

## GLOBEC CRUISE REPORT

Cruise HX280 – 2-10 December, 2003

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

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### Scientific Personnel:

Thomas Kline	Zooplankton stable isotope composition, PWSSC
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Melanie Rohr	Nutrients/Chlorophyll, Technician, IMS-UAF
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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 that end, the GLOBEC cruises on the Gulf of Alaska shelf will determine the physical-chemical structure, primary production, the distribution and abundance of zooplankton, YOY salmon, other planktivorous fishes, and marine birds and mammals. These interdisciplinary cruises will occur over a seven-year period and throughout the year so that seasonal and interannual comparisons of the oceanography of this shelf can be made. 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 December 2003 cruise was the sixth December to be sampled as part of the LTOP program in the Gulf of Alaska. December characterizes early winter conditions in the Gulf of Alaska. We have a truncated sampling scheme for zooplankton and phytoplankton growth experiments in December.

## **Cruise Objectives:**

1. Determine thermohaline, velocity, and nutrient structure of the Gulf of Alaska shelf, emphasizing Seward Line, C. Fairfield Line, Prince William Sound stations, and offshore PWS stations (Table 1). Other lines as time permits.
2. Determine primary production and phytoplankton biomass distribution.
3. Determine the distribution and abundance of zooplankton and microzooplankton.
4. Characterize the carbon and nitrogen stable isotope concentrations in zooplankton.

## **SAMPLING**

1. Occupied the hydrographic transects (Table 1) and collected vertical CTD-chlorophyll-PAR-NO<sub>3</sub> profiles.
2. Collected ADCP, sea surface salinity (SSS), temperature (SST) and fluorescence (SSF) using seacrest sensors,
3. Collected discrete bottle samples at these stations for nutrients and chlorophyll pigments. Chlorophyll Size Fractionation was done at the whole numbered Seward Line stations.
4. Measured Primary Productivity at Stations GAK1, GAK9, GAK13, and KIP2.
5. One CalVet Net cast was done (the CalVet frame has 4 nets) on the Seward Line stations and at selected PWS stations. There were two fine mesh nets (.053mm) and two large mesh nets (.150mm) on each tow.
6. We did deep MOCNESS tows (to 600 m) near the end of the Seward Line at station GAK12 and at station PWS2.

A detailed sampling schedule is contained in the Cruise Event Log appended to this report.

## **Cruise Chronology:**

We departed Seward at 09:57 on December 2, took samples at RES2.5 and GAK1. and departed immediately for Prince William Sound. At GAK1 we were experiencing icing on the CTD bottles: 24 kt wind speed, -7.5 degree C air temperature, barometer at 995 mb. Given the cold northerly winds there was no opportunity for safe sampling in the open Gulf but we felt comfortable in trying to transit across to Prince William Sound in the lee of the mountains to the north. We arrived at 18:35 and began work in Montague Strait, then continued to Hogan Bay, Knight Island Passage, and our PWS-1 and PWS-2 stations. Air temperatures were well below freezing, offshore winds continued to blow so we anchored for the night of December 3 at Little Bay in PWS. December 4 was spent taking more samples in PWS and transit back toward Resurrection Bay. We were able to begin work on the Seward Line on December 5, starting at GAK1 and working our way offshore. Completed Seward Line work on 7

December and commenced to the Cape Fairfield Line for CTD work followed by an ADCP transect. We then were able to occupy the Hinchinbrook Entrance stations and finished with the wind again blowing up over 25 kts. Outside weather continued to be unsuitable for work; we took the opportunity to pay a port call in Cordova and were able to drop off T. Kline back in his home city. Spent the afternoon in Cordova then departed for the drive back to Seward where we finished the cruise on December 10 after CTDs at stations GAK1 and RES2.5.

#### **Nutrients: S. Thornton:**

We ran 650 nutrient samples; 444 chlorophyll samples, including 96 size-fractionated samples (20um, 5um, .8um); 4 productivity experiments (KIP2, GAK1, 9, 13) with additions of  $^{15}\text{NO}_3$  and  $^{15}\text{NH}_4$ .

The ISUS nitrate analyzer was deployed on all but 5 CTD casts collecting high-resolution nitrate profiles along with the CTD profiles.

#### **T. Kline (Stable C & N Isotopes)**

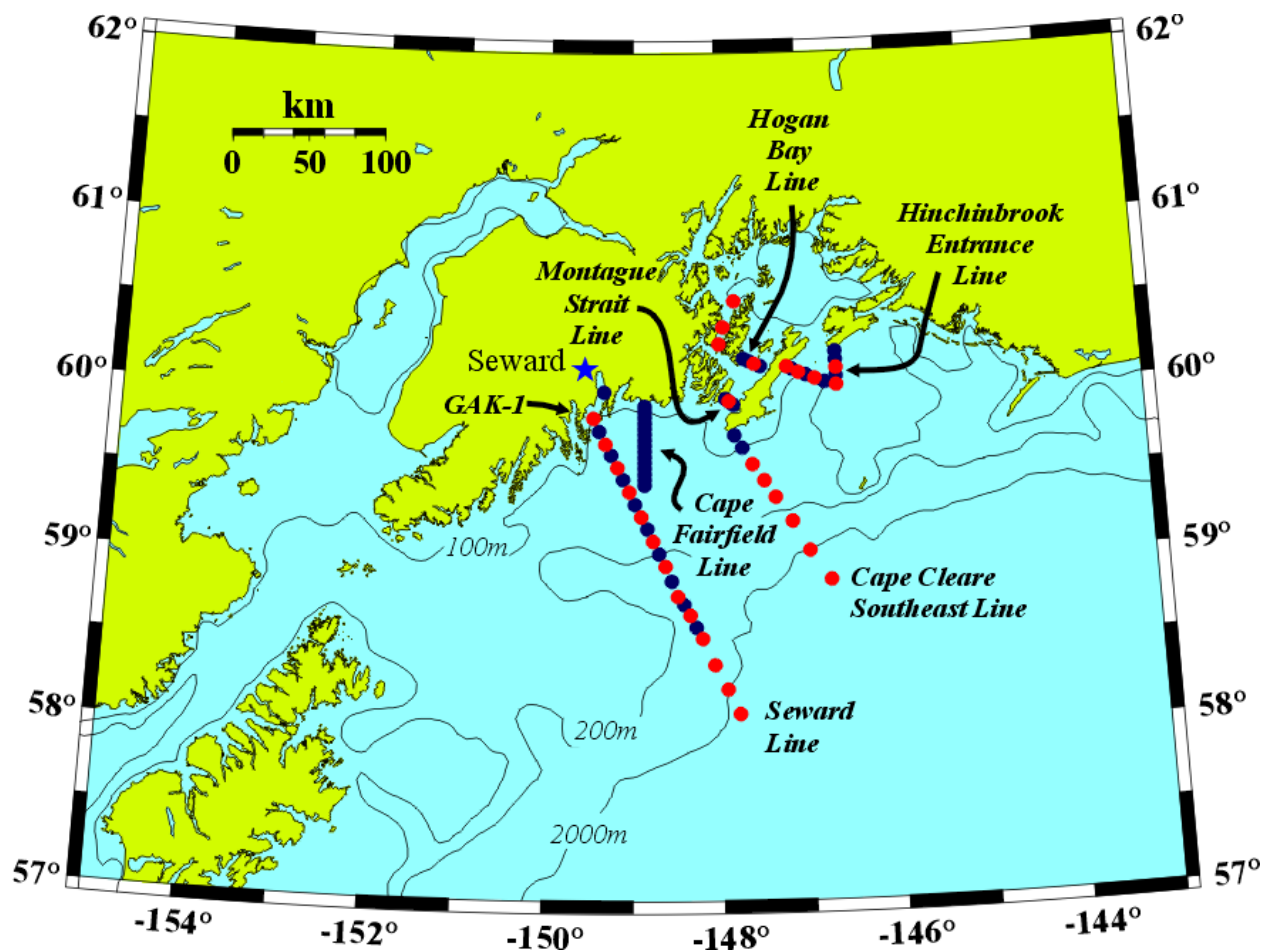
During HX280, diapausing *Neocalanus* spp. were sampled for stable isotope analysis (SIA) from the contents of MOCNESS tows that sampled between 400 and 600m at stations GAK12 and PWS2. *Neocalanus* were frozen individually in vials for further laboratory processing.

Table 1.

<b>NEP GLOBEC LTOP STANDARD STATIONS</b>				
<b>Latitude N (degrees, minutes)</b>		<b>Longitude W (degrees, minutes)</b>		<b>Station Name</b>
<b><i>Resurrection Bay Station</i></b>				
60	1.5	149	21.5	RES2.5
<b><i>Seward Line</i></b>				
59	50.7	149	28	GAK1
59	46	149	23.8	GAK1I
59	41.5	149	19.6	GAK2
59	37.6	149	15.5	GAK2I
59	33.2	149	11.3	GAK3
59	28.9	149	7.1	GAK3I
59	24.5	149	2.9	GAK4
59	20.1	148	58.7	GAK4I
59	15.7	148	54.5	GAK5
59	11.4	148	50.3	GAK5I
59	7	148	46.2	GAK6
59	2.7	148	42	GAK6I
58	58.3	148	37.8	GAK7
58	52.9	148	33.6	GAK7I
58	47.5	148	29.4	GAK8
58	44.6	148	25.2	GAK8I
58	40.8	148	21	GAK9
58	36.7	148	16.7	GAK9I
58	32.5	148	12.7	GAK10
58	23.3	148	4.3	GAK11
58	14.6	147	56	GAK12
58	5.9	147	47.6	GAK13
<b><i>Cape Fairfield Line</i></b>				
59	54.5	148	52	CF1
59	53	148	52	CF2
59	51	148	52	CF3
59	49	148	52	CF4
59	47	148	52	CF5
59	45	148	52	CF6
59	43	148	52	CF7
59	41	148	52	CF8
59	39	148	52	CF9
59	37	148	52	CF10
59	35	148	52	CF11
59	33	148	52	CF12

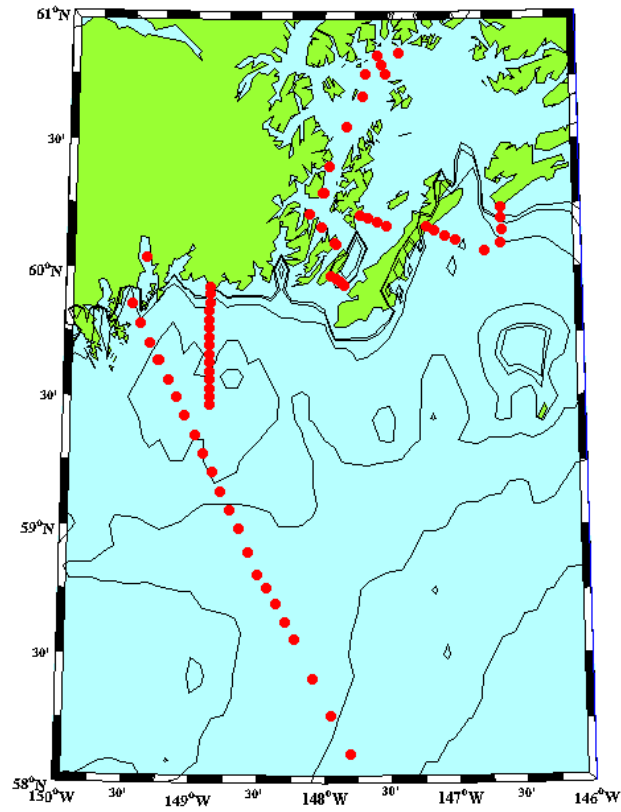
59	31	148	52	CF13
59	29	148	52	CF14
59	27	148	52	CF15
<b>Prince William Sound Stations</b>				
60	22.78	147	56.17	PWS1
60	32.1	147	48.2	PWS2
<b>Knight Island Passage Station</b>				
60	16.7	147	59.2	KIP2
<b>Hogan Bay Line</b>				
60	11.57	147	42	HB1
60	10.754	147	38.5	HB2
60	9.855	147	34.508	HB3
60	8.807	147	30.04	HB4
<b>Montague Strait Line</b>				
59	57.465	147	56.225	MS0i
59	57.257	147	55.602	MS1
59	56.982	147	54.761	MS1i
59	56.6	147	53.7	MS2
59	56.282	147	52.633	MS2i
59	55.9	147	51.4	MS3
59	55.56	147	50.611	MS3i
59	55.2	147	49.7	MS4
<b>Hinchinbrook Entrance Line</b>				
60	13	146	36.5	HE1
60	10.8	146	36.5	HE2
60	7.8	146	36.5	HE3
60	4.8	146	36.5	HE4
60	3.126	146	44.19	HE6.5
60	5.6	146	57.7	HE8
60	6.6	147	3	HE9
60	7.8	147	8	HE10
60	8.6	147	11.5	HE11
<b>Cape Cleare Southeast</b>				
59	44.5	147	49	CCSE1
59	40	147	43.6	CCSE2
59	34.25	147	36.5	CCSE3
59	28.5	147	28.5	CCSE4
59	22.5	147	21	CCSE5
59	14	147	9.5	CCSE6
59	3.5	146	58	CCSE7
58	53	146	44	CCSE8

# NEP GLOBEC Standard Station Map

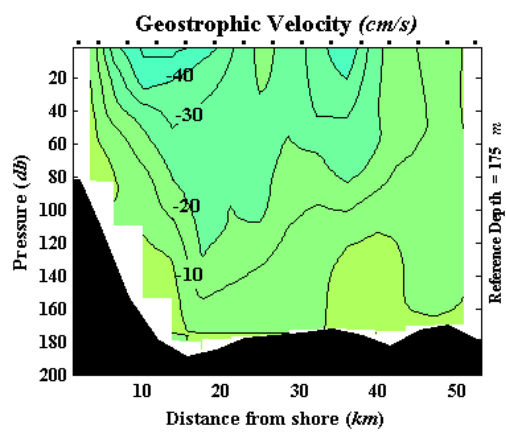
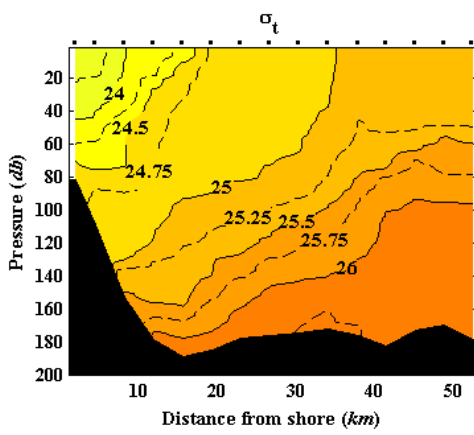
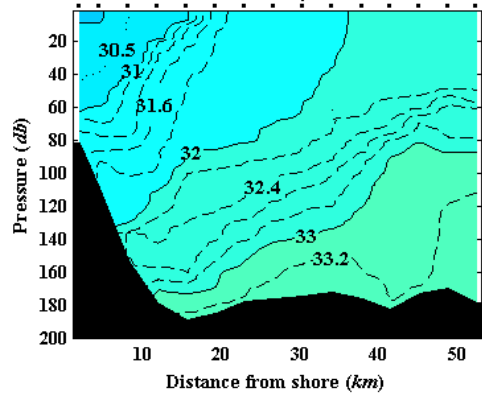
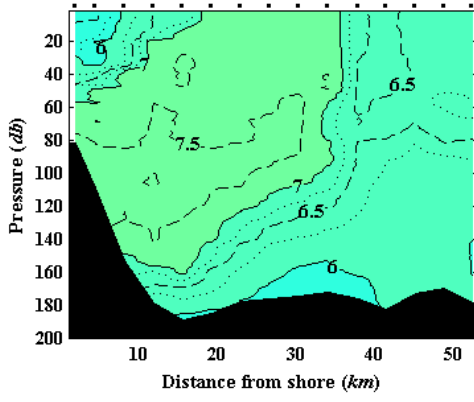


Note: The Cape Cleare Southeast Line is a standard line only in select cruises during the Process Study sampling years.

2-10 December 2003

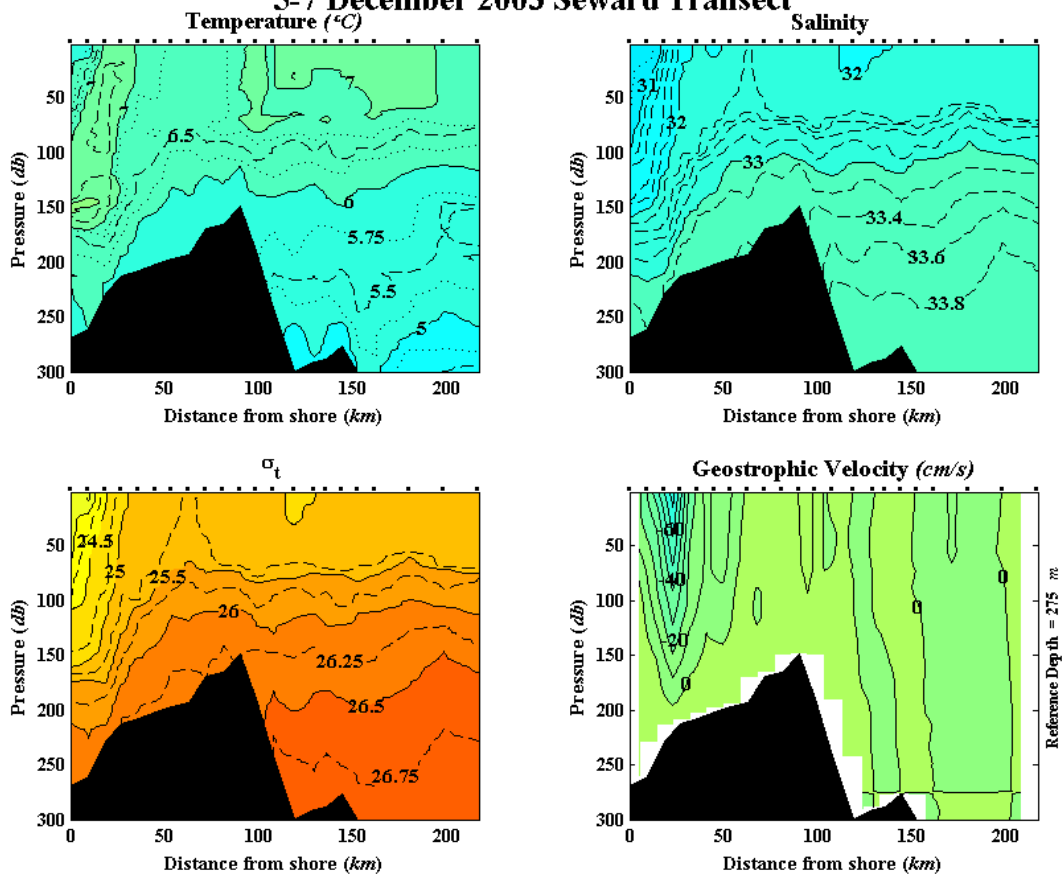


**7-8 December 2003 Cape Fairfield Transect**





### 5-7 December 2003 Seward Transect



Unless otherwise noted, CTDs were taken for T. Weingartner and T. Royer.  
 Water samples taken for T. Whitledge and D. Stockwell Nutrient and Chlorophyll analysis.  
 CalVet samples were taken for K. Coyle and R. Hopcroft.  
 MOCNESS samples were taken for R. Hopcroft and T. Kline.  
 Ring Net samples were taken for R. Hopcroft and K. Coyle.

event	Description	Station	Date	GMT	lat	lon	Depth	si	comments
HX28033603.01	CTD1-Start	RES2.5	12/2/03	1938	60.0234	149.3608	295	Weingartner	a little chilly out there
HX28033603.02	CTD1-End	RES2.5	12/2/03				295	Weingartner	
HX28033603.03	CTD2-Start	GAK1	12/2/03	2107	59.8447	149.4673	270	Weingartner	
HX28033603.04	CTD2-End	GAK1	12/2/03	2133	59.8348	149.4559	270	Weingartner	
HX28033603.05	CalVET Net Tow-Start	GAK1	12/2/03	2148	59.8288	149.4532	270	Hopcroft	
HX28033603.06	CalVET Net Tow-End	GAK1	12/2/03	2153	59.8264	149.4524	270	Hopcroft	
HX28033703.01	CTD3-Start	MS1	12/3/03	0336	59.9547	147.9285	163	Weingartner	
HX28033703.02	CTD3-End	MS1	12/3/03				163	Weingartner	
HX28033703.03	CTD4-Start	MS2	12/3/03	0406	59.9439	147.8956	193	Weingartner	
HX28033703.04	CTD4-End	MS2	12/3/03	0421	59.9418	147.9037	193	Weingartner	
HX28033703.05	CalVET Net Tow-Start	MS2	12/3/03	0438	59.9408	147.9006	193	Hopcroft	
HX28033703.06	CalVET Net Tow-End	MS2	12/3/03	0443	59.9398	147.9029	193	Hopcroft	
HX28033703.07	CTD5-Start	MS3	12/3/03	0456	59.9322	147.8567	168	Weingartner	
HX28033703.08	CTD5-End	MS3	12/3/03	0510	59.9297	147.8631	168	Weingartner	
HX28033703.09	CTD6-Start	MS4	12/3/03	0523	59.9205	147.8280	115	Weingartner	
HX28033703.10	CTD6-End	MS4	12/3/03	0533	59.9183	147.8334	115	Weingartner	
HX28033703.11	CTD7-Start	HB4	12/3/03	0726	60.1472	147.5010	108	Weingartner	
HX28033703.12	CTD7-End	HB4	12/3/03	0736	60.1459	147.5026	108	Weingartner	
HX28033703.13	CTD8-Start	HB3	12/3/03	0754	60.1640	147.5757	88	Weingartner	
HX28033703.14	CTD8-End	HB3	12/3/03	0803	60.1632	147.5787	88	Weingartner	
HX28033703.15	CTD9-Start	HB2	12/3/03	0819	60.1786	147.6425	176	Weingartner	
HX28033703.16	CTD9-End	HB2	12/3/03	0837	60.1730	147.6487	176	Weingartner	
HX28033703.17	CalVET Net Tow-Start	HB2	12/3/03	0844	60.1786	147.6402	176	Hopcroft	
HX28033703.18	CalVET Net Tow-End	HB2	12/3/03	0849	60.1765	147.6424	176	Hopcroft	
HX28033703.19	CTD10-Start	HB1	12/3/03	0904	60.1924	147.7007	245	Weingartner	
HX28033703.20	CTD10-End	HB1	12/3/03	0922	60.1874	147.7073	245	Weingartner	
HX28033703.21	MOCNESS-Start	PWS2	12/3/03	1254	60.5340	147.8886	596	Hopcroft	aborted
HX28033703.22	MOCNESS-End	PWS2	12/3/03	1301	60.5339	147.8810	596	Hopcroft	aborted
HX28033703.23	MOCNESS-Start	PWS2	12/3/03	1311	60.5341	147.8957	596	Hopcroft	
HX28033703.24	MOCNESS-End	PWS2	12/3/03	1508	60.5307	147.7881	596	Hopcroft	
HX28033703.25	CTD11-Start	PWS2	12/3/03	1525	60.5345	147.8077	736	Weingartner	
HX28033703.26	CTD11-End	PWS2	12/3/03	1611	60.5243	147.8331	736	Weingartner	
HX28033703.27	CTD12-Start	KIP2	12/3/03	1800	60.2763	147.9891	576	Weingartner	
HX28033703.28	CTD12-End	KIP2	12/3/03	1841	60.2596	148.0017	576	Weingartner	
HX28033703.29	CalVET Net Tow-Start	KIP2	12/3/03	1900	60.2793	147.9827	576	Hopcroft	

HX28033703.30	CalVET Net Tow-End	KIP2	12/3/03	1906	60.2768	147.9843	576	Hopcroft	
HX28033703.31	CTD13-Start	KIP2	12/3/03	1914	60.2769	147.9890	576	Whitledge	prim prod cast
HX28033703.32	CTD13-End	KIP2	12/3/03	1923	60.2733	147.9933	576	Whitledge	
HX28033703.33	CTD14-Start	PWS1	12/3/03	2036	60.3808	147.9368	352	Weingartner	
HX28033703.34	CTD14-End	PWS1	12/3/03	2059	60.3765	147.9536	352	Weingartner	
HX28033703.35	CalVET Net Tow-Start	PWS1	12/3/03	2109	60.3766	147.9425	352	Hopcroft	
HX28033703.36	CalVET Net Tow-End	PWS1	12/3/03	2114	60.3763	147.9446	352	Hopcroft	
HX28033803.01	CTD15-Start	EV2	12/4/03	2147	60.0762	147.8916	114	Weingartner	
HX28033803.02	CTD15-End	EV2	12/4/03	2155	60.0740	147.8939	114	Weingartner	
HX28033803.03	CTD16-Start	EV1	12/4/03	2205	60.0834	147.9066	224	Weingartner	
HX28033803.04	CTD16-End	EV1	12/4/03	2214	60.0806	147.9081	224	Weingartner	
HX28033803.05	CTD17-Start	FI1	12/4/03	2321	60.1443	148.0053	258	Weingartner	
HX28033803.06	CTD17-End	FI1	12/4/03	2329	60.1435	148.0065	258	Weingartner	
HX28033903.01	CTD18-Start	PB1	12/5/03	0018	60.1939	148.0982	263	Weingartner	
HX28033903.02	CTD18-End	PB1	12/5/03	0029	60.1928	148.1013	263	Weingartner	
HX28033903.03	CTD19-Start	PWS2	12/5/03	0250	60.5356	147.8039	734	Weingartner	to 100m for Calvet haul
HX28033903.04	CTD19-End	PWS2	12/5/03	0257	60.5343	147.8012	734	Weingartner	
HX28033903.05	CalVET Net Tow-Start	PWS2	12/5/03	0301	60.5336	147.8001	734	Hopcroft	
HX28033903.06	CalVET Net Tow-End	PWS2	12/5/03	0307	60.5320	147.7992	734	Hopcroft	
HX28033903.07	MOCNESS-Start	PWS2	12/5/03	0320	60.5343	147.7401	734	Kline	
HX28033903.08	MOCNESS-End	PWS2	12/5/03	0433	60.5745	147.7488	734	Kline	
HX28033903.09	CTD20-Start	GAK1	12/5/03	1847	59.8450	149.4693	272	Weingartner	
HX28033903.10	CTD20-End	GAK1	12/5/03	1906	59.8407	149.4728	272	Weingartner	
HX28033903.11	CTD21-Start	GAK1	12/5/03	1918	59.8447	149.4683	272	Weingartner	PRIM PROD CAST
HX28033903.12	CTD21-End	GAK1	12/5/03	1926	59.8430	149.4699	272	Weingartner	
HX28033903.13	CTD22-Start	GAK1I	12/5/03	2006	59.7656	149.3995	261	Weingartner	
HX28033903.14	CTD22-End	GAK1I	12/5/03	2033	59.7606	149.4128	261	Weingartner	
HX28033903.15	CalVET Net Tow-Start	GAK2	12/5/03	2113	59.6907	149.3286	226	Hopcroft	
HX28033903.16	CalVET Net Tow-End	GAK2	12/5/03	2120	59.6883	149.3308	226	Hopcroft	
HX28033903.17	CTD23-Start	GAK2	12/5/03	2126	59.6910	149.3295	229	Weingartner	
HX28033903.18	CTD23-End	GAK2	12/5/03	2144	59.6841	149.3339	229	Weingartner	
HX28033903.19	CTD24-Start	GAK2I	12/5/03	2218	59.6242	149.2625	216	Weingartner	
HX28033903.20	CTD24-End	GAK2I	12/5/03	2236	59.6175	149.2738	216	Weingartner	
HX28033903.21	CTD25-Start	GAK2I	12/5/03	2250	59.6269	149.2616	216	Weingartner	RECAST
HX28033903.22	CTD25-End	GAK2I	12/5/03	2305	59.6229	149.2723	216	Weingartner	
HX28033903.23	CTD26-Start	GAK2I	12/5/03	2326	59.6266	149.2576	216	Weingartner	RECAST #2
HX28033903.24	CTD26-End	GAK2I	12/5/03	2342	59.6216	149.2665	216	Weingartner	
HX28034003.01	CalVET Net Tow-Start	GAK3	12/6/03	0015	59.5523	149.1860	212	Hopcroft	
HX28034003.02	CalVET Net Tow-End	GAK3	12/6/03	0022	59.5514	149.1864	212	Hopcroft	
HX28034003.03	CTD27-Start	GAK3	12/6/03	0025	59.5514	149.1853	212	Weingartner	
HX28034003.04	CTD27-End	GAK3	12/6/03	0047	59.5485	149.1843	212	Weingartner	
HX28034003.05	CTD28-Start	GAK3I	12/6/03	0121	59.4815	149.1198	204	Weingartner	

HX28034003.06	CTD28-End	GAK3I	12/6/03	0137	59.4817	149.1182	204	Weingartner	
HX28034003.07	CalVET Net Tow-Start	GAK4	12/6/03	0215	59.4078	149.0486	200	Hopcroft	
HX28034003.08	CalVET Net Tow-End	GAK4	12/6/03	0220	59.4084	149.0507	200	Hopcroft	
HX28034003.09	CTD29-Start	GAK4	12/6/03	0222	59.4087	149.0512	200	Weingartner	
HX28034003.10	CTD29-End	GAK4	12/6/03	0238	59.4091	149.0570	200	Weingartner	
HX28034003.11	CTD30-Start	GAK4I	12/6/03	0320	59.3348	148.9765	196	Weingartner	
HX28034003.12	CTD30-End	GAK4I	12/6/03	0342	59.3272	148.9738	196	Weingartner	
HX28034003.13	CalVET Net Tow-Start	GAK5	12/6/03	0418	59.2609	148.9083	196	Hopcroft	
HX28034003.14	CalVET Net Tow-End	GAK5	12/6/03	0423	59.2616	148.9092	196	Hopcroft	
HX28034003.15	CTD31-Start	GAK5	12/6/03	0426	59.2618	148.9102	169	Weingartner	
HX28034003.16	CTD31-End	GAK5	12/6/03				169	Weingartner	
HX28034003.17	CTD32-Start	GAK5I	12/6/03	0521	59.1903	148.8368	165	Weingartner	
HX28034003.18	CTD32-End	GAK5I	12/6/03	0536	59.1919	148.8421	165	Weingartner	
HX28034003.19	CalVET Net Tow-Start	GAK6	12/6/03	0618	59.1161	148.7704	150	Hopcroft	
HX28034003.20	CalVET Net Tow-End	GAK6	12/6/03	0625	59.1167	148.7715	150	Hopcroft	
HX28034003.21	CTD33-Start	GAK6	12/6/03	0626	59.1168	148.7720	150	Weingartner	
HX28034003.22	CTD33-End	GAK6	12/6/03	0643	59.1185	148.7776	150	Weingartner	
HX28034003.23	CTD34-Start	GAK6I	12/6/03	0719	59.0447	148.6994	191	Weingartner	
HX28034003.24	CTD34-End	GAK6I	12/6/03	0737	59.0467	148.7036	191	Weingartner	
HX28034003.25	CalVET Net Tow-Start	GAK7	12/6/03	0816	58.9714	148.6304	244	Hopcroft	
HX28034003.26	CalVET Net Tow-End	GAK7	12/6/03	0823	58.9732	148.6303	244	Hopcroft	
HX28034003.27	CTD35-Start	GAK7	12/6/03	0825	58.9734	148.6305	244	Weingartner	
HX28034003.28	CTD35-End	GAK7	12/6/03	0841	58.9763	148.6339	244	Weingartner	
HX28034003.29	MOCNESS-Start	GAK12	12/6/03	1430				Hopcroft	
HX28034003.30	MOCNESS-End	GAK12	12/6/03	1537	58.2154	147.8870	2275	Hopcroft	
HX28034003.31	CalVET Net Tow-Start	GAK13	12/6/03	1755	58.0979	147.7933	2087	Hopcroft	
HX28034003.32	CalVET Net Tow-End	GAK13	12/6/03	1801	58.0975	147.7917	2087	Hopcroft	
HX28034003.33	CTD036-Start	GAK13	12/6/03	1842	58.0973	147.7936	2087	Weingartner	prim prod cast
HX28034003.34	CTD036-End	GAK13	12/6/03	1855	58.0959	147.7882	2087	Weingartner	
HX28034003.35	CTD037-Start	GAK13	12/6/03	1937	58.0971	147.7945	2087	Weingartner	
HX28034003.36	CTD037-End	GAK13	12/6/03	2054	58.0881	147.7718	2087	Weingartner	
HX28034003.37	CalVET Net Tow-Start	GAK12	12/6/03	2206	58.2443	147.9342	2164	Hopcroft	
HX28034003.38	CalVET Net Tow-End	GAK12	12/6/03	2212	58.2434	147.9338	2164	Hopcroft	
HX28034003.39	CTD38-Start	GAK12	12/6/03	2217	58.2436	147.9351	2164	Weingartner	
HX28034003.40	CTD38-End	GAK12	12/6/03	2331	58.2394	147.9261	2164	Weingartner	
HX28034103.01	CalVET Net Tow-Start	GAK11	12/7/03	0038	58.3889	148.0733	1428	Hopcroft	
HX28034103.02	CalVET Net Tow-End	GAK11	12/7/03	0044	58.3892	148.0722	1428	Hopcroft	
HX28034103.03	CTD39-Start	GAK11	12/7/03	0046	58.3893	148.0716	1428	Weingartner	
HX28034103.04	CTD39-End	GAK11	12/7/03	0159	58.3854	148.0491	1428	Weingartner	
HX28034103.05	CalVET Net Tow-	GAK10	12/7/03	0313	58.5419	148.2129	1459	Hopcroft	

	Start								
HX28034103.06	CalVET Net Tow-End	GAK10	12/7/03	0320	58.5400	148.2136	1459	Hopcroft	
HX28034103.07	CTD40-Start	GAK10	12/7/03	0323	58.5395	148.2136	1459	Weingartner	
HX28034103.08	CTD40-End	GAK10	12/7/03				1459	Weingartner	
HX28034103.09	CTD41-Start	GAK9I	12/7/03	0530	58.6107	148.2807	674	Weingartner	
HX28034103.10	CTD41-End	GAK9I	12/7/03				674	Weingartner	
HX28034103.11	CalVET Net Tow-Start	GAK9	12/7/03	0640	58.6809	148.3498	276	Hopcroft	
HX28034103.12	CalVET Net Tow-End	GAK9	12/7/03	0645	58.6805	148.3494	276	Hopcroft	
HX28034103.13	CTD 42-Start	GAK9	12/7/03	0648	58.6801	148.3494	276	Weingartner	
HX28034103.14	CTD42-End	GAK9	12/7/03	0710	58.6837	148.3566	276	Weingartner	
HX28034103.15	CTD43-Start	GAK8I	12/7/03	0739	58.7433	148.4225	291	Weingartner	
HX28034103.16	CTD43-End	GAK8I	12/7/03	0806	58.7551	148.4366	291	Weingartner	
HX28034103.17	CalVET Net Tow-Start	GAK8	12/7/03	0825	58.7930	148.4899	291	Hopcroft	
HX28034103.18	CalVET Net Tow-End	GAK8	12/7/03	0830	58.7935	148.4902	291	Hopcroft	
HX28034103.19	CTD 44-Start	GAK8	12/7/03	0831	58.7938	148.4898	291	Weingartner	
HX28034103.20	CTD 44-End	GAK8	12/7/03	0851	58.7973	148.4882	291	Weingartner	
HX28034103.21	CTD 45-Start	GAK7I	12/7/03	0929	58.8818	148.5616	301	Weingartner	
HX28034103.22	CTD 45-End	GAK7I	12/7/03	0956	58.8729	148.5440	301	Weingartner	
HX28034103.23	CTD46-Start	GAK10	12/7/03	1543	58.5399	148.2100	1459	Weingartner	recast upper 250m
HX28034103.24	CTD46-End	GAK10	12/7/03	1601	58.5362	148.2063	1459	Weingartner	
HX28034103.25	CTD47-Start	GAK9	12/7/03	1827	58.6789	148.3520	279	Weingartner	PRIM PROD
HX28034103.26	CTD47-End	GAK9	12/7/03	1834	58.6782	148.3521	279	Weingartner	
HX28034103.27	CTD48-Start	CF15	12/7/03	2309	59.4510	148.8651	182	Weingartner	
HX28034103.28	CTD48-End	CF15	12/7/03	2324	59.4531	148.8658	182	Weingartner	
HX28034103.29	CTD49-Start	CF14	12/7/03	2338	59.4830	148.8676	171	Weingartner	
HX28034103.30	CTD49-End	CF14	12/7/03	2347	59.4829	148.8688	171	Weingartner	
HX28034203.01	CTD50-Start	CF13	12/8/03	0004	59.5169	148.8682	174	Weingartner	
HX28034203.02	CTD50-End	CF13	12/8/03				174	Weingartner	
HX28034203.03	CTD51-Start	CF12	12/8/03	0031	59.5502	148.8683	185	Weingartner	
HX28034203.04	CTD51-End	CF12	12/8/03	0042	59.5507	148.8691	185	Weingartner	
HX28034203.05	CTD52-Start	CF11	12/8/03	0057	59.5827	148.8655	177	Weingartner	
HX28034203.06	CTD52-End	CF11	12/8/03	0110	59.5811	148.8692	177	Weingartner	
HX28034203.07	CTD53-Start	CF10	12/8/03	0127	59.6175	148.8661	175	Weingartner	
HX28034203.08	CTD53-End	CF10	12/8/03	0135	59.6162	148.8707	175	Weingartner	
HX28034203.09	CTD54-Start	CF9	12/8/03	0154	59.6506	148.8666	175	Weingartner	
HX28034203.10	CTD54-End	CF9	12/8/03	0208	59.6502	148.8729	175	Weingartner	
HX28034203.11	CTD55-Start	CF8	12/8/03	0223	59.6837	148.8661	175	Weingartner	
HX28034203.12	CTD55-End	CF8	12/8/03	0233	59.6820	148.8703	175	Weingartner	
HX28034203.13	CTD56-Start	CF7	12/8/03	0250	59.7170	148.8682	180	Weingartner	
HX28034203.14	CTD56-End	CF7	12/8/03	0302	59.7173	148.8756	180	Weingartner	
HX28034203.15	CTD57-Start	CF6	12/8/03	0318	59.7505	148.8684	182	Weingartner	
HX28034203.16	CTD57-End	CF6	12/8/03	0328	59.7513	148.8757	182	Weingartner	
HX28034203.17	CTD58-Start	CF5	12/8/03	0344	59.7831	148.8670	190	Weingartner	
HX28034203.18	CTD58-End	CF5	12/8/03	0412	59.7920	148.8860	190	Weingartner	
HX28034203.19	CTD59-Start	CF4	12/8/03	0425	59.8167	148.8686	181	Weingartner	

HX28034203.20	CTD59-End	CF4	12/8/03	0440	59.8153	148.8826	181	Weingartner	
HX28034203.21	CTD60-Start	CF3	12/8/03	0455	59.8504	148.8678	159	Weingartner	
HX28034203.22	CTD60-End	CF3	12/8/03	0508	59.8500	148.8788	159	Weingartner	
HX28034203.23	CTD61-Start	CF2	12/8/03	0525	59.8838	148.8675	105	Weingartner	
HX28034203.24	CTD61-End	CF2	12/8/03	0533	59.8840	148.8728	105	Weingartner	
HX28034203.25	CTD62-Start	CF1	12/8/03	0546	59.9089	148.8679	82	Weingartner	
HX28034203.26	CTD62-End	CF1	12/8/03	0553	59.9089	148.8703	82	Weingartner	
HX28034203.27	ADCP Line-Start	CF1	12/8/03	0554	59.9090	148.8712	82	Weingartner	
HX28034203.28	ADCP Line-End	CF15	12/8/03	1110	59.4494	148.8665	82	Weingartner	
HX28034203.29	CTd63-Start	HE11	12/8/03	1813	60.1442	147.1887	178	Weingartner	
HX28034203.30	CTd63-End	HE11	12/8/03	1823	60.1464	147.1912	178	Weingartner	
HX28034203.31	CalVET Net Tow-Start	HE217	12/8/03	1841	60.1299	147.1346	178	Hopcroft	
HX28034203.32	CalVET Net Tow-End	HE217	12/8/03	1847	60.1308	147.1366	178	Hopcroft	
HX28034203.33	CTD64-Start	HE10	12/8/03	1851	60.1304	147.1326	216	Weingartner	
HX28034203.34	CTD64-End	HE10	12/8/03	1908	60.1328	147.1387	216	Weingartner	
HX28034203.35	CTD65-Start	HE9	12/8/03	1939	60.1108	147.0499	278	Weingartner	
HX28034203.36	CTD65-End	HE9	12/8/03	1959	60.1131	147.0620	278	Weingartner	
HX28034203.37	CTD66-Start	HE8	12/8/03	2027	60.0945	146.9613	149	Weingartner	
HX28034203.38	CTD66-End	HE8	12/8/03	2037	60.0965	146.9653	149	Weingartner	
HX28034203.39	CalVET Net Tow-Start	HE6.5	12/8/03	2129	60.0517	146.7372	149	Hopcroft	
HX28034203.40	CalVET Net Tow-End	HE6.5	12/8/03	2135	60.0530	146.7376	149	Hopcroft	
HX28034203.41	CTD67-Start	HE6.5	12/8/03	2137	60.0528	146.7377	125	Weingartner	
HX28034203.42	CTD67-End	HE6.5	12/8/03	2149	60.0550	146.7386	125	Weingartner	
HX28034203.43	CalVET Net Tow-Start	HE4	12/8/03	2225	60.0793	146.6094	117	Hopcroft	
HX28034203.44	CalVET Net Tow-End	HE4	12/8/03	2231	60.0802	146.6100	117	Hopcroft	
HX28034203.45	CTD68-Start	HE4	12/8/03	2234	60.0798	146.6103	117	Weingartner	
HX28034203.46	CTD68-End	HE4	12/8/03	2243	60.0814	146.6119	117	Weingartner	
HX28034203.47	CTD69-Start	HE3	12/8/03	2312	60.1298	146.6067	117	Weingartner	
HX28034203.48	CTD69-End	HE3	12/8/03	2323	60.1314	146.6074	117	Weingartner	
HX28034303.01	CalVET Net Tow-Start	HE2	12/9/03	0001	60.1798	146.6102	196	Hopcroft	
HX28034303.02	CalVET Net Tow-End	HE2	12/9/03				196	Hopcroft	
HX28034303.03	CTD70-Start	HE2	12/9/03	0006	60.1798	146.6297	196	Weingartner	
HX28034303.04	CTD70-End	HE2	12/9/03				196	Weingartner	
HX28034303.05	CTD71-Start	HE1	12/9/03	0039	60.2165	146.6075	76	Weingartner	
HX28034303.06	CTD71-End	HE1	12/9/03				76	Weingartner	
HX28034303.07	CTD72-Start	PWS5	12/9/03	0525	60.8222	147.3958	475	Weingartner	
HX28034303.08	CTD72-End	PWS5	12/9/03				475	Weingartner	
HX28034303.09	CTD73-Start	NI4	12/9/03	0628	60.7407	147.4990	256	Weingartner	
HX28034303.10	CTD73-End	NI4	12/9/03				256	Weingartner	
HX28034303.11	CTD74-Start	NI3	12/9/03	0705	60.7738	147.5292	517	Weingartner	
HX28034303.12	CTD74-End	NI3	12/9/03				517	Weingartner	
HX28034303.13	CTD75-Start	NI2	12/9/03	0758	60.8091	147.5655	502	Weingartner	
HX28034303.14	CTD75-End	NI2	12/9/03				502	Weingartner	

HX28034303.15	CTD76-Start	PWS4	12/9/03	0856	60.7365	147.6570	650	Weingartner	
HX28034303.16	CTD76-End	PWS4	12/9/03				650	Weingartner	
HX28034303.17	CTD77-Start	PWS3	12/9/03	0952	60.5467	147.6775	745	Weingartner	
HX28034303.18	CTD77-End	PWS3	12/9/03				745	Weingartner	
HX28034303.19	CTD78-Start	PWS2	12/9/03	1104	60.5343	147.8028	736	Weingartner	
HX28034303.20	CTD78-End	PWS2	12/9/03				736	Weingartner	
HX28034403.01	CTD79-Start	GAK1	12/10/03	1707	59.8452	149.4677	270	Weingartner	
HX28034403.02	CTD79-End	GAK1	12/10/03				270	Weingartner	
HX28034403.03	CTD80-Start	RES2.5	12/10/03	1835	60.2480	149.3608	295	Weingartner	
HX28034403.04	CTD80End	RES2.5	12/10/03				295	Weingartner	