	
KM26603.04	CTDB	72	84	ENW4	23	9	0601	58.2223	-148.6723	504	
KM26603.05	CTDB	73	85	ENW5	23	9	0715	58.1968	-148.6230	720	
KM26603.06	CTDB	74	86	ENW6	23	9	0902	58.1490	-148.4932	1162	
KM26703.01	CTDB	75	87	NB1	25	9	0324	59.4397	-150.4720	197	
KM26703.02	CTDB	76	88	NB2	25	9	0423	59.3978	-150.4773	233	
KM26703.03	CTDB	77	89	NG003	25	9	0522	59.3745	-150.5280	244	
KM26703.06	CTDB	78	90	ENW1	25	9	2110	58.3343	-148.9585	126	
KM26703.07	CTDB	79	91	ENW2	25	9	2145	58.2582	-148.7542	166	
KM26703.08	CTDB	80	92	ENW3	25	9	2240	58.2485	-148.7087	351	
KM26803.01	CTDB	81	93	ENW4	26	9	0100	58.2117	-148.6705	546	
KM26803.02	CTDB	82	94	ENW05	26	9	0230	58.1847	-148.6215	848	
KM26803.05	CTDB	83	95	ENW06	26	9	0459	58.1418	-148.4945	1175	
KM26803.06	CTDB	84	96	ENW7	26	9	0700	58.0520	-148.2605	1351	
KM26803.07	CTDB	85	97	ENW8	26	9	1031	57.9313	-148.0037	2455	
KM26803.08	CTDB	86	98	ENW9	26	9	1328	57.8175	-147.7463	3429	
KM26803.09	CTDB	87	99	ENW10	26	9	1608	57.7015	-147.4992	4922	
KM26803.12	CTDB	88	100	ENW11	26	9	1911	57.6223	-147.2488	4843	
KM26803.16	CTDB	89	101	ENW12	26	9	2253	57.5153	-146.9943	4754	
KM26903.02	CTDB	90	103	ENW13	27	9	0200	57.4023	-146.7533	4420	
KM26903.03	CTDB	91	104	ENW14	27	9	0503	57.2887	-146.5168	4174	
KM26903.04	CTDB	92	105	ENW15	27	9	0834	57.1753	-146.2437	3982	
KM26903.05	CTDB	93	106	ENW16	27	9	1202	57.0647	-145.9832	4080	
KM26903.06	CTDB	94	107	ENW17	27	9	1513	56.9070	-145.6930	3892	
KM26903.07	CTDB	95	108	ENW12	27	9	2135	57.5200	-146.9963	4764	
KM26903.08	CTDB	96	109	ESW1	27	9	2354	57.3757	-147.2197	4752	

Table 6: CTD Casts with Bottles (cont'd)

Event#	Instr	Cast	Sta	Sta std	Day	Mos	Time	Lat	Long	Water Depth	Comments
KM27003.01	CTDB	97	110	ESW2	28	9	0146	57.2490	-147.4085	4694	
KM27003.02	CTDB	98	111	ESW3	28	9	0338	57.1273	-147.6230	4625	
KM27003.03	CTDB	99	112	ESW4	28	9	0617	56.9168	-147.9155	4419	
KM27003.04	CTDB	100	113	ESW5	28	9	0744	56.8512	-148.0012	4372	

Table 7: Deployment of Satellite Buoy

Event#	Instr	Cast	Sta	Sta std	Day	Mos	Time	Lat	Long	Water Depth	Comments
KM25903.03	SatBuoy	1	27	GB5A	16	9	1341	59.0473	-148.6833	233	Drifter #37506 deployment.
KM25903.05	SatBuoy	2	28	GB4A	16	9	1449	59.1632	-148.7473	147	Drifter #37488 deployment.
KM26303.05	SatBuoy	3	50	GAK2I	20	9	0436	59.6267	-149.2583	212	Drifter #37501 deployment.
KM26303.10	SatBuoy	4	54	GAK5/GB3M	20	9	1025	59.2608	-148.9145	268	Drifter #37498 deployment.
KM26803.15	SatBuoy	5	100	ENW11	26	9	2210	57.6217	-146.4667	4843	Drifter #37516 deployment.
KM26903.01	SatBuoy	6	102	ENW13.5	27	9	0058	57.4205	-146.8047	4300	Drifter #37499 deployment.

APPENDIX I

KM0313 EVENT LOG

EVENT LOG CONTENTS

Column Label	**Description**
Event#	Unique identifier for each line of event log
Instrument (Instr)	60Bon: 0.505 mm mesh 0.6 diameter Bongo tows; CAT: Seabird SeaCAT profiles of conductivity and temperature; (Note: 60Bon and CAT are a single lowering of the wire, but 2 different event #s. All 60Bon/CAT were double oblique to 300m or to ca. 5m off bottom if shallower); CTDB: Conductivity Temperature Depth cast with PAR and fluorescence; bottle samples for nutrients and extracted chlorophyll; SatBuoy: Satellite tracked drifter deployment.
Cast	Sequence # for a particular instrument
Station (Sta)	Sequence # for stations occupied
Station Standard (Sta std)	Standard station name
Day	GMT time basis
Month (Mos)	GMT time basis
Time	GMT time
Latitude (Lat)	Decimal degrees; north is positive
Longitude (Long)	Decimal degrees; east is positive
Water Depth	Depth of bottom
Comments	

Appendix 1: Event Log

Event#	Instr	Cast	Sta	Sta std	Day	Mos	Time	Lat	Long	Water Depth	Comments
KM25603.01	Depart Kodiak	nd	nd	nd	13	9	2300	57.7287	-152.5207	9	Depart Kodiak, AK.
KM25703.01	CTDB	1	1	AP1	14	9	0413	58.4153	-151.7247	167	
KM25703.02	CTDB	2	2	AP2	14	9	0530	58.4275	-151.5313	165	
KM25703.03	CTDB	3	3	AP3	14	9	0644	58.4428	-151.3363	130	
KM25703.04	CTDB	4	4	AP4	14	9	0758	58.4568	-151.1505	98	
KM25703.05	CTDB	5	5	AP5	14	9	0910	58.4702	-150.9485	73	
KM25703.06	CTDB	6	6	AP6	14	9	1021	58.4825	-150.7553	88	
KM25703.07	CTDB	7	7	GP6	14	9	1250	58.7508	-150.8752	178	
KM25703.08	CTDB	8	8	GP1	14	9	1534	59.0995	-150.9970	163	
KM25703.09	Mooring recover	1	9	03GP32A	14	9	1622	59.1033	-150.9983	165	
KM25703.10	Mooring deploy	1	9	03GP32B	14	9	1958	59.1003	-150.9897	165	
KM25703.11	CTDB	9	10	GP34A	14	9	2126	58.9583	-150.9348	146	
KM25703.12	Mooring recover	2	10	03GP34A	14	9	2132	58.9590	-150.9375	181	
KM25803.01	Mooring recover	3	11	03GP36A	15	9	0200	58.7497	-150.8633	140	
KM25803.02	Mooring deploy	2	11	03GP36B	15	9	0315	58.7500	-150.8666	181	
KM25803.03	Mooring deploy	3	12	03GP34B	15	9	0606	58.9630	-150.9332	140	
KM25803.04	CTDB	10	13	KE1	15	9	1025	59.2340	-152.0353	84	
KM25803.05	CTDB	11	14	KE2	15	9	1134	59.1973	-152.0775	95	
KM25803.06	CTDB	12	15	KE3	15	9	1244	59.1380	-152.1205	158	
KM25803.07	CTDB	13	16	KE4	15	9	1336	59.1082	-152.1535	159	
KM25803.08	CTDB	14	17	KE5	15	9	1428	59.0572	-152.1990	134	
KM25803.09	CTDB	15	18	KE6	15	9	1514	59.0147	-152.2355	112	
KM25803.10	CTDB	16	19	KE7	15	9	1600	58.9835	-152.2995	81	
KM25803.11	CTDB	17	20	SE1	15	9	1748	58.8278	-152.3408	121	
KM25803.12	CTDB	18	21	SE2	15	9	1842	58.7832	-152.3633	134	
KM25803.13	CTDB	19	22	SE3	15	9	1927	58.7430	-152.3768	119	
KM25803.14	CTDB	20	23	SE4	15	9	2013	58.7050	-152.3970	151	
KM25803.15	CTDB	21	24	SE5	15	9	2100	58.6687	-152.4220	83	
KM25903.01	CTDB	22	25	GB12	16	9	1100	58.7000	-148.8500	193	
KM25903.02	CTDB	23	26	GB5	16	9	1321	59.0483	-148.6925	233	
KM25903.03	SatBuoy	1	27	GB5A	16	9	1341	59.0473	-148.6833	233	Drifter #37506 deployment.
KM25903.04	CTDB	24	28	GB4A	16	9	1436	59.1292	-148.7538	147	
KM25903.05	SatBuoy	2	28	GB4A	16	9	1449	59.1632	-148.7473	147	Drifter #37488 deployment.
KM25903.06	CTDB	25	29	GB3	16	9	1608	59.2802	-148.9557	182	
KM25903.07	Mooring recover	4	29	03GBP3A	16	9	1622	59.2805	-148.9543	184	
KM25903.08	Mooring recover	5	29	03GBM3A	16	9	1900	59.2740	-148.9490	186	
KM26003.01	Mooring deploy	4	30	03GBM3B	17	9	0124	59.2977	-148.9595	186	
KM26003.02	Mooring deploy	5	30	03GBP3B	17	9	0321	59.2837	-148.9586	184	
KM26003.03	CTDB	26	30	GB3B	17	9	0508	59.2750	-148.9628	185	
KM26003.04	CTDB	27	31	ATB0	17	9	0706	59.1917	-148.6023	128	
KM26003.05	CTDB	28	32	ATB1	17	9	0807	59.1158	-148.6455	161	
KM26003.06	CTDB	29	33	ATB2	17	9	0910	59.0400	-148.6902	197	
KM26003.07	CTDB	30	34	ATB3	17	9	1014	58.9665	-148.7350	248	
KM26003.08	CTDB	31	35	ATB4	17	9	1120	58.8908	-148.7837	288	
KM26003.09	CTDB	32	36	ATB5	17	9	1235	58.7972	-148.8212	251	
KM26003.10	CTDB	33	37	ATB6	17	9	1353	58.7025	-148.8515	210	
KM26003.11	CTDB	34	38	ATB7	17	9	1503	58.6138	-148.8818	115	
KM26003.12	Mooring recover	6	39	03GB12A	17	9	1620	58.6835	-148.8479	201	

Appendix 1: Event Log (cont'd)

Event#	Instr	Cast	Sta	Sta std	Day	Mos	Time	Lat	Long	Water Depth	Comments
KM26003.13	Mooring deploy	6	39	03GB12B	17	9	1840	58.6835	-148.8479	201	
KM26003.14	Mooring recover	7	40	03GB5A	17	9	2353	59.0417	-148.7033	194	
KM26103.01	Mooring recover	8	41	03GB4A	18	9	0212	59.1292	-148.7599	146	
KM26103.02	Mooring deploy	7	42	03GB4B	18	9	0502	59.1278	-148.7608	146	
KM26103.03	Mooring deploy	8	43	03GB5B	18	9	0640	59.0423	-148.6936	194	
KM26103.04	CTDB	35	44	GB3	18	9	1015	59.2612	-148.9107	166	
KM26103.05	Mooring recover	9	45	03GB2A	18	9	1712	59.5337	-148.1831	212	
KM26103.06	Mooring deploy	9	45	03GB2B	18	9	1932	59.5337	-149.1831	212	
KM26103.07	Mooring recover	10	46	03GB1A	18	9	2118	59.6935	-149.3307	228	
KM26203.01	Mooring	10	46	03GB1B	19	9	0109	59.6948	-149.3318	228	
KM26203.02	Mooring	10	46	03GB1B	19	9	0400	59.6948	-149.3318	228	
KM26203.03	Mooring	10	46	03GB1B	19	9	1630	59.6948	-149.3318	228	
KM26203.04	Mooring deploy	10	46	03GB1B	19	9	1804	59.6947	-149.3316	228	
KM26203.05	nd	nd	nd	nd	19	9	2030	nd	nd	nd	Arrive Seward; debark scientists.
KM26203.06	nd	nd	nd	nd	19	9	2245	nd	nd	nd	Depart Seward; embark scientists.
KM26303.01	CTDB	36	47	GAK1	20	9	0102	59.8440	-149.4672	268	
KM26303.02	CTDB	37	48	GAK1I	20	9	0220	59.7648	-149.3965	257	
KM26303.03	CTDB	38	49	GB1A	20	9	0314	59.6995	-149.3230	222	
KM26303.04	CTDB	39	50	GAK2I	20	9	0417	59.6268	-149.2590	212	
KM26303.05	SatBuoy	3	50	GAK2I	20	9	0436	59.6267	-149.2583	212	Drifter #37501 deployment.
KM26303.06	CTDB	40	51	GB2A	20	9	0538	59.5408	-149.1930	215	
KM26303.07	CTDB	41	52	GAK3I	20	9	0659	59.4823	-149.1228	203	
KM26303.08	CTDB	42	53	GAK4	20	9	0818	59.4093	-149.0475	199	
KM26303.09	CTDB	43	54	GAK5	20	9	0957	59.2608	-148.9145	167	
KM26303.10	SatBuoy	4	54	GAK5/GB3M	20	9	1025	59.2608	-148.9145	268	Drifter #37498 deployment.
KM26303.11	CTDB	44	55	GP0	20	9	1604	59.1607	-151.0095	73	
KM26303.12	CTDB	45	56	GP1	20	9	1652	59.0995	-150.9895	270	
KM26303.13	CTDB	46	57	GP1.5	20	9	1735	59.0535	-150.9815	165	
KM26303.14	CTDB	47	58	GP2	20	9	1825	59.0095	-150.9605	158	
KM26303.15	CTDB	48	59	GP3	20	9	1916	58.9505	-150.9252	152	
KM26303.16	Transit	nd	nd	nd	20	9	2000	nd	nd	nd	Storm;.suspend ops;retreat to Nuka Bay, Kenai Fjords N.P.
KM26403.01	Transit	nd	nd	nd	21	9	1900	nd	nd	nd	Depart Nuka Bay to resume ops.
KM26503.01	CTDB	49	60	STA10	22	9	0420	58.0835	-149.0703	81	
KM26503.02	60Bon	1	60	STA10	22	9	0445	58.0835	-149.0703	82	
KM26503.03	CAT	1	60	STA10	22	9	0445	58.0835	-149.0703	82	
KM26503.04	CTDB	50	61	STA9	22	9	0533	58.0637	-149.1725	110	
KM26503.05	CTDB	51	62	STA8	22	9	0633	58.0238	-149.2888	217	
KM26503.06	CTDB	52	63	STA7	22	9	0742	57.9858	-149.4042	197	
KM26503.07	CTDB	53	64	STA6	22	9	0837	57.9498	-149.4712	189	
KM26503.08	CTDB	54	65	STA5	22	9	0931	57.9160	-149.5787	125	
KM26503.09	CTDB	55	66	STA4	22	9	1026	57.8785	-149.6852	234	
KM26503.10	CTDB	56	67	STA3A	22	9	1122	57.8428	-149.7828	265	
KM26503.11	CTDB	57	68	STA3	22	9	1225	57.8087	-149.8765	254	
KM26503.12	CTDB	58	69	STA2A	22	9	1325	57.7722	-149.9987	178	
KM26503.13	CTDB	59	70	STA2	22	9	1420	57.7363	-150.1163	192	
KM26503.14	CTDB	60	71	STA1	22	9	1514	57.7048	-150.2398	131	
KM26503.15	CTDB	61	72	STB8	22	9	1613	57.7798	-150.1570	181	
KM26503.16	CTDB	62	73	STB7	22	9	1707	57.8338	-150.0857	208	

Appendix 1: Event Log (cont'd)

Event#	Instr	Cast	Sta	Sta std	Day	Mos	Time	Lat	Long	Water Depth	Comments
KM26503.17	CTDB	63	74	STB6	22	9	1815	57.9057	-150.0050	258	
KM26503.18	CTDB	64	75	STB5	22	9	1925	57.9837	-149.9062	262	
KM26503.19	CTDB	65	76	STB4	22	9	2030	58.0528	-149.8180	243	
KM26503.20	CTDB	66	77	STB3	22	9	2130	58.1215	-149.7400	218	
KM26503.21	CTDB	67	78	STB2	22	9	2223	58.1745	-149.6673	105	
KM26503.22	CTDB	68	79	STB1	22	9	2313	58.2240	-149.6055	69	
KM26503.23	60Bon	2	80	STB2	22	9	2342	58.2240	-149.6055	69	
KM26503.24	CAT	2	80	STB2	22	9	2342	58.2240	-149.6055	69	
KM26603.01	CTDB	69	81	ENW1	23	9	0209	58.3530	-148.9770	123	
KM26603.02	CTDB	70	82	ENW2	23	9	0339	58.2607	-148.7530	157	
KM26603.03	CTDB	71	83	ENW3	23	9	0433	58.2412	-148.7028	390	
KM26603.04	CTDB	72	84	ENW4	23	9	0601	58.2223	-148.6723	504	
KM26603.05	CTDB	73	85	ENW5	23	9	0715	58.1968	-148.6230	720	
KM26603.06	CTDB	74	86	ENW6	23	9	0902	58.1490	-148.4932	1162	
KM26603.07	Transit	nd	nd	nd	23	9	0950	nd	nd	nd	Storm; suspend ops; retreat to Nuka Bay, Kenai Fjords N.P.
KM26703.01	CTDB	75	87	NB1	25	9	0324	59.4397	-150.4720	197	
KM26703.02	CTDB	76	88	NB2	25	9	0423	59.3978	-150.4773	233	
KM26703.03	CTDB	77	89	NG003	25	9	0522	59.3745	-150.5280	244	
KM26703.04	Transit	nd	nd	nd	25	9	1300	nd	nd	nd	Depart Nuka Bay to resume ops.
KM26703.05	Transit	nd	nd	ENW1	25	9	2110	58.3343	-148.9585	nd	Resume operations.
KM26703.06	CTDB	78	90	ENW1	25	9	2110	58.3343	-148.9585	126	
KM26703.07	CTDB	79	91	ENW2	25	9	2145	58.2582	-148.7542	166	
KM26703.08	CTDB	80	92	ENW3	25	9	2240	58.2485	-148.7087	351	
KM26703.09	60Bon	3	92	ENW3	25	9	2325	58.2485	-148.7087	351	
KM26703.10	CAT	3	92	ENW3	25	9	2325	58.2485	-148.7087	351	
KM26803.01	CTDB	81	93	ENW4	26	9	0100	58.2117	-148.6705	546	
KM26803.02	CTDB	82	94	ENW05	26	9	0230	58.1847	-148.6215	848	
KM26803.03	60Bon	4	94	ENW05	26	9	0325	58.1847	-148.6215	848	
KM26803.04	CAT	4	94	ENW05	26	9	0325	58.1847	-148.6215	848	
KM26803.05	CTDB	83	95	ENW06	26	9	0459	58.1418	-148.4945	1175	
KM26803.06	CTDB	84	96	ENW7	26	9	0700	58.0520	-148.2605	1351	
KM26803.07	CTDB	85	97	ENW8	26	9	1031	57.9313	-148.0037	2455	
KM26803.08	CTDB	86	98	ENW9	26	9	1328	57.8175	-147.7463	3429	
KM26803.09	CTDB	87	99	ENW10	26	9	1608	57.7015	-147.4992	4922	
KM26803.10	60Bon	5	99	ENW10	26	9	1815	57.7015	-147.4992	4922	
KM26803.11	CAT	5	99	ENW10	26	9	1815	57.7015	-147.4992	4922	
KM26803.12	CTDB	88	100	ENW11	26	9	1911	57.6223	-147.2488	4843	
KM26803.13	60Bon	6	100	ENW11	26	9	2130	57.6223	-147.2488	4843	
KM26803.14	CAT	6	100	ENW11	26	9	2130	57.6223	-147.2488	4843	
KM26803.15	SatBuoy	5	100	ENW11	26	9	2210	57.6217	-146.4667	4843	Drifter #37516 deployment.
KM26803.16	CTDB	89	101	ENW12	26	9	2253	57.5153	-146.9943	4754	
KM26903.01	SatBuoy	6	102	ENW13.5	27	9	0058	57.4205	-146.8047	4300	Drifter #37499 deployment.
KM26903.02	CTDB	90	103	ENW13	27	9	0200	57.4023	-146.7533	4420	
KM26903.03	CTDB	91	104	ENW14	27	9	0503	57.2887	-146.5168	4174	
KM26903.04	CTDB	92	105	ENW15	27	9	0834	57.1753	-146.2437	3982	
KM26903.05	CTDB	93	106	ENW16	27	9	1202	57.0647	-145.9832	4080	
KM26903.06	CTDB	94	107	ENW17	27	9	1513	56.9070	-145.6930	3892	
KM26903.07	CTDB	95	108	ENW12	27	9	2135	57.5200	-146.9963	4764	

Appendix 1: Event Log (cont'd)

Event#	Instr	Cast	Sta	Sta std	Day	Mos	Time	Lat	Long	Water Depth	Comments
KM26903.08	CTDB	96	109	ESW1	27	9	2354	57.3757	-147.2197	4752	
KM27003.01	CTDB	97	110	ESW2	28	9	0146	57.2490	-147.4085	4694	
KM27003.02	CTDB	98	111	ESW3	28	9	0338	57.1273	-147.6230	4625	
KM27003.03	CTDB	99	112	ESW4	28	9	0617	56.9168	-147.9155	4419	
KM27003.04	CTDB	100	113	ESW5	28	9	0744	56.8512	-148.0012	4372	
KM27003.05	Arrive Kodiak	nd	nd	nd	28	9	2210	57.7287	-152.5207	8	Arrive Kodiak AK.