

GLOBEC CRUISE REPORT
CRUISE HX246 – June 28-July 9 2001

Funding Source: NSF-NOAA (NA-67-RJ-0147)

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Scientific Purpose:

The purpose of the NE Pacific GLOBEC program is to develop a mechanistic understanding of the response of this marine ecosystem to climate variability. Toward this end the GLOBEC cruises on the Gulf of Alaska shelf will determine the physical-chemical structure, primary production and the distribution and abundance of zooplankton, yoy salmon and other planktivorous fish. These interdisciplinary cruises will occur over a seven-year period and throughout the year so that seasonal and interannual depictions of the oceanography of this shelf will be available. Some of the data will be compared with historical data sets whereas other data sets will be a product of the first systematic sampling effort from this shelf.

The July 2001 cruise focused on the distribution of physical properties, nutrients, and chlorophyll, zooplankton, and seabird populations over the shelf along the Seward Line, within western Prince William Sound, and on the shelf south of Hinchinbrook Entrance. The purpose was to characterize the along shore variability in the physical and chemical properties and the biological components of the northern Gulf of Alaska shelf.

Cruise Objectives

Determine thermohaline, velocity, and nutrient structure of the Gulf of Alaska shelf, emphasizing Seward Line (Table 1), C. Fairfield Line (Table 2), Prince William Sound stations (Table 3), offshore PWS stations (Table 4) and the Cape Cleare Southeast Line. Other lines as time permits

Determine primary production and phytoplankton biomass distribution.

Determine the distribution and abundance of zooplankton.

Determine the distribution and abundance of seabirds and marine mammals.

Determine copepod and euphausiid rates of growth and egg production.

SAMPLING

DAYTIME ACTIVITIES

Occupied the various hydrographic transects and collect vertical CTD-chlorophyll-PAR profiles. Station Transect priorities are (in order): Seward (Table 1), C. Fairfield (Table 2), W. PWS (Table 3), Hinchinbrook Entrance (Table 4). AHC Line (Table 6); PWSSW Line, and Cape Cleare Line (Table 7).

Collected ADCP, sea surface salinity (SSS), temperature (SST) and fluorescence (SSF) using seachest sensors, collected discrete bottle samples at these stations for nutrients and chlorophyll pigments. Chlorophyll Size Fractionation was done at the whole numbered Seward Line stations and at every other C. Fairfield Line station.

Measured Primary Productivity at Stations GAK 1, 4, 9, and 13, within Prince William Sound and on the Cape Cleare Line.

Observed and documented marine mammal and seabird distributions from the bridge.

2 CalVet Net casts were done (1 before and 1 after the CTD cast) along the Seward Line, at selected PWS stations and along the Cape Cleare Line. The first was a large mesh net and the second was with a fine mesh net.

At 2 Seward Line stations and one PWS station Hopcroft performed 7 casts with the 10-liter Niskins/Rosette to collect water (from ~ 20m) for zooplankton incubations.

One deep MOCNESS tow (to 350 or 500 m) was done near the end of the Seward Line and in PWS.

NIGHTTIME ACTIVITIES

Hydroacoustic samples and MOCNESS discrete samples were done along the Seward Line, in PWS (Table 3), at Hinchinbrook Entrance (Table 4) and Cape Cleare stations.

CRUISE ACTIVITY SCHEDULE

Chronology

The cruise departed Seward, Alaska at 0900 (0100 ADT) 28 June 2001 and proceeded to test gear within Resurrection Bay before beginning sampling at GAK 13. Work in on the Seward line followed with CTD sampling, CALVET net tows and HTI and MOCNESS deployments on the inner Seward line. On 30 June we returned to Seward briefly for MOCNESS repairs and then returned to working the inner and middle segments of the Seward line. Casts for primary production measurements were taken at GAK 1, 4, 9 and 13. The Seward line work was interrupted on 2 July. The CTD and ADCP transect of the Cape Fairfield line was done on 2 July. Following this work the Seward line was reoccupied after the completion of the Fairfield line. Seward line work was again broken on 3 July for a brief Ragged Island line occupation. Seward line work was completed on 4 July. Work on the Knight Island Passage, PWSW1 & 2, Hogan Bay, and Montague Straits was carried out between 4 and 6 July. The sampling at Hinchinbrook Entrance (CTD, HTI, MOCNESS and CALVET) was carried out on 6 and 7 July. Cape Cleare Southwest(1-5) and the Along Hinchinbrook Canyon line (5-9) was done while in transit to the Cape Cleare Southeast line. The HTI and MOCNESS work on the CCSE line began in the middle of that line and the CTD sampling and CALVET work worked the outer (CCSE4-7) section. The line was interrupted to high seas and winds. A ctd line was run on the Across Hinchinbrook Canyon stations XCM11 thru XCHM01 during 8 July. Returned to Seward on 9 July at 0700 (2300 ADT).

Results

Hydrography (Sarah Zimmemann)

143 CTD casts were performed. Of these, 7 were for the productivity study and 21 were for Russel Hopcroft's grazing study or repeat casts for his CalVET nets. The rest of the casts were performed along the transects: Seward Line, Cape Fairfield, Ragged Island, Southwest spoke of GAK4 (MM), stations at Knight Island Passage and Prince William Sound, Montague Strait, Hogan Bay, Hinchinbrook Entrance, Cape Clear South East and Across Hinchinbrook Canyon Middle.

Data was collected with a Seabird 911 CTD with primary and secondary temperature and conductivity sensors. A fluorometer, transmissometer and PAR

sensors were also attached. There was no altimeter and the transmissometer was removed after station 110. 5-liter niskin bottles on a 12 position Seabird rosette were used for water sampling. One salinity sample every other station was taken for calibration of CTD salinity. For the grazing study a separate system with 10 liter bottles was used for the purpose of collecting a large volume of water.

Occasional spikes in the data would cause the CTD pump to turn off momentarily. The casts were halted until the pump turned on again and then were resumed. Two re-terminations were performed.

Underway ADCP, SST, SSS and SSF measurements were also taken.

Chlorophyll and Nutrients (Stockwell)

During HX246 we conducted seven productivity experiments at the following sites: GAK 1, GAK 4, GAK 9, GAK 13, KIP 2, CCSE2 and CCSE8. These experiments were N-15 and C –13 studies for nitrogen uptake rates and primary productivity estimates. In addition, nutrient addition studies were also run in conjunction with the nitrogen uptake and primary production stations at Seward Line stations. Time prevented additional amendment studies to be carried out along the Cape Cleare Southeast stations. Chlorophyll and nutrient samples were collected at all stations along the Seward line and at alternate stations along the Cape Fairfield line. Within the sound, samples were collected at the Knight Island Passage, Montague Strait, and Hogan Bay lines. Nutrient samples were run on board and chlorophyll samples will be analyzed back in Fairbanks. Samples were also taken along the Cape Clear line or the Hinchinbrook entrance lines. Isotope filter samples were taken for B. Finney (UAF) during this cruise

Stable isotope samples (Kline)

Zooplankton samples were taken for stable carbon and nitrogen isotope analysis from the contents of net #1 of each MOCNESS tow made during HX246. There were two categories of SIA samples taken from MOCNESS tows made during HX246, (1) those from the upper 100m and (2) those from 400 to 600m.

(1) Upper 100m MOCNESS tows: Macro-zooplankters were saved for SIA from the contents of net #1 of each upper 100m MOCNESS tow, including two aborted tows made at station GAK2.

(2) Deep MOCNESS tows: Diapausing *Neocalanus* spp. were saved for stable isotope analysis from the contents of a closed MOCNESS net that sampled between 400 and 600m at stations GAK13 and PWS2.

MOCNESS SIA samples consisted primarily of macro-zooplankton, which were sorted to species and frozen individually in vials for further laboratory processing.

Microzooplankton (Foy)

Samples were taken to determine microzooplankton abundance and biomass, either as discrete vertical samples or as integrated samples. Vertical samples consisted of sampling from depths 0m, 10 or 20m, 30m, 50m, & 100m and were taken at GAK 2,4,6,8,10,11,13 and PWS2. Integrated samples were taken by combining water for an upper layer sample (0m, 10m, 20m, 30m, 40m & 50m) and a lower layer sample (75m & 100m) and were taken at GAK 1,3,5,7,9,11,12, CF 3,9, HE 2,6.5,10, CCSE 2,5,8 and KIP 2. Above samples were filtered and prepared for epifluorescent microscopy as well as preserved in acid Lugols. In addition, samples were fixed for flow cytometry.

Distribution of zooplankton and micronekton (Coyle)

The goal of the zooplankton component of the long term observation program (LTOP) is to characterize the distribution, abundance and biomass of the major zooplankton taxa in the upper 100 m along the Seward Line on the northern Gulf of Alaska shelf. Supplemental material was collected in Prince William Sound and Hinchinbrook Entrance to determine the contribution of zooplankton in fjords and estuaries to the composition of zooplankton on the shelf.

Micronekton and large zooplankton were collected with a MOCNESS (multiple opening closing net and environmental sampling system) equipped with 0.5 mm mesh nets. The MOCNESS was fished at night whenever possible. Due to the short day length during summer, some of the micronekton samples were collected at dusk or during the day. The MOCNESS collected samples at 20 m depth intervals between 100 m and the surface. Tows were taken at 13 stations on the Seward Line, at three stations in Knight Islands Passage, at two station in Montague Strait and at four station in Hinchinbrook Entrance. Three MOCNESS tows were taken at three stations on the southeast Cape Cleare line. Supplemental tows were taken to 600 m depth at the outer end of the Seward Line and in Prince William Sound to characterize the deep zooplankton populations.

Small zooplankton were collected with 25 cm ring nets (CalVETs) towed vertically from 100 m to the surface. The mesh size of two of the nets was 0.15 mm and that of the other two was 0.053 mm. Each net was equipped with a GO flowmeter. The samples from the 0.15 mm nets were combined and samples from the 0.53 mm nets were combined to produce two samples from each station.

Acoustic data were collected with an HTI model 244 echosounder. The system collected volume scattering data at 43, 120, 200 and 420 kHz. Target strength data were collected at 43, 120 and 200 kHz. The transducer array is towed at 6 knots beside the vessel about three meters beneath the surface. Acoustic transect data were collected along the entire Seward Line and on the outer part of the Cape Cleare southeast line. In addition, acoustic data were taken during each MOCNESS tow to aid in scaling the acoustic targets.

Zooplankton Growth (Hopcroft)

Experiments were setup for estimating copepod growth rates at Gak 1, Gak 9, Gak 13 and PWS2. Unusually warm surface water temperatures (up to 15°C) may compromise survival for some of the species in the on-deck incubations. We are optimistic that it may be possible to estimate growth rates for the larvacean *Oikopleura dioica* at PWS2. All *Neocalanus* species are now rare in surface waters and stage-specific molt rate experiments are no longer possible. Copepod egg production experiments were setup at those same stations plus Gak 4 for combinations of *Oithona similis*, *Eucalanus bungii*, *Pseudocalanus* spp., *Acartia longiremis*, and *Centropages abdominalis*. Simultaneous attempts to obtain egg production for *Metridia pacifica*, *Metridia okhotensis*, *Gaetanus intermedia* and *Heterorhabdis* sp. appear to have been largely unsuccessful this cruise. *Calanus marshallae* adults remain too rare for experimental work. Euphausiids were incubated for molt rate determination at Gak 9, Gak 7 and CCSE 6.

Bird Sampling:

Seabird identification and abundance were recorded on the Seward, Cape Fairfield, Hinchinbrook Entrance, Hinchinbrook Canyon and Cape Clear Lines, and in Knight Island Passage. Seabirds were identified to species and age when possible, and flock occurrences were recorded as single or multiple species flock. Counts were recorded in 5 min. bins and the locations and time was recorded for each sighting. Sections of the Seward and Cape Clear lines were surveyed twice in order to obtain better abundance estimates (Fig. 1).

Bird Sampling Transects

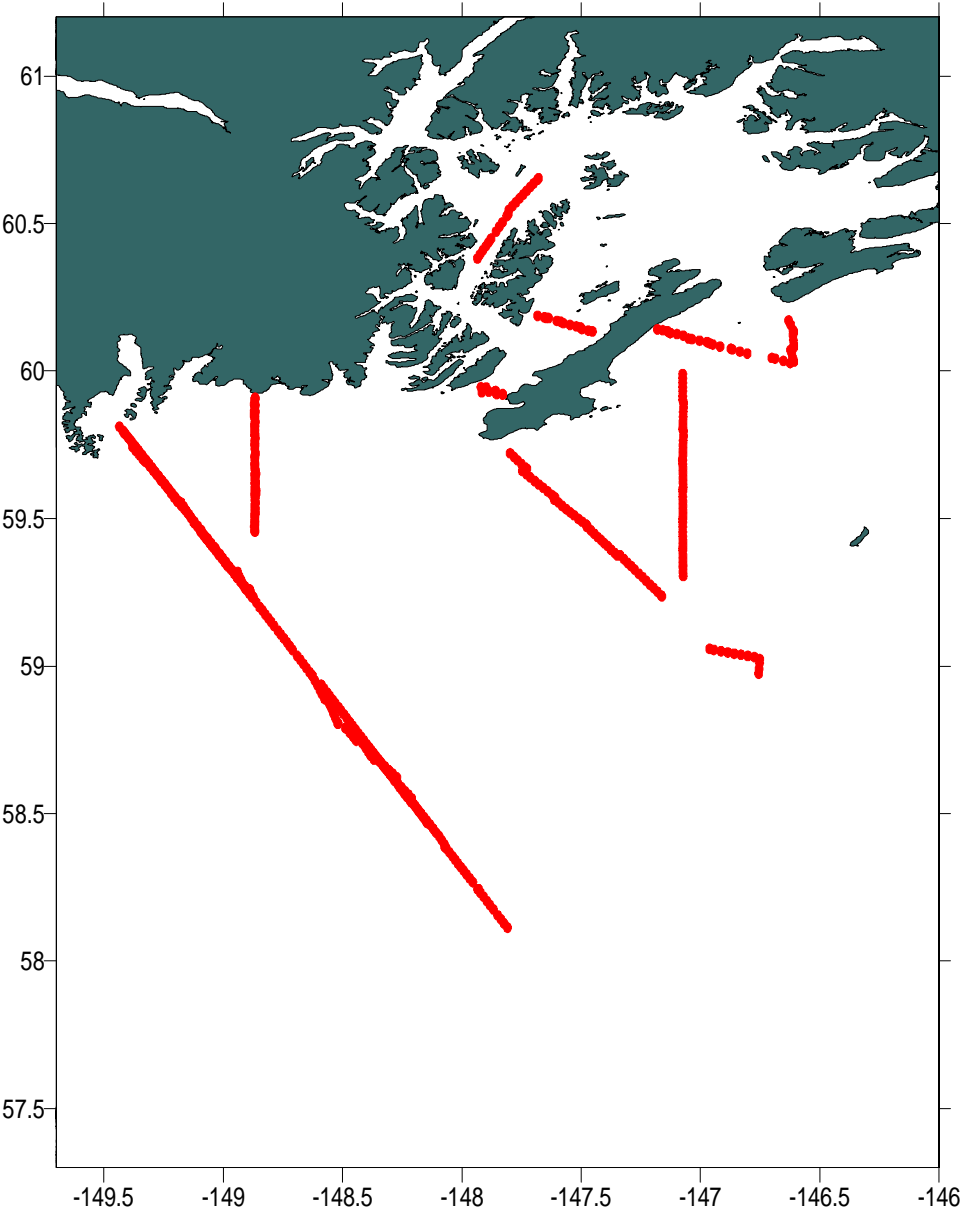


Figure 1: Transects surveyed during HX 246 for seabird distribution and abundance

Station Locations:

Table 1. CTD Station Locations along Seward Line.

Station Name	Latitude	Longitude	Approximate Bottom Depth (m)
RES 2.5	60 0.0	149 20.3	290
GAK 1	59 50.7	149 28.0	265
GAK 1i*	59 46.0	149 23.8	250
GAK 2	59 41.5	149 19.6	220
GAK 2i*	59 37.6	149 15.5	220
GAK 3	59 33.2	149 11.3	220
GAK3i*	59 28.9	149 7.1	210
GAK 4	59 24.5	149 2.9	200
GAK 4i*	59 20.1	148 58.7	200
GAK 5	59 15.7	148 54.5	175
GAK 5i*	59 11.4	148 50.3	150
GAK 6	59 7.0	148 46.2	145
GAK 6i**	59 2.7	148 42.0	190
GAK 7**	58 58.3	148 37.8	230
GAK 7i**	58 52.9	148 33.6	260
GAK 8**	58 47.5	148 29.4	290
Gak 8i**	58 44.6	148 25.2	280
GAK 9	58 40.8	148 21.0	275
GAK9i**	58 36.7	148 16.7	~700
GAK 10	58 32.5	148 12.7	1300
GAK 11	58 23.3	148 4.3	1400
GAK 12	58 14.6	147 56.0	1500
GAK 13	58 5.9	147 47.6	1525

*useful in defining Alaska Coastal Current front

**useful in defining the shelfbreak front

Table 2. CTD Station Locations Along Cape Fairfield Line

Station Name	Latitude	Longitude	Approximate Bottom Depth (m)
CF 1	59 55.0	148 52.0	50
CF 2	59 53.0	148 52.0	120
CF 3	59 51.0	148 52.0	170
CF 4	59 49.0	148 52.0	180
CF-5	59 47.0	148 52.0	180
CF-6	59 45.0	148 52.0	185
CF-7	59 43.0	148 52.0	180
CF-8	59 41.0	148 52.0	180
CF-9	59 39.0	148 52.0	175
CF-9	59 39.0	148 52.0	175
CF-10	59 37.0	148 52.0	175
CF 11	59 35.0	148 52.0	160
CF-12	59 33.0	148 52.0	145
CF-13	59 31.0	148 52.0	145
CF-14	59 29.0	148 52.0	145
CF-15	59 27.0	148 52.0	145

Table 3. CTD Station Locations In Western PWS (Northern PWS; Knight Island Passage; KIP; Hogan Bay; HB; and Montague Strait; MS). [ANC = weather station)

Station Name	Latitude	Longitude	Approx. Bottom Depth (m)
HB1	60.1929	147.7001	246
HB2	60.1792	147.6410	173
HB3	60.1634	147.5756	84
HB4	60.1482	147.5024	95
MS1	59.9587	147.9138	179
MS2	59.9442	147.8783	201
MS3	59.9332	147.8550	168
MS4	59.9219	147.8268	118
KIP2	60.2783	147.9866	588
KIP1	60.2811	148.0132	540
PWS 10	60.385	146.925	293
PWS 9	60.477	147.070	222
PWS 8	60.557	147.126	228
PWS 7	60.629	147.149	292
PWS 6	60.722	147.145	390
PWS 5	60.822	147.398	476
PWS 4	60.737	147.658	657
PWS 3	60.655	147.809	753
PWS 2	60.534	147.802	742
PWS 1	60.379	147.936	333

Table 4. CTD Stations Bracketing Hinchinbrook Entrance.

Station Name	Latitude	Longitude	Approximate Bottom Depth (m)
HE 1	60 13.8	146 36.5	
HE 2	60 10.8	146 36.5	
HE 3	60 7.8	146 36.5	
HE 4	60 4.8	146 36.5	
HE-5	60 1.8	146 36.5	
HE-6	60 3.0	146 44.8	
HE-7	60 4.3	146 51.3	
HE-8	60 5.6	146 57.7	
HE-9	60 6.6	147 3.0	
HE-10	60 7.8	147 8.0	
HE-11	60 8.6	147 11.5	

Table 5. CTD Station Locations Along Ragged Island and Pye Island Lines

Station Name	Latitude	Longitude	Approximate Bottom Depth (m)
RI10	59.4091	148.8670	165
RI8	59.4081	149.2115	188
RI7	59.4076	149.3767	142
RI6	59.4077	149.5417	98
RI5	59.4093	149.7095	112
RI4	59.4077	149.8711	164
RI3	59.4091	150.0361	172
RI2	59.4093	150.1996	124
RI1	59.4063	150.2638	100
PI2	59.3262	150.1958	152
PI3	59.2429	150.1279	154

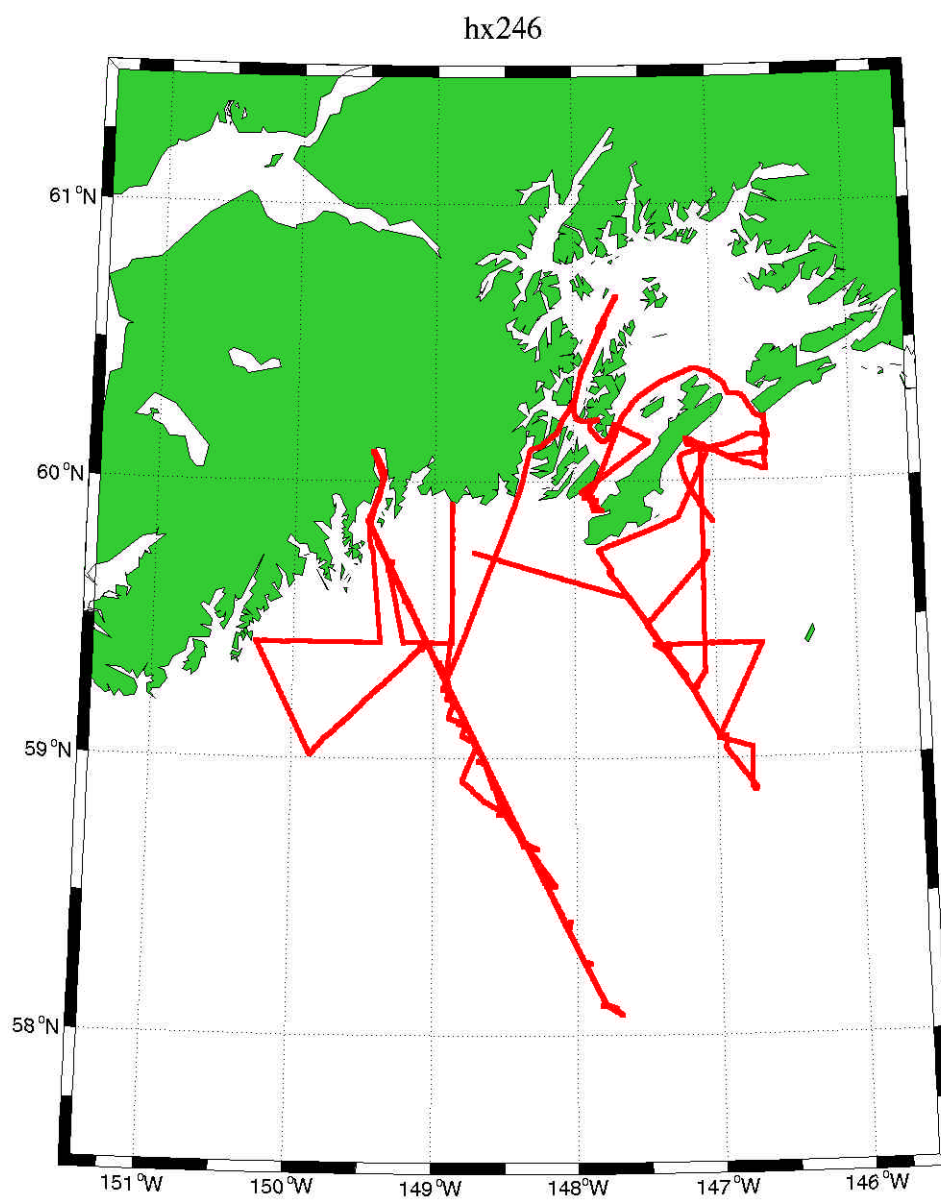
Table 6. CTD Station Locations Along Hinchinbrook Canyon: Deep Inflow into PWS

Station Name	Latitude (° N)	Longitude (°)	Approximate Bottom Depth (m)
AHC 1	59 18.0	147 4.5	200
AHC 2	59 24.0	147 4.5	200
AHC 3	59 30.0	147 4.5	200
AHC 4	59 36.0	147 4.5	200
AHC-5	59 42.0	147 4.5	200
AHC-6	59 48.0	147 4.5	200
AHC-7	59 54.0	147 4.5	200
AHC-8	60 00.0	147 4.5	200
AHC-9	60 06.0	147 4.5	200

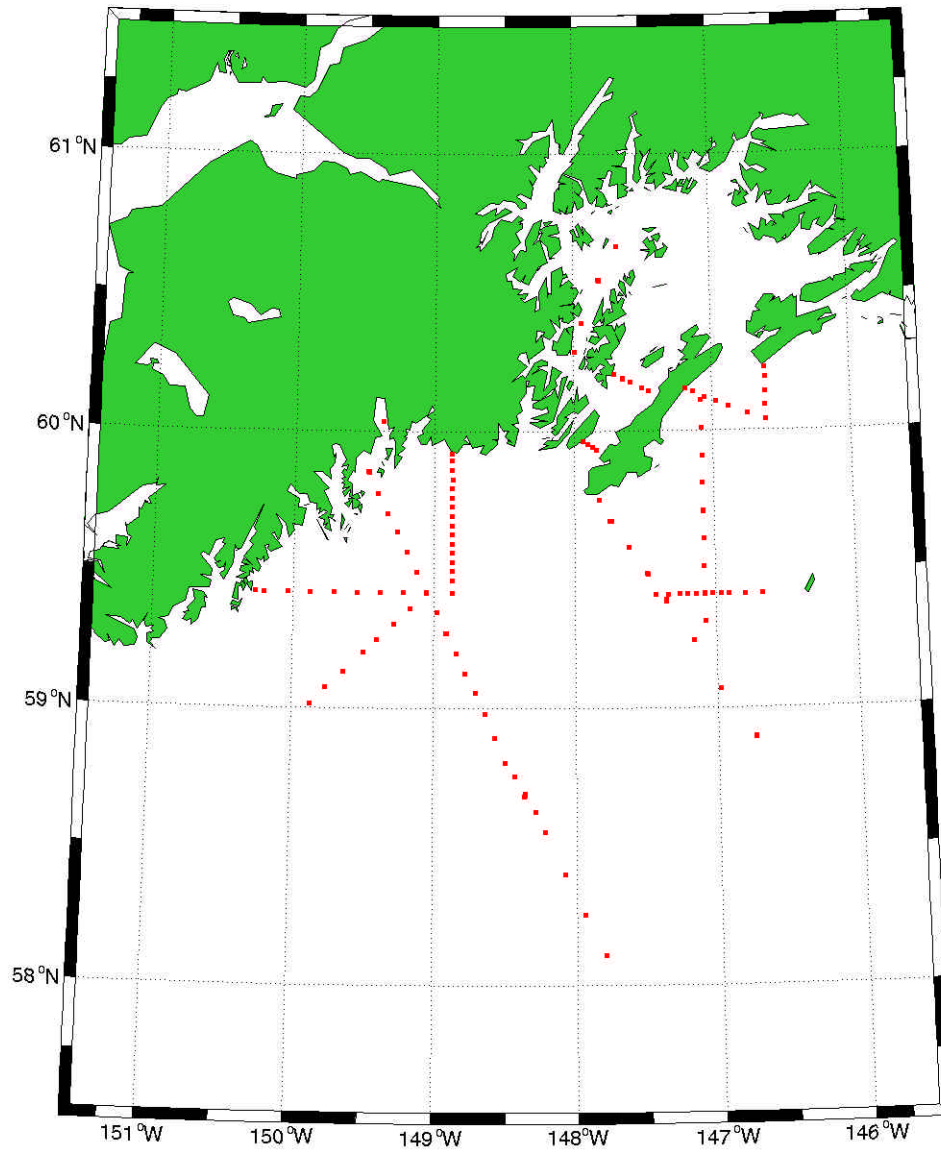
Table 7. CTD Stations Along the Cape Cleare SouthEast Line: Alongshore Coverage for comparison to the Seward Line.

Station Name	Latitude	Longitude	Approximate Bottom Depth (m)
CCSE1	59.74167	-147.817	
CCSE2	59.66667	-147.727	
CCSE3	59.57083	-147.608	
CCSE4	59.475	-147.475	
CCSE5	59.375	-147.35	
CCSE6	59.23333	-147.158	
CCSE7	59.05833	-146.967	
CCSE8	58.88333	-146.733	

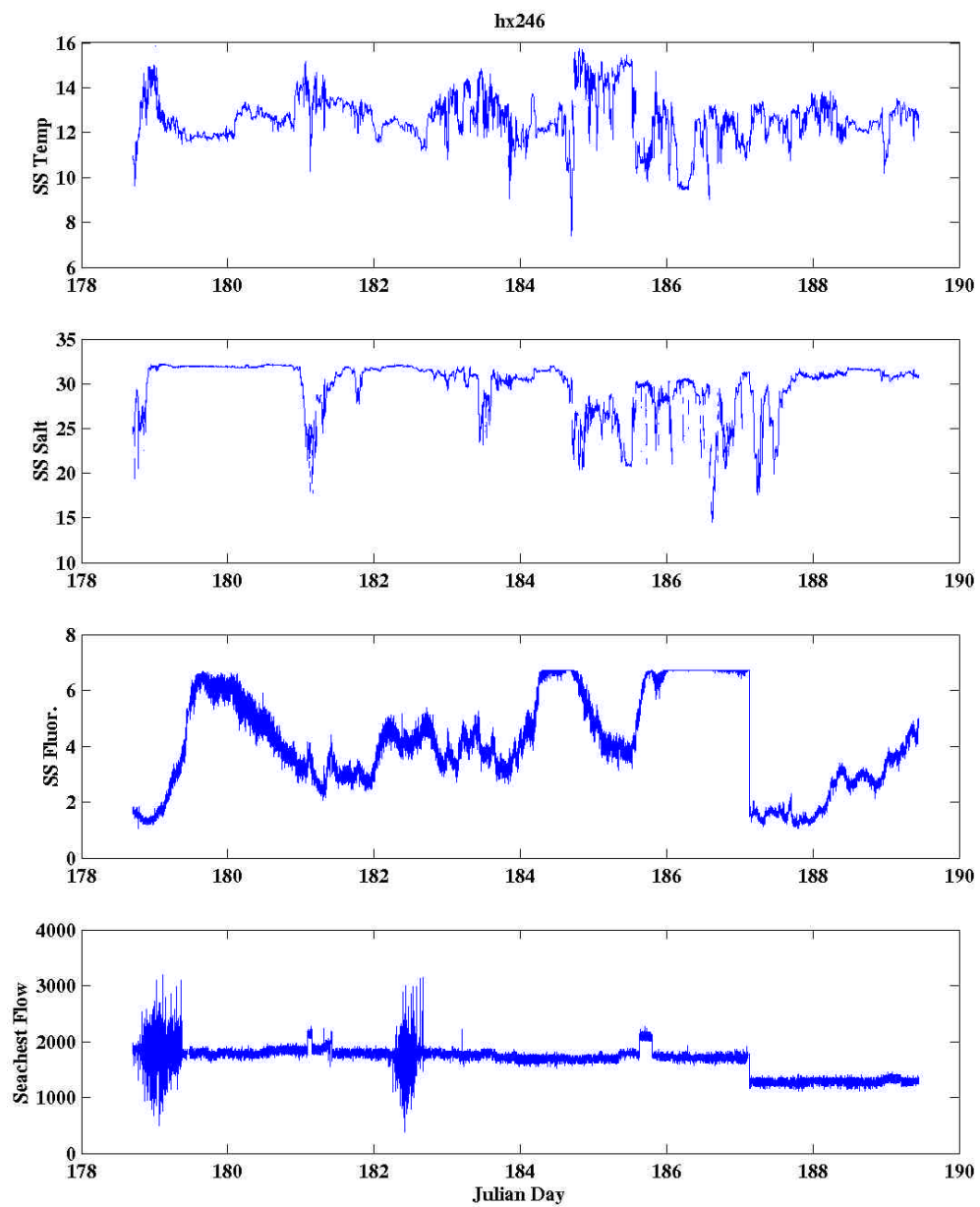
Hx246 total cruise track.

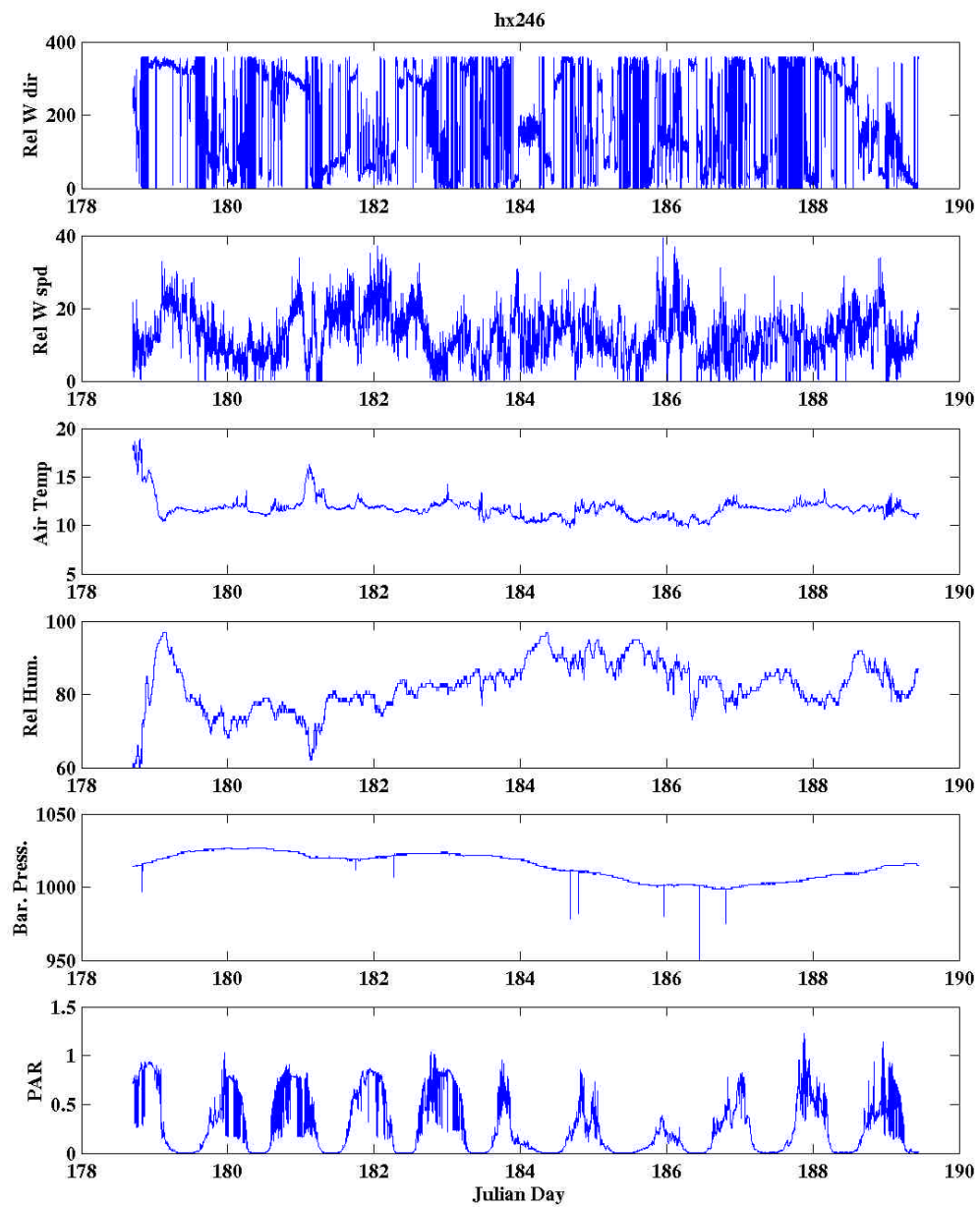


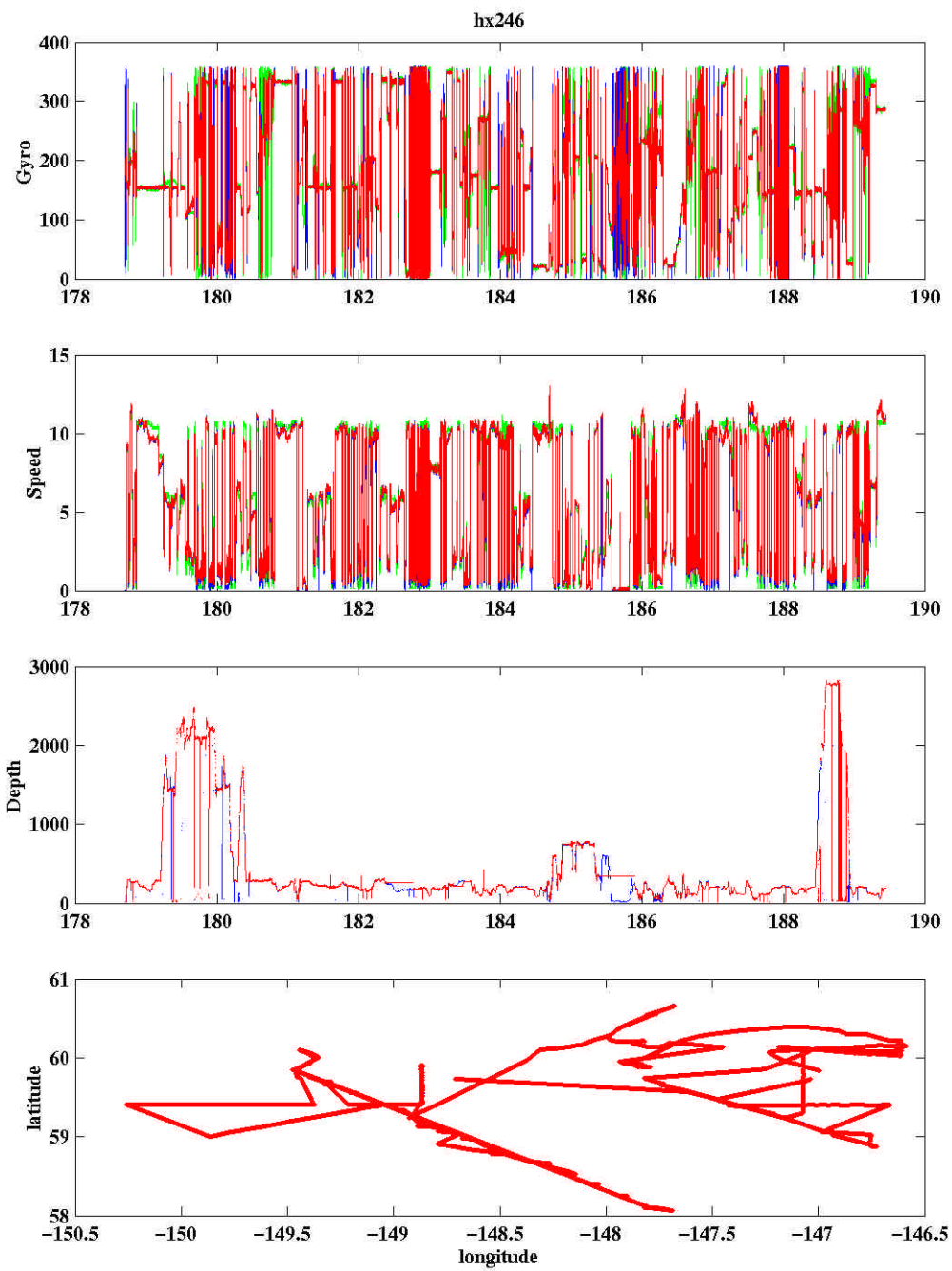
hx246 Station Locations



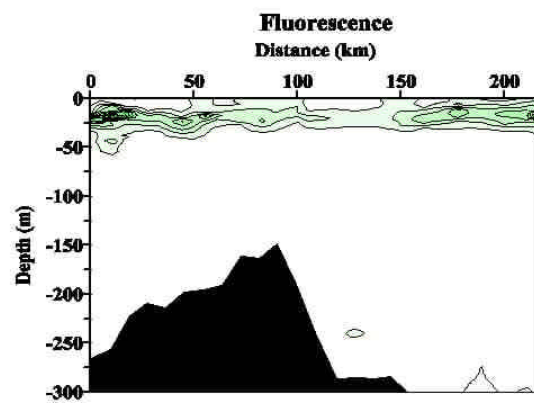
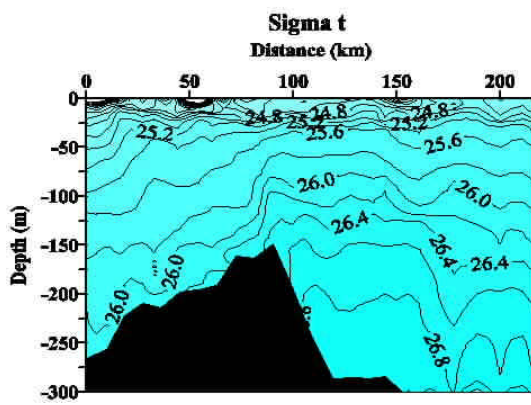
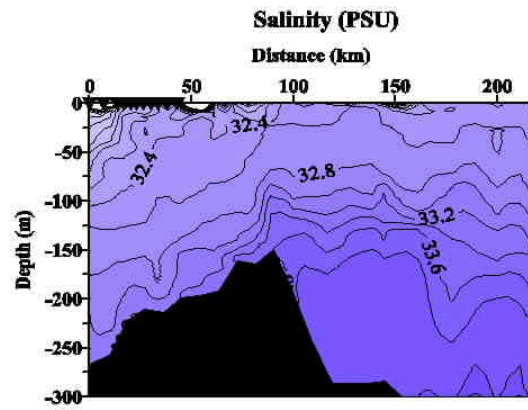
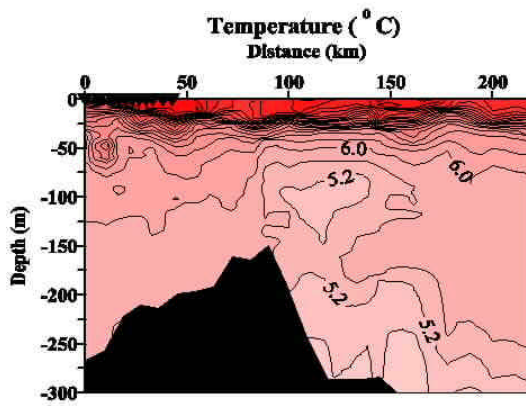
HX246 Sea Surface data collected underway (raw).



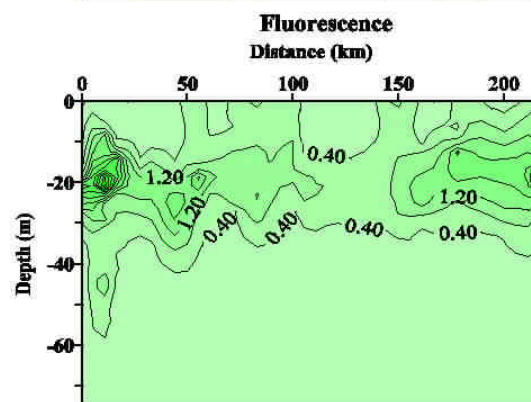
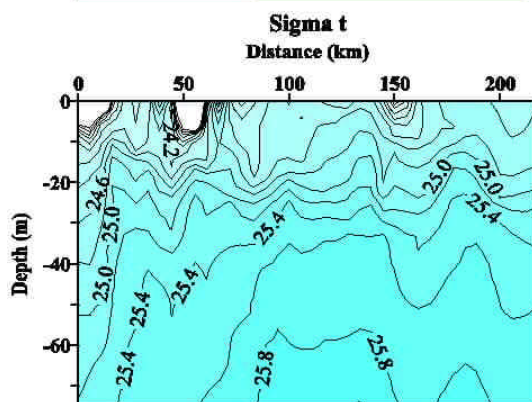
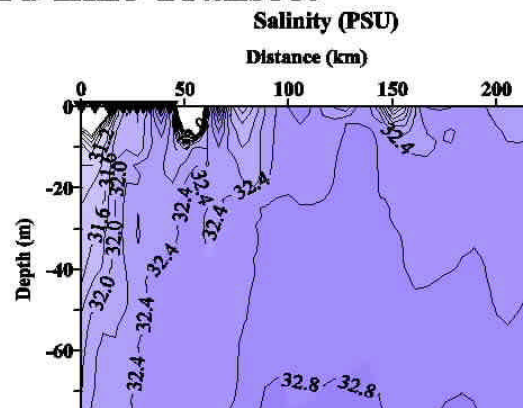
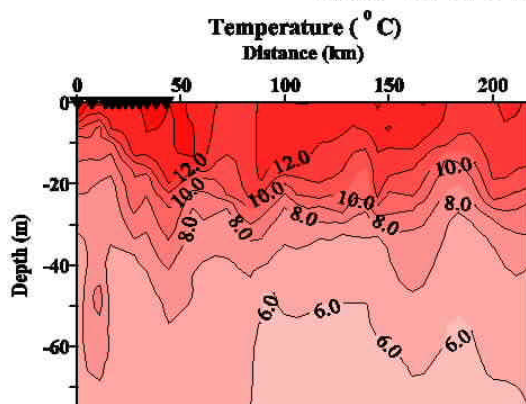




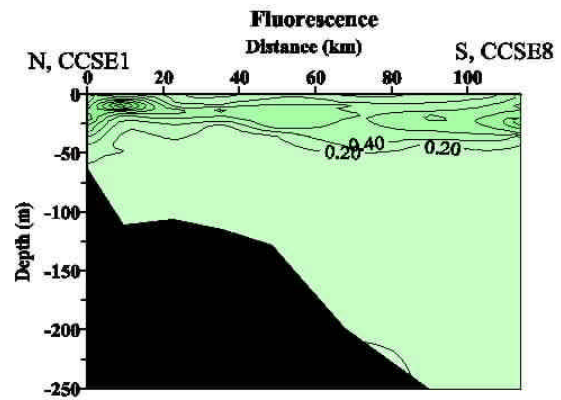
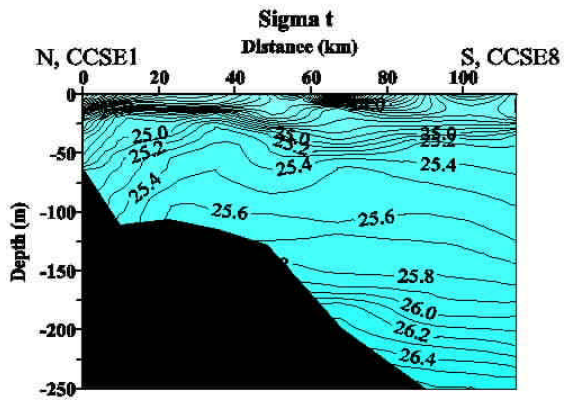
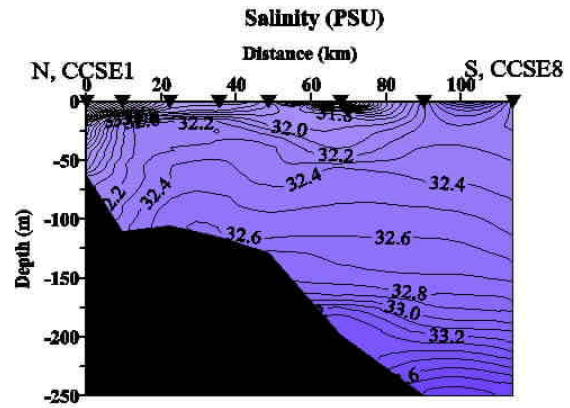
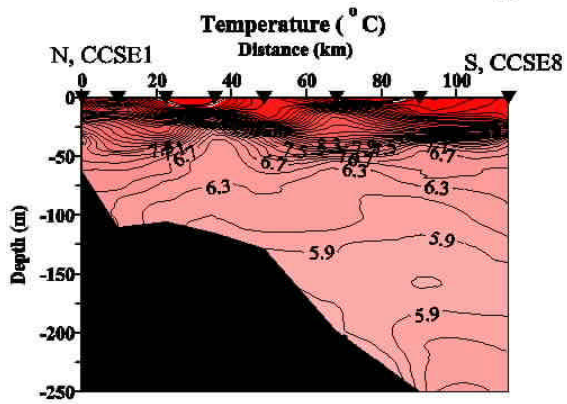
6/30 to 7/1 2001 Seward Line Transect



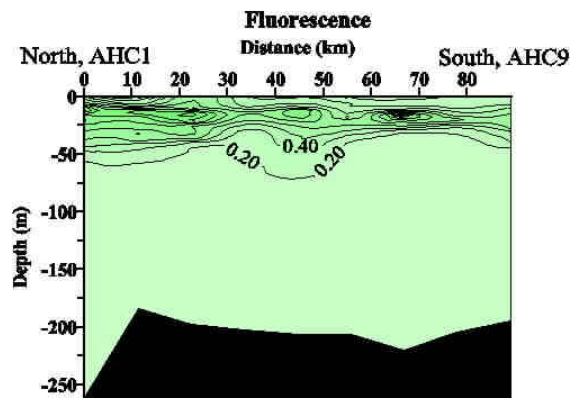
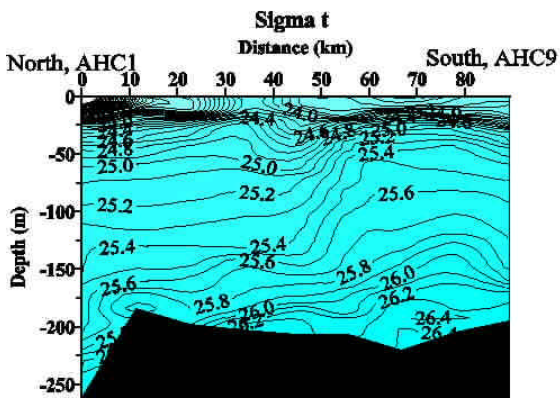
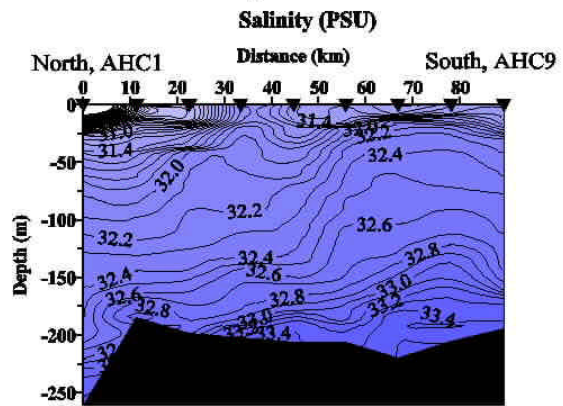
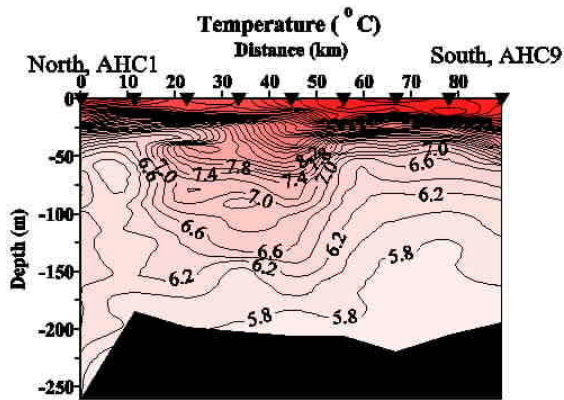
6/30 to 7/1 Seward Line Transect



7/7 to 7/8/2001 Cape Clear South East Transect

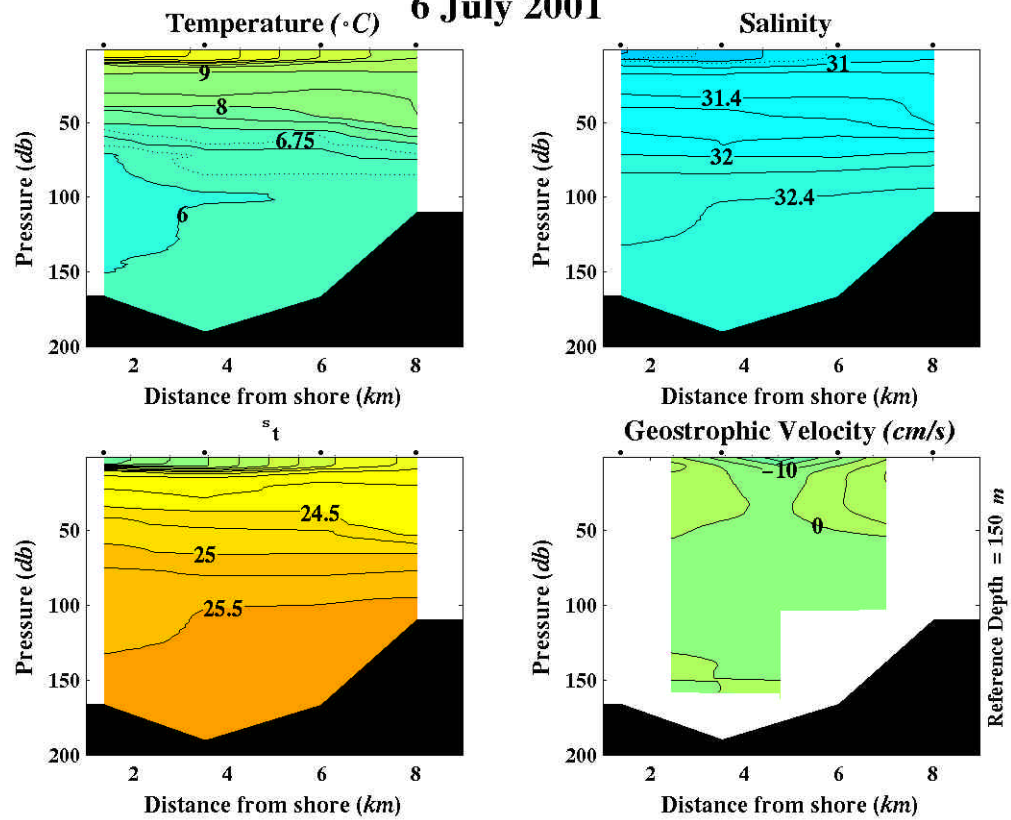


7/6 to 7/7/2001 Along Hinchinbrook Canyon Transect

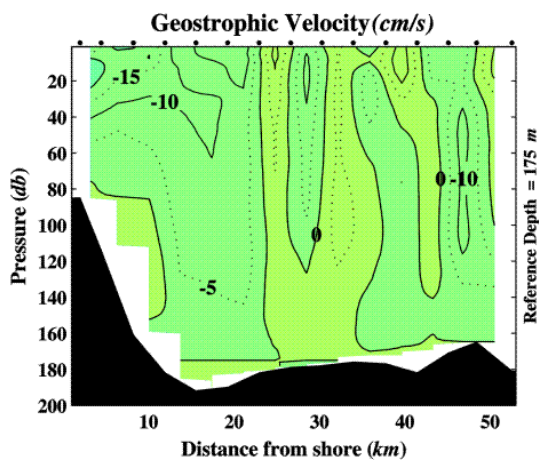
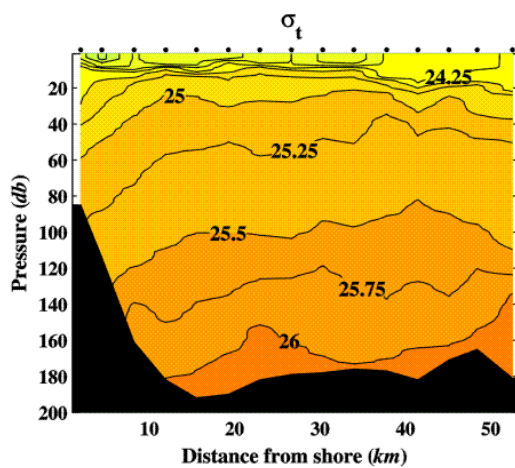
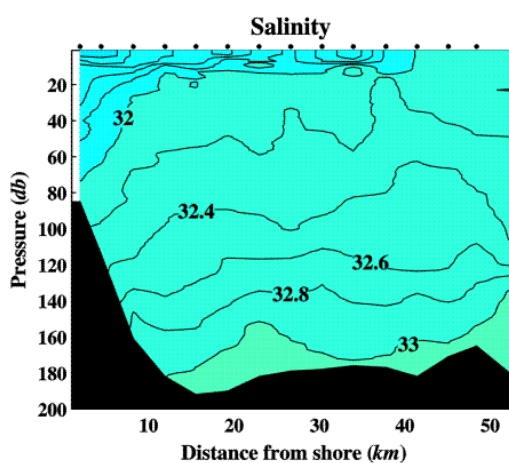
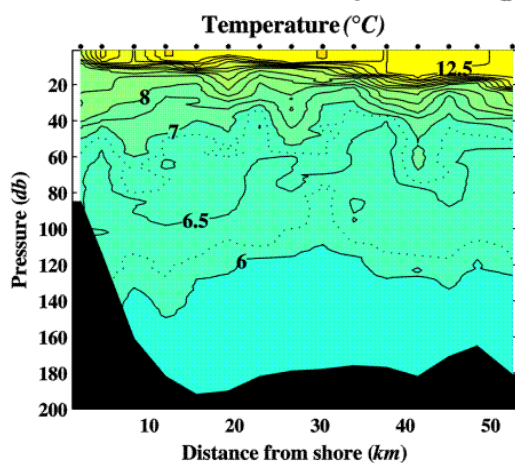


Montague Strait Transect:

6 July 2001



2-3 July 2001 Cape Fairfield Line Transect



EVENT LOG:

Event #	Description	Station	Date	GMT	Latitude	Longitude	Depth	Comments	Scientist
HX24617901.001	CTD1 Start	RES 2.5	6/28/01	18:54	60 1.51	149 21.65	296	test station	Zimmermann
HX24617901.002	HTI Transect Start	RES 2.5	6/28/01	19:15	60 1.51	149 21.65	296		Coyle
HX24617901.003	Ring Net Start	GAK 1	6/28/01	19:44	59.872	149.4466	267		Hopcroft
HX24617901.004	CTD2 Start	GAK 1	6/28/01	20:39	59.8431	149.4673	270	new termination	Zimmermann
HX24617901.005	HTI Transect Start	Gak10	6/28/01	6:08	58.5388	148.2082	1487		Coyle
HX24617901.006	HTI Transect End	Gak11	6/28/01	7:59	58.5388	148.2082	1427		Coyle
HX24617901.007	MOCNESS Start	Gak11	6/28/01	7:59	58.5388	148.2082	1427		Coyle
HX24617901.008	MOCNESS End	GAK11	6/28/01	8:25	58.5388	148.2082	1450		Coyle
HX24617901.009	HTI Transect Start	GAK11	6/28/01	8:54	58.388	148.0708	1450		Coyle
HX24618001.001	HTI Transect End	gak12	6/29/01	10:36	58.2429	147.9329	2197		Coyle
HX24618001.002	MOCNESS Start	gak12	6/29/01	10:47	58.2398	147.9176	2197		Coyle
HX24618001.003	MOCNESS End	gak12	6/29/01	11:13	58.2375	147.8832	2197		Coyle
HX24618001.004	HTI Transect Start	gak12	6/29/01	11:46	58.2429	147.9328	2160		Coyle
HX24618001.005	HTI Transect End	gak13	6/29/01	13:18	58.0982	147.7901	2037		Coyle
HX24618001.006	MOCNESS Start	gak13	6/29/01	13:21	58.0975	147.7862	2037		Coyle
HX24618001.007	MOCNESS End	gak13	6/29/01	13:53	58.0921	147.7489	2037		Coyle
HX24618001.008	MOCNESS Start	gak13	6/29/01	14:32	58.0962	147.7886	2037		Coyle
HX24618001.009	MOCNESS End	gak13	6/29/01	16:17	58.0645	147.6909	2037		Coyle
HX24618001.010	CTD3 Start	gak13	6/29/01	16:57	58.097	147.7945	2037	Prod	Thorton

HX24618001.011	Ring Net Start	gak13	6/29/01	17:05	58.0968	147.7967	2087		Hopcroft
HX24618001.012	CalVET Net Tow Start	gak13	6/29/01	17:20	58.0956	147.7986	2084		Hopcroft
HX24618001.013	CTD4 Start	gak13	6/29/01	17:33	58.0983	147.7933	2084	1500m	Zimmermann
HX24618001.014	CTD4 End	gak13	6/29/01	18:46	58.0967	147.8201	2010		Zimmermann
HX24618001.015	Ring Net Start	gak13	6/29/01	19:05	58.099	147.7961	2082		Hopcroft
HX24618001.016	Ring Net Start	gak13	6/29/01	19:11	58.0991	147.7985	2082	second ringnet	Hopcroft
HX24618001.017	CTD5 Start	gak13	6/29/01	19:24	58.0988	147.7963	2082	grazing	Hopcroft
HX24618001.018	CTD5 End	gak13	6/29/01	19:25	58.0986	147.7966	2082		Hopcroft
HX24618001.019	CTD6 Start	gak13	6/29/01	19:45	58.0987	147.7952	2082	Grazing water	Hopcroft
HX24618001.020	CTD6 End	gak13	6/29/01	19:46	58.0991	147.7961	2082		Hopcroft
HX24618001.021	CTD7 Start	gak13	6/29/01	20:00	58.0986	147.7921	2082		Hopcroft
HX24618001.022	CTD7 End	gak13	6/29/01	20:02	58.099	147.7939	2082		Hopcroft
HX24618001.023	CTD8 End	gak13	6/29/01	20:22	58.0984	147.7945	2085		Hopcroft
HX24618001.024	CTD9 Start	gak12	6/29/01	21:22	58.2441	147.9357	2172		Zimmermann
HX24618001.025	CTD9 End	gak12	6/29/01	22:34	58.2534	147.9279	2172		Zimmermann
HX24618001.026	CalVET Net Tow Start	gak12	6/29/01	22:45	58.2435	147.9308	2221		Hopcroft
HX24618001.027	CalVET Net Tow End	gak12	6/29/01	22:53	58.2447	147.9283	2202		Hopcroft
HX24618001.028	CalVET Net Tow Start	gak12	6/29/01	23:03	58.2433	147.9323	2221		Schell
HX24618001.029	CalVET Net Tow End	gak12	6/29/01	23:07	58.2438	147.9308	2221		Schell
HX24618001.030	CTD10 Start	gak11	6/29/01	0:14	58.3901	148.0716	1430		Zimmermann
HX24618001.031	CTD10 End	gak11	6/29/01	1:32	58.4006	148.0336	1430		Zimmermann
HX24618001.032	CalVET Net Tow Start	gak 11	6/29/01	1:47	58.3884	148.0719	1430		Hopcroft
HX24618001.033	CalVET Net Tow End	gak11	6/29/01	1:52	58.389	148.07	1430		Hopcroft

HX24618001.034	CalVET Net Tow Start	gak10	6/29/01	2:59	58.5422	148.2124	1465		Hopcroft
HX24618001.035	CalVET Net Tow End	gak10	6/29/01	3:05	58.5424	148.2113	1465		Hopcroft
HX24618001.036	CTD11 Start	gak10	6/29/01	3:08	58.5425	148.2113	1465		Zimmermann
HX24618001.037	CTD11 End	gak10	6/29/01	4:19	58.544	148.2036	1465		Zimmermann
HX24618001.038	CTD12 Start	gak9i	6/29/01	4:54	58.615	148.2798	650		Zimmermann
HX24618001.039	CTD12 End	gak9i	6/29/01	5:31	58.6213	148.271	650		Zimmermann
HX24618001.040	CTD13 Start	gak9	6/29/01	5:59	58.6807	148.3495	280		Zimmermann
HX24618001.041	CTD13 End	gak9	6/29/01	6:21	58.6856	148.346	280		Zimmermann
HX24618001.042	HTI Transect Start	gak9	6/29/01	6:30	58.6863	148.3479	285		Coyle
HX24618101.001	HTI Transect End	gak10	6/30/01	8:01	58.5425	148.2125	1450		Coyle
HX24618101.002	MOCNESS Start	gak10	6/30/01	8:06	58.5393	148.2061	1450		Coyle
HX24618101.003	MOCNESS End	gak10	6/30/01	8:49	58.5277	148.151	1450		Coyle
HX24618101.004	MOCNESS Start	gak9	6/30/01	10:22	58.6787	148.3356	276		Coyle
HX24618101.005	MOCNESS End	gak9	6/30/01	11:04	58.6643	148.2755	350		Coyle
HX24618101.006	HTI Transect Start	gak9	6/30/01	11:36	58.6803	148.3502	277		Coyle
HX24618101.007	HTI Transect End	gak8	6/30/01	13:16	58.7925	148.491	287		Coyle
HX24618101.008	CTD 14Start	gak9	6/30/01	14:10	58.679	148.3492	280	Prod	Thorton
HX24618101.009	CTD14 End	gak9	6/30/01	14:16	58.6772	148.3502	280		Thorton
HX24618101.010	Ring Net Start	gak9	6/30/01	14:21	58.6758	148.3507	280		Hopcroft
HX24618101.011	Ring Net End	gak9	6/30/01	14:26	58.6754	148.3521	280		Hopcroft
HX24618101.012	Ring Net Start	gak9	6/30/01	14:32	58.6735	148.3515	280	second ringnet	Hopcroft
HX24618101.013	Ring Net End	gak9	6/30/01	14:37	58.6727	148.3524	280		Hopcroft
HX24618101.014	CalVET Net Tow Start	gak9	6/30/01	14:46	58.6793	148.3522	280		Hopcroft

HX24618101.015	CalVET Net Tow End	gak9	6/30/01	14:52	58.6793	148.3523	280		Hopcroft
HX24618101.016	CTD15 Start	gak9	6/30/01	14:54	58.6774	148.353	280		Hopcroft
HX24618101.017	CTD15 End	gak9	6/30/01	14:57	58.6762	148.3536	280		Hopcroft
HX24618101.018	CTD16 Start	gak9	6/30/01	15:08	58.6732	148.3536	280		Hopcroft
HX24618101.019	CTD16 End	gak9	6/30/01	15:10	58.6732	148.3544	280		Hopcroft
HX24618101.020	CTD17 Start	gak9	6/30/01	15:17	58.6726	148.3576	280		Hopcroft
HX24618101.021	CTD17 End	gak9	6/30/01	15:19	58.6722	148.3589	280		Hopcroft
HX24618101.022	CTD18 Start	gak9	6/30/01	15:35	58.679	148.3523	280		
HX24618101.023	CTD19 Start	gak8i	6/30/01	16:23	58.7435	148.4214	290		Zimmermann
HX24618101.024	CTD19 End	gak8i	6/30/01	16:45	58.7392	148.4319	290		Zimmermann
HX24618101.025	CTD20 Start	gak8	6/30/01	17:12	58.7926	148.4922	290		Zimmermann
HX24618101.026	CTD20 End	gak8	6/30/01	17:35	58.7938	148.5054	290		Zimmermann
HX24618101.027	CalVET Net Tow Start	gak8	6/30/01	17:36	58.7939	148.5059	290		Hopcroft
HX24618101.028	CalVET Net Tow End	gak8	6/30/01	17:43	58.7946	148.5113	290		Hopcroft
HX24618101.029	CTD21 Start	gak7i	6/30/01	18:17	58.8819	148.561	300		Zimmermann
HX24618101.030	CTD21 End	gak7i	6/30/01	18:37	58.8821	148.5703	300		Zimmermann
HX24618101.031	CTD22 Start	gak7	6/30/01	19:10	58.9714	148.6315	245		Zimmermann
HX24618101.032	CTD22 End	gak7	6/30/01	19:29	58.9745	148.6345	245		Zimmermann
HX24618101.033	CalVET Net Tow Start	gak7	6/30/01	19:32	58.9751	148.635	245		Hopcroft
HX24618101.034	CalVET Net Tow End	gak7	6/30/01	19:41	58.9767	148.6358	245		Hopcroft
HX24618201.001	CTD23 Start	gak1	7/1/01	5:13	59.845	149.46	272		Zimmermann
HX24618201.002	CTD23 End	gak1	7/1/01	5:31	59.8456	149.4689	272		Zimmermann
HX24618201.003	CalVET Net Tow Start	gak1	7/1/01	5:49	59.8455	149.4732	272		Hopcroft

HX24618201.004	CalVET Net Tow End	gak1	7/1/01	5:52	59.8456	149.474	272		Hopcroft
HX24618201.005	CalVET Net Tow End	gak1	7/1/01	5:54	59.8456	149.4747	272		Hopcroft
HX24618201.006	HTI Transect Start	gak1	7/1/01	6:56	59.8386	149.4611	272		Coyle
HX24618201.007	HTI Transect End	gak2	7/1/01	8:37	59.6901	149.326	228		Coyle
HX24618201.008	HTI Transect Start	gak2	7/1/01	10:39	59.6901	149.3247	228		Coyle
HX24618201.009	HTI Transect End	gak3	7/1/01	12:10	59.554	149.1889	220		Coyle
HX24618201.010	MOCNESS Start	gak3	7/1/01	12:21	59.5545	149.1848	220		Coyle
HX24618201.011	MOCNESS End	gak3	7/1/01	12:44	59.5576	149.2014	220		Coyle
HX24618201.012	HTI Transect Start	gak3	7/1/01	13:06	59.5526	149.1875	220		Coyle
HX24618201.013	HTI Transect End	gak4	7/1/01	14:39	59.4068	149.0475	198		Coyle
HX24618201.014	CTD24 Start	gak4	7/1/01	14:51	59.4076	149.0495	198		Thorton
HX24618201.015	CTD24 End	gak4	7/1/01	15:08	59.4088	149.0444	198		Thorton
HX24618201.016	CalVET Net Tow Start	gak4	7/1/01	15:11	59.409	149.0434	198		Hopcroft
HX24618201.017	CalVET Net Tow End	gak4	7/1/01	15:19	59.4083	149.0408	198		Hopcroft
HX24618201.018	CTD25 Start	gak4	7/1/01	15:25	59.4073	149.0489	198	Prod	Thorton
HX24618201.019	CTD25 End	gak4	7/1/01	15:37	59.408	149.0464	198	Prod	Thorton
HX24618201.020	Ring Net Start	gak4	7/1/01	15:38	59.4078	149.0461	198		Hopcroft
HX24618201.021	Ring Net End	gak4	7/1/01	15:44	59.4079	149.0443	198		Hopcroft
HX24618201.022	Ring Net Start	gak4	7/1/01	15:50	59.4076	149.0427	198		Hopcroft
HX24618201.023	Ring Net End	gak4	7/1/01	15:55	59.4073	149.0415	198		Hopcroft
HX24618201.024	CTD26 Start	gak4	7/1/01	16:01	59.4072	149.0478	198	Grazing	Hopcroft
HX24618201.025	CTD26 End	gak4	7/1/01	16:04	59.4074	149.0478	198		Hopcroft
HX24618201.026	CTD27 Start	gak1i	7/1/01	18:33	59.7654	149.3984	260		Zimmermann

HX24618201.027	CTD27 End	gak1i	7/1/01	18:53	59.7651	149.4043	260		Zimmermann
HX24618201.028	CTD28 Start	gak2	7/1/01	19:26	59.6915	149.3271	228		Zimmermann
HX24618201.029	CTD28 End	gak2	7/1/01	19:43	59.6922	149.3267	228		Zimmermann
HX24618201.030	CalVET Net Tow Start	gak2	7/1/01	19:46	59.6922	149.3267	228		Hopcroft
HX24618201.031	CalVET Net Tow End	gak2	7/1/01	19:52	59.6924	149.3255	228		Hopcroft
HX24618201.032	CTD29 Start	gak2i	7/1/01	20:23	59.6269	149.2569	215		Zimmermann
HX24618201.033	CTD29 End	gak2i	7/1/01	20:39	59.6293	149.2582	215		Zimmermann
HX24618201.034	CTD30 Start	gak3	7/1/01	21:13	59.5534	149.1862	215		Zimmermann
HX24618201.035	CTD30 End	gak3	7/1/01	21:29	59.5554	149.1866	215		Zimmermann
HX24618201.036	CalVET Net Tow Start	gak3	7/1/01	21:31	59.5559	149.1856	215		Hopcroft
HX24618201.037	CalVET Net Tow End	gak3	7/1/01	21:39	59.5574	149.1829	215		Hopcroft
HX24618201.038	CTD31 Start	gak3i	7/1/01	22:13	59.4816	149.1153	203		Zimmermann
HX24618201.039	CTD31 End	gak3i	7/1/01	22:28	59.4839	149.1169	203		Zimmermann
HX24618201.040	CTD32 Start	gak4i	7/1/01	23:36	59.3353	148.9752	195		Zimmermann
HX24618201.041	CTD32 End	gak4i	7/1/01	23:55	59.3366	148.9583	195		Zimmermann
HX24618201.042	CTD33 Start	gak5	7/1/01	0:36	59.2607	148.9054	167		Zimmermann
HX24618201.043	CTD33 End	gak5	7/1/01	0:57	59.263	148.8934	167		Zimmermann
HX24618201.044	CalVET Net Tow Start	gak5	7/1/01	0:58	59.2631	148.8933	167		Hopcroft
HX24618201.045	CalVET Net Tow End	gak5	7/1/01	1:02	59.2645	148.8909	167		Hopcroft
HX24618201.046	CTD34 Start	gak5i	7/1/01	1:49	59.1889	148.8385	167		Zimmermann
HX24618201.047	CTD34 End	gak5i	7/1/01	2:05	59.1906	148.8381	167		Zimmermann
HX24618201.048	CTD35 Start	gak6	7/1/01	3:04	59.1167	148.7711	150		Zimmermann
HX24618201.049	CTD35 End	gak6	7/1/01	3:17	59.1196	148.7735	150		Zimmermann

HX24618201.050	CalVET Net Tow Start	gak6	7/1/01	3:26	59.1205	148.78	150		Hopcroft
HX24618201.051	CalVET Net Tow End	gak6	7/1/01	3:32	59.1206	148.7813	150		Hopcroft
HX24618201.052	CTD36 Start	gak6i	7/1/01	4:25	59.0457	148.7004	194		Zimmermann
HX24618201.053	CTD36 End	gak6i	7/1/01	4:39	59.0482	148.703	194		Zimmermann
HX24618201.054	MOCNESS Start	gak8	7/1/01	7:13	58.7892	148.5119	290		Coyle
HX24618201.055	HTI Transect End	gak8	7/1/01	7:32	58.7871	148.5343	290		Coyle
HX24618201.056	HTI Transect Start	gak8	7/1/01	7:56	58.7925	148.4908	290		Coyle
HX24618301.001	HTI Transect End	gak7	7/2/01	9:46	58.9723	148.6306	245		Coyle
HX24618301.002	MOCNESS Start	gak7	7/2/01	9:51	58.974	148.6352	245		Coyle
HX24618301.003	MOCNESS End	gak7	7/2/01	10:33	58.9764	148.669	245		Coyle
HX24618301.004	HTI Transect Start	gak7	7/2/01	11:00	58.9729	148.6298	245		Coyle
HX24618301.005	HTI Transect End	gak6	7/2/01	12:51	59.1181	148.7719	148		Coyle
HX24618301.006	MOCNESS Start	gak6	7/2/01	12:54	59.118	148.7755	148		Coyle
HX24618301.007	MOCNESS End	gak6	7/2/01	13:28	59.1186	148.8148	148		Coyle
HX24618301.008	HTI Transect Start	gak6	7/2/01	14:00	59.1171	148.7704	148		Coyle
HX24618301.009	HTI Transect End	gak6	7/2/01	15:40	59.2611	148.9133	260		Coyle
HX24618301.010	CTD37 Start	gak5	7/2/01	15:45	59.2611	148.9133	260	Repeat	Hopcroft
HX24618301.011	CalVET Net Tow Start	gak5	7/2/01	15:58	59.2609	148.9143	260	Repeat	Hopcroft
HX24618301.012	CalVET Net Tow End	gak5	7/2/01	16:04	59.2601	148.9144	260	Repeat	Hopcroft
HX24618301.013	CTD38 Start	cf15	7/2/01	17:18	59.4504	148.8662	181		Zimmermann
HX24618301.014	CTD38 End	cf15	7/2/01	17:30	59.4525	148.8695	181		Zimmermann
HX24618301.015	CTD39 Start	cf14	7/2/01	17:51	59.4864	148.8674	168		Zimmermann
HX24618301.016	CTD39 End	cf14	7/2/01	17:57	59.4876	148.8678	168	Pump-off	Zimmermann

HX24618301.017	CTD40 Start	cf14	7/2/01	17:58	59.4878	148.868	168	Recast	Zimmermann
HX24618301.018	CTD40 End	cf14	7/2/01	18:12	59.4956	148.8674	168		Zimmermann
HX24618301.019	CTD41 Start	cf13	7/2/01	18:22	59.5176	148.8649	171		Zimmermann
HX24618301.020	CTD41 End	cf13	7/2/01	18:35	59.5194	148.8663	171		Zimmermann
HX24618301.021	CTD42 Start	cf12	7/2/01	18:49	59.5505	148.8656	180		Zimmermann
HX24618301.022	CTD42 End	cf12	7/2/01	19:00	59.5526	148.8656	180		Zimmermann
HX24618301.023	CTD43 Start	cf11	7/2/01	19:13	59.5834	148.8647	177		Zimmermann
HX24618301.024	CTD43 End	cf11	7/2/01	19:28	59.5856	148.8617	177		Zimmermann
HX24618301.025	CTD44 Start	cf10	7/2/01	19:50	59.6178	148.8671	176		Zimmermann
HX24618301.026	CTD44 End	cf10	7/2/01	20:01	59.6189	148.8658	176		Zimmermann
HX24618301.027	CTD45 Start	cf09	7/2/01	20:16	59.6507	148.8657	178		Zimmermann
HX24618301.028	CTD45 End	cf09	7/2/01	20:28	59.6516	148.8642	178		Zimmermann
HX24618301.029	CTD46 Start	cf08	7/2/01	20:44	59.6837	148.866	179		Zimmermann
HX24618301.030	CTD46 End	cf08	7/2/01	21:01	59.6845	148.8662	179		Zimmermann
HX24618301.031	CTD47 Start	cf07	7/2/01	21:15	59.7169	148.8656	182		Zimmermann
HX24618301.032	CTD47 End	cf07	7/2/01	21:30	59.7185	148.8649	182		Zimmermann
HX24618301.033	CTD48 Start	cf06	7/2/01	21:45	59.7502	148.8656	190		Zimmermann
HX24618301.034	CTD48 End	cf06	7/2/01	22:00	59.7508	148.8666	190		Zimmermann
HX24618301.035	CTD49 Start	cf05	7/2/01	22:14	59.7837	148.8655	192		Zimmermann
HX24618301.036	CTD49 End	cf05	7/2/01	22:28	59.7828	148.8676	192		Zimmermann
HX24618301.037	CTD50 Start	cf04	7/2/01	22:44	59.8162	148.8655	182		Zimmermann
HX24618301.038	CTD50 End	cf04	7/2/01	22:54	59.8155	148.8672	182		Zimmermann
HX24618301.039	CTD51 Start	cf03	7/2/01	23:11	59.85	148.8676	161		Zimmermann

HX24618301.040	CTD51 End	cf03	7/2/01	23:24	59.8496	148.871	161		Zimmermann
HX24618301.041	CTD52 Start	cf02	7/2/01	23:40	59.884	148.8663	112		Zimmermann
HX24618301.042	CTD52 End	cf02	7/2/01	23:50	59.8841	148.8705	112		Zimmermann
HX24618301.043	CTD53 Start	cf01	7/3/01	0:04	59.9077	148.8673	85		Zimmermann
HX24618301.044	CTD53 End	cf01	7/3/01	0:12	59.9077	148.8673	85		Zimmermann
HX24618301.045	Doppler Start	cf01-15	7/2/01	0:15	59.9087	148.8675	85		Zimmermann
HX24618301.046	CTD54 Start	ri10	7/2/01	4:08	59.4072	148.8668	167		Zimmermann
HX24618301.047	CTD54 End	ri10	7/2/01	4:20	59.4066	148.8679	167		Zimmermann
HX24618301.048	CTD55 Start	ri09	7/2/01	4:55	59.4076	149.0488	200	aka Gak4	Zimmermann
HX24618301.049	CTD55 End	ri09	7/2/01	5:08	59.4085	149.0516	200		Zimmermann
HX24618401.001	CTD56 Start	ri08	7/2/01	5:41	59.4072	149.2126	190		Zimmermann
HX24618401.002	CTD56 End	ri08	7/2/01	5:55	59.4072	149.2126	190		Zimmermann
HX24618401.003	MOCNESS Start	gak2	7/3/01	8:32	59.6969	149.2947	215		Coyle
HX24618401.004	MOCNESS End	gak2	7/3/01	9:06	59.6823	149.311	215		Coyle
HX24618401.005	MOCNESS Start	gak1	7/3/01	10:39	59.8436	149.4681	272		Coyle
HX24618401.006	MOCNESS End	gak1	7/3/01	11:13	59.8262	149.4558	272		Coyle
HX24618401.007	Ring Net Start	gak1	7/3/01	12:00	59.8449	149.467	272		Hopcroft
HX24618401.008	Ring Net End	gak1	7/3/01	12:06	59.8443	149.4671	272		Hopcroft
HX24618401.009	CTD57 Start	gak1	7/3/01	12:08	59.843	149.4667	270		Zimmermann
HX24618401.010	CTD57 End	gak1	7/3/01	12:25	59.843	149.4667	270		Zimmermann
HX24618401.011	Ring Net Start	gak1	7/3/01	12:29	59.8425	149.4638	270		Hopcroft
HX24618401.012	Ring Net Start	gak1	7/3/01	12:34	59.8421	149.4636	270		Hopcroft
HX24618401.013	Ring Net End	gak1	7/3/01	12:36	59.8418	149.4633	270		Hopcroft

HX24618401.014	Ring Net End	gak1	7/3/01	12:37	59.8417	149.4631	270		Hopcroft
HX24618401.015	CTD58 Start	gak1	7/3/01	12:42	59.8414	149.4635	270	grazing	Hopcroft
HX24618401.016	CTD58 End	gak1	7/3/01	12:46	59.8408	149.464	270	grazing	Hopcroft
HX24618401.017	CTD59 Start	gak1	7/3/01	12:57	59.8439	149.4649	270	Grazing	Hopcroft
HX24618401.018	CTD59 End	gak1	7/3/01	12:58	59.8438	149.4649	270	Grazing	Hopcroft
HX24618401.019	CTD60 Start	gak1	7/3/01	13:06	59.8433	149.464	270	Grazing	Hopcroft
HX24618401.020	CTD60 End	gak1	7/3/01	13:08	59.8432	149.4637	270	Grazing	Hopcroft
HX24618401.021	CTD61 Start	gak1	7/3/01	13:16	59.8426	149.4624	270	Grazing	Hopcroft
HX24618401.022	CTD61 End	gak1	7/3/01	13:18	59.8425	149.4622	270	Grazing	Hopcroft
HX24618401.023	CTD62 Start	gak1	7/3/01	13:26	59.8421	149.4608	270	Grazing	Hopcroft
HX24618401.024	CTD62 End	gak1	7/3/01	13:28	59.842	149.4605	270	Grazing	Hopcroft
HX24618401.025	CalVET Net Tow Start	gak1	7/3/01	13:33	59.8432	149.4628	270		Hopcroft
HX24618401.026	CalVET Net Tow End	gak1	7/3/01	13:38	59.8426	149.4633	270		Hopcroft
HX24618401.027	CTD63 Start	gak1	7/3/01	13:45	59.8418	149.4653	270	Productivity	Thorton
HX24618401.028	CTD63 End	gak1	7/3/01	13:53	59.8404	149.466	270	Productivity	Thorton
HX24618401.029	CTD64 Start	ri7	7/3/01	16:28	59.4083	149.3759	142		Zimmermann
HX24618401.030	CTD64 End	ri7	7/3/01	16:40	59.4084	149.3736	142		Zimmermann
HX24618401.031	CTD65 Start	ri6	7/3/01	17:13	59.4075	149.5412	98		Zimmermann
HX24618401.032	CTD65 End	ri6	7/3/01	17:21	59.4076	149.5433	98		Zimmermann
HX24618401.033	CTD66 Start	ri5	7/3/01	17:54	59.4074	149.7055	100		Zimmermann
HX24618401.034	CTD66 End	ri5	7/3/01	18:04	59.4072	149.7059	100		Zimmermann
HX24618401.035	CTD67 Start	ri4	7/3/01	18:39	59.4079	149.8714	164		Zimmermann
HX24618401.036	CTD67 End	ri4	7/3/01	18:50	59.4079	149.8714	164		Zimmermann

HX24618401.037	CTD68 Start	ri3	7/3/01	19:22	59.4071	150.0333	164		Zimmermann
HX24618401.038	CTD68 End	ri3	7/3/01	19:33	59.4062	150.0307	164		Zimmermann
HX24618401.039	CTD69 Start	ri2	7/3/01	20:12	59.4069	150.1986	123		Zimmermann
HX24618401.040	CTD69 End	ri2	7/3/01	20:23	59.4053	150.2007	123		Zimmermann
HX24618401.041	CTD70 Start	ri1	7/3/01	20:37	59.4094	150.2583	98		Zimmermann
HX24618401.042	CTD70 End	ri1	7/3/01	20:48	59.4077	150.26	98		Zimmermann
HX24618401.043	CTD71 Start	mm8	7/3/01	23:32	59.0029	149.8626	225		Zimmermann
HX24618401.044	CTD71 End	mm8	7/3/01	23:48	59.0035	149.8592	225		Zimmermann
HX24618401.045	CTD72 Start	mm7	7/3/01	0:24	59.0642	149.7563	225		Zimmermann
HX24618401.046	CTD72 End	mm7	7/3/01	0:43	59.0631	149.754	225		Zimmermann
HX24618401.047	CTD73 Start	mm6	7/3/01	1:20	59.1208	149.631	207		Zimmermann
HX24618401.048	CTD73 End	mm6	7/3/01	1:38	59.1186	149.6336	207		Zimmermann
HX24618401.049	CTD74 Start	mm5	7/3/01	2:21	59.1904	149.4914	128		Zimmermann
HX24618401.050	CTD74 End	mm5	7/3/01	2:33	59.1915	149.4922	128		Zimmermann
HX24618401.051	CTD75 Start	mm4	7/3/01	3:02	59.2372	149.3969	144		Zimmermann
HX24618401.052	CTD75 End	mm4	7/3/01	3:14	59.2379	149.3952	144		Zimmermann
HX24618401.053	CTD76 Start	mm3	7/3/01	3:49	59.2928	149.2792	150		Zimmermann
HX24618401.054	CTD76 End	mm3	7/3/01	4:02	59.2926	149.2782	150		Zimmermann
HX24618401.055	CTD77-start	mm2	7/3/01	4:36	59.3499	149.1626	195		Zimmermann
HX24618401.056	CTD77 End	mm2	7/3/01	4:51	59.3517	149.1623	195		Zimmermann
HX24618401.057	CTD78 Start	mm1	7/3/01	5:53	59.4072	149.0517	200		Zimmermann
HX24618401.058	CTD78 End	mm1	7/3/01	6:15	59.4047	149.0588	200	AKA GAK4	Zimmermann
HX24618401.059	MOCNESS Start	gak 4	7/3/01	7:07	59.4075	149.0554	200		Coyle

HX24618401.060	MOCNESS End	gak 4	7/3/01	7:44	59.3988	149.0915	200		Coyle
HX24618501.001	HTI Transect Start	gak 4	7/4/01	8:13	59.4074	149.0475	200		Coyle
HX24618501.002	HTI Transect End	gak 5	7/4/01	10:04	59.2611	148.9079	170		Coyle
HX24618501.003	MOCNESS Start	gak 5	7/4/01	10:10	59.2575	148.9066	170		Coyle
HX24618501.004	MOCNESS End	gak 5	7/4/01	10:40	59.2458	148.9175	170		Coyle
HX24618501.005	CTD79 Start	kip2	7/4/01	18:00	60.2777	147.9884	570	Productivity	Thorton
HX24618501.006	CTD79 End	kip2	7/4/01	18:06	60.2769	147.987	570	Productivity	Thorton
HX24618501.007	CalVET Net Tow Start	kip2	7/4/01	18:11	60.2764	147.9865	570		Hopcroft
HX24618501.008	CalVET Net Tow End	kip2	7/4/01	18:17	60.2755	147.9857	570		Hopcroft
HX24618501.009	CTD80 Start	kip2	7/4/01	18:26	60.2772	147.9857	570		Zimmermann
HX24618501.010	CTD80 End	kip2	7/4/01	18:57	60.276	147.9839	570		Zimmermann
HX24618501.011	CTD81 Start	pws1	7/4/01	19:42	60.3796	147.9379	350		Zimmermann
HX24618501.012	CTD81 End	pws1	7/4/01	20:03	60.3776	147.9411	350		Zimmermann
HX24618501.013	CalVET Net Tow Start	pws1	7/4/01	20:08	60.3781	147.9391	350		Hopcroft
HX24618501.014	CalVET Net Tow End	pws1	7/4/01	20:13	60.3773	147.9385	350		Hopcroft
HX24618501.015	CTD82 Start	pws2	7/4/01	21:19	60.5353	147.8046	745		Zimmermann
HX24618501.016	CTD82 End	pws2	7/4/01	21:58	60.5305	147.8078	745		Zimmermann
HX24618501.017	CalVET Net Tow Start	pws2	7/4/01	22:05	60.5344	147.803	745		Hopcroft
HX24618501.018	CalVET Net Tow End	pws2	7/4/01	22:13	60.5328	147.8036	745		Hopcroft
HX24618501.019	CTD83 Start	pws2	7/4/01	22:19	60.5343	147.8027	745	grazing	Hopcroft
HX24618501.020	CTD83 End	pws2	7/4/01	22:23	60.5337	147.8026	745		Hopcroft
HX24618501.021	Ring Net Start	pws2	7/4/01	22:31	60.5341	147.8029	745	net fouled	Hopcroft
HX24618501.022	Ring Net End	pws2	7/4/01	22:37	60.5339	147.804	745	net fouled	Hopcroft

HX24618501.023	Ring Net Start	pws2	7/4/01	22:39	60.5339	147.804	745	repeat	Hopcroft
HX24618501.024	Ring Net End	pws2	7/4/01	22:44	60.5337	147.8045	745		Hopcroft
HX24618501.025	CTD84 Start	pws2	7/4/01	22:47	60.5334	147.8053	745	grazing 2	Hopcroft
HX24618501.026	CTD84 End	pws2	7/4/01	22:50	60.5331	147.8064	745		Hopcroft
HX24618501.027	Ring Net Start	pws2	7/4/01	22:54	60.5342	147.8044	745	#3	Hopcroft
HX24618501.028	Ring Net End	pws2	7/4/01	23:01	60.5337	147.8058	745		Hopcroft
HX24618501.029	CTD85 Start	pws2	7/4/01	23:03	60.5334	147.8062	745	gazing3	Hopcroft
HX24618501.030	CTD85 End	pws2	7/4/01	23:16	60.5347	147.8054	745		Hopcroft
HX24618501.031	CTD86 Start	pws2	7/4/01	23:18	60.5346	147.8057	745	grazing4	Hopcroft
HX24618501.032	CTD86 End	pws2	7/4/01	23:20	60.5346	147.8063	745		Hopcroft
HX24618501.033	CTD87 Start	pws2	7/4/01	23:32	60.5346	147.8102	745	grazing5	Hopcroft
HX24618501.034	CTD87 End	pws2	7/4/01	23:34	60.5346	147.8108	745		Hopcroft
HX24618501.035	CTD88 Start	pws2	7/4/01	23:44	60.5339	147.8133	745	grazing6	Hopcroft
HX24618501.036	CTD88 End	pws2	7/4/01	23:47	60.5337	147.8138	745		Hopcroft
HX24618501.037	CTD89 Start	pws3	7/4/01	0:44	60.6553	147.6763	750		Zimmermann
HX24618501.038	CTD89 End	pws3	7/4/01	1:25	60.6514	147.688	750		Zimmermann
HX24618501.039	MOCNESS Start	pws2	7/4/01	3:40	60.5392	147.808	750		Hopcroft
HX24618501.040	MOCNESS End	pws2	7/4/01	4:49	60.5683	147.7712	775		Hopcroft
HX24618501.041	MOCNESS Start	pws2	7/4/01	7:11	60.5392	147.808	750		Coyle
HX24618501.042	MOCNESS End	pws2	7/4/01	7:40	60.5477	147.7771	723		Coyle
HX24618601.001	MOCNESS Start	pws1	7/5/01	9:19	60.3793	147.9401	364		Coyle
HX24618601.002	MOCNESS End	pws1	7/5/01	9:56	60.3952	147.9216	364		Coyle
HX24618601.003	MOCNESS Start	kip1	7/5/01	10:55	60.2773	147.9853	592		Coyle

HX24618601.004	MOCNESS End	kip1	7/5/01	11:26	60.2918	147.9766	592		Coyle
HX24618601.005	CTD90 Start	hb1	7/5/01	21:20	60.1937	147.6995	248		Zimmermann
HX24618601.006	CTD90 End	hb1	7/5/01	21:38	60.1909	147.7004	248		Zimmermann
HX24618601.007	CalVET Net Tow Start	hb2	7/5/01	21:55	60.1789	147.6413	248		Hopcroft
HX24618601.008	CalVET Net Tow End	hb2	7/5/01	22:02	60.1784	147.6419	248		Hopcroft
HX24618601.009	CTD91 Start	hb2	7/5/01	22:04	60.179	147.6406	175	Pump problems	Zimmermann
HX24618601.010	CTD91 End	hb2	7/5/01	22:19	60.1794	147.6389	175		Zimmermann
HX24618601.011	CTD92 Start	hb2	7/5/01	22:23	60.1796	147.6421	175	Repeat cast;	Zimmermann
HX24618601.012	CTD92 End	hb2	7/5/01	22:35	60.1795	147.6417	175		Zimmermann
HX24618601.013	CTD93 Start	hb3	7/5/01	22:53	60.1658	147.5855	84		Zimmermann
HX24618601.014	CTD93 End	hb3	7/5/01	23:00	60.1654	147.5864	84		Zimmermann
HX24618601.015	CTD94 Start	hb4	7/5/01	23:22	60.1462	147.5013	110		Zimmermann
HX24618601.016	CTD94 End	hb4	7/5/01	23:32	60.1447	147.5029	110		Zimmermann
HX24618601.017	CTD95 Start	hb5	7/5/01	23:47	60.1331	147.4489	39		Zimmermann
HX24618601.018	CTD95 End	hb5	7/5/01	23:51	60.1319	147.4501	39		Zimmermann
HX24618601.019	CTD96 Start	ms1	7/5/01	2:00	59.9537	147.9288	166		Zimmermann
HX24618601.020	CTD96 End	ms1	7/5/01	2:13	59.9488	147.9389	166		Zimmermann
HX24618601.021	CTD97 Start	ms2	7/5/01	2:27	59.9432	147.8972	190		Zimmermann
HX24618601.022	CTD97 End	ms2	7/5/01	2:46	59.934	147.9061	190		Zimmermann
HX24618601.023	CalVET Net Tow Start	ms2	7/5/01	2:48	59.9331	147.9072	190	>wire angle	Hopcroft
HX24618601.024	CalVET Net Tow End	ms2	7/5/01	2:54	59.9305	147.9125	190		Hopcroft
HX24618601.025	CalVET Net Tow Start	ms2	7/5/01	3:01	59.9292	147.9182	190	Repeat	Hopcroft
HX24618601.026	CalVET Net Tow End	ms2	7/5/01	3:06	59.929	147.9214	190		Hopcroft

HX24618601.027	CTD98 Start	ms3	7/5/01	3:24	59.9316	147.8588	166		Zimmermann
HX24618601.028	CTD98 End	ms3	7/5/01	3:38	59.9253	147.8643	166		Zimmermann
HX24618601.029	CTD99 Start	ms4	7/5/01	3:50	59.9208	147.8295	110		Zimmermann
HX24618601.030	CTD99 End	ms4	7/5/01	4:01	59.9187	147.8336	110		Zimmermann
HX24618601.031	MOCNESS Start	ms2	7/5/01	7:28	59.9421	147.881	195		Coyle
HX24618701.001	MOCNESS End	ms2	7/6/01	8:15	59.9698	147.8502	195		Coyle
HX24618701.002	MOCNESS Start	hb2	7/6/01	9:58	60.1878	147.6691	154		Coyle
HX24618701.003	MOCNESS End	hb2	7/6/01	10:41	60.21	147.6509	154		Coyle
HX24618701.004	CTD100 Start	he1	7/6/01	14:59	60.217	146.6098	75		Zimmermann
HX24618701.005	CTD100 End	he1	7/6/01	15:08	60.2152	146.6166	75		Zimmermann
HX24618701.006	CTD101 Start	he2	7/6/01	15:24	60.1795	146.6087	191		Zimmermann
HX24618701.007	CTD101 End	he2	7/6/01	15:42	60.1749	146.6259	191		Zimmermann
HX24618701.008	CalVET Net Tow Start	he2	7/6/01	15:46	60.1739	146.6292	191		Hopcroft
HX24618701.009	CalVET Net Tow End	he2	7/6/01	15:51	60.1734	146.6309	191		Hopcroft
HX24618701.010	CTD102 Start	he3	7/6/01	16:10	60.1288	146.6099	112		Zimmermann
HX24618701.011	CTD102 End	he3	7/6/01	16:19	60.1256	146.6123	112		Zimmermann
HX24618701.012	CTD103 Start	he4	7/6/01	16:39	60.0792	146.6107	112		Zimmermann
HX24618701.013	CTD103 End	he4	7/6/01	16:49	60.0766	146.6169	112		Zimmermann
HX24618701.014	CalVET Net Tow Start	he4	7/6/01	16:53	60.0759	146.6179	113		Hopcroft
HX24618701.015	CalVET Net Tow End	he4	7/6/01	16:59	60.0742	146.6223	113		Hopcroft
HX24618701.016	CTD104 Start	he5	7/6/01	17:19	60.0291	146.6106	92		Zimmermann
HX24618701.017	CTD104 End	he5	7/6/01	17:28	60.0267	146.6151	92		Zimmermann
HX24618701.018	CTD105 Start	he6.5	7/6/01	17:54	60.0517	146.7395	122		Zimmermann

HX24618701.019	CTD105 End	he6.5	7/6/01	18:07	60.0499	146.7542	122		Zimmermann
HX24618701.020	CalVET Net Tow Start	he6.5	7/6/01	18:14	60.0482	146.7594	122		Hopcroft
HX24618701.021	CalVET Net Tow End	he6.5	7/6/01	18:22	60.0486	146.763	122		Hopcroft
HX24618701.022	CTD106 Start	he8	7/6/01	18:44	60.0754	146.8769	106		Zimmermann
HX24618701.023	CTD106 End	he8	7/6/01	18:55	60.0762	146.8886	106		Zimmermann
HX24618701.024	CTD107 Start	he9	7/6/01	19:10	60.0941	146.9623	150		Zimmermann
HX24618701.025	CTD107 End	he9	7/6/01	19:23	60.097	146.9693	150		Zimmermann
HX24618701.026	CTD108 Start	he10	7/6/01	19:40	60.1112	147.0508	277		Zimmermann
HX24618701.027	CTD108 End	he10	7/6/01	20:05	60.1166	147.0607	277		Zimmermann
HX24618701.028	CalVET Net Tow Start	he10	7/6/01	20:08	60.1171	147.0603	277		Hopcroft
HX24618701.029	CalVET Net Tow End	he10	7/6/01	20:14	60.1186	147.0624	277		Hopcroft
HX24618701.030	CTD109 Start	he11	7/6/01	20:33	60.1311	147.1335	216		Zimmermann
HX24618701.031	CTD109 End	he11	7/6/01	20:48	60.1336	147.1364	216		Zimmermann
HX24618701.032	CTD110 Start	he12	7/6/01	21:08	60.1411	147.1886	180		Zimmermann
HX24618701.033	CTD110 End	he12	7/6/01	21:19	60.1406	147.1877	180		Zimmermann
HX24618701.034	CTD111 Start	ahc01	7/6/01	21:53	60.1005	147.0743	263		Zimmermann
HX24618701.035	CTD111 End	ahc01	7/6/01	22:09	60.1011	147.0746	263		Zimmermann
HX24618701.036	CTD112 Start	ahc02	7/6/01	22:51	59.999	147.0743	185		Zimmermann
HX24618701.037	CTD112 End	ahc02	7/6/01	23:04	59.999	147.0736	185		Zimmermann
HX24618701.038	CTD113 Start	ahc03	7/6/01	23:45	59.899	147.0732	200		Zimmermann
HX24618701.039	CTD113 End	ahc03	7/6/01	0:00	59.8984	147.0702	200		Zimmermann
HX24618701.040	CTD114 Start	ahc04	7/6/01	0:40	59.8006	147.0743	203		Zimmermann
HX24618701.041	CTD114 End	ahc04	7/6/01	0:56	59.802	147.071	203		Zimmermann

HX24618701.042	CTD115 Start	ahc05	7/6/01	1:52	59.6991	147.0723	207		Zimmermann
HX24618701.043	CTD115 End	ahc05	7/6/01	2:08	59.6987	147.0752	207		Zimmermann
HX24618701.044	MOCNESS Start	he2	7/6/01	7:24	60.1777	146.6055	207		Coyle
HX24618701.045	MOCNESS End	he2	7/6/01	7:51	60.1702	146.6054	207		Coyle
HX24618801.001	MOCNESS Start	he4	7/7/01	8:36	60.0909	146.6334	117		Coyle
HX24618801.002	MOCNESS End	he4	7/7/01	9:01	60.0879	146.6136	117		Coyle
HX24618801.003	MOCNESS23 Start	he8	7/7/01	10:09	60.0741	146.8648	108		Coyle
HX24618801.004	MOCNESS23 End	he8	7/7/01	10:36	60.064	146.8331	108		Coyle
HX24618801.005	MOCNESS24 Start	he10	7/7/01	11:35	60.109	147.0474	280		Coyle
HX24618801.006	MOCNESS24 End	he10	7/7/01	12:23	60.0585	147.0636	280		Coyle
HX24618801.007	CTD116 Start	ccse1	7/7/01	15:17	59.7406	147.817	65		Zimmermann
HX24618801.008	CTD116 End	ccse1	7/7/01	15:22	59.7391	147.8197	65		Zimmermann
HX24618801.009	CTD117 Start	ccse2	7/7/01	15:58	59.6664	147.728	113	Productivity	Thorton
HX24618801.010	CTD117 End	ccse2	7/7/01	16:05	59.6655	147.7319	113		Thorton
HX24618801.011	CalVET Net Tow Start	ccse2	7/7/01	16:08	59.6654	147.7331	113		Hopcroft
HX24618801.012	CalVET Net Tow End	ccse2	7/7/01	16:14	59.6653	147.7361	113		Hopcroft
HX24618801.013	CTD118 Start	ccse2	7/7/01	16:24	59.6634	147.7437	113		Zimmermann
HX24618801.014	CTD118 End	ccse2	7/7/01	16:34	59.6627	147.7499	113		Zimmermann
HX24618801.015	CTD119 Start	ccse3	7/7/01	17:21	59.5712	147.6082	108		Zimmermann
HX24618801.016	CTD119 End	ccse3	7/7/01	17:32	59.5695	147.6132	108		Zimmermann
HX24618801.017	CalVET Net Tow Start	ccse3	7/7/01	17:35	59.5692	147.615	108		Hopcroft
HX24618801.018	CalVET Net Tow End	ccse3	7/7/01	17:44	59.5688	147.6169	108		Hopcroft
HX24618801.019	CTD120 Start	ccse4	7/7/01	18:34	59.4749	147.476	115		Zimmermann

HX24618801.020	CTD120 End	ccse4	7/7/01	18:44	59.4767	147.4807	115		Zimmermann
HX24618801.021	CTD121 Start	ccse5	7/7/01	19:39	59.3756	147.3488	132		Zimmermann
HX24618801.022	CTD121 Start	ccse5	7/7/01	19:50	59.379	147.3481	132		Zimmermann
HX24618801.023	CalVET Net Tow Start	ccse5	7/7/01	19:54	59.3793	147.3467	132		Hopcroft
HX24618801.024	CalVET Net Tow End	ccse5	7/7/01	20:00	59.3809	147.3459	132		Hopcroft
HX24618801.025	CTD122 Start	ccse6	7/7/01	21:10	59.2331	147.1576	200		Zimmermann
HX24618801.026	CTD122 End	ccse6	7/7/01	21:24	59.2359	147.1577	200		Zimmermann
HX24618801.027	CalVET Net Tow Start	ccse6	7/7/01	21:27	59.2353	147.1574	200		Hopcroft
HX24618801.028	CalVET Net Tow End	ccse6	7/7/01	21:34	59.2358	147.1572	200		Hopcroft
HX24618801.029	CTD123 Start	ahc09	7/7/01	22:07	59.3003	147.0736	195		Zimmermann
HX24618801.030	CTD123 End	ahc09	7/7/01	22:21	59.3016	147.0732	195		Zimmermann
HX24618801.031	CTD124 Start	ahc08	7/7/01	23:00	59.401	147.0744	205		Zimmermann
HX24618801.032	CTD124 End	ahc08	7/7/01	23:17	59.4044	147.0751	205		Zimmermann
HX24618801.033	CTD125 Start	ahc07	7/7/01	23:55	59.5012	147.0746	222		Zimmermann
HX24618801.034	CTD125 End	ahc07	7/7/01	0:09	59.5043	147.0739	222		Zimmermann
HX24618801.035	CTD126 Start	ahc06	7/7/01	0:46	59.601	147.0739	207		Zimmermann
HX24618801.036	CTD126 End	ahc06	7/7/01	1:01	59.6023	147.0726	207		Zimmermann
HX24618801.037	CTD127 Start	ahc05	7/7/01	1:39	59.7002	147.0735	207		Zimmermann
HX24618801.038	CTD127 End	ahc05	7/7/01	1:54	59.7002	147.0764	207		Zimmermann
HX24618801.039	CTD128 Start	ccse4	7/7/01	3:43	59.4736	147.4752	115	repeat 100m	Hopcroft
HX24618801.040	CTD128 End	ccse4	7/7/01	3:50	59.4719	147.4773	115		Hopcroft
HX24618801.041	CalVET Net Tow Start	ccse4	7/7/01	3:52	59.4715	147.4773	115	repeat	Hopcroft
HX24618801.042	CalVET Net Tow End	ccse4	7/7/01	3:58	59.4706	147.4781	115		Hopcroft

HX24618801.043	MOCNESS Start	ccse5	7/7/01	7:03	59.3768	147.3448	132		Coyle
HX24618801.044	MOCNESS End	ccse5	7/7/01	7:32	59.387	147.3202	132		Coyle
HX24618801.045	HTI Transect Start	ccse5	7/7/01	7:53	59.3744	147.3494	132		Coyle
HX24618901.001	HTI Transect End	ccse6	7/8/01	9:42	59.2326	147.1575	200		Coyle
HX24618901.002	MOCNESS Start	ccse6	7/8/01	9:47	59.2331	147.1541	200		Coyle
HX24618901.003	MOCNESS End	ccse6	7/8/01	10:30	59.2467	147.1274	200		Coyle
HX24618901.004	HTI Transect Start	ccse6	7/8/01	10:51	59.2321	147.1572	200		Coyle
HX24618901.005	HTI Transect End	ccse7	7/8/01	12:56	59.0575	146.9653	2015		Coyle
HX24618901.006	MOCNESS Start	ccse7	7/8/01	12:59	59.0579	146.9625	2015		Coyle
HX24618901.007	MOCNESS End	ccse7	7/8/01	13:28	59.0667	146.9376	2015		Coyle
HX24618901.008	CTD129 Start	ccse8	7/8/01	14:54	58.8838	146.732	2800	Productivity	Thorton
HX24618901.009	CTD129 End	ccse8	7/8/01	15:01	58.8826	146.7318	2800		Thorton
HX24618901.010	CalVET Net Tow Start	ccse8	7/8/01	15:02	58.8824	146.7315	2800		Hopcroft
HX24618901.011	CalVET Net Tow End	ccse8	7/8/01	15:08	58.8822	146.7326	2800		Hopcroft
HX24618901.012	CTD130 Start	ccse8	7/8/01	15:16	58.881	146.7331	2772	1500m	Zimmermann
HX24618901.013	CTD130 End	ccse8	7/8/01	15:51	58.8755	146.7367	2772	termination problem	Zimmermann
HX24618901.014	CTD131 Start	ccse8	7/8/01	16:50	58.883	146.7328	2778	1500m repeat	Zimmermann
HX24618901.015	CTD131 End	ccse8	7/8/01	18:03	58.8729	146.7388	2778		Zimmermann
HX24618901.016	CTD132 Start	ccse7	7/8/01	19:55	59.0584	146.9694	2000		Zimmermann
HX24618901.017	CTD132 End	ccse7	7/8/01	21:12	59.0583	146.9835	2000		Zimmermann
HX24618901.018	CalVET Net Tow Start	ccse7	7/8/01	21:15	59.0585	146.9844	2000		Hopcroft
HX24618901.019	CalVET Net Tow End	ccse7	7/8/01	21:23	59.0595	146.9868	2000		Hopcroft
HX24618901.020	CTD133 Start	xhcm11	7/8/01	23:42	59.4008	146.6661	97		Zimmermann

HX24618901.021	CTD133 End	xhcm11	7/8/01	23:50	59.4022	146.6685	97		Zimmermann
HX24618901.022	CTD134 Start	xhcm10	7/8/01	0:14	59.4006	146.785	128		Zimmermann
HX24618901.023	CTD134 End	xhcm10	7/8/01	0:25	59.403	146.7886	128		Zimmermann
HX24618901.024	CTD135 Start	xhcm9	7/8/01	0:47	59.4009	146.9014	195		Zimmermann
HX24618901.025	CTD135 End	xhcm9	7/8/01	1:00	59.4053	146.9047	195		Zimmermann
HX24618901.026	CTD136 Start	xhcm8	7/8/01	1:14	59.4005	146.9594	197		Zimmermann
HX24618901.027	CTD136 End	xhcm8	7/8/01	1:28	59.4036	146.9626	197		Zimmermann
HX24618901.028	CTD137 Start	xhcm7	7/8/01	1:44	59.4007	147.0181	203		Zimmermann
HX24618901.029	CTD137 End	xhcm7	7/8/01	1:55	59.4029	147.0193	203		Zimmermann
HX24618901.030	CTD138 Start	xhcm6	7/8/01	2:24	59.3998	147.0746	203	aka ahc8	Zimmermann
HX24618901.031	CTD138 End	xhcm6	7/8/01	2:34	59.401	147.073	203	aka ahc8	Zimmermann
HX24618901.032	CTD139 Start	xhcm5	7/8/01	3:07	59.4	147.1324	204		Zimmermann
HX24618901.033	CTD139 End	xhcm5	7/8/01	3:20	59.3995	147.1339	204		Zimmermann
HX24618901.034	CTD140 Start	xhcm4	7/8/01	3:33	59.4008	147.1922	195		Zimmermann
HX24618901.035	CTD140 End	xhcm4	7/8/01	3:44	59.3987	147.1946	195		Zimmermann
HX24618901.036	CTD141 Start	xhcm3	7/8/01	3:57	59.4001	147.2504	195		Zimmermann
HX24618901.037	CTD141 End	xhcm3	7/8/01	4:17	59.3988	147.2918	195		Zimmermann
HX24618901.038	CTD142 Start	xhcm2	7/8/01	4:26	59.4002	147.3336	145		Zimmermann
HX24618901.039	CTD142 End	xhcm2	7/8/01	4:43	59.4002	147.3336	145		Zimmermann
HX24618901.040	CTD143 Start	xhcm1	7/8/01	4:51	59.3996	147.4184	116		Zimmermann
HX24618901.041	CTD143 End	xhcm1	7/8/01	5:00	59.3981	147.4245	116		Zimmermann
HX24618901.042	HTI Transect Start	ccse5	7/8/01	5:27	59.3753	147.3523	127		Coyle
HX24618901.043	HTI Transect End	ccse3	7/8/01	7:35	59.5697	147.6122	110		Coyle

