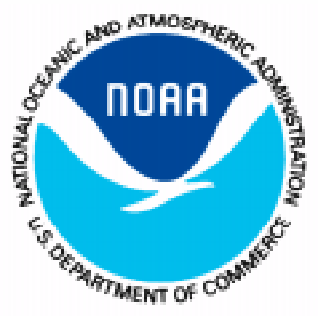
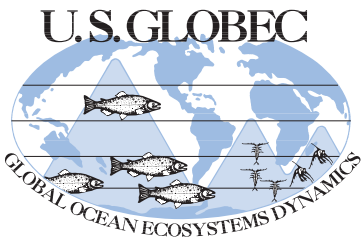
GLOBEC Northeast Pacific, Coastal Gulf of Alaska

Cruise Report, R/V *Alpha Helix* (HX 247)

12 – 27 July 2001





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12 – 27 July 2001

Chief Scientist:

Jeffrey Napp
NOAA/Alaska Fisheries Science Center
7600 Sand Point Way, N.E., Bldg. #4
Seattle, WA 98115
Tel: 206 – 526 - 4148
E-mail: Jeff.Napp@NOAA.gov

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

Cruise Goals / Scientific Purpose

The GLOBEC Northeast Pacific program seeks to understand the relationship between climate variability and the success of marine fish, bird and mammal populations. In the coastal Gulf of Alaska, the program focuses on the mechanisms by which climate and weather can influence the physical - chemical structure of the coastal zone, how this in turn affects the coastal planktonic food web, and how food web variations influence distribution and recruitment success of pink salmon. The process cruises specifically will be conducted 3 times in 2001 and 3 times in 2003. On each cruise the aim is to visit four sites representing a diversity of physical - chemical conditions in the coastal Gulf of Alaska. At each of these core sites, rates of phytoplankton growth, zooplankton grazing and zooplankton egg production will be measured, as well as aspects of phytoplankton and zooplankton community structure. These measurements will be related to the physical - chemical environment by means of vertical profiling at the process stations themselves, sampling of a "fine-scale" grid around each of the core process stations, and use of data collected on LTOP cruises. Data collected will ultimately be compared to related data from the Oregon coastal upwelling system.

The July cruise will focus on processes related to strongly stratified water columns, and the responses of the zooplankton to communities dominated by small phytoplankton cells using regenerated nutrients. Two other GLOBEC Investigators (Lew Haldorson and Jack Helle) will each be in the general area sampling juvenile salmon from charter fishing boats. If possible, we will do coordinated sampling with these other investigators.

Cruise Objectives

1. Determine phytoplankton growth rates and rates of microzooplankton herbivory.
2. Determine rates of grazing on phyto- and microzooplankton by dominant copepod taxa including *Neocalanus* and *Calanus*. Live net collections are summarized in Table 2.
3. Measure rates of egg production by copepods *Calanus*, *Pseudocalanus*, and *Metridia*.
4. Assess vertical distribution of temperature, salinity, light, nutrients, chlorophyll and microzooplankton at core process stations and fine-scale grid stations (Table 3).
5. Conduct quantitative net tows (CalVET, MOCNESS) for distribution and abundance of zooplankton at core process stations. MOCNESS tows are summarized in Table 4; CalVET net tow collections with 0.150 mm mesh and 0.053 mm mesh are summarized in Tables 5 and 6, respectively.

6. Conduct coordinated sampling with GLOBEC investigators on fishing boats (including neuston tows) in the areas where juvenile salmon are present. Neuston collections are summarized in Table 7.

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

Suzanne Strom (Project Co-PI)	Microzoo grazing, WWU (F),
Brady Olson	Microzoo grazing, WWU (M),
Marnie Jo Zirbel	MOCNESS, chlorophyll/nutrients, WWU (F),
Franchesca Perez	Chlorophyll/nutrients, WWU (F),
Erica Close	Microzoo grazing, WWU (F),
Jennifer Lanksbury	Copepod egg production/grazing, AFSC (F),
Hongbin Liu	*Neocalanus* grazing, LUMCON (M),
David Lawrence	*Neocalanus* grazing, LUMCON (M),
Georgina Blamey	MOCNESS, chlorophyll/nutrients, UAF (F),
Dimitri Dukhovskoy	CTD/ADCP, UAF (M)

AFSC = Alaska Fisheries Science Center (NOAA); LUMCON = Louisiana Universities Marine Consortium; WWU = Western Washington University; UAF = University of Alaska, Fairbanks

Summary of Cruise

Appendix I (Event Log) lists station operations and locations in chronological order. Figure 1 shows the location of the core and grid stations and Figure 2 shows the location of LTOP CTD stations that were occupied.

Daily Cruise Summary (Narrative)

12 - 15 July. Departed Seward 0958 ADT. Due to failure of a septic system relay switch, we chose to work in the Alaska Coastal Current so that we could easily return to retrieve a new part once it arrived in Seward. A hydrographic survey from GAK 1 to GAK 3 (including intermediate stations) revealed that the ACC was close to the coast and that Station ACC1 was a good location for our studies (i.e. the station had moderate concentrations of chlorophyll at the surface and was located on the outer edge of the ACC). We worked this station for three days conducting a hydrographic section each day to look for shifts in the location of the ACC. We accomplished all scheduled work (dilution, grazing, and egg production experiments) at this station, including CTDs at all grid stations. While on station, the ADF & G R/V *Pandalus* chartered by GLOBEC P.I.s Drs. Lew Haldorson and Kate Myers was contacted. We learned that successive trawls by the R.V. *Pandalus* did not yield significant numbers of juvenile salmon on the Seward Line. We chose to do neuston tows anyway to learn how the plankton in juvenile salmon ambit differed from what we were collecting in the MOCNESS.

15 - 18 July. After completing our studies in the ACC (15 July), we proceeded to the middle shelf completing a hydrographic section from GAK 3 to GAK 7 (including intermediate stations). Based on the water column structure and location of the fluorescence maximum, we chose to make GAK6 our middle shelf station. We worked this station for three days and accomplished all scheduled work (dilution, grazing, and egg production experiments), including CTDs and neuston tows at all grid stations. Between experiments at GAK 6 we completed another hydrographic section out to GAK9 to look at water column structure and the depth of the subsurface fluorescence maximum.

18 - 21 July. We completed our studies of the middle shelf on 18 July and began another hydrographic section to determine the location of our outer shelf station. The section began at

GAK9 and ended at GAK 12 (GAK 13 was occupied later that evening). GAK 10 was chosen based on the water column structure and fluorescence profile. We again completed all our work despite a 24-hr period of moderate winds (> 20 kt) which made microscopy and water handling more difficult. All scheduled work (dilution, grazing, and egg production experiments) and grid CTDs was accomplished around midnight 21 July and we proceeded to Prince William Sound.

21 - 24 July. We completed the Cape Fairfield hydrographic line before entering the Sound through Bainbridge Passage on our way to Station PWS 2. Operations commenced around midnight 21 July with our first MOCNESS in the Sound. We worked this station for three days and accomplished all scheduled work (dilution, grazing, and egg production experiments), including CTDs and neuston tows at all grid stations. A deep MOCNESS (to 500 m) was also accomplished to see if *Neocalanus* spp. were in diapause in the deep water. Additional CTDs were taken at Stations KIP1, PWS1 and PWS3.

24 July. We left Knight Island Passage midday 24 July to complete the Hogan Bay and Montague Passage CTD lines.

25 - 26 July. We re-surveyed the ACC completing a hydrographic section in the early morning and then conducted our last set of grazing and dilution experiments at Station ACC1. The following morning we repeated the neuston tows at the inner shelf grid stations and then returned to the dock at Seward Marine Center 1400 hrs 26 July 2001. The early arrival was to facilitate the change from Process to LTOP cruises and to allow the Process laboratories sufficient time to prepare their equipment for return to their respective laboratories.

27 July. Final experimental chlorophylls were processed on board the ship the morning of 27 July.

We thank Captain Bill Rook and the crew of the R.V. *Alpha Helix* for all their hard work, good humor and great attitude during this long field season. Their efforts greatly contributed to this very successful set of cruises. We also thank Tom Smith and the staff at the Seward Marine Center for their help in cruise preparation and logistics.

Summary of Sampling Operations

Daytime Activities:

1. Collected ADCP, sea surface salinity, temperature and fluorescence data using sensors in the seachest, both while underway and while on station.

2. Occupied core process stations OS-C (GAK-10), MS-C (GAK-6), IS-C (ACC-1) and PWS-C (PWS-2) and conducted vertical CTD profiles (to near bottom, as for LTOP cruises) for determination of T, S, light (PAR) and in situ fluorescence distribution.

3. Collected discrete water samples from CTD cast (8 to 11 depths per cast) for measurement of nutrients (frozen for analysis by C. Mordy, PMEL), size-fractionated chlorophyll (<5 µm, 5 – 20 µm, >20 µm, analyzed on board), algal pigments (frozen for HPLC analysis by S. Strom) and microzooplankton abundance (acid Lugol's-fixed samples for inverted microscopy, gluataraldehyde-fixed samples for epifluorescence microscopy). (Activities 2 and 3 were conducted upon arrival and at approx. local noon each day on station, with a reduced set of sample types taken during all but first cast on station.)

4. Conducted net tows (Quad Net, Ring Net) for preserved samples (quantitative zooplankton abundance and copepod egg abundance) and live animals (grazing and egg production experiment set-up).

5. Used CTD to collect water from upper mixed layer for set-up of dilution experiments (phytoplankton growth and microzooplankton grazing rates) and copepod grazing experiments.

6. Occupied fine-scale grid stations (8) surrounding each core station (Figure 1) and conducted vertical profiling (as in #2) and water bottle sampling (as in #3, but with only 5 depths per cast, water samples collected for nutrient and size-fractionated chlorophyll analysis).

7. Conducted neuston tows and other activities in regions where juvenile salmon are present.

Nighttime Activities:

1. Conducted MOCNESS and Quad Net tows for quantitative enumeration of zooplankton once each night while on core process stations.

2. Conducted night CTD/water sample profiling at core process station (see above).

Summary of Process Studies

Microplankton Studies (Strom, Olson, and Perez, with assistance from Zirbel and Close)

A total of 13 seawater dilution experiments were conducted to measure phytoplankton growth rates and microzooplankton grazing rates. At least two experiments from the mixed layer (50% I_0) and one from the deeper chlorophyll maximum layer were conducted at each of the 4 core stations. Dilution series were enriched with nutrients (N, P) to ensure that phytoplankton growth rates were not affected by dilution; unenriched controls provided an assay for the degree of nutrient limitation in the environment. Samples were taken from experiments for analysis of microplankton biomass and composition (inverted and epifluorescence microscopy), size-fractionated chlorophyll analysis, and algal pigment composition by HPLC. In addition, on-board FlowCAM analysis of 9 copepod grazing experiments were conducted and 5 size fractionation experiments were completed to look at trophic relationships among the microplankton.

Preliminary results:

1. The inner shelf (ACC) was dominated by >20 µm phytoplankton cells, primarily diatoms, while all other stations were dominated by small (<5 µm) phytoplankton cells.

2. Strong nutrient limitation of phytoplankton growth rates was observed on the inner and mid-shelf. Curiously, despite strong water column stratification, rates on the outer shelf and in Prince William Sound did not appear N- or P-limited.

3. Nutrient-enriched phytoplankton growth rates ranged up to 1.2 per d and were usually highest for the largest chlorophyll size fraction (>20 µm). Nutrient-enriched growth rates from the deep chlorophyll maximum layer were not consistently lower than those from the surface mixed layer.

4. Microzooplankton grazing rates were generally lowest on the large (>20 µm) phytoplankton. Substantial rates of grazing were nearly always measured on intermediate (5 to 20 µm) and small (<5 µm) phytoplankton. Saturated grazing was frequently observed at the more concentrated end of the dilution series, particularly on the smallest phytoplankton size fraction.

Copepod Egg Production and Diet Studies (Napp and Lanksbury, with assistance from Perez, Zirbel, and Blamey)

Shipboard incubation experiments for egg production, egg viability, and diet were conducted at selected stations. Females of the target species (*Calanus* spp., *Pseudocalanus* spp. and *Metridia* spp.) were used when available. Only *Pseudocalanus* spp. were available at every station.

Preliminary results are as follows:

1. Calanus marshallae females were very rare; sufficient numbers for egg production were found only at the outer shelf station (GAK10). All females were mature and egg production ranged from > 25 to 60 eggs per female per day.
2. Calanus eggs hatched during incubation; viability rates will be calculated after the preserved samples are returned to our laboratory.
3. Three distinct sizes of *Pseudocalanus* spp. females were found probably corresponding to *P. newmani, P mimus,* and

P. minutus. Preserved samples will confirm the identities of the different sized females.
4. Approximately 1 in 5 *Pseudocalanus* spp. females laid eggs during the 24-hr incubation period from the shelf stations; the rate in Prince William Sound was about double that on the shelf.
5. Viability of *Pseudocalanus* spp. eggs will be determined from females incubated until their eggs hatched.
6. Diet studies for the females of the target species were conducted using 24-hr shipboard grazing experiments on natural particulate matter. This research was done in collaboration with S. Strom and co-workers. Samples for chlorophyll, microplankton community (Lugol's and glutaraldehyde preserved), FlowCam, and HPLC will be analyzed to determine grazing rates and diet preferences. Particular effort was expended to conduct parallel grazing experiments for *Pseudocalanus* and *Metridia* females so that we could examine their grazing impact on the microplankton community.
7. Zooplankton samples were collected at each core station using the NEP GOA GLOBEC protocol (MOCNESS 500 µm and Quad Net 150 µm mesh) to determine the concentration and depth distribution of GLOBEC target species.
8. A deep MOCNESS tow in Prince William Sound revealed high concentrations of *Neocalanus* spp. in the 400 – 500 m depth range. The MOCNESS also captured a fish predator (Zoarcidae?) in two of the depth strata where there were high concentrations of *Neocalanus* spp.
9. We collected neuston samples around the inner shelf, middle shelf, and Prince William Sound core stations to determine the availability of food for juvenile salmon. The stations in the ACC were occupied twice at the beginning and end of the cruise.

Neocalanus *Grazing Experiments (Liu and Lawrence)*

During cruise HX247 (July 17 – 26), we conducted 12 *Neocalanus* grazing experiments at 4 core stations. Throughout the cruise, *Neocalanus* spp. abundance in the upper 100 meters was low at all locations, especially in the Prince William Sound where they were almost absent. Deep MOCNESS tows showed that the *Neocalanus* population resides in a deep layer below at least 400 meters. Most experiments were done with water from the depth of 50% surface light intensity. Several experiments were performed with water from the subsurface chlorophyll maximum layer. Various numbers of *Neocalanus* copepodids were added to each experimental bottle, usually duplicates of 3 different treatments plus controls. Nutrients were added to each bottle to ensure that the phytoplankton growth in the treatment bottles were not stimulated by the nutrient excreted by the copepods. Chlorophyll *a* concentrations in 3 size fractions (< 5, 5 – 20 and > 20 µm) were measured at the beginning and end of the experiment. Water samples were taken at the beginning and end of the incubation for FlowCam analysis of phytoplankton and microzooplankton compositions. In addition, samples from each incubation bottle were preserved in Lugol's solution and gluteraldehyde (for making slides on board) for additional identification of microzooplankton. *Neocalanus* spp. were also dried onboard for dry weight measurement and frozen in liquid nitrogen for future analyses. Water samples were also taken at each core station and from selected experiments for flow cytometric analysis of picophytoplankton and bacteria abundance.

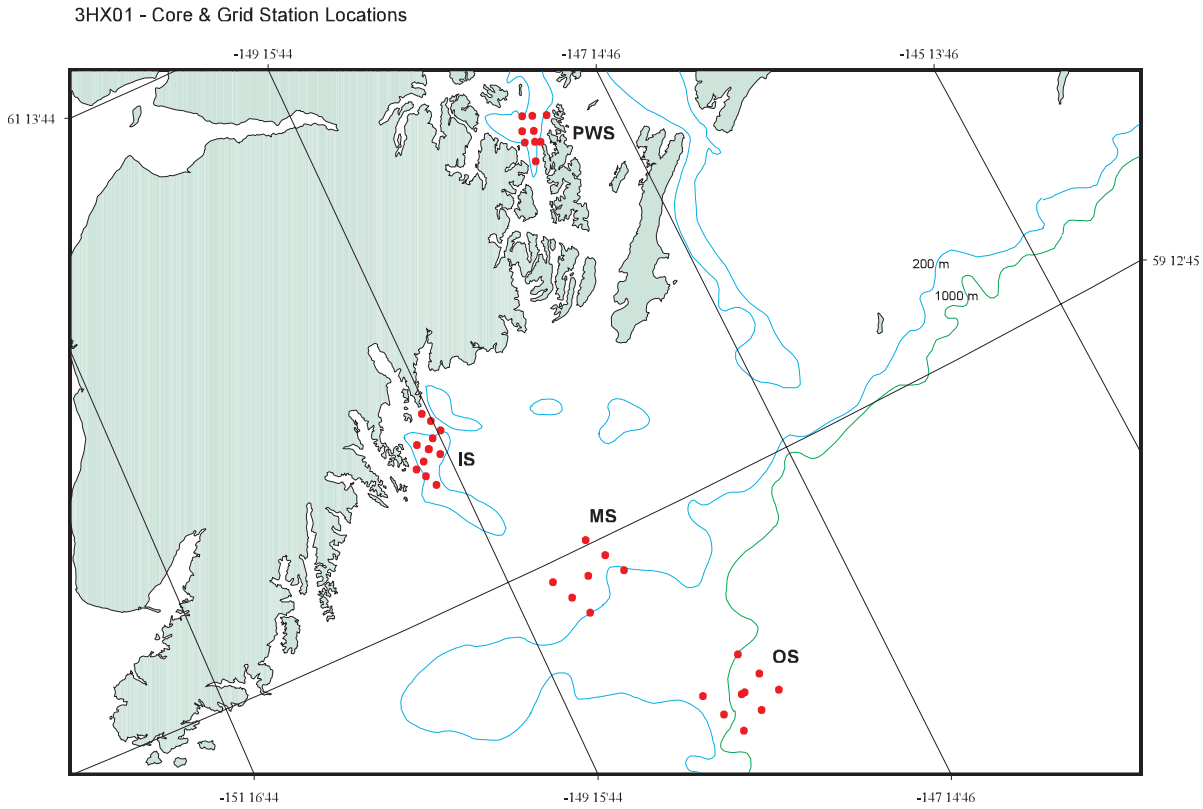

Figure 1 - Core process and surrounding grid stations

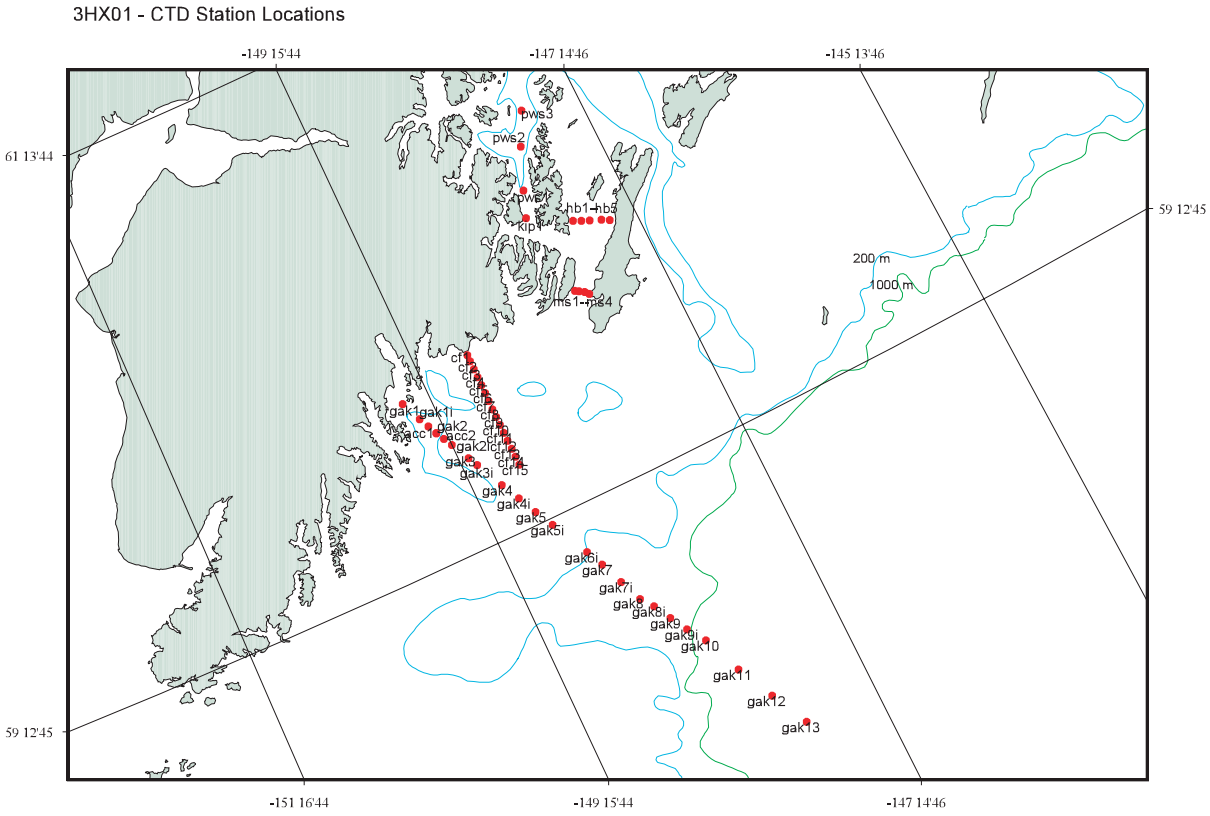

Figure 2 - Gulf of Alaska LTOP stations sampled by CTD

Table 2: Collection of Live Animals for Shipboard Experiments

Event#	Instr	Cast	Sta	Sta std	Day	Mos	Time	Lat	Long	Water Depth	Cast Depth	SI	Comments
HX19301.09	LiveNet	1	8	ACC1	12	7	1814	59.7286	-149.3615	240	75	Napp	ev#009
HX19301.10	LiveNet	2	8	ACC1	12	7	1903	59.7223	-149.3451	240	75	Napp	ev#010
HX19301.11	LiveNet	3	8	ACC1	12	7	1903	59.7223	-149.3449	240	75	Napp	ev#011; ISC
HX19401.05	LiveNet	4	8	ACC1	13	7	0804	59.7255	-149.3685	242	75	Napp	ev#020; ISC
HX19401.06	LiveNet	5	8	ACC1	13	7	0823	59.7299	-149.3586	242	75	Napp	ev#021; ISC
HX19401.07	LiveNet	6	8	ACC1	13	7	0827	59.7300	-149.3586	242	75	Napp	ev#022; ISC
HX19401.08	LiveNet	7	8	ACC1	13	7	0854	59.7274	-149.3607	242	75	Napp	ev#023
HX19401.24	LiveNet	8	20	ISGH	13	7	2214	59.7650	-149.2422	265	100	Strom	ev#039
HX19501.05	LiveNet	9	21	ACC1	14	7	0735	59.7251	-149.3659	242	75	Napp	ev#046
HX19501.06	LiveNet	10	21	ACC1	14	7	0740	59.7267	-149.3658	245	75	Napp	ev#047
HX19501.15	LiveNet	11	28	ACC1	14	7	1404	59.7261	-149.3642	241	75	Napp	ev#056
HX19501.16	LiveNet	12	28	ACC1	14	7	1416	59.7258	-149.3633	241	75	nd	ev#057
HX19601.12	LiveNet	13	44	GAK6	15	7	0905	59.1170	-148.7710	150	75	nd	ev#076
HX19601.13	LiveNet	14	44	GAK6	15	7	0905	59.1190	-148.7698	150	75	nd	ev#077
HX19601.24	LiveNet	15	51	GAK6I	15	7	2159	59.0219	-148.6752	228	100	Strom	ev#088
HX19701.07	LiveNet	16	52	GAK6	16	7	0800	59.1147	-148.7756	148	75	Napp	ev#095
HX19701.08	LiveNet	17	52	GAK6	16	7	0809	59.1160	-148.7795	148	75	Dagg	ev#096
HX19701.09	LiveNet	18	52	GAK6	16	7	0822	59.1175	-148.7843	148	100	Dagg	ev#097
HX19701.11	LiveNet	19	52	GAK6	16	7	0904	59.1201	-148.7730	145	110	Dagg	ev#099
HX19801.07	LiveNet	20	61	GAK6	17	7	0754	59.1170	-148.7709	149	75	Napp	ev#125
HX19801.08	LiveNet	21	61	GAK6	17	7	0808	59.1149	-148.7680	149	75	Napp	ev#126
HX19801.14	LiveNet	22	61	GAK6	17	7	2203	59.1171	-148.7718	nd	100	Dagg	ev#132
HX19901.13	LiveNet	23	67	GAK10	18	7	1411	58.5454	-148.2044	1475	nd	Napp	ev#145
HX19901.14	LiveNet	24	67	GAK10	18	7	1419	58.5463	-148.2032	1475	nd	Napp	ev#146
HX19901.15	LiveNet	25	67	GAK10	18	7	1428	58.5477	-148.2019	1475	nd	Napp	ev#147
HX19901.19	LiveNet	26	69	GAK10	18	7	2259	58.5407	-147.2118	nd	100	nd	ev#151
HX20001.08	LiveNet	27	69	GAK10	19	7	0804	58.5414	-148.2103	1463	75	Napp	ev#159
HX20001.09	LiveNet	28	69	GAK10	19	7	0815	58.5440	-148.2082	1463	75	Napp	ev#160
HX20001.10	LiveNet	29	69	GAK10	19	7	0825	58.5448	-148.2074	1463	75	Napp	ev#161
HX20001.23	LiveNet	30	77	OSC	19	7	2300	58.5413	-148.2088	nd	100	nd	ev#174
HX20101.08	LiveNet	31	78	GAK10	20	7	0807	58.5414	-148.2133	1458	nd	Napp	ev#182
HX20101.09	LiveNet	32	78	GAK10	20	7	0818	58.5429	-148.2088	1458	nd	Napp	ev#183
HX20101.12	LiveNet	33	78	GAK10	20	7	1423	58.5440	-148.2129	1461	75	Napp	ev#186
HX20101.13	LiveNet	34	78	GAK10	20	7	1432	58.5449	-148.2113	1461	75	Dagg	ev#187
HX20201.18	LiveNet	35	94	PWS2	21	7	2305	60.5339	-147.8024	742	nd	Napp	ev#209
HX20301.07	LiveNet	36	94	PWS2	22	7	0801	60.5327	-147.8179	733	75	Napp	ev#217
HX20301.08	LiveNet	37	94	PWS2	22	7	0813	60.5326	-147.8206	733	75	Napp	ev#218
HX20301.30	LiveNet	38	103	PWS2	22	7	2300	60.5341	-147.8124	759	100	Strom	ev#240
HX20401.03	LiveNet	39	103	PWS2	23	7	0055	60.5400	-147.7787	711	nd	nd	ev#244
HX20401.07	LiveNet	40	107	PWS2	23	7	0805	60.5344	-147.8038	735	75	Napp	ev#248
HX20401.09	LiveNet	41	107	PWS2	23	7	1358	60.5352	-147.8056	735	125	Dagg	ev#250
HX20401.10	LiveNet	42	107	PWS2	23	7	1410	60.5337	-147.8024	735	100	Napp	ev#251
HX20401.11	LiveNet	43	107	PWS2	23	7	1444	60.5320	-147.8004	735	150	Dagg	ev#252
HX20401.15	LiveNet	44	107	PWS2	23	7	2306	60.5347	-147.8067	735	100	Napp	ev#256
HX20501.07	LiveNet	45	107	PWS2	24	7	0805	60.5345	-147.8020	735	nd	Napp	ev#265
HX20501.08	LiveNet	46	107	PWS2	24	7	0814	60.5334	-147.8000	735	nd	Napp	ev#266
HX20601.08	LiveNet	47	124	ACC1	25	7	0805	59.7282	-149.3625	245	nd	Napp	ev#287
HX20601.09	LiveNet	48	124	ACC1	25	7	0821	59.7265	-149.3687	245	nd	Dagg	ev#288

Table 3: CTD Casts

Event#	Instr	Cast	Sta	Sta std	Day	Mos	Time	Lat	Long	Water Depth	Cast Depth	SI	Comments
HX19301.01	CTD	1	1	GAK1	12	7	1146	59.8457	-149.4686	270	268	Strom	ev#001; ACC Survey
HX19301.02	CTD	2	2	GAK1I	12	7	1241	59.7651	-149.4006	260	254	Strom	ev#002
HX19301.03	CTD	3	3	ACC1	12	7	1323	59.7268	-149.3659	242	nd	Strom	ev#003
HX19301.04	CTD	4	4	GAK2	12	7	1359	59.6899	-149.3286	227	nd	Strom	ev#004
HX19301.05	CTD	5	5	ACC2	12	7	1434	59.6573	-149.2943	219	nd	Strom	ev#005
HX19301.06	CTD	6	6	GAK2I	12	7	1511	59.6248	-149.2632	212	nd	Strom	ev#006
HX19301.07	CTD	7	7	GAK3	12	7	1603	59.5532	-149.1899	212	nd	Strom	ev#007
HX19301.08	CTD	8	8	ACC1	12	7	1741	59.7287	-149.3632	240	nd	Strom	ev#008; Inner Shelf Core Station
HX19301.12	CTD	9	8	ACC1	12	7	1917	59.7289	-149.3611	240	50	Dagg	ev#012; Dilution PFW (BO)
HX19301.13	CTD	10	8	ACC1	12	7	2025	59.7292	-149.3616	240	50	Dagg	ev#013; 4m water for expt. #1 (SS)
HX19301.15	CTD	11	8	ACC1	12	7	2350	59.7281	-149.3648	242	nd	Napp	ev#015; ISC
HX19401.09	CTD	12	8	ACC1	13	7	0906	59.7258	-149.3656	242	nd	Strom	ev#024; FSW for Dilution
HX19401.10	CTD10	13	8	ACC1	13	7	1007	59.7288	-149.3626	242	nd	Strom	ev#025; 10 L rosette CTD. Dil/Graze #2.
HX19401.11	CTD	14	8	ACC1	13	7	1400	59.7291	-149.3618	242	nd	Strom	ev#026
HX19401.12	CTD	15	9	ISGA	13	7	1446	59.6842	-149.4900	221	nd	Strom	ev#027; Inner shelf grid survey
HX19401.13	CTD	16	10	ISGD	13	7	1522	59.6490	-149.4526	275	nd	Strom	ev#028
HX19401.14	CTD	17	11	ISGF	13	7	1557	59.6079	-149.4163	217	nd	Strom	ev#029
HX19401.15	CTD	18	12	GAK3	13	7	1708	59.5534	-149.1890	220	nd	Strom	ev#030
HX19401.16	CTD	19	13	GAK2I	13	7	1756	59.6261	-149.2599	215	nd	Strom	ev#031
HX19401.17	CTD	20	14	ACC2	13	7	1828	59.6598	-149.2943	215	nd	Strom	ev#032
HX19401.18	CTD	21	15	GAK2	13	7	1856	59.6917	-149.3278	227	nd	Strom	ev#033
HX19401.19	CTD	22	16	ACC1	13	7	1929	59.7290	-149.3605	227	nd	Strom	ev#034
HX19401.20	CTD	23	17	GAK1I	13	7	2000	59.7662	-149.3987	257	nd	Strom	ev#035
HX19401.21	CTD	24	18	ISGC	13	7	2055	59.8437	-149.3063	100	nd	Strom	ev#036
HX19401.22	CTD	25	19	ISGE	13	7	2123	59.8096	-149.2710	106	nd	Strom	ev#037
HX19401.23	CTD	26	20	ISGH	13	7	2153	59.7690	-149.2364	265	nd	Strom	ev#038
HX19401.26	CTD	27	21	ACC1	13	7	2334	59.7252	-149.3658	242	nd	nd	ev#041
HX19501.07	CTD	28	22	GAK1	14	7	0846	59.8443	-149.4666	273	nd	Napp	ev#048
HX19501.08	CTD	29	23	GAK1I	14	7	0933	59.7665	-149.3966	263	nd	Strom	ev#049
HX19501.09	CTD	30	24	ACC1	14	7	1009	59.7272	-149.3616	240	nd	Strom	ev#050
HX19501.10	CTD	31	25	GAK2	14	7	1036	59.6924	-149.3257	226	nd	Strom	ev#051
HX19501.11	CTD	32	26	ACC2	14	7	1104	59.6588	-149.2955	219	nd	Strom	ev#052
HX19501.12	CTD	33	27	GAK2I	14	7	1134	59.6271	-149.2566	212	nd	Strom	ev#053
HX19501.13	CTD	34	28	ACC1	14	7	1233	59.7292	-149.3613	241	236	Strom	ev#054
HX19501.14	CTD	35	28	ACC1	14	7	1328	59.7276	-149.3595	241	50	Strom	ev#055; 17m water for fsw
HX19501.17	CTD	36	28	ACC1	14	7	1426	59.7264	-149.3609	241	nd	Strom	ev#058
HX19601.01	CTD	37	35	ACC1	15	7	0017	59.7257	-149.3533	240	nd	Napp	ev#066
HX19601.03	CTD	38	36	GAK3	15	7	0214	59.5521	-149.1874	212	nd	Strom	ev#068
HX19601.04	CTD	39	37	GAK3I	15	7	nd	59.5522	-149.1875	212	nd	nd	ev#068; Aborted
HX19601.05	CTD	40	37	GAK3I	15	7	0256	59.4806	-149.1181	203	nd	Strom	ev#069
HX19601.06	CTD	41	38	GAK4	15	7	0341	59.4072	-149.0487	189	nd	Strom	ev#070
HX19601.07	CTD	42	39	GAK4I	15	7	0424	59.3341	-148.9772	195	nd	Strom	ev#071
HX19601.08	CTD	43	40	GAK5	15	7	0506	59.2610	-148.9074	166	nd	Strom	ev#072
HX19601.09	CTD	44	41	GAK5I	15	7	0548	59.1905	-148.8372	166	nd	Strom	ev#073
HX19601.10	CTD	45	42	GAK6I	15	7	0713	59.0460	-148.7001	189	nd	Strom	ev#074
HX19601.11	CTD	46	43	GAK7	15	7	0759	58.9731	-148.6288	241	nd	Strom	ev#075; CONSECUTIVE CTD #46
HX19601.14	CTD	47	44	GAK6	15	7	0935	59.1175	-148.7680	150	50	Strom	ev#078; 5m water for fsw
HX19601.15	CTD	48	44	GAK6	15	7	1056	59.1191	-148.7661	150	50	Strom	ev#079; 5m for expt. #5

Table 3: CTD Casts (cont'd)

Event#	Instr	Cast	Sta	Sta std	Day	Mos	Time	Lat	Long	Water Depth	Cast Depth	SI	Comments
HX19601.16	CTD	49	44	GAK6	15	7	1233	59.1170	-148.7706	150	nd	Strom	ev#080
HX19601.17	CTD	50	44	GAK6	15	7	1326	59.1150	-148.7728	150	50	Strom	ev#081
HX19601.18	CTD	51	45	GAK7	15	7	1439	58.9711	-148.6331	241	nd	Strom	ev#082
HX19601.19	CTD	52	46	GAK7I	15	7	1536	58.8817	-148.5611	303	nd	Strom	ev#083
HX19601.20	CTD	53	47	GAK8	15	7	1633	58.7924	-148.4897	290	nd	Strom	ev#084
HX19601.21	CTD	54	48	GAK8I	15	7	1716	58.7437	-148.4195	292	nd	Strom	ev#085
HX19601.22	CTD	55	49	GAK9	15	7	1804	58.6760	-148.3527	275	nd	Strom	ev#086
HX19601.23	CTD	56	50	GAK9I	15	7	1848	58.6120	-148.2785	669	nd	nd	ev#087
HX19701.02	CTD	57	52	GAK6	16	7	0018	59.1195	-148.7688	148	nd	Strom	ev#090
HX19701.10	CTD	58	52	GAK6	16	7	0855	59.1186	-148.7710	145	50	Strom	ev#098
HX19701.12	CTD10	59	52	GAK6	16	7	1007	59.1199	-148.7716	145	nd	Strom	ev#100; 10 L rosette CTD.
HX19701.13	CTD	60	52	GAK6	16	7	1307	59.1163	-148.7701	148	nd	Strom	ev#101
HX19701.15	CTD	61	53	MSGA	16	7	1435	59.1512	-148.9961	164	nd	Strom	ev#103
HX19701.17	CTD	62	54	MSGD	16	7	1535	59.0763	-148.9262	150	nd	Strom	ev#105
HX19701.19	CTD	63	55	MSGF	16	7	1634	59.0039	-148.8582	215	nd	Strom	ev#107
HX19701.21	CTD	64	56	GAK6I	16	7	1747	59.0448	-148.7003	192	nd	Strom	ev#109
HX19701.23	CTD	65	57	MSGH	16	7	1854	59.0841	-148.5430	210	nd	Strom	ev#111
HX19701.25	CTD	66	58	MSGE	16	7	1954	59.1564	-148.6131	145	nd	Strom	ev#113
HX19701.27	CTD	67	59	MSGC	16	7	2054	59.2293	-148.6826	127	nd	Napp	ev#115
HX19701.29	CTD	68	60	GAK5I	16	7	2158	59.1898	-148.8402	170	nd	Napp	ev#117
HX19801.02	CTD	69	61	GAK6	17	7	0009	59.1135	-148.7631	151	nd	Napp	ev#120
HX19801.09	CTD	70	61	GAK6	17	7	0814	59.1141	-148.7667	150	50	Strom	ev#127
HX19801.10	CTD10	71	61	GAK6	17	7	0939	59.1161	-148.7690	150	50	Strom	ev#128; 10 L rosette CTD.
HX19801.11	CTD	72	61	GAK6	17	7	1023	59.1155	-148.7704	150	50	Strom	ev#129
HX19801.12	CTD	73	61	GAK6	17	7	1348	59.1154	-148.7760	150	50	Strom	ev#130
HX19801.13	CTD	74	61	GAK6	17	7	1457	59.1160	-148.7702	150	50	Strom	ev#131
HX19901.02	CTD	75	61	GAK6	18	7	0012	59.1185	-148.7711	150	nd	Strom	ev#134
HX19901.04	CTD	76	62	GAK9	18	7	0410	58.6790	-148.3487	270	nd	Strom	ev#136
HX19901.05	CTD	77	63	GAK9I	18	7	0521	58.6118	-148.2776	670	nd	Strom	ev#137
HX19901.06	CTD	78	64	GAK10	18	7	0555	58.5406	-148.2090	1478	nd	Strom	ev#138
HX19901.10	CTD	79	65	GAK11	18	7	0843	58.3888	-148.0695	1429	nd	Strom	ev#142
HX19901.11	CTD	80	66	GAK12	18	7	1050	58.2439	-147.9324	2174	nd	Strom	ev#143
HX19901.12	CTD	81	67	GAK10	18	7	1348	58.5426	-148.2105	1475	nd	Strom	ev#144
HX19901.16	CTD	82	67	GAK10	18	7	1502	58.5417	-148.2112	1475	nd	Strom	ev#148
HX19901.17	CTD	83	67	GAK10	18	7	1559	58.5416	-148.2115	1467	nd	Strom	ev#149
HX19901.18	CTD	84	68	GAK13	18	7	1907	58.0973	-147.7922	2090	nd	Strom	ev#150
HX20001.02	CTD	85	69	GAK10	19	7	0016	58.5445	-148.2101	1477	nd	Strom	ev#153
HX20001.04	CTD	86	69	GAK10	19	7	0125	58.5403	-148.2102	1477	nd	Strom	ev#155
HX20001.11	CTD	87	69	GAK10	19	7	0838	58.5421	-148.2088	1463	nd	Strom	ev#162
HX20001.12	CTD10	88	69	GAK10	19	7	0954	58.5415	-148.2053	1463	nd	Strom	ev#163; 10 L rosette CTD.
HX20001.13	CTD	89	69	GAK10	19	7	1157	58.5444	-148.2116	1463	300	Strom	ev#164
HX20001.14	CTD	90	69	GAK10	19	7	1235	58.5441	-148.2107	1463	50	Strom	ev#165
HX20001.15	CTD	91	70	OSGA	19	7	1342	58.5927	-148.4375	235	nd	Strom	ev#166
HX20001.16	CTD	92	71	OSGD	19	7	1442	58.5063	-148.3674	621	nd	Strom	ev#167
HX20001.17	CTD	93	72	OSGF	19	7	1546	58.4292	-148.2984	1347	nd	Strom	ev#168
HX20001.18	CTD	94	73	OSGG	19	7	1640	58.4659	-148.1402	1830	nd	Strom	ev#169
HX20001.19	CTD	95	74	OSGH	19	7	1730	58.5009	-147.9823	2140	nd	Strom	ev#170
HX20001.20	CTD	96	75	OSGE	19	7	1822	58.5776	-148.0514	1818	nd	Strom	ev#171

Table 3: CTD Casts (cont'd)

Event#	Instr	Cast	Sta	Sta std	Day	Mos	Time	Lat	Long	Water Depth	Cast Depth	SI	Comments
HX20001.21	CTD	97	76	OSGC	19	7	1915	58.6654	-148.1192	787	nd	Strom	ev#172
HX20001.22	CTD	98	76	OSGC	19	7	1927	58.6679	-148.1195	787	nd	Strom	ev#173
HX20101.02	CTD	99	78	GAK10	20	7	0027	58.5440	-148.2091	1477	nd	Strom	ev#176
HX20101.04	CTD	100	78	GAK10	20	7	0144	58.5414	-148.2104	1477	nd	Strom	ev#178
HX20101.10	CTD	101	78	GAK10	20	7	0842	58.5415	-148.2103	1458	50	Strom	ev#184
HX20101.11	CTD	102	78	GAK10	20	7	1357	58.5410	-148.2119	1458	300	Strom	ev#185
HX20101.14	CTD	103	78	GAK10	20	7	1501	58.5395	-148.2139	1469	50	Strom	ev#188
HX20101.15	CTD10	104	78	GAK10	20	7	1615	58.5411	-148.2094	1476	50	Strom	ev#189; 10 L rosette CTD.
HX20101.16	CTD	105	78	GAK10	20	7	1644	58.5436	-148.2097	1476	nd	Strom	ev#190
HX20101.17	CTD	106	78	GAK10	20	7	2259	58.5429	-148.2126	1476	1500	Strom	ev#191
HX20201.03	CTD	107	79	CF15	21	7	0701	59.4494	-148.8669	180	nd	Strom	ev#194
HX20201.04	CTD	108	80	CF14	21	7	0730	59.4829	-148.8678	168	nd	Strom	ev#195
HX20201.05	CTD	109	81	CF13	21	7	0758	59.5160	-148.8683	174	nd	Strom	ev#196
HX20201.06	CTD	110	82	CF12	21	7	0826	59.5505	-148.8695	182	nd	Strom	ev#197
HX20201.07	CTD	111	83	CF11	21	7	0854	59.5831	-148.8694	175	nd	Strom	ev#198
HX20201.08	CTD	112	84	CF10	21	7	0918	59.6163	-148.8699	173	nd	Strom	ev#199
HX20201.09	CTD	113	85	CF9	21	7	0947	59.6497	-148.8699	175	nd	Strom	ev#200
HX20201.10	CTD	114	86	CF8	21	7	1013	59.6830	-148.8703	178	nd	Strom	ev#201
HX20201.11	CTD	115	87	CF7	21	7	1041	59.7177	-148.8700	180	nd	Strom	ev#202
HX20201.12	CTD	116	88	CF6	21	7	1109	59.7504	-148.8661	188	nd	Strom	ev#203
HX20201.13	CTD	117	89	CF5	21	7	1134	59.7834	-148.8688	191	nd	Strom	ev#204
HX20201.14	CTD	118	90	CF4	21	7	1203	59.8165	-148.8668	184	nd	Strom	ev#205
HX20201.15	CTD	119	91	CF3	21	7	1227	59.8500	-148.8676	160	nd	Strom	ev#206
HX20201.16	CTD	120	92	CF2	21	7	1254	59.8834	-148.8679	113	nd	Strom	ev#207
HX20201.17	CTD	121	93	CF1	21	7	1311	59.9081	-148.8654	88	nd	Strom	ev#208
HX20301.01	CTD	122	94	PWS2	22	7	0005	60.5101	-147.8396	742	nd	Napp	ev#211
HX20301.09	CTD	123	94	PWS2	22	7	0839	60.5362	-147.8058	733	50	Strom	ev#219
HX20301.10	CTD10	124	94	PWS2	22	7	0946	60.5348	-147.8055	733	50	Strom	ev#220; 10 L rosette CTD.
HX20301.11	CTD	125	94	PWS2	22	7	1158	60.5342	-147.8050	733	nd	Strom	ev#221
HX20301.12	CTD	126	94	PWS2	22	7	1256	60.5350	-147.8049	733	nd	Strom	ev#222
HX20301.14	CTD	127	95	PWSGA	22	7	1350	60.5958	-147.8285	324	300	Strom	ev#224
HX20301.16	CTD	128	96	PWSGD	22	7	1448	60.5504	-147.8737	504	300	Strom	ev#226
HX20301.18	CTD	129	97	PWSGF	22	7	1547	60.4990	-147.8316	521	300	Strom	ev#228
HX20301.20	CTD	130	98	PWSGG	22	7	1632	60.4910	-147.7936	224	300	Strom	ev#230
HX20301.22	CTD	131	99	PWSGH	22	7	1726	60.4411	-147.8848	342	300	Strom	ev#232
HX20301.24	CTD	132	100	PWSGE	22	7	1830	60.5138	-147.9003	211	300	Strom	ev#234
HX20301.26	CTD	133	101	PWSGC	22	7	1943	60.5625	-147.6800	700	300	Strom	ev#236
HX20301.28	CTD	134	102	PWSGB	22	7	2035	60.5809	-147.7631	759	300	Strom	ev#238
HX20401.01	CTD	135	103	PWS2	23	7	0008	60.5342	-147.8116	733	300	Strom	ev#242
HX20401.04	CTD	136	104	PWS3	23	7	0156	60.6555	-147.6776	750	nd	Napp	ev#245
HX20401.05	CTD	137	105	KIP1	23	7	0446	60.2807	-148.0109	564	nd	Napp	ev#246
HX20401.06	CTD	138	106	PWS1	23	7	0542	60.3796	-147.9380	353	nd	Napp	ev#247
HX20401.08	CTD	139	107	PWS2	23	7	1328	60.5351	-147.8053	735	300	Napp	ev#249
HX20401.12	CTD	140	107	PWS2	23	7	1503	60.5333	-147.8017	735	50	Strom	ev#253
HX20401.13	CTD10	141	107	PWS2	23	7	1545	60.5361	-147.8050	735	50	Strom	ev#254; 10 L rosette CTD.
HX20501.02	CTD	142	107	PWS2	24	7	0008	60.5350	-147.7983	735	300	Napp	ev#258
HX20501.09	CTD	143	107	PWS2	24	7	0837	60.5341	-147.8047	735	50	Strom	ev#267
HX20501.10	CTD	144	107	PWS2	24	7	0936	60.5337	-147.8056	735	50	Strom	ev#268

Table 3: CTD Casts (cont'd)

Event#	Instr	Cast	Sta	Sta std	Day	Mos	Time	Lat	Long	Water Depth	Cast Depth	SI	Comments
HX20501.11	CTD	145	107	PWS2	24	7	1104	60.5371	-147.8036	735	50	Strom	ev#269
HX20501.12	CTD	146	107	PWS2	24	7	1301	60.5379	-147.8017	733	nd	Strom	ev#270
HX20501.13	CTD	147	108	HB1	24	7	1618	60.1933	-147.7001	246	246	Napp	ev#271
HX20501.14	CTD	148	109	HB2	24	7	1649	60.1788	-147.6411	246	246	Napp	ev#272
HX20501.15	CTD	149	110	HB3	24	7	1708	60.1661	-147.5853	84	84	Napp	ev#273
HX20501.16	CTD	150	111	HB4	24	7	1736	60.1485	-147.5020	107	107	Napp	ev#274
HX20501.17	CTD	151	112	HB5	24	7	1757	60.1334	-147.4469	40	40	Napp	ev#275
HX20501.18	CTD	152	113	MS1	24	7	2000	59.9507	-147.9231	170	170	Napp	ev#276
HX20501.19	CTD	153	114	MS2	24	7	2009	59.9426	-147.8951	193	nd	Napp	ev#277
HX20501.20	CTD	154	115	MS3	24	7	2030	59.9308	-147.8573	164	nd	Napp	ev#278
HX20501.21	CTD	155	116	MS4	24	7	2050	59.9170	-147.8338	112	nd	Napp	ev#279
HX20601.01	CTD	156	117	GAK3	25	7	0201	59.5520	-149.1884	210	nd	Napp	ev#280
HX20601.02	CTD	157	118	GAK2I	25	7	0248	59.6262	-149.2602	213	nd	Napp	ev#281
HX20601.03	CTD	158	119	ACC2	25	7	0319	59.6590	-149.2943	219	nd	Napp	ev#282
HX20601.04	CTD	159	120	GAK2	25	7	0347	59.6915	-149.3288	225	nd	Napp	ev#283
HX20601.05	CTD	160	121	ACC1	25	7	0418	59.7287	-149.3631	240	nd	Napp	ev#284
HX20601.06	CTD	161	122	GAK1I	25	7	0449	59.7668	-149.3974	258	nd	Napp	ev#285
HX20601.07	CTD	162	123	GAK1	25	7	0536	59.8453	-149.4672	271	nd	Napp	ev#286
HX20601.10	CTD	163	124	ACC1	25	7	0835	59.7301	-149.3666	245	50	Strom	ev#289; 3 m FSW
HX20601.11	CTD10	164	124	ACC1	25	7	0933	59.7296	-149.3642	242	50	Strom	ev#290; 10L rosette CTD. 3 m exp wtr.
HX20601.15	CTD	165	124	ACC1	25	7	1257	59.7291	-149.3663	242	235	Strom	ev#294

Table 4: MOCNESS Sampling

Event#	Instr	Cast	Sta	Sta std	Day	Mos	Time	Lat	Long	Water Depth	Cast Depth	SI	Comments
HX19401.01	MOC	1	8	ACC1	13	7	0025	59.7219	-149.3566	242	97	Strom	ev#016; ISC
HX19501.01	MOC	2	21	ACC1	14	7	0140	59.7295	-149.3550	238	97	Napp	ev#042
HX19601.02	MOC	3	35	ACC1	15	7	0044	59.7152	-149.3492	240	100	Napp	ev#067
HX19701.03	MOC	4	52	GAK6	16	7	0032	59.1792	-148.6919	148	96	Strom	ev#091
HX19801.03	MOC	5	61	GAK6	17	7	0030	59.1090	-148.7627	151	94	Napp	ev#121
HX19901.03	MOC	6	61	GAK6	18	7	0039	59.1145	-148.7752	150	93	Napp	ev#135
HX20001.03	MOC	7	69	GAK10	19	7	0045	58.5409	-148.2097	1477	93	Strom	ev#154
HX20101.03	MOC	8	78	GAK10	20	7	0049	58.5417	-148.2095	1477	93	Strom	ev#177
HX20201.02	MOC	9	78	GAK10	21	7	0022	58.5400	-148.2105	1471	95	nd	ev#193
HX20301.02	MOC	10	94	PWS2	22	7	0024	60.5118	-147.8369	742	97	Napp	ev#212
HX20401.02	MOC	11	103	PWS2	23	7	0032	60.5371	-147.8023	733	94	Napp	ev#243
HX20401.14	MOC	12	107	PWS2	23	7	1920	60.5397	-147.7832	735	494	Napp	ev#255
HX20501.03	MOC	13	107	PWS2	24	7	0233	60.5254	-147.8198	735	292	Napp	ev#259

Table 5: QUAD150 Sampling

Event#	Instr	Cast	Sta	Sta std	Day	Mos	Time	Lat	Long	Water Depth	Cast Depth	SI	Comments
HX19301.14	QUAD150	1	8	ACC1	12	7	2338	59.7297	-149.3625	242	100	Napp	ev#014; ISC
HX19401.25	QUAD150	2	21	ACC1	13	7	2334	59.7267	-149.3648	242	100	nd	ev#040
HX19501.24	QUAD150	3	34	ISC	14	7	2334	59.7268	-149.3603	241	100	nd	ev#065
HX19701.01	QUAD150	4	52	GAK6	16	7	0013	59.1192	-148.7708	148	100	Strom	ev#089
HX19801.01	QUAD150	5	61	GAK6	17	7	0003	59.1140	-148.7653	150	100	nd	ev#119
HX19901.01	QUAD150	6	61	GAK6	18	7	0005	59.1172	-148.7706	150	100	Napp	ev#133
HX20001.01	QUAD150	7	69	GAK10	19	7	0009	58.5426	-148.2112	1477	100	Strom	ev#152
HX20101.01	QUAD150	8	78	GAK10	20	7	0000	58.5420	-148.2125	1457	100	nd	ev#175
HX20201.01	QUAD150	9	78	GAK10	21	7	0012	58.5411	-148.2108	1476	100	Strom	ev#192
HX20201.19	QUAD150	10	94	PWS2	21	7	2358	60.5317	-147.7995	711	100	nd	ev#210
HX20301.31	QUAD150	11	103	PWS2	22	7	2359	60.5342	-147.8138	733	100	Strom	ev#241
HX20501.01	QUAD150	12	107	PWS2	24	7	0000	60.5350	-147.7982	735	100	Napp	ev#257

Table 6: QUAD053 Sampling

Event#	Instr	Cast	Sta	Sta std	Day	Mos	Time	Lat	Long	Water Depth	Cast Depth	SI	Comments
HX19401.02	QUAD053	1	8	ACC1	13	7	0701	59.7295	-149.3591	242	100	Napp	ev#017; ISC, egg ratio study
HX19401.03	QUAD053	2	8	ACC1	13	7	0723	59.7295	-149.3590	242	100	Napp	ev#018; ISC, egg ratio study
HX19401.04	QUAD053	3	8	ACC1	13	7	0729	59.7300	-149.3573	242	100	Napp	ev#019; ISC, egg ratio study
HX19501.02	QUAD053	4	21	ACC1	14	7	0700	59.7270	-149.3645	242	100	Napp	ev#043; egg ratio study
HX19501.03	QUAD053	5	21	ACC1	14	7	0707	59.7278	-149.3672	243	100	Napp	ev#044; egg ratio study
HX19501.04	QUAD053	6	21	ACC1	14	7	0718	59.7273	-149.3712	245	100	Napp	ev#045; egg ratio study
HX19701.04	QUAD053	7	52	GAK6	16	7	0658	59.1171	-148.7728	148	100	Napp	ev#092; egg ratio study
HX19701.05	QUAD053	8	52	GAK6	16	7	0708	59.1172	-148.7728	148	100	Napp	ev#093; egg ratio study
HX19701.06	QUAD053	9	52	GAK6	16	7	0719	59.1177	-148.7768	148	100	Napp	ev#094; egg ratio study
HX19801.04	QUAD053	10	61	GAK6	17	7	0704	59.1166	-148.7707	147	100	Napp	ev#122; egg ratio study
HX19801.05	QUAD053	11	61	GAK6	17	7	0714	59.1154	-148.7679	147	100	Napp	ev#123; egg ratio study
HX19801.06	QUAD053	12	61	GAK6	17	7	0724	59.1141	-148.7666	147	100	Napp	ev#124; egg ratio study
HX19901.07	QUAD053	13	64	GAK10	18	7	0704	58.5413	-148.2116	1478	100	Napp	ev#139; egg ratio study
HX19901.08	QUAD053	14	64	GAK10	18	7	0715	58.5406	-148.2120	1478	100	Napp	ev#140; egg ratio study
HX19901.09	QUAD053	15	64	GAK10	18	7	0724	58.5408	-148.2097	1478	100	Napp	ev#141; egg ratio study
HX20001.05	QUAD053	16	69	GAK10	19	7	0706	58.5415	-148.2135	1463	100	Napp	ev#156; egg ratio study
HX20001.06	QUAD053	17	69	GAK10	19	7	0717	58.5436	-148.2113	1463	100	Napp	ev#157; egg ratio study
HX20001.07	QUAD053	18	69	GAK10	19	7	0727	58.5456	-148.2092	1463	100	Napp	ev#158; egg ratio study
HX20101.05	QUAD053	19	78	GAK10	20	7	0713	58.5420	-148.2120	1458	100	Napp	ev#179; egg ratio study
HX20101.06	QUAD053	20	78	GAK10	20	7	0723	58.5432	-148.2081	1458	100	Napp	ev#180; egg ratio study
HX20101.07	QUAD053	21	78	GAK10	20	7	0732	58.5440	-148.2056	1458	100	Napp	ev#181; egg ratio study
HX20301.03	QUAD053	22	94	PWS2	22	7	0705	60.5339	-147.8049	733	100	Napp	ev#213; wrong flowmeter read by BCR
HX20301.04	QUAD053	23	94	PWS2	22	7	0713	60.5335	-147.8071	733	100	Napp	ev#214; egg ratio study
HX20301.05	QUAD053	24	94	PWS2	22	7	0723	60.5332	-147.8092	733	100	Napp	ev#215; egg ratio study
HX20301.06	QUAD053	25	94	PWS2	22	7	0735	60.5329	-147.8116	733	100	Napp	ev#216; egg ratio study
HX20501.04	QUAD053	26	107	PWS2	24	7	0703	60.5357	-147.8017	735	100	Napp	ev#262; egg ratio study
HX20501.05	QUAD053	27	107	PWS2	24	7	0713	60.5343	-147.8006	735	100	Napp	ev#263; egg ratio study
HX20501.06	QUAD053	28	107	PWS2	24	7	0723	60.5329	-147.7996	735	100	Napp	ev#264; egg ratio study
HX20601.12	QUAD053	29	124	ACC1	25	7	1112	59.7279	-149.3630	242	100	Napp	ev#291; egg ratio study
HX20601.13	QUAD053	30	124	ACC1	25	7	1123	59.7274	-149.3663	242	100	Napp	ev#292; egg ratio study
HX20601.14	QUAD053	31	124	ACC1	25	7	1135	59.7258	-149.3747	242	100	Napp	ev#293; egg ratio study

Table 7: Neuston Sampling

Event#	Instr	Cast	Sta	Sta std	Day	Mos	Time	Lat	Long	Water Depth	Cast Depth	SI	Comments
HX19501.18	Neuston	1	28	ACC1	14	7	1841	59.7248	-149.3657	242	1	nd	ev#059
HX19501.19	Neuston	2	29	ISNA	14	7	1916	59.7548	-149.3068	242	1	nd	ev#060
HX19501.20	Neuston	3	30	ISNB	14	7	1951	59.7565	-149.4192	265	1	nd	ev#061
HX19501.21	Neuston	4	31	ISNC	14	7	2024	59.6975	-149.4252	168	1	nd	ev#062
HX19501.22	Neuston	5	32	ISND	14	7	2102	59.6968	-149.3063	217	1	nd	ev#063
HX19501.23	Neuston	6	33	ISNB	14	7	2155	59.7562	-149.4208	265	1	nd	ev#064
HX19701.14	Neuston	7	52	GAK6	16	7	1330	59.1165	-148.7710	148	1	Napp	ev#102
HX19701.16	Neuston	8	53	MSGA	16	7	1455	59.1491	-148.9939	164	1	Napp	ev#104
HX19701.18	Neuston	9	54	MSGD	16	7	1548	59.0759	-148.9256	150	1	Napp	ev#106
HX19701.20	Neuston	10	55	MSGF	16	7	1649	59.0051	-148.8623	215	1	Napp	ev#108
HX19701.22	Neuston	11	56	GAK6I	16	7	1810	59.0465	-148.6968	192	1	Napp	ev#110
HX19701.24	Neuston	12	57	MSGH	16	7	1906	59.0841	-148.5437	210	1	Napp	ev#112
HX19701.26	Neuston	13	58	MSGE	16	7	2008	59.1580	-148.6125	145	1	Napp	ev#114
HX19701.28	Neuston	14	59	MSGC	16	7	2107	59.2312	-148.6860	127	1	Napp	ev#116
HX19701.30	Neuston	15	60	GAK5I	16	7	2224	59.1857	-148.8295	170	1	Napp	ev#118
HX20301.13	Neuston	16	94	PWS2	22	7	1314	60.5366	-147.8037	733	1	Napp	ev#223
HX20301.15	Neuston	17	95	PWSGA	22	7	1414	60.5943	-147.8386	324	1	Napp	ev#225
HX20301.17	Neuston	18	96	PWSGD	22	7	1510	60.5493	-147.8813	504	1	Napp	ev#227
HX20301.19	Neuston	19	97	PWSGF	22	7	1629	60.4984	-147.8319	521	1	Napp	ev#229
HX20301.21	Neuston	20	98	PWSGG	22	7	1649	60.4913	-147.8040	224	1	Napp	ev#231
HX20301.23	Neuston	21	99	PWSGH	22	7	1747	60.4379	-147.8867	342	1	Strom	ev#233
HX20301.25	Neuston	22	100	PWSGE	22	7	1856	60.5099	-147.8939	230	1	Strom	ev#235
HX20301.27	Neuston	23	101	PWSGC	22	7	2004	60.5622	-147.6834	700	1	Strom	ev#237
HX20301.29	Neuston	24	102	PWSGB	22	7	2056	60.5812	-147.7757	759	1	Strom	ev#239
HX20701.01	Neuston	25	125	ISGA	26	7	0733	59.6817	-149.4901	226	1	Napp	ev#295
HX20701.02	Neuston	26	126	ISGD	26	7	0755	59.6506	-149.4532	277	1	Napp	ev#296
HX20701.03	Neuston	27	127	ISGF	26	7	0822	59.6089	-149.4137	215	1	Napp	ev#297
HX20701.04	Neuston	28	128	GAK2	26	7	0908	59.6923	-149.3284	227	1	Napp	ev#298
HX20701.05	Neuston	29	129	ACC1	26	7	0933	59.7296	-149.3609	240	1	Napp	ev#299
HX20701.06	Neuston	30	130	GAK1I	26	7	0959	59.7675	-149.3949	259	1	Napp	ev#300
HX20701.07	Neuston	31	131	ISGH	26	7	1036	59.7689	-149.2367	255	1	Napp	ev#301
HX20701.08	Neuston	32	132	ISGE	26	7	1101	59.8090	-149.2678	101	1	Napp	ev#302
HX20701.09	Neuston	33	133	ISGC	26	7	1123	59.8436	-149.3025	98	1	Napp	ev#303

APPENDIX I

HX247 EVENT LOG

EVENT LOG CONTENTS

Column Label	Description
Event#	Unique identifier for each line of event log
Instrument (Instr)	CTD: Conductivity, temperature, depth and fluorescence from Seabird CTD Unit1; 5-L bottles on rosette; CTD10: Conductivity, temperature, and depth from Seabird CTD Unit2; 10-L bottles on rosette; MOC: 1m^2 MOCNESS with 0.505 mm mesh; LiveNet: 0.75 m diameter ring net with 0.200 mm mesh for collecting animals for experiments; non-screened, 10-L codend; Quad053: Frame of four nets, each 0.25 m diameter; two nets have 0.053 mm mesh nets with codends to sample eggs; Quad150: Same frame of four nets as QUAD053, each 0.25 m diameter; two nets have 0.150 mm mesh nets with codends to sample zoops; used in place of CalVET net; Neuston: Tows at surface with 1m^2 Tucker net; 0.333 mm mesh.
Cast	Sequence # for a particular instrument
Station (Sta)	
Station Standard (Sta std)	
Day	Local time basis
Month (Mos)	Local time basis
Time	Local time
Latitude (Lat)	Decimal degrees; north is positive
Longitude (Long)	Decimal degrees; east is positive
Water Depth	Depth of bottom
Cast Depth	Maximum depth of deployment
Scientific Investigator (SI)	
Comments	

Event#	Instr	Cast	Sta	Sta std	Day	Mos	Time	Lat	Long	Water Depth	Cast Depth	SI	Comments
HX19301.01	CTD	1	1	GAK1	12	7	1146	59.8457	-149.4686	270	268	Strom	ev#001; ACC Survey
HX19301.02	CTD	2	2	GAK1I	12	7	1241	59.7651	-149.4006	260	254	Strom	ev#002
HX19301.03	CTD	3	3	ACC1	12	7	1323	59.7268	-149.3659	242	nd	Strom	ev#003
HX19301.04	CTD	4	4	GAK2	12	7	1359	59.6899	-149.3286	227	nd	Strom	ev#004
HX19301.05	CTD	5	5	ACC2	12	7	1434	59.6573	-149.2943	219	nd	Strom	ev#005
HX19301.06	CTD	6	6	GAK2I	12	7	1511	59.6248	-149.2632	212	nd	Strom	ev#006
HX19301.07	CTD	7	7	GAK3	12	7	1603	59.5532	-149.1899	212	nd	Strom	ev#007
HX19301.08	CTD	8	8	ACC1	12	7	1741	59.7287	-149.3632	240	nd	Strom	ev#008; Inner Shelf Core Station
HX19301.09	LiveNet	1	8	ACC1	12	7	1814	59.7286	-149.3615	240	75	Napp	ev#009
HX19301.10	LiveNet	2	8	ACC1	12	7	1903	59.7223	-149.3451	240	75	Napp	ev#010
HX19301.11	LiveNet	3	8	ACC1	12	7	1903	59.7223	-149.3449	240	75	Napp	ev#011; ISC
HX19301.12	CTD	9	8	ACC1	12	7	1917	59.7289	-149.3611	240	50	Dagg	ev#012; Dilution PFW (BO)
HX19301.13	CTD	10	8	ACC1	12	7	2025	59.7292	-149.3616	240	50	Dagg	ev#013; 4m water for expt. #1 (SS)
HX19301.14	QUAD150	1	8	ACC1	12	7	2338	59.7297	-149.3625	242	100	Napp	ev#014; ISC
HX19301.15	CTD	11	8	ACC1	12	7	2350	59.7281	-149.3648	242	nd	Napp	ev#015; ISC
HX19401.01	MOC	1	8	ACC1	13	7	0025	59.7219	-149.3566	242	97	Strom	ev#016; ISC
HX19401.02	QUAD053	1	8	ACC1	13	7	0701	59.7295	-149.3591	242	100	Napp	ev#017; ISC, egg ratio study
HX19401.03	QUAD053	2	8	ACC1	13	7	0723	59.7295	-149.3590	242	100	Napp	ev#018; ISC, egg ratio study
HX19401.04	QUAD053	3	8	ACC1	13	7	0729	59.7300	-149.3573	242	100	Napp	ev#019; ISC, egg ratio study
HX19401.05	LiveNet	4	8	ACC1	13	7	0804	59.7255	-149.3685	242	75	Napp	ev#020; ISC
HX19401.06	LiveNet	5	8	ACC1	13	7	0823	59.7299	-149.3586	242	75	Napp	ev#021; ISC
HX19401.07	LiveNet	6	8	ACC1	13	7	0827	59.7300	-149.3586	242	75	Napp	ev#022; ISC
HX19401.08	LiveNet	7	8	ACC1	13	7	0854	59.7274	-149.3607	242	75	Napp	ev#023
HX19401.09	CTD	12	8	ACC1	13	7	0906	59.7258	-149.3656	242	nd	Strom	ev#024; FSW for Dilution
HX19401.10	CTD10	13	8	ACC1	13	7	1007	59.7288	-149.3626	242	nd	Strom	ev#025; 10 L rosette CTD. Dil/Graze #2.
HX19401.11	CTD	14	8	ACC1	13	7	1400	59.7291	-149.3618	242	nd	Strom	ev#026
HX19401.12	CTD	15	9	ISGA	13	7	1446	59.6842	-149.4900	221	nd	Strom	ev#027; Inner shelf grid survey
HX19401.13	CTD	16	10	ISGD	13	7	1522	59.6490	-149.4526	275	nd	Strom	ev#028
HX19401.14	CTD	17	11	ISGF	13	7	1557	59.6079	-149.4163	217	nd	Strom	ev#029
HX19401.15	CTD	18	12	GAK3	13	7	1708	59.5534	-149.1890	220	nd	Strom	ev#030
HX19401.16	CTD	19	13	GAK2I	13	7	1756	59.6261	-149.2599	215	nd	Strom	ev#031
HX19401.17	CTD	20	14	ACC2	13	7	1828	59.6598	-149.2943	215	nd	Strom	ev#032
HX19401.18	CTD	21	15	GAK2	13	7	1856	59.6917	-149.3278	227	nd	Strom	ev#033
HX19401.19	CTD	22	16	ACC1	13	7	1929	59.7290	-149.3605	227	nd	Strom	ev#034
HX19401.20	CTD	23	17	GAK1I	13	7	2000	59.7662	-149.3987	257	nd	Strom	ev#035
HX19401.21	CTD	24	18	ISGC	13	7	2055	59.8437	-149.3063	100	nd	Strom	ev#036
HX19401.22	CTD	25	19	ISGE	13	7	2123	59.8096	-149.2710	106	nd	Strom	ev#037
HX19401.23	CTD	26	20	ISGH	13	7	2153	59.7690	-149.2364	265	nd	Strom	ev#038
HX19401.24	LiveNet	8	20	ISGH	13	7	2214	59.7650	-149.2422	265	100	Strom	ev#039
HX19401.25	QUAD150	2	21	ACC1	13	7	2334	59.7267	-149.3648	242	100	nd	ev#040
HX19401.26	CTD	27	21	ACC1	13	7	2334	59.7252	-149.3658	242	nd	nd	ev#041
HX19501.01	MOC	2	21	ACC1	14	7	0140	59.7295	-149.3550	238	97	Napp	ev#042
HX19501.02	QUAD053	4	21	ACC1	14	7	0700	59.7270	-149.3645	242	100	Napp	ev#043; egg ratio study
HX19501.03	QUAD053	5	21	ACC1	14	7	0707	59.7278	-149.3672	243	100	Napp	ev#044; egg ratio study
HX19501.04	QUAD053	6	21	ACC1	14	7	0718	59.7273	-149.3712	245	100	Napp	ev#045; egg ratio study
HX19501.05	LiveNet	9	21	ACC1	14	7	0735	59.7251	-149.3659	242	75	Napp	ev#046
HX19501.06	LiveNet	10	21	ACC1	14	7	0740	59.7267	-149.3658	245	75	Napp	ev#047
HX19501.07	CTD	28	22	GAK1	14	7	0846	59.8443	-149.4666	273	nd	Napp	ev#048

Event#	Instr	Cast	Sta	Sta std	Day	Mos	Time	Lat	Long	Water Depth	Cast Depth	SI	Comments
HX19501.08	CTD	29	23	GAK1I	14	7	0933	59.7665	-149.3966	263	nd	Strom	ev#049
HX19501.09	CTD	30	24	ACC1	14	7	1009	59.7272	-149.3616	240	nd	Strom	ev#050
HX19501.10	CTD	31	25	GAK2	14	7	1036	59.6924	-149.3257	226	nd	Strom	ev#051
HX19501.11	CTD	32	26	ACC2	14	7	1104	59.6588	-149.2955	219	nd	Strom	ev#052
HX19501.12	CTD	33	27	GAK2I	14	7	1134	59.6271	-149.2566	212	nd	Strom	ev#053
HX19501.13	CTD	34	28	ACC1	14	7	1233	59.7292	-149.3613	241	236	Strom	ev#054
HX19501.14	CTD	35	28	ACC1	14	7	1328	59.7276	-149.3595	241	50	Strom	ev#055; 17m water for fsw
HX19501.15	LiveNet	11	28	ACC1	14	7	1404	59.7261	-149.3642	241	75	Napp	ev#056
HX19501.16	LiveNet	12	28	ACC1	14	7	1416	59.7258	-149.3633	241	75	nd	ev#057
HX19501.17	CTD	36	28	ACC1	14	7	1426	59.7264	-149.3609	241	nd	Strom	ev#058
HX19501.18	Neuston	1	28	ACC1	14	7	1841	59.7248	-149.3657	242	1	nd	ev#059
HX19501.19	Neuston	2	29	ISNA	14	7	1916	59.7548	-149.3068	242	1	nd	ev#060
HX19501.20	Neuston	3	30	ISNB	14	7	1951	59.7565	-149.4192	265	1	nd	ev#061
HX19501.21	Neuston	4	31	ISNC	14	7	2024	59.6975	-149.4252	168	1	nd	ev#062
HX19501.22	Neuston	5	32	ISND	14	7	2102	59.6968	-149.3063	217	1	nd	ev#063
HX19501.23	Neuston	6	33	ISNB	14	7	2155	59.7562	-149.4208	265	1	nd	ev#064
HX19501.24	QUAD150	3	34	ISC	14	7	2334	59.7268	-149.3603	241	100	nd	ev#065
HX19601.01	CTD	37	35	ACC1	15	7	0017	59.7257	-149.3533	240	nd	Napp	ev#066
HX19601.02	MOC	3	35	ACC1	15	7	0044	59.7152	-149.3492	240	100	Napp	ev#067
HX19601.03	CTD	38	36	GAK3	15	7	0214	59.5521	-149.1874	212	nd	Strom	ev#068
HX19601.04	CTD	39	37	GAK3I	15	7	nd	59.5522	-149.1875	212	nd	nd	ev#068; Aborted
HX19601.05	CTD	40	37	GAK3I	15	7	0256	59.4806	-149.1181	203	nd	Strom	ev#069
HX19601.06	CTD	41	38	GAK4	15	7	0341	59.4072	-149.0487	189	nd	Strom	ev#070
HX19601.07	CTD	42	39	GAK4I	15	7	0424	59.3341	-148.9772	195	nd	Strom	ev#071
HX19601.08	CTD	43	40	GAK5	15	7	0506	59.2610	-148.9074	166	nd	Strom	ev#072
HX19601.09	CTD	44	41	GAK5I	15	7	0548	59.1905	-148.8372	166	nd	Strom	ev#073
HX19601.10	CTD	45	42	GAK6I	15	7	0713	59.0460	-148.7001	189	nd	Strom	ev#074
HX19601.11	CTD	46	43	GAK7	15	7	0759	58.9731	-148.6288	241	nd	Strom	ev#075; CONSECUTIVE CTD #46
HX19601.12	LiveNet	13	44	GAK6	15	7	0905	59.1170	-148.7710	150	75	nd	ev#076
HX19601.13	LiveNet	14	44	GAK6	15	7	0905	59.1190	-148.7698	150	75	nd	ev#077
HX19601.14	CTD	47	44	GAK6	15	7	0935	59.1175	-148.7680	150	50	Strom	ev#078; 5m water for fsw
HX19601.15	CTD	48	44	GAK6	15	7	1056	59.1191	-148.7661	150	50	Strom	ev#079; 5m for expt. #5
HX19601.16	CTD	49	44	GAK6	15	7	1233	59.1170	-148.7706	150	nd	Strom	ev#080
HX19601.17	CTD	50	44	GAK6	15	7	1326	59.1150	-148.7728	150	50	Strom	ev#081
HX19601.18	CTD	51	45	GAK7	15	7	1439	58.9711	-148.6331	241	nd	Strom	ev#082
HX19601.19	CTD	52	46	GAK7I	15	7	1536	58.8817	-148.5611	303	nd	Strom	ev#083
HX19601.20	CTD	53	47	GAK8	15	7	1633	58.7924	-148.4897	290	nd	Strom	ev#084
HX19601.21	CTD	54	48	GAK8I	15	7	1716	58.7437	-148.4195	292	nd	Strom	ev#085
HX19601.22	CTD	55	49	GAK9	15	7	1804	58.6760	-148.3527	275	nd	Strom	ev#086
HX19601.23	CTD	56	50	GAK9I	15	7	1848	58.6120	-148.2785	669	nd	nd	ev#087
HX19601.24	LiveNet	15	51	GAK6I	15	7	2159	59.0219	-148.6752	228	100	Strom	ev#088
HX19701.01	QUAD150	4	52	GAK6	16	7	0013	59.1192	-148.7708	148	100	Strom	ev#089
HX19701.02	CTD	57	52	GAK6	16	7	0018	59.1195	-148.7688	148	nd	Strom	ev#090
HX19701.03	MOC	4	52	GAK6	16	7	0032	59.1792	-148.6919	148	96	Strom	ev#091
HX19701.04	QUAD053	7	52	GAK6	16	7	0658	59.1171	-148.7728	148	100	Napp	ev#092; egg ratio study
HX19701.05	QUAD053	8	52	GAK6	16	7	0708	59.1172	-148.7728	148	100	Napp	ev#093; egg ratio study
HX19701.06	QUAD053	9	52	GAK6	16	7	0719	59.1177	-148.7768	148	100	Napp	ev#094; egg ratio study
HX19701.07	LiveNet	16	52	GAK6	16	7	0800	59.1147	-148.7756	148	75	Napp	ev#095

Event#	Instr	Cast	Sta	Sta std	Day	Mos	Time	Lat	Long	Water Depth	Cast Depth	SI	Comments
HX19701.08	LiveNet	17	52	GAK6	16	7	0809	59.1160	-148.7795	148	75	Dagg	ev#096
HX19701.09	LiveNet	18	52	GAK6	16	7	0822	59.1175	-148.7843	148	100	Dagg	ev#097
HX19701.10	CTD	58	52	GAK6	16	7	0855	59.1186	-148.7710	145	50	Strom	ev#098
HX19701.11	LiveNet	19	52	GAK6	16	7	0904	59.1201	-148.7730	145	110	Dagg	ev#099
HX19701.12	CTD10	59	52	GAK6	16	7	1007	59.1199	-148.7716	145	nd	Strom	ev#100; 10 L rosette CTD.
HX19701.13	CTD	60	52	GAK6	16	7	1307	59.1163	-148.7701	148	nd	Strom	ev#101
HX19701.14	Neuston	7	52	GAK6	16	7	1330	59.1165	-148.7710	148	1	Napp	ev#102
HX19701.15	CTD	61	53	MSGA	16	7	1435	59.1512	-148.9961	164	nd	Strom	ev#103
HX19701.16	Neuston	8	53	MSGA	16	7	1455	59.1491	-148.9939	164	1	Napp	ev#104
HX19701.17	CTD	62	54	MSGD	16	7	1535	59.0763	-148.9262	150	nd	Strom	ev#105
HX19701.18	Neuston	9	54	MSGD	16	7	1548	59.0759	-148.9256	150	1	Napp	ev#106
HX19701.19	CTD	63	55	MSGF	16	7	1634	59.0039	-148.8582	215	nd	Strom	ev#107
HX19701.20	Neuston	10	55	MSGF	16	7	1649	59.0051	-148.8623	215	1	Napp	ev#108
HX19701.21	CTD	64	56	GAK6I	16	7	1747	59.0448	-148.7003	192	nd	Strom	ev#109
HX19701.22	Neuston	11	56	GAK6I	16	7	1810	59.0465	-148.6968	192	1	Napp	ev#110
HX19701.23	CTD	65	57	MSGH	16	7	1854	59.0841	-148.5430	210	nd	Strom	ev#111
HX19701.24	Neuston	12	57	MSGH	16	7	1906	59.0841	-148.5437	210	1	Napp	ev#112
HX19701.25	CTD	66	58	MSGE	16	7	1954	59.1564	-148.6131	145	nd	Strom	ev#113
HX19701.26	Neuston	13	58	MSGE	16	7	2008	59.1580	-148.6125	145	1	Napp	ev#114
HX19701.27	CTD	67	59	MSGC	16	7	2054	59.2293	-148.6826	127	nd	Napp	ev#115
HX19701.28	Neuston	14	59	MSGC	16	7	2107	59.2312	-148.6860	127	1	Napp	ev#116
HX19701.29	CTD	68	60	GAK5I	16	7	2158	59.1898	-148.8402	170	nd	Napp	ev#117
HX19701.30	Neuston	15	60	GAK5I	16	7	2224	59.1857	-148.8295	170	1	Napp	ev#118
HX19801.01	QUAD150	5	61	GAK6	17	7	0003	59.1140	-148.7653	150	100	nd	ev#119
HX19801.02	CTD	69	61	GAK6	17	7	0009	59.1135	-148.7631	151	nd	Napp	ev#120
HX19801.03	MOC	5	61	GAK6	17	7	0030	59.1090	-148.7627	151	94	Napp	ev#121
HX19801.04	QUAD053	10	61	GAK6	17	7	0704	59.1166	-148.7707	147	100	Napp	ev#122; egg ratio study
HX19801.05	QUAD053	11	61	GAK6	17	7	0714	59.1154	-148.7679	147	100	Napp	ev#123; egg ratio study
HX19801.06	QUAD053	12	61	GAK6	17	7	0724	59.1141	-148.7666	147	100	Napp	ev#124; egg ratio study
HX19801.07	LiveNet	20	61	GAK6	17	7	0754	59.1170	-148.7709	149	75	Napp	ev#125
HX19801.08	LiveNet	21	61	GAK6	17	7	0808	59.1149	-148.7680	149	75	Napp	ev#126
HX19801.09	CTD	70	61	GAK6	17	7	0814	59.1141	-148.7667	150	50	Strom	ev#127
HX19801.10	CTD10	71	61	GAK6	17	7	0939	59.1161	-148.7690	150	50	Strom	ev#128; 10 L rosette CTD.
HX19801.11	CTD	72	61	GAK6	17	7	1023	59.1155	-148.7704	150	50	Strom	ev#129
HX19801.12	CTD	73	61	GAK6	17	7	1348	59.1154	-148.7760	150	50	Strom	ev#130
HX19801.13	CTD	74	61	GAK6	17	7	1457	59.1160	-148.7702	150	50	Strom	ev#131
HX19801.14	LiveNet	22	61	GAK6	17	7	2203	59.1171	-148.7718	nd	100	Dagg	ev#132
HX19901.01	QUAD150	6	61	GAK6	18	7	0005	59.1172	-148.7706	150	100	Napp	ev#133
HX19901.02	CTD	75	61	GAK6	18	7	0012	59.1185	-148.7711	150	nd	Strom	ev#134
HX19901.03	MOC	6	61	GAK6	18	7	0039	59.1145	-148.7752	150	93	Napp	ev#135
HX19901.04	CTD	76	62	GAK9	18	7	0410	58.6790	-148.3487	270	nd	Strom	ev#136
HX19901.05	CTD	77	63	GAK9I	18	7	0521	58.6118	-148.2776	670	nd	Strom	ev#137
HX19901.06	CTD	78	64	GAK10	18	7	0555	58.5406	-148.2090	1478	nd	Strom	ev#138
HX19901.07	QUAD053	13	64	GAK10	18	7	0704	58.5413	-148.2116	1478	100	Napp	ev#139; egg ratio study
HX19901.08	QUAD053	14	64	GAK10	18	7	0715	58.5406	-148.2120	1478	100	Napp	ev#140; egg ratio study
HX19901.09	QUAD053	15	64	GAK10	18	7	0724	58.5408	-148.2097	1478	100	Napp	ev#141; egg ratio study
HX19901.10	CTD	79	65	GAK11	18	7	0843	58.3888	-148.0695	1429	nd	Strom	ev#142
HX19901.11	CTD	80	66	GAK12	18	7	1050	58.2439	-147.9324	2174	nd	Strom	ev#143

Event#	Instr	Cast	Sta	Sta std	Day	Mos	Time	Lat	Long	Water Depth	Cast Depth	SI	Comments
HX19901.12	CTD	81	67	GAK10	18	7	1348	58.5426	-148.2105	1475	nd	Strom	ev#144
HX19901.13	LiveNet	23	67	GAK10	18	7	1411	58.5454	-148.2044	1475	nd	Napp	ev#145
HX19901.14	LiveNet	24	67	GAK10	18	7	1419	58.5463	-148.2032	1475	nd	Napp	ev#146
HX19901.15	LiveNet	25	67	GAK10	18	7	1428	58.5477	-148.2019	1475	nd	Napp	ev#147
HX19901.16	CTD	82	67	GAK10	18	7	1502	58.5417	-148.2112	1475	nd	Strom	ev#148
HX19901.17	CTD	83	67	GAK10	18	7	1559	58.5416	-148.2115	1467	nd	Strom	ev#149
HX19901.18	CTD	84	68	GAK13	18	7	1907	58.0973	-147.7922	2090	nd	Strom	ev#150
HX19901.19	LiveNet	26	69	GAK10	18	7	2259	58.5407	-147.2118	nd	100	nd	ev#151
HX20001.01	QUAD150	7	69	GAK10	19	7	0009	58.5426	-148.2112	1477	100	Strom	ev#152
HX20001.02	CTD	85	69	GAK10	19	7	0016	58.5445	-148.2101	1477	nd	Strom	ev#153
HX20001.03	MOC	7	69	GAK10	19	7	0045	58.5409	-148.2097	1477	93	Strom	ev#154
HX20001.04	CTD	86	69	GAK10	19	7	0125	58.5403	-148.2102	1477	nd	Strom	ev#155
HX20001.05	QUAD053	16	69	GAK10	19	7	0706	58.5415	-148.2135	1463	100	Napp	ev#156; egg ratio study
HX20001.06	QUAD053	17	69	GAK10	19	7	0717	58.5436	-148.2113	1463	100	Napp	ev#157; egg ratio study
HX20001.07	QUAD053	18	69	GAK10	19	7	0727	58.5456	-148.2092	1463	100	Napp	ev#158; egg ratio study
HX20001.08	LiveNet	27	69	GAK10	19	7	0804	58.5414	-148.2103	1463	75	Napp	ev#159
HX20001.09	LiveNet	28	69	GAK10	19	7	0815	58.5440	-148.2082	1463	75	Napp	ev#160
HX20001.10	LiveNet	29	69	GAK10	19	7	0825	58.5448	-148.2074	1463	75	Napp	ev#161
HX20001.11	CTD	87	69	GAK10	19	7	0838	58.5421	-148.2088	1463	nd	Strom	ev#162
HX20001.12	CTD10	88	69	GAK10	19	7	0954	58.5415	-148.2053	1463	nd	Strom	ev#163; 10 L rosette CTD.
HX20001.13	CTD	89	69	GAK10	19	7	1157	58.5444	-148.2116	1463	300	Strom	ev#164
HX20001.14	CTD	90	69	GAK10	19	7	1235	58.5441	-148.2107	1463	50	Strom	ev#165
HX20001.15	CTD	91	70	OSGA	19	7	1342	58.5927	-148.4375	235	nd	Strom	ev#166
HX20001.16	CTD	92	71	OSGD	19	7	1442	58.5063	-148.3674	621	nd	Strom	ev#167
HX20001.17	CTD	93	72	OSGF	19	7	1546	58.4292	-148.2984	1347	nd	Strom	ev#168
HX20001.18	CTD	94	73	OSGG	19	7	1640	58.4659	-148.1402	1830	nd	Strom	ev#169
HX20001.19	CTD	95	74	OSGH	19	7	1730	58.5009	-147.9823	2140	nd	Strom	ev#170
HX20001.20	CTD	96	75	OSGE	19	7	1822	58.5776	-148.0514	1818	nd	Strom	ev#171
HX20001.21	CTD	97	76	OSGC	19	7	1915	58.6654	-148.1192	787	nd	Strom	ev#172
HX20001.22	CTD	98	76	OSGC	19	7	1927	58.6679	-148.1195	787	nd	Strom	ev#173
HX20001.23	LiveNet	30	77	OSC	19	7	2300	58.5413	-148.2088	nd	100	nd	ev#174
HX20101.01	QUAD150	8	78	GAK10	20	7	0000	58.5420	-148.2125	1457	100	nd	ev#175
HX20101.02	CTD	99	78	GAK10	20	7	0027	58.5440	-148.2091	1477	nd	Strom	ev#176
HX20101.03	MOC	8	78	GAK10	20	7	0049	58.5417	-148.2095	1477	93	Strom	ev#177
HX20101.04	CTD	100	78	GAK10	20	7	0144	58.5414	-148.2104	1477	nd	Strom	ev#178
HX20101.05	QUAD053	19	78	GAK10	20	7	0713	58.5420	-148.2120	1458	100	Napp	ev#179; egg ratio study
HX20101.06	QUAD053	20	78	GAK10	20	7	0723	58.5432	-148.2081	1458	100	Napp	ev#180; egg ratio study
HX20101.07	QUAD053	21	78	GAK10	20	7	0732	58.5440	-148.2056	1458	100	Napp	ev#181; egg ratio study
HX20101.08	LiveNet	31	78	GAK10	20	7	0807	58.5414	-148.2133	1458	nd	Napp	ev#182
HX20101.09	LiveNet	32	78	GAK10	20	7	0818	58.5429	-148.2088	1458	nd	Napp	ev#183
HX20101.10	CTD	101	78	GAK10	20	7	0842	58.5415	-148.2103	1458	50	Strom	ev#184
HX20101.11	CTD	102	78	GAK10	20	7	1357	58.5410	-148.2119	1458	300	Strom	ev#185
HX20101.12	LiveNet	33	78	GAK10	20	7	1423	58.5440	-148.2129	1461	75	Napp	ev#186
HX20101.13	LiveNet	34	78	GAK10	20	7	1432	58.5449	-148.2113	1461	75	Dagg	ev#187
HX20101.14	CTD	103	78	GAK10	20	7	1501	58.5395	-148.2139	1469	50	Strom	ev#188
HX20101.15	CTD10	104	78	GAK10	20	7	1615	58.5411	-148.2094	1476	50	Strom	ev#189; 10 L rosette CTD.
HX20101.16	CTD	105	78	GAK10	20	7	1644	58.5436	-148.2097	1476	nd	Strom	ev#190
HX20101.17	CTD	106	78	GAK10	20	7	2259	58.5429	-148.2126	1476	1500	Strom	ev#191

Event#	Instr	Cast	Sta	Sta std	Day	Mos	Time	Lat	Long	Water Depth	Cast Depth	SI	Comments
HX20201.01	QUAD150	9	78	GAK10	21	7	0012	58.5411	-148.2108	1476	100	Strom	ev#192
HX20201.02	MOC	9	78	GAK10	21	7	0022	58.5400	-148.2105	1471	95	nd	ev#193
HX20201.03	CTD	107	79	CF15	21	7	0701	59.4494	-148.8669	180	nd	Strom	ev#194
HX20201.04	CTD	108	80	CF14	21	7	0730	59.4829	-148.8678	168	nd	Strom	ev#195
HX20201.05	CTD	109	81	CF13	21	7	0758	59.5160	-148.8683	174	nd	Strom	ev#196
HX20201.06	CTD	110	82	CF12	21	7	0826	59.5505	-148.8695	182	nd	Strom	ev#197
HX20201.07	CTD	111	83	CF11	21	7	0854	59.5831	-148.8694	175	nd	Strom	ev#198
HX20201.08	CTD	112	84	CF10	21	7	0918	59.6163	-148.8699	173	nd	Strom	ev#199
HX20201.09	CTD	113	85	CF9	21	7	0947	59.6497	-148.8699	175	nd	Strom	ev#200
HX20201.10	CTD	114	86	CF8	21	7	1013	59.6830	-148.8703	178	nd	Strom	ev#201
HX20201.11	CTD	115	87	CF7	21	7	1041	59.7177	-148.8700	180	nd	Strom	ev#202
HX20201.12	CTD	116	88	CF6	21	7	1109	59.7504	-148.8661	188	nd	Strom	ev#203
HX20201.13	CTD	117	89	CF5	21	7	1134	59.7834	-148.8688	191	nd	Strom	ev#204
HX20201.14	CTD	118	90	CF4	21	7	1203	59.8165	-148.8668	184	nd	Strom	ev#205
HX20201.15	CTD	119	91	CF3	21	7	1227	59.8500	-148.8676	160	nd	Strom	ev#206
HX20201.16	CTD	120	92	CF2	21	7	1254	59.8834	-148.8679	113	nd	Strom	ev#207
HX20201.17	CTD	121	93	CF1	21	7	1311	59.9081	-148.8654	88	nd	Strom	ev#208
HX20201.18	LiveNet	35	94	PWS2	21	7	2305	60.5339	-147.8024	742	nd	Napp	ev#209
HX20201.19	QUAD150	10	94	PWS2	21	7	2358	60.5317	-147.7995	711	100	nd	ev#210
HX20301.01	CTD	122	94	PWS2	22	7	0005	60.5101	-147.8396	742	nd	Napp	ev#211
HX20301.02	MOC	10	94	PWS2	22	7	0024	60.5118	-147.8369	742	97	Napp	ev#212
HX20301.03	QUAD053	22	94	PWS2	22	7	0705	60.5339	-147.8049	733	100	Napp	ev#213; Wrong flowmeter read by BCR
HX20301.04	QUAD053	23	94	PWS2	22	7	0713	60.5335	-147.8071	733	100	Napp	ev#214; egg ratio study
HX20301.05	QUAD053	24	94	PWS2	22	7	0723	60.5332	-147.8092	733	100	Napp	ev#215; egg ratio study
HX20301.06	QUAD053	25	94	PWS2	22	7	0735	60.5329	-147.8116	733	100	Napp	ev#216; egg ratio study
HX20301.07	LiveNet	36	94	PWS2	22	7	0801	60.5327	-147.8179	733	75	Napp	ev#217
HX20301.08	LiveNet	37	94	PWS2	22	7	0813	60.5326	-147.8206	733	75	Napp	ev#218
HX20301.09	CTD	123	94	PWS2	22	7	0839	60.5362	-147.8058	733	50	Strom	ev#219
HX20301.10	CTD10	124	94	PWS2	22	7	0946	60.5348	-147.8055	733	50	Strom	ev#220; 10 L rosette CTD.
HX20301.11	CTD	125	94	PWS2	22	7	1158	60.5342	-147.8050	733	nd	Strom	ev#221
HX20301.12	CTD	126	94	PWS2	22	7	1256	60.5350	-147.8049	733	nd	Strom	ev#222
HX20301.13	Neuston	16	94	PWS2	22	7	1314	60.5366	-147.8037	733	1	Napp	ev#223
HX20301.14	CTD	127	95	PWSGA	22	7	1350	60.5958	-147.8285	324	300	Strom	ev#224
HX20301.15	Neuston	17	95	PWSGA	22	7	1414	60.5943	-147.8386	324	1	Napp	ev#225
HX20301.16	CTD	128	96	PWSGD	22	7	1448	60.5504	-147.8737	504	300	Strom	ev#226
HX20301.17	Neuston	18	96	PWSGD	22	7	1510	60.5493	-147.8813	504	1	Napp	ev#227
HX20301.18	CTD	129	97	PWSGF	22	7	1547	60.4990	-147.8316	521	300	Strom	ev#228
HX20301.19	Neuston	19	97	PWSGF	22	7	1629	60.4984	-147.8319	521	1	Napp	ev#229
HX20301.20	CTD	130	98	PWSGG	22	7	1632	60.4910	-147.7936	224	300	Strom	ev#230
HX20301.21	Neuston	20	98	PWSGG	22	7	1649	60.4913	-147.8040	224	1	Napp	ev#231
HX20301.22	CTD	131	99	PWSGH	22	7	1726	60.4411	-147.8848	342	300	Strom	ev#232
HX20301.23	Neuston	21	99	PWSGH	22	7	1747	60.4379	-147.8867	342	1	Strom	ev#233
HX20301.24	CTD	132	100	PWSGE	22	7	1830	60.5138	-147.9003	211	300	Strom	ev#234
HX20301.25	Neuston	22	100	PWSGE	22	7	1856	60.5099	-147.8939	230	1	Strom	ev#235
HX20301.26	CTD	133	101	PWSGC	22	7	1943	60.5625	-147.6800	700	300	Strom	ev#236
HX20301.27	Neuston	23	101	PWSGC	22	7	2004	60.5622	-147.6834	700	1	Strom	ev#237
HX20301.28	CTD	134	102	PWSGB	22	7	2035	60.5809	-147.7631	759	300	Strom	ev#238
HX20301.29	Neuston	24	102	PWSGB	22	7	2056	60.5812	-147.7757	759	1	Strom	ev#239

Event#	Instr	Cast	Sta	Sta std	Day	Mos	Time	Lat	Long	Water Depth	Cast Depth	SI	Comments
HX20301.30	LiveNet	38	103	PWS2	22	7	2300	60.5341	-147.8124	759	100	Strom	ev#240
HX20301.31	QUAD150	11	103	PWS2	22	7	2359	60.5342	-147.8138	733	100	Strom	ev#241
HX20401.01	CTD	135	103	PWS2	23	7	0008	60.5342	-147.8116	733	300	Strom	ev#242
HX20401.02	MOC	11	103	PWS2	23	7	0032	60.5371	-147.8023	733	94	Napp	ev#243
HX20401.03	LiveNet	39	103	PWS2	23	7	0055	60.5400	-147.7787	711	nd	nd	ev#244
HX20401.04	CTD	136	104	PWS3	23	7	0156	60.6555	-147.6776	750	nd	Napp	ev#245
HX20401.05	CTD	137	105	KIP1	23	7	0446	60.2807	-148.0109	564	nd	Napp	ev#246
HX20401.06	CTD	138	106	PWS1	23	7	0542	60.3796	-147.9380	353	nd	Napp	ev#247
HX20401.07	LiveNet	40	107	PWS2	23	7	0805	60.5344	-147.8038	735	75	Napp	ev#248
HX20401.08	CTD	139	107	PWS2	23	7	1328	60.5351	-147.8053	735	300	Napp	ev#249
HX20401.09	LiveNet	41	107	PWS2	23	7	1358	60.5352	-147.8056	735	125	Dagg	ev#250
HX20401.10	LiveNet	42	107	PWS2	23	7	1410	60.5337	-147.8024	735	100	Napp	ev#251
HX20401.11	LiveNet	43	107	PWS2	23	7	1444	60.5320	-147.8004	735	150	Dagg	ev#252
HX20401.12	CTD	140	107	PWS2	23	7	1503	60.5333	-147.8017	735	50	Strom	ev#253
HX20401.13	CTD10	141	107	PWS2	23	7	1545	60.5361	-147.8050	735	50	Strom	ev#254; 10 L rosette CTD.
HX20401.14	MOC	12	107	PWS2	23	7	1920	60.5397	-147.7832	735	494	Napp	ev#255
HX20401.15	LiveNet	44	107	PWS2	23	7	2306	60.5347	-147.8067	735	100	Napp	ev#256
HX20501.01	QUAD150	12	107	PWS2	24	7	0000	60.5350	-147.7982	735	100	Napp	ev#257
HX20501.02	CTD	142	107	PWS2	24	7	0008	60.5350	-147.7983	735	300	Napp	ev#258
HX20501.03	MOC	13	107	PWS2	24	7	0233	60.5254	-147.8198	735	292	Napp	ev#259
HX20501.04	QUAD053	26	107	PWS2	24	7	0703	60.5357	-147.8017	735	100	Napp	ev#262; egg ratio study
HX20501.05	QUAD053	27	107	PWS2	24	7	0713	60.5343	-147.8006	735	100	Napp	ev#263; egg ratio study
HX20501.06	QUAD053	28	107	PWS2	24	7	0723	60.5329	-147.7996	735	100	Napp	ev#264; egg ratio study
HX20501.07	LiveNet	45	107	PWS2	24	7	0805	60.5345	-147.8020	735	nd	Napp	ev#265
HX20501.08	LiveNet	46	107	PWS2	24	7	0814	60.5334	-147.8000	735	nd	Napp	ev#266
HX20501.09	CTD	143	107	PWS2	24	7	0837	60.5341	-147.8047	735	50	Strom	ev#267
HX20501.10	CTD	144	107	PWS2	24	7	0936	60.5337	-147.8056	735	50	Strom	ev#268
HX20501.11	CTD	145	107	PWS2	24	7	1104	60.5371	-147.8036	735	50	Strom	ev#269
HX20501.12	CTD	146	107	PWS2	24	7	1301	60.5379	-147.8017	733	nd	Strom	ev#270
HX20501.13	CTD	147	108	HB1	24	7	1618	60.1933	-147.7001	246	246	Napp	ev#271
HX20501.14	CTD	148	109	HB2	24	7	1649	60.1788	-147.6411	246	246	Napp	ev#272
HX20501.15	CTD	149	110	HB3	24	7	1708	60.1661	-147.5853	84	84	Napp	ev#273
HX20501.16	CTD	150	111	HB4	24	7	1736	60.1485	-147.5020	107	107	Napp	ev#274
HX20501.17	CTD	151	112	HB5	24	7	1757	60.1334	-147.4469	40	40	Napp	ev#275
HX20501.18	CTD	152	113	MS1	24	7	2000	59.9507	-147.9231	170	170	Napp	ev#276
HX20501.19	CTD	153	114	MS2	24	7	2009	59.9426	-147.8951	193	nd	Napp	ev#277
HX20501.20	CTD	154	115	MS3	24	7	2030	59.9308	-147.8573	164	nd	Napp	ev#278
HX20501.21	CTD	155	116	MS4	24	7	2050	59.9170	-147.8338	112	nd	Napp	ev#279
HX20601.01	CTD	156	117	GAK3	25	7	0201	59.5520	-149.1884	210	nd	Napp	ev#280
HX20601.02	CTD	157	118	GAK2I	25	7	0248	59.6262	-149.2602	213	nd	Napp	ev#281
HX20601.03	CTD	158	119	ACC2	25	7	0319	59.6590	-149.2943	219	nd	Napp	ev#282
HX20601.04	CTD	159	120	GAK2	25	7	0347	59.6915	-149.3288	225	nd	Napp	ev#283
HX20601.05	CTD	160	121	ACC1	25	7	0418	59.7287	-149.3631	240	nd	Napp	ev#284
HX20601.06	CTD	161	122	GAK1I	25	7	0449	59.7668	-149.3974	258	nd	Napp	ev#285
HX20601.07	CTD	162	123	GAK1	25	7	0536	59.8453	-149.4672	271	nd	Napp	ev#286
HX20601.08	LiveNet	47	124	ACC1	25	7	0805	59.7282	-149.3625	245	nd	Napp	ev#287
HX20601.09	LiveNet	48	124	ACC1	25	7	0821	59.7265	-149.3687	245	nd	Dagg	ev#288
HX20601.10	CTD	163	124	ACC1	25	7	0835	59.7301	-149.3666	245	50	Strom	ev#289; 3 m FSW

Event#	Instr	Cast	Sta	Sta std	Day	Mos	Time	Lat	Long	Water Depth	Cast Depth	SI	Comments
HX20601.11	CTD10	164	124	ACC1	25	7	0933	59.7296	-149.3642	242	50	Strom	ev#290; 10L rosette CTD. 3 m exp wtr.
HX20601.12	QUAD053	29	124	ACC1	25	7	1112	59.7279	-149.3630	242	100	Napp	ev#291; egg ratio study
HX20601.13	QUAD053	30	124	ACC1	25	7	1123	59.7274	-149.3663	242	100	Napp	ev#292; egg ratio study
HX20601.14	QUAD053	31	124	ACC1	25	7	1135	59.7258	-149.3747	242	100	Napp	ev#293; egg ratio study
HX20601.15	CTD	165	124	ACC1	25	7	1257	59.7291	-149.3663	242	235	Strom	ev#294
HX20701.01	Neuston	25	125	ISGA	26	7	0733	59.6817	-149.4901	226	1	Napp	ev#295
HX20701.02	Neuston	26	126	ISGD	26	7	0755	59.6506	-149.4532	277	1	Napp	ev#296
HX20701.03	Neuston	27	127	ISGF	26	7	0822	59.6089	-149.4137	215	1	Napp	ev#297
HX20701.04	Neuston	28	128	GAK2	26	7	0908	59.6923	-149.3284	227	1	Napp	ev#298
HX20701.05	Neuston	29	129	ACC1	26	7	0933	59.7296	-149.3609	240	1	Napp	ev#299
HX20701.06	Neuston	30	130	GAK1I	26	7	0959	59.7675	-149.3949	259	1	Napp	ev#300
HX20701.07	Neuston	31	131	ISGH	26	7	1036	59.7689	-149.2367	255	1	Napp	ev#301
HX20701.08	Neuston	32	132	ISGE	26	7	1101	59.8090	-149.2678	101	1	Napp	ev#302
HX20701.09	Neuston	33	133	ISGC	26	7	1123	59.8436	-149.3025	98	1	Napp	ev#303