

CRUISE REPORT for SU-94-06 (FOCI 1SU94)
September 1994

Cruise SU-94-06 (FOCI 1Su94) consisted of two phases. In the first phase, the Surveyer was alone, while phase 2 was a joint cruise with the NOAA ship Miller Freeman.

PHASE ONE

Phase 1 of cruise SU-94-06 (FOCI 1Su94) lasted from 2-16 September 1994. Its purpose was to conduct a hydrographic and acoustic survey to be used to determine suitable locations for phase two of the study. We also did bongo tows at every other transect of the survey, and bird and marine mammal sightings were logged during daylight hours. The survey extended along the Bering Sea shelf and slope from roughly 54.5N to slightly north of 58N. Preparation for phase 2 included the deployment of an upward-looking acoustic Doppler current profiler (ADCP) and two groups of ARGOS ARGOS drifting buoys. Each of these topics is described in more detail below.

Participating scientists were Mary Beth Decker, Mike Force, David Greene, Carrie Hadden, Mary Engle, Libby Logerwell, Bill Rugen, and Sigrid Salo. They were from three NOAA organizations; Pacific Marine Environmental Laboratory (PMEL), the Alaska Fisheries Science Center (AFSC), the Southwest Fisheries Science Center (SWFSC) and from the University of California at Irvine and at Santa Cruz.

CTD transects, Bongo Tows and Acoustic Transects

During phase 1 we occupied ten CTD transects (table 1, x's in figure 1). The transects contained from five to nineteen stations extending from the 1000m to ~ the 70m depth contour. Bongo tows were taken on every other transect, as noted in Table 1 (O's in figure 1). At stations where we did bongo tows, we also sampled nutrients during the CTD cast. Data from SWFSC's transducers, one at 125MHz and one at 200MHz were logged and plotted continuously during the transects except during periods of high seas when their signal was too scattered by wave action.

Time limits forced us to skip lines B, D, and J of the cruise plan. Because of high winds and seas, we replaced CTDs by XBTs (+ in figure 1) at the southern end of transects C and A and truncated transect A.

ADCP Deployment

An upward-looking ADCP in a prototype "trawl-resistant" cage was deployed during the cruise. The cage for the mooring was designed by Lt. Carrie Hadden. We needed as long a record as possible from the ADCP, and planned our itinerary to deploy it near the start of the cruise, on 5 September 1994, just north of transect L in 110m of water (X in figure 1). The mooring was recovered when we reoccupied line L during phase 2 of the cruise.

The ADCP measured the currents in 4-m "bins", starting at 97m. Data from some of its bins are plotted in figure 2.

ARGOS Buoys

Most of the ARGOS buoys deployed during the cruise were drogueed at 40m, but two buoys were drogueed at 20m. The buoys' positions are determined by polar-orbiting satellites and transmitted to us at PMEL over the ARGOS system. ARGOS buoys are marked by small *'s in figure 1.

The first group of ARGOS buoys was deployed to span the front at lines K and L, in order to measure the change in currents across the width of the front. At two sites, both a 20m and 40m buoy were deployed, to measure the depth-dependence of currents. Deployment information is listed in table 1 and figure 3 shows the displacement of the buoys from their deployment on 10 September until the end of the cruise.

The second group of drifters was deployed at the northern end of line

H. They were set out at the vertices and in the center of a triangle with 10km long sides. The triangle's deformation will measure the dispersion of currents.

Marine Mammal Observations (Mary Engle)

Marine mammal observations were conducted during daylight hours from the flying bridge of the Surveyor while the ship was underway. Observations were halted if winds reached Beaufort state VI. For each sighting we logged time, location, distance, angle, species, number of animals, and behavior.

Animals encountered in the survey were northern fur seals (*Callorhinus ursinus*), Stellar sea lions (*Eumatopias jubatus*), Dall's porpoises (*Phocoenoides dalli*), killer whales (*Orcinus orca*), fin whales (*Balaenoptera physalis*), and an unidentified pinniped.

Preliminary examination reveals that the majority of sightings were at or very near 57N, regardless of species. The westward location of the animals was more variable, spanning 161W to 171W. By comparing these locations to oceanographic parameters, we hope to determine if fur seals, in particular, are utilizing oceanographic features during foraging.

Ornithological Observations (Mary Beth Decker and Elizabeth Logerwell)

The ornithological observations report is appended to this report.

PHASE 2

Phase 2 of SU-94-06 began with the rendezvous of the Surveyor and Miller Freeman near St. George Island on the morning of 17 September (local time). At that time, Lisa Britt, Dr. Roger Hewitt, Dr. Jeff Napp, and Dr. James Overland, the Chief Scientist, transferred from the Miller Freeman to the Surveyor.

During phase 2, we occupied transects near St. Paul and St. George Islands (figure 4). At each line, we first took hydrographic data, then reoccupied the line for an acoustic survey, and finally, using the hydrographic and acoustic data, chose locations for MOCNESS trawls. The Miller Freeman and Surveyor each occupied half the CTD stations, but both ships surveyed the whole line acoustically, and both ships trawled, albeit with different nets, at the same locations. The locations of the Surveyor's CTDs and MOCNESS trawls is in Table 1.

Acknowledgements

We would like to thank Captain Ruszala, Science Officer James Bunn, and the officers and crewmembers of the Surveyor for their help during this cruise. ETs Don McDaniel and Brian Shupe helped us quickly solve problems with the CTD rosette and the bongo's Seacat. The survey department and winch operators deserve special thanks from us.

Cruise Report: Surveyor/FOCI
Ornithological Observations
Mary Beth Decker and Elizabeth Logerwell
2-22 September 1994

We surveyed 950 nautical miles to determine the distribution and abundance of marine birds in relation to hydrographic features and juvenile pollock in the southeastern Bering Sea. Preliminary results from phase 1 of the cruise indicate that high numbers of murre were observed in the middle domain and in the vicinity of the middle front (Fig. 1). Low numbers of murre were found in the outer domain and south of the Pribilof Islands. During phase 2, we found high densities of murre and auklets on the stratified side of the inner front on Line A north of St. Paul Island (Fig. 2). On Line B south of St. Paul Island relative densities of murre were highest on the seaward side of the inner front, whereas auklet numbers were highest at the end on Line B (Fig. 3). North of St. George Island on Line D, bird abundance was generally high in the frontal region (Fig. 4). On Line L, we found high densities of murre in the frontal region but we have no data from the stratified side of the middle front (Fig. 5).

Murre are known to feed on juvenile walleye pollock. Auklets are typically planktivores, however, we observed high numbers of feeding Crested auklets in areas where no zooplankters were sampled with the MOCNESS. We assume that the auklets were feeding on 0-age pollock that were being sampled by the IKMT gear in the inner front region. Unfortunately, we were unable to collect birds for diet analysis due to logistical conflicts with the ship. We suggest that if the aims of FOCI are to include predation on juvenile pollock, it is necessary to include small boat operations to collect bird specimens in the main body of the cruise plan and not listed as a "piggy-back" project.

TABLE 1: Timetable of Operations

Line K									
Stn		Time (GMT)			Latitude	Longitude		Depth	Event
001	3	Sep	94	1820	56 32.9'N	172	51.8'W	1067	CTD
002	3	Sep	94	1933	56 34.2'N	172	49.7'W	273	CTD
003	3	Sep	94	2055	56 40.5'N	172	38.5'W	132	CTD
004	3	Sep	94	2218	56 46.9'N	172	25.6'W	126	CTD
005	3	Sep	94	2347	56 52.9'N	172	13.4'W	126	CTD
006	4	Sep	94	0103	56 58.9'N	172	01.2'W	116	CTD
007	4	Sep	94	0213	57 04.9'N	171	49.1'W	110	CTD
008	4	Sep	94	0321	57 10.8'N	171	35.8'W	107	CTD
009	4	Sep	94	0431	57 17.1'N	171	23.9'W	103	CTD
010	4	Sep	94	0543	57 23.0'N	171	12.1'W	93	CTD
011	4	Sep	94	0701	57 29.0'N	171	00.1'W	88	CTD
012	4	Sep	94	0814	57 34.9'N	170	47.9'W	82	CTD
013	4	Sep	94	0932	57 41.0'N	170	36.0'W	73	CTD
014	4	Sep	94	1045	57 46.9'N	170	23.8'W	70	CTD
015	4	Sep	94	1201	57 52.9'N	170	12.2'W	70	CTD
016	4	Sep	94	1317	57 59.2'N	169	59.9'W	72	CTD
Line L									
Stn		Time (GMT)			Latitude	Longitude		Depth	Event
017	4	Sep	94	1422	57 53.9'N	170	13.3'W	68	CTD
018	4	Sep	94	1532	57 50.9'N	170	28.2'W	72	CTD, Bongo
019	4	Sep	94	1756	57 47.0'N	170	42.9'W	82	CTD
020	4	Sep	94	1901	57 43.3'N	170	58.2'W	88	CTD
021	4	Sep	94	2006	57 40.2'N	171	13.7'W	96	CTD, Bongo
022	4	Sep	94	2141	57 37.2'N	171	28.4'W	97	CTD
023	4	Sep	94	2249	57 33.1'N	171	42.7'W	101	CTD
024	4	Sep	94	2358	57 30.3'N	171	58.0'W	104	CTD, Bongo
025	5	Sep	94	0155	57 26.5'N	172	12.1'W	107	CTD
026	5	Sep	94	0311	57 22.0'N	172	26.5'W	108	CTD
027	5	Sep	94	0507	57 18.1'N	172	42.2'W	112	CTD, Bongo
028	5	Sep	94	0621	57 14.9'N	172	57.9'W	113	CTD
029	5	Sep	94	0731	57 11.9'N	173	12.2'W	118	CTD
030	5	Sep	94	0933	57 09.0'N	173	26.8'W	133	CTD, Bongo
000	5	Sep	94	1933	57 32.0'N	172	10.1'W	105	ADCP
031	6	Sep	94	0151	57 09.3'N	173	26.9'W	133	CTD, Bongo
032	6	Sep	94	0433	57 04.4'N	173	41.2'W	232	CTD
033	6	Sep	94	0625	57 02.2'N	173	48.3'W	561	CTD
034	6	Sep	94	0809	56 59.0'N	173	58.7'W	965	CTD, Bongo
Line M									
Stn		Time (GMT)			Latitude	Longitude		Depth	Event
035	6	Sep	94	1603	57 47.5'N	174	18.9'W	790	CTD
036	6	Sep	94	1715	57 46.6'N	174	15.1'W	180	CTD
037	6	Sep	94	1846	57 48.6'N	173	54.3'W	582	CTD
038	6	Sep	94	2010	57 49.8'N	173	38.9'W	138	CTD
039	6	Sep	94	2131	57 51.2'N	173	20.9'W	136	CTD
040	6	Sep	94	2245	57 51.5'N	173	04.0'W	121	CTD
041	7	Sep	94	0016	57 52.6'N	172	47.8'W	122	CTD
042	7	Sep	94	0128	57 53.0'N	172	31.7'W	120	CTD
043	7	Sep	94	0245	57 54.4'N	172	14.8'W	117	CTD
044	7	Sep	94	0354	57 56.8'N	171	58.8'W	116	CTD
045	7	Sep	94	0500	57 56.6'N	171	42.7'W	98	CTD
046	7	Sep	94	0604	57 57.7'N	171	26.7'W	93	CTD
047	7	Sep	94	0709	57 58.8'N	171	10.5'W	87	CTD
048	7	Sep	94	0814	57 59.8'N	170	53.7'W	92	CTD
049	7	Sep	94	0924	58 00.9'N	170	37.7'W	85	CTD
050	7	Sep	94	1028	58 01.8'N	170	21.9'W	75	CTD
051	7	Sep	94	1143	58 03.0'N	170	04.7'W	76	CTD

Line	N	Time (GMT)		Latitude	Longitude	Depth	Event	
052	7	Sep	94	1426	58 30.8'N	169 53.9'W	75	CTD, Bongo
053	7	Sep	94	1634	58 28.9'N	170 06.7'W	65	CTD
054	7	Sep	94	1747	58 27.9'N	170 26.9'W	72	CTD, Bongo
055	7	Sep	94	1853	58 26.8'N	170 43.1'W	76	CTD
056	7	Sep	94	2022	58 26.3'N	170 59.1'W	85	CTD
057	7	Sep	94	2127	58 24.8'N	171 15.2'W	93	CTD
058	7	Sep	94	2234	58 23.8'N	171 32.4'W	100	CTD, Bongo
059	8	Sep	94	0006	58 23.0'N	171 49.8'W	106	CTD
060	8	Sep	94	0110	58 22.2'N	172 05.8'W	106	CTD
061	8	Sep	94	0219	58 21.4'N	172 21.8'W	102	CTD, Bongo
062	8	Sep	94	0427	58 20.3'N	172 38.5'W	104	CTD
063	8	Sep	94	0534	58 19.3'N	172 54.3'W	106	CTD
064	8	Sep	94	0638	58 18.5'N	173 10.0'W	107	CTD, Bongo
065	8	Sep	94	0821	58 18.0'N	173 26.9'W	118	CTD
066	8	Sep	94	0928	58 16.9'N	173 44.0'W	121	CTD
067	8	Sep	94	1029	58 16.0'N	173 29.6'W	128	CTD, Bongo
068	8	Sep	94	1244	58 15.7'N	174 16.5'W	238	CTD, Bongo
069	8	Sep	94	1416	58 15.2'N	174 22.3'W	991	CTD, Bongo

ARGOS Buoys on lines K and L								
Stn		Time (GMT)		Latitude	Longitude	Depth	Buoy	
070	9	Sep	94	0040	57 43.4'N	170 58.1'W	90	7224
071	9	Sep	94	0212	57 37.1'N	171 27.9'W	98	7236
072	9	Sep	94	0343	57 30.1'N	171 57.9'W	105	7213
073	9	Sep	94	0546	57 11.2'N	171 35.1'W	104	7168
074	9	Sep	94	0700	57 20.1'N	171 17.8'W	109	23005
074'	9	Sep	94	0701	57 20.1'N	171 17.9'W	109	23004
075	9	Sep	94	0809	57 27.7'N	171 02.6'W	99	7243
076	9	Sep	94	0914	57 35.0'N	170 48.0'W	90	23006
076'	9	Sep	94	0915	57 35.0'N	170 47.9'W	90	23007
077	9	Sep	94	1028	57 43.9'N	170 30.0'W	85	7225

Line	I	Time (GMT)		Latitude	Longitude	Depth	Event	
078	9	Sep	94	1313	57 52.4'N	169 40.3'W	74	CTD
079	9	Sep	94	1417	57 43.9'N	169 46.0'W	75	CTD
080	9	Sep	94	1527	57 36.1'N	169 53.0'W	74	CTD
081	9	Sep	94	1637	57 28.3'N	170 00.1'W	62	CTD
082	9	Sep	94	1752	57 20.1'N	170 06.2'W	54	CTD
083	9	Sep	94	2037	57 00.4'N	170 21.3'W	63	CTD
084	9	Sep	94	2133	56 55.0'N	170 26.5'W	93	CTD
085	9	Sep	94	2244	56 47.0'N	170 33.7'W	118	CTD
086	10	Sep	94	0001	56 38.4'N	170 40.1'W	117	CTD
087	10	Sep	94	0112	56 30.1'N	170 47.0'W	120	CTD
088	10	Sep	94	0227	56 22.4'N	170 53.1'W	120	CTD
089	10	Sep	94	0351	56 14.5'N	170 58.5'W	171	CTD
090	10	Sep	94	0508	56 12.9'N	171 00.6'W	946	CTD
091	10	Sep	94	0724	56 12.7'N	171 01.0'W	787	CTD

Line	H	Time (GMT)		Latitude	Longitude	Depth	Event	
092	10	Sep	94	1126	55 59.0'N	170 22.3'W	1158	CTD, Bongo
093	10	Sep	94	1256	56 03.3'N	170 18.9'W	503	CTD
094	10	Sep	94	1351	56 04.2'N	170 19.5'W	213	CTD, Bongo
095	10	Sep	94	1600	56 12.3'N	170 14.4'W	119	CTD, Bongo
096	10	Sep	94	1734	56 21.3'N	170 09.2'W	107	CTD
097	10	Sep	94	1843	56 30.3'N	170 04.2'W	101	CTD
098	10	Sep	94	1948	56 38.2'N	169 59.9'W	110	CTD, Bongo
099	10	Sep	94	2144	56 46.9'N	169 54.9'W	87	CTD
100	10	Sep	94	2301	56 54.8'N	169 50.0'W	72	CTD
101	11	Sep	94	0033	57 02.4'N	169 41.3'W	55	CTD, Bongo
102	11	Sep	94	0232	57 09.9'N	169 31.9'W	62	CTD
103	11	Sep	94	0403	57 17.6'N	169 21.6'W	69	CTD
104	11	Sep	94	0530	57 25.4'N	169 12.3'W	69	CTD, Bongo

105	11	Sep	94	0713	57 31.7'N	169	03.0'W	68	CTD
106	11	Sep	94	0832	57 39.1'N	168	53.9'W	77	CTD
107	11	Sep	94	0944	57 46.1'N	168	44.9'W	75	CTD, Bongo

Line F -----

Stn			Time (GMT)		Latitude		Longitude	Depth	Event
108	11	Sep	94	1303	57 27.5'N	168	04.5'W	74	CTD, Bongo
109	11	Sep	94	1450	57 20.0'N	168	12.8'W	74	CTD
110	11	Sep	94	1557	57 12.0'N	168	20.3'W	74	CTD, Bongo
111	11	Sep	94	1743	57 04.2'N	168	28.4'W	77	CTD
112	11	Sep	94	1850	56 57.3'N	168	35.0'W	81	CTD
113	11	Sep	94	2002	56 49.2'N	168	42.8'W	100	CTD, Bongo
114	11	Sep	94	2209	56 42.1'N	168	51.2'W	105	CTD
115	11	Sep	94	2322	56 32.1'N	168	56.2'W	107	CTD
116	12	Sep	94	0037	56 22.8'N	169	01.4'W	119	CTD, Bongo
117	12	Sep	94	0228	56 12.1'N	169	05.6'W	205	CTD
118	12	Sep	94	0324	56 10.8'N	169	08.6'W	480	CTD
119	12	Sep	94	0435	56 09.0'N	169	10.4'W	1013	CTD, Bongo

Line G -----

Stn			Time (GMT)		Latitude		Longitude	Depth	Event
120	12	Sep	94	0812	55 58.9'N	169	31.4'W	921	CTD
121	12	Sep	94	0925	56 01.1'N	169	32.3'W	442	CTD
122	12	Sep	94	1150	56 17.6'N	169	31.2'W	210	CTD
123	12	Sep	94	1249	56 23.6'N	169	31.2'W	138	CTD
124	12	Sep	94	1407	56 26.7'N	169	31.5'W	101	CTD

Line E -----

Stn			Time (GMT)		Latitude		Longitude	Depth	Event
125	12	Sep	94	1731	55 56.8'N	169	03.6'W	1036	CTD
126	12	Sep	94	1940	56 06.4'N	168	38.6'W	502	CTD
127	12	Sep	94	2057	56 11.6'N	168	27.9'W	202	CTD
128	12	Sep	94	2221	56 17.7'N	168	12.0'W	153	CTD
129	12	Sep	94	2333	56 25.9'N	168	04.8'W	131	CTD
130	13	Sep	94	0050	56 33.6'N	167	55.7'W	106	CTD
131	13	Sep	94	0212	56 41.4'N	167	47.1'W	94	CTD
132	13	Sep	94	0326	56 49.0'N	167	39.0'W	85	CTD
133	13	Sep	94	0443	56 57.2'N	167	30.4'W	75	CTD
134	13	Sep	94	0546	57 04.0'N	167	23.0'W	70	CTD
135	13	Sep	94	0658	57 12.2'N	167	14.6'W	69	CTD
136	13	Sep	94	0758	57 18.7'N	167	06.6'W	79	CTD

Line C -----

Stn			Time (GMT)		Latitude		Longitude	Depth	Event
137	13	Sep	94	0806	57 06.9'N	165	34.6'W	67	CTD
138	13	Sep	94	1344	56 59.7'N	165	45.4'W	74	CTD, Bongo
139	13	Sep	94	1512	56 52.4'N	165	56.7'W	84	CTD
140	13	Sep	94	1626	56 45.4'N	166	08.0'W	82	CTD
141	13	Sep	94	1744	56 38.5'N	166	18.8'W	80	CTD, Bongo
142	13	Sep	94	1920	56 31.3'N	166	30.3'W	94	CTD
143	13	Sep	94	2036	56 24.4'N	166	41.1'W	110	CTD
144	13	Sep	94	2155	56 17.2'N	166	51.4'W	112	CTD, Bongo
145	14	Sep	94	0017	56 09.8'N	167	02.3'W	124	CTD
146	14	Sep	94	0140	56 02.7'N	167	13.4'W	133	CTD
147	14	Sep	94	0310	55 54.9'N	167	24.9'W	132	CTD
148	14	Sep	94	0422	55 48.5'N	167	34.8'W	131	XBT72
149	14	Sep	94	0615	55 41.9'N	167	46.9'W	131	XBT73
150	14	Sep	94	0827	55 34.3'N	167	57.2'W	147	XBT74
151	14	Sep	94	1109	55 27.9'N	168	08.2'W	205	XBT75

Line A -----

Stn			Time (GMT)		Latitude		Longitude	Depth	Event
152	14	Sep	94	1459	54 57.9'N	167	12.0'W	241	XBT76
153	14	Sep	94	2005	55 04.4'N	167	02.3'W	170	XBT77
154	15	Sep	94	0007	55 12.3'N	166	50.6'W	140	XBT79

ARGOS Buoys (Dispersion Experiment)									
Stn	Time (GMT)			Latitude	Longitude		Depth	Event	
155	15	Sep	94	2143	57 46.2'N	168	45.4'W	75	CTD
155'	15	Sep	94	2200	57 46.4'N	168	46.3'W	75	B7171
156	15	Sep	94	2246	57 50.6'N	168	49.9'W	80	XBT80
156'	15	Sep	94	2250	57 50.6'N	168	49.9'W	80	B0232
157	15	Sep	94	2324	57 47.6'N	168	50.1'W	80	XBT81
157'	15	Sep	94	2328	57 47.6'N	168	50.1'W	80	B7256
158	16	Sep	94	0001	57 46.0'N	168	55.5'W	70	XBT82
158'	16	Sep	94	0005	57 46.0'N	168	55.7'W	70	B7172

Line K (2nd occupation)									
Stn	Time (GMT)			Latitude	Longitude		Depth	Event	
159	16	Sep	94	0327	57 58.7'N	169	59.6'W	68	CTD
160	16	Sep	94	0433	57 52.8'N	170	12.4'W	71	CTD
161	16	Sep	94	0538	57 46.7'N	170	24.2'W	72	CTD
162	16	Sep	94	0642	57 40.7'N	170	36.0'W	73	CTD
163	16	Sep	94	0746	57 34.8'N	170	48.6'W	85	CTD
164	16	Sep	94	0852	57 28.9'N	171	00.3'W	87	CTD
165	16	Sep	94	1000	57 22.9'N	171	12.2'W	97	CTD
166	16	Sep	94	1110	57 16.9'N	171	24.5'W	100	CTD
167	16	Sep	94	1224	57 11.0'N	171	36.2'W	167	CTD
168	16	Sep	94	1340	57 05.0'N	171	49.0'W	116	CTD
169	16	Sep	94	1502	56 58.9'N	172	00.9'W	128	CTD
170	16	Sep	94	1838	56 53.0'N	172	13.6'W	128	CTD
171	16	Sep	94	2021	56 47.0'N	172	25.4'W	125	CTD
172	16	Sep	94	2233	56 41.0'N	172	38.0'W	131	CTD
173	17	Sep	94	0038	56 34.0'N	172	48.6'W	210	CTD

Array around northern line K									
174	17	Sep	94	0939	57 16.9'N	171	00.3'W	100	CTD
175	17	Sep	94	1143	57 28.8'N	171	24.0'W	95	CTD
176	17	Sep	94	1257	57 43.8'N	171	11.9'W	100	CTD
177	17	Sep	94	1444	57 22.9'N	170	47.6'W	89	CTD
178	17	Sep	94	1559	57 28.9'N	170	35.8'W	71	CTD
179	17	Sep	94	1740	57 34.7'N	170	24.0'W	71	CTD

PHASE 2

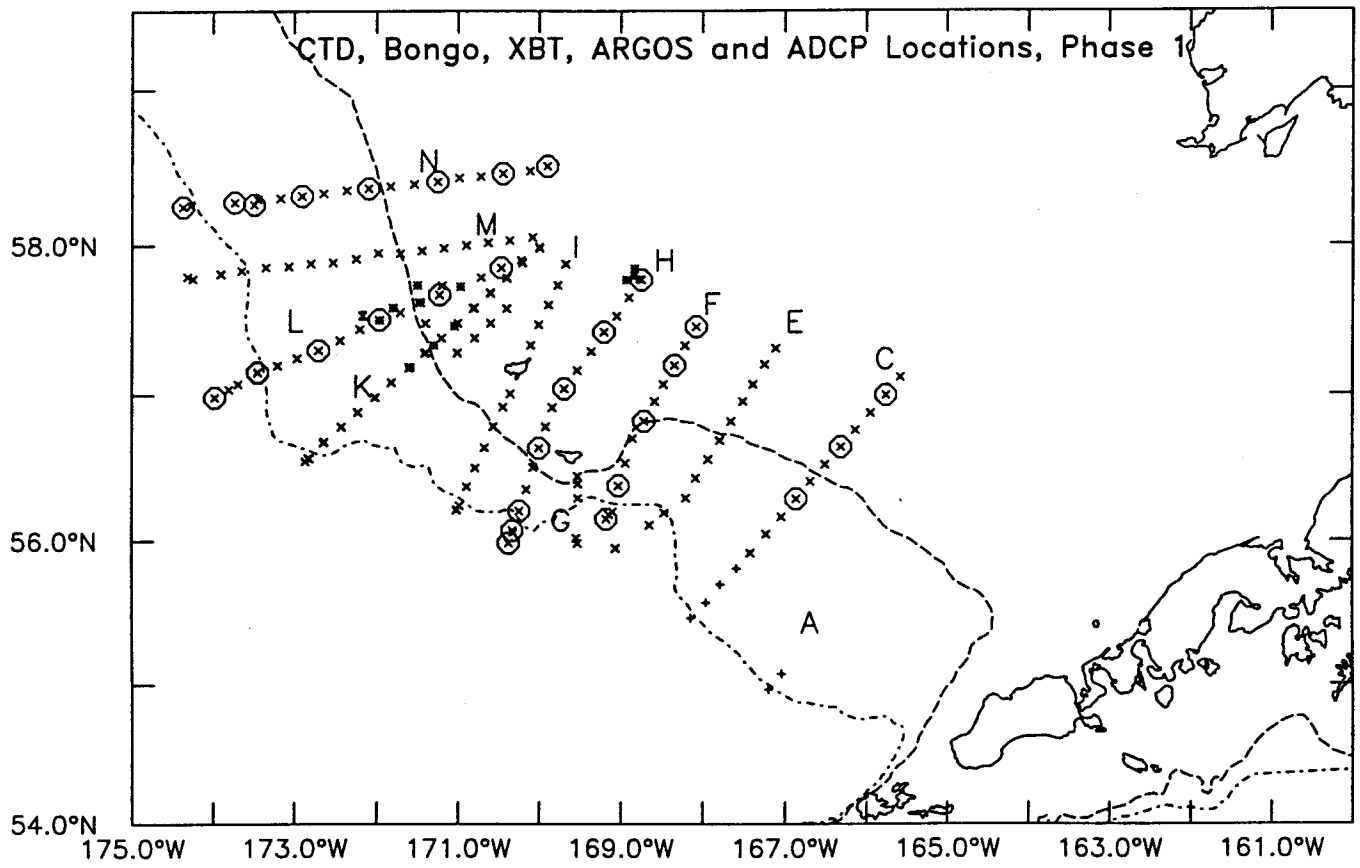
During phase 2 of the experiment, the Surveyor and Miller Freeman worked together on CTD lines, with each ship sampling roughly half the stations on each line.

Line L, Second Occupation									
180	18	Sep	94	1035	57 47.0'N	170	43.2'W	78	CTD
181	18	Sep	94	1155	57 43.5'N	170	58.5'W	85	CTD
182	Acoustic Survey of line "L"								
183	18	Sep	94	2225	57 29.3'N	171	56.7'W	110	MOC
184	19	Sep	94	0229	57 32.0'N	172	10.1'W	105	ADCP REC
185	19	Sep	94	0630	57 36.8'N	171	27.8'W	100	MOC
186	19	Sep	94	0920	57 44.0'N	170	59.7'W	80	MOC

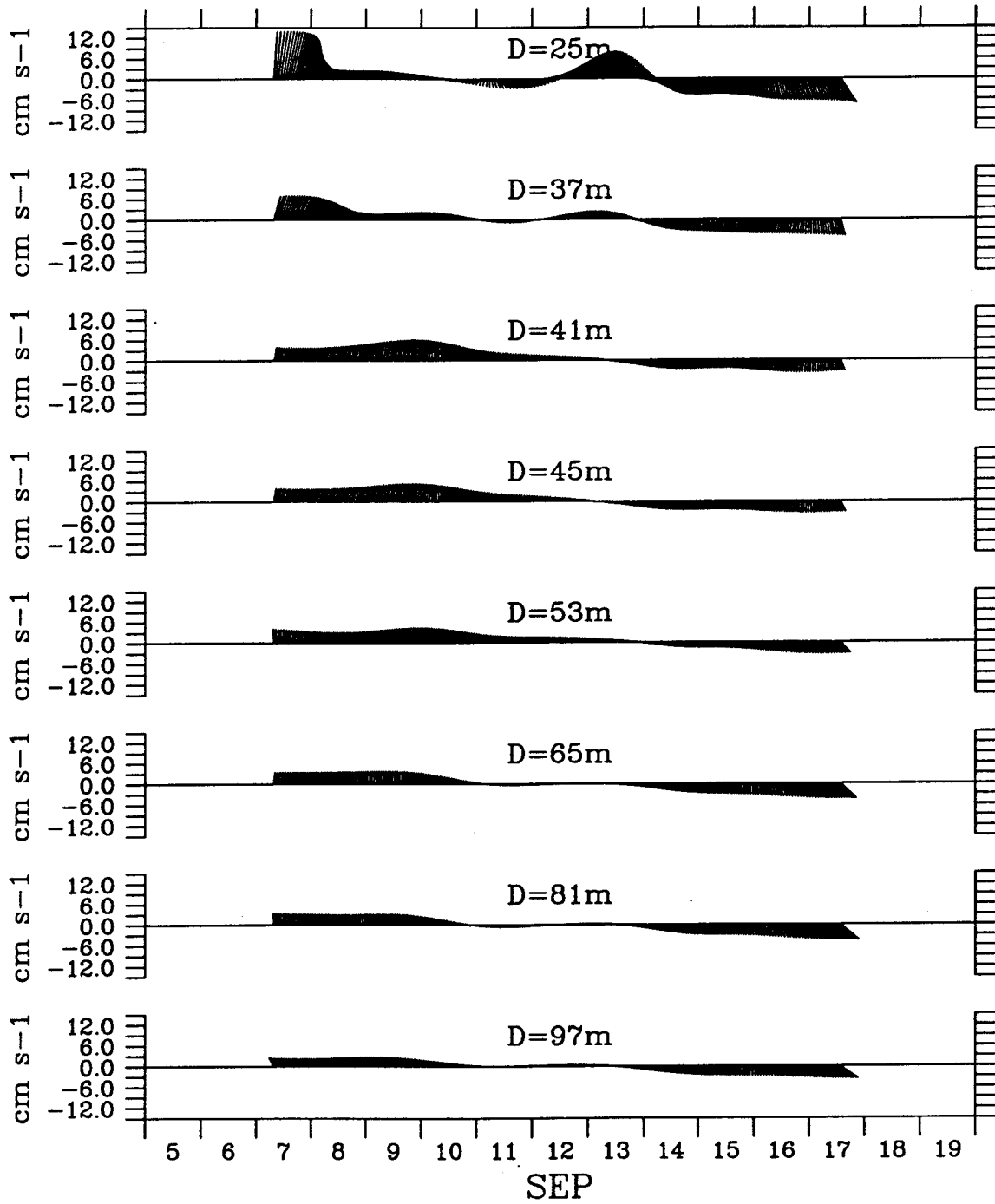
Phase-2 "A" line									
187	19	Sep	94	1332	57 41.0'N	169	51.6'W	72	CTD
188	19	Sep	94	1436	57 34.5'N	169	56.5'W	70	CTD
189	19	Sep	94	1533	57 29.5'N	170	01.0'W	63	CTD
190	19	Sep	94	1629	57 26.0'N	170	03.0'W	60	CTD
191	19	Sep	94	1712	57 23.4'N	170	06.0'W	57	CTD
192	Acoustic Survey of line "A"								
193	19	Sep	94	2224	57 35.6'N	169	56.2'W	71	MOC
194	20	Sep	94	0028	57 24.6'N	170	05.9'W	55	MOC
195	20	Sep	94	0159	57 18.5'N	170	11.3'W	50	MOC
196	20	Sep	94	0213					IKMT
197	20	Sep	94	0310					IKMT
198	Second Acoustic Survey of line "A"								
199	20	Sep	94	0927	57 34.3'N	169	58.5'W	70	MOC
200	20	Sep	94	1142	57 24.0'N	170	3.0'W	61	MOC
201	20	Sep	94	1320	57 17.5'N	170	12.0'W	40	MOC

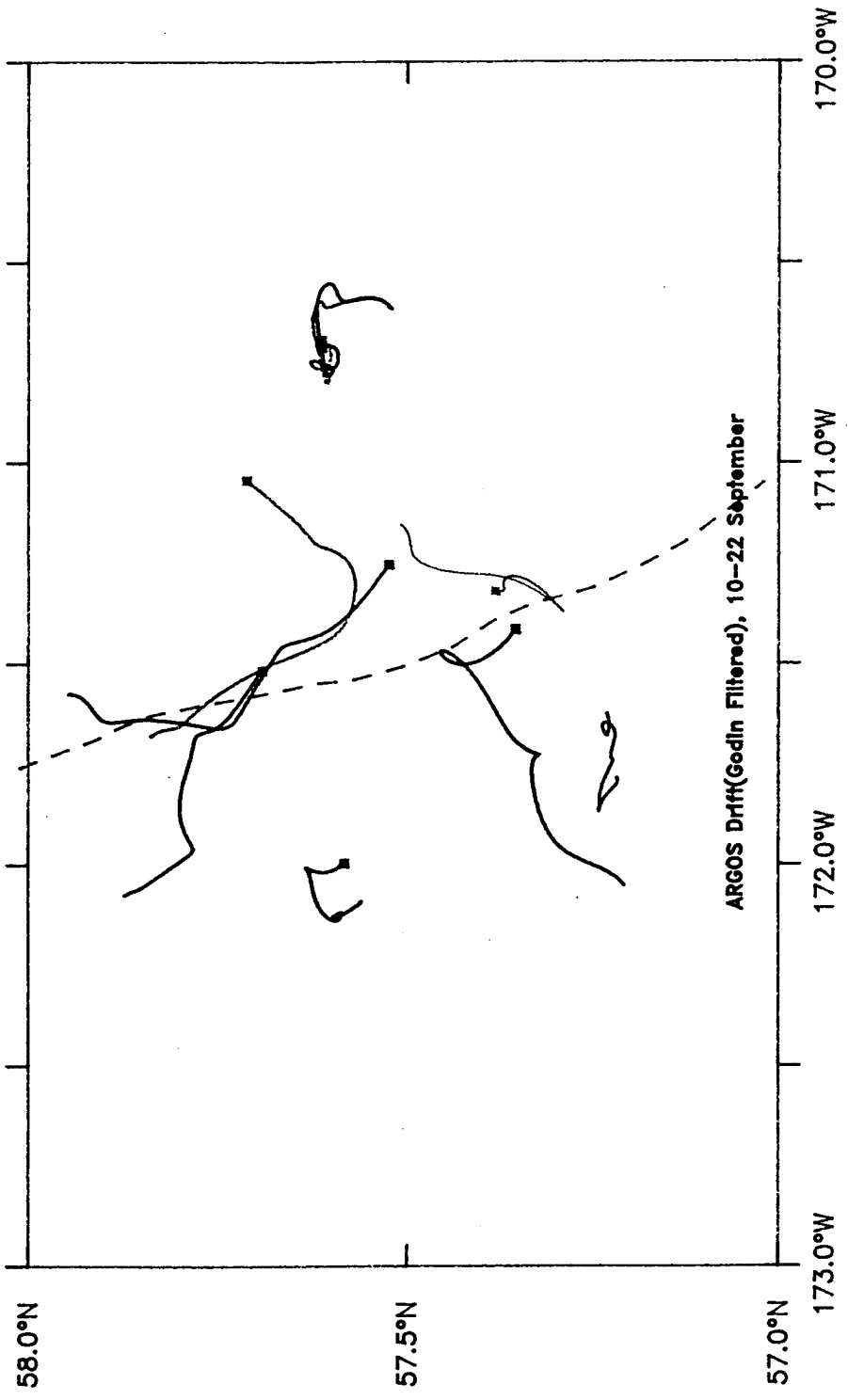
Phase-2 "B" line -----										
202	20	Sep	94	1759	56	41.7'N	170	36.8'W	110	CTD
203	20	Sep	94	1927	56	47.3'N	170	31.4'W	100	CTD
204	20	Sep	94	2054	56	52.9'N	170	26.9'W	102	CTD
205	Acoustic Survey of line "B"									
206	21	Sep	94	0214	56	53.5'N	170	29.6'W	95	MOC
207	21	Sep	94	0438	56	59.1'N	170	19.3'W	65	MOC
208	21	Sep	94	0620	57	01.5'N	170	14.3'W	62	MOC
209	Second Acoustic Survey of line "B"									
210	21	Sep	94	1048	56	52.3'N	170	29.9'W		MOC
Phase-2 "D" line -----										
211	21	Sep	94	1430	56	50.0'N	169	35.0'W	70	CTD
212	21	Sep	94	1514	56	46.9'N	169	35.0'W	75	CTD
213	21	Sep	94	1557	56	43.9'N	169	34.6'W	77	CTD
214	21	Sep	94	1633	56	42.3'N	169	34.9'W	76	CTD
215	Acoustic Survey of line "D"									
216	21	Sep	94	2000	56	46.4'N	169	37.6'W	75	MOC
217	21	Sep	94	2206	56	39.9'N	169	38.0'W	72	MOC
218	21	Sep	94	2358	56	38.5'N	169	36.0'W	68	MOC
XBT's south of St. George Island -----										
219	Acoustic Survey south of St. George									
220	22	Sep	94	0240	56	25.6'N	169	37.1'W	98	XBT84
221	22	Sep	94	0249	56	23.8'N	169	36.4'W	112	XBT85
222	22	Sep	94	0307	56	20.7'N	169	34.9'W	142	XBT86
223	22	Sep	94	0326	56	17.8'N	169	33.5'W		XBT87
224	22	Sep	94	0339	56	14.9'N	169	32.1'W		XBT88
225	22	Sep	94	0356	56	12.0'N	169	30.7'W	458	XBT89
226	22	Sep	94	0405	56	11.0'N	169	30.0'W	480	XBT90
228?	22	Sep	94	0518	56	16.1'N	169	33.0'W	247	MOC

CTD, Bongo, XBT, ARGOS and ADCP Locations, Phase 1



Godin-filtered RD data





CTD, XBT, and MOCNESS Locations, Phase 2

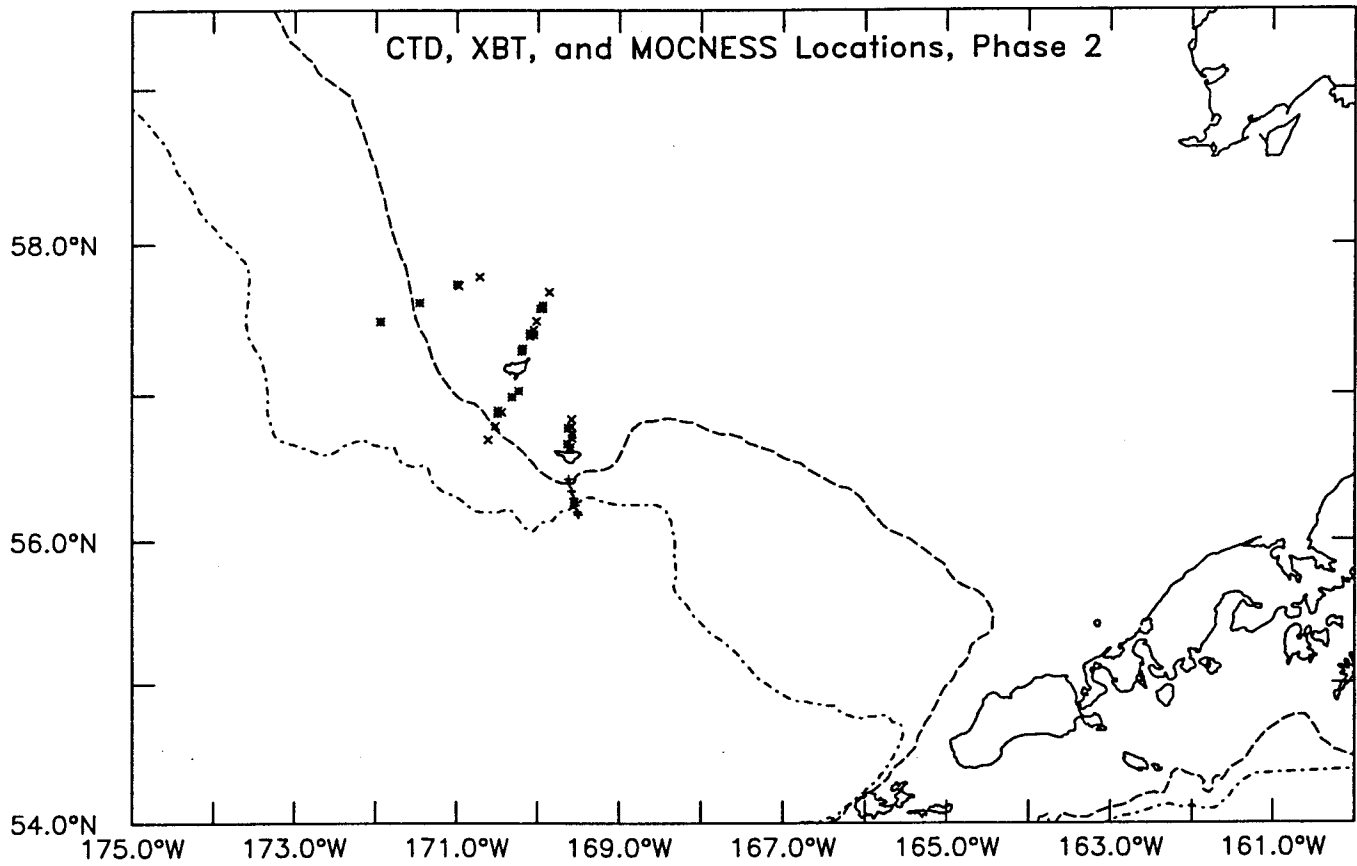
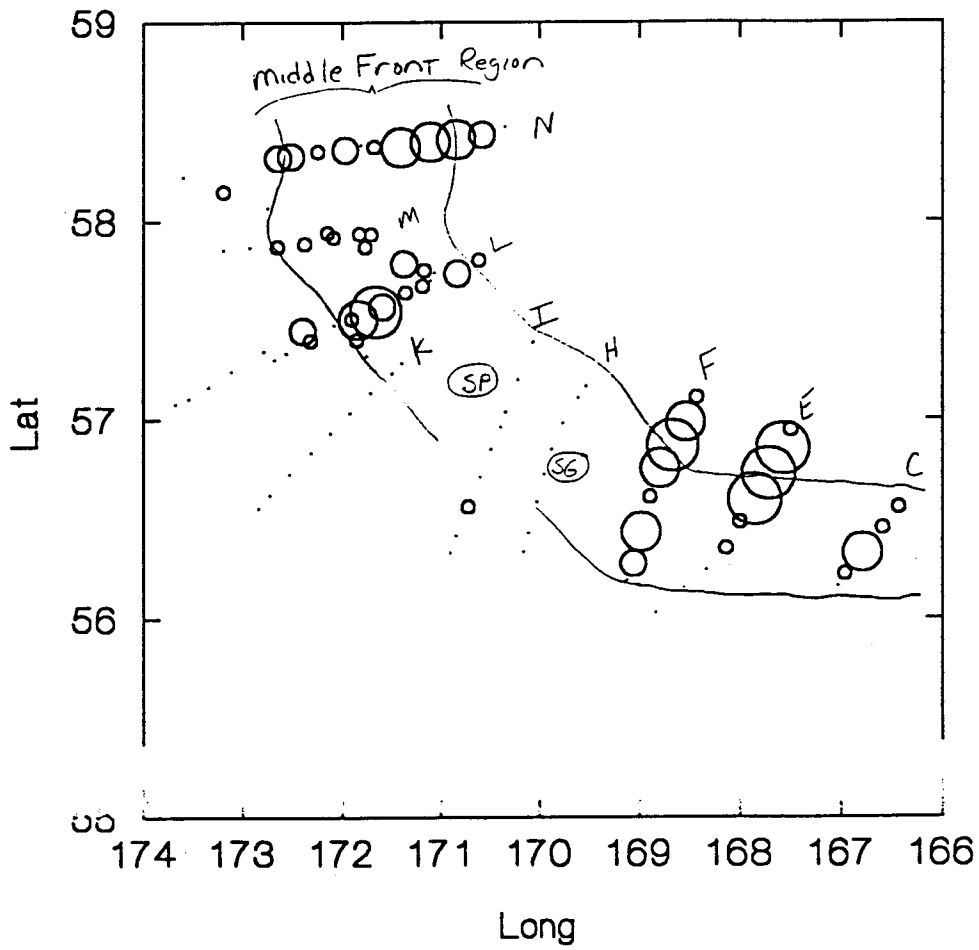


Fig. 1

Phase 1: Feeding murre



- 0-10 Birds/Interval
- 11-30
- 31-50
- 51-100

() 101-150

Fig. 32

Birds on the water, Line A

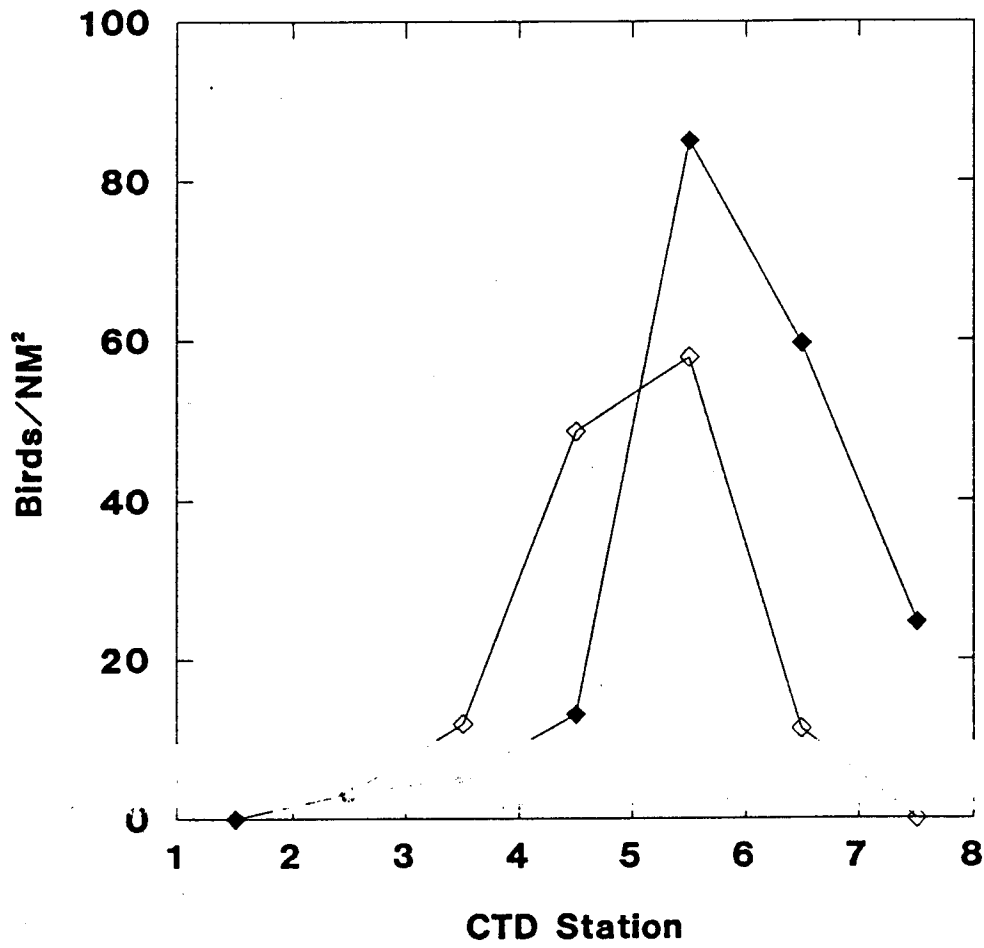


Fig. # 3

MURRES AND AUKLETS ON WATER, LINE B

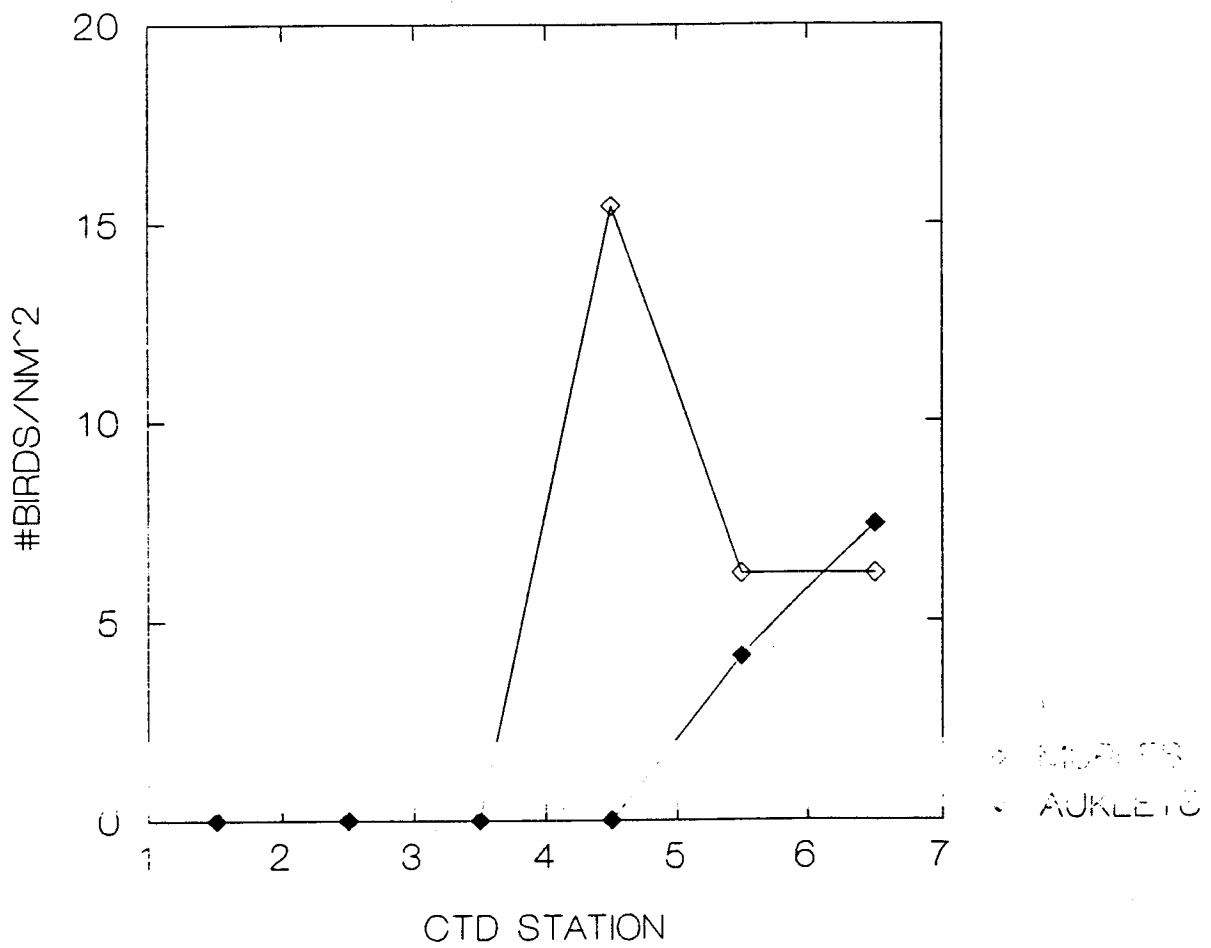
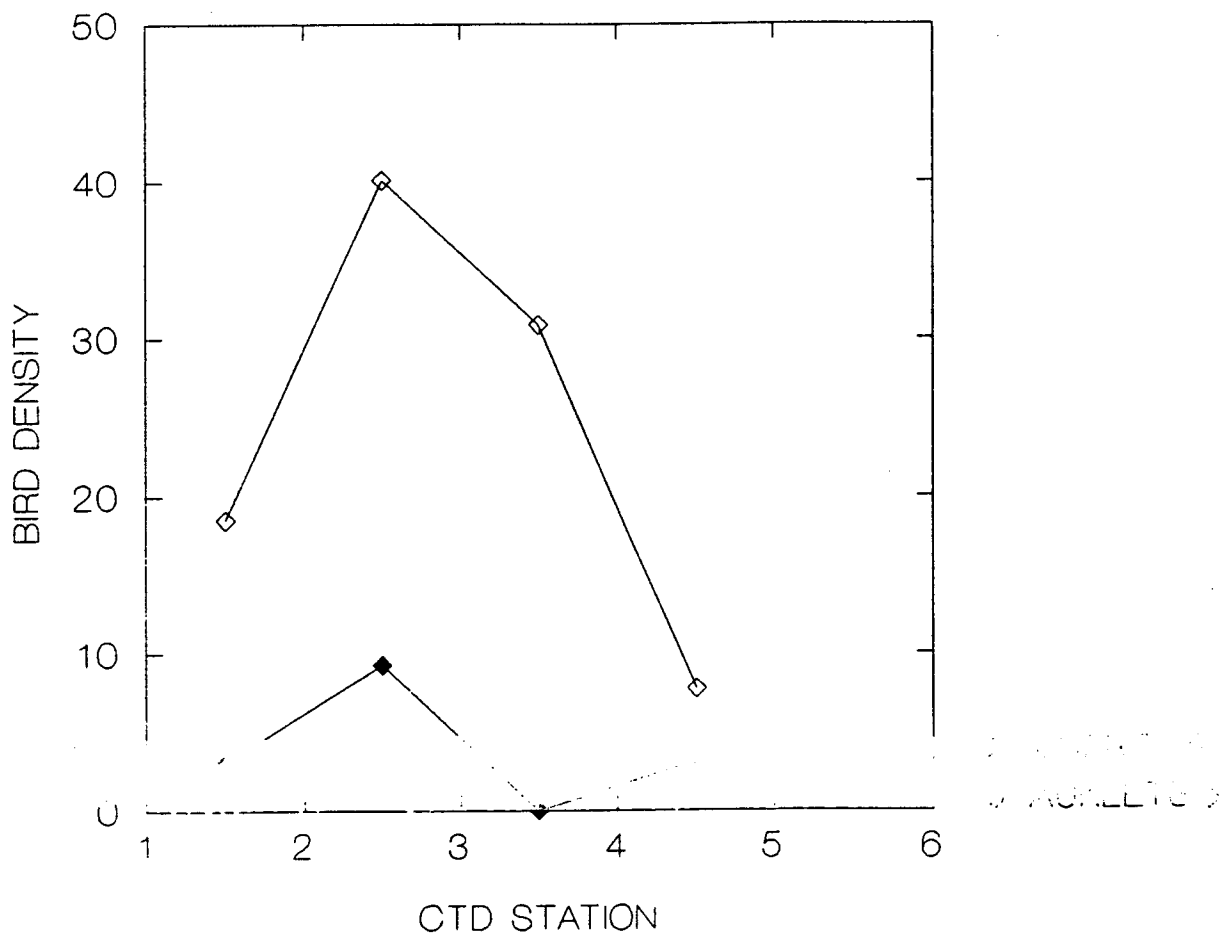
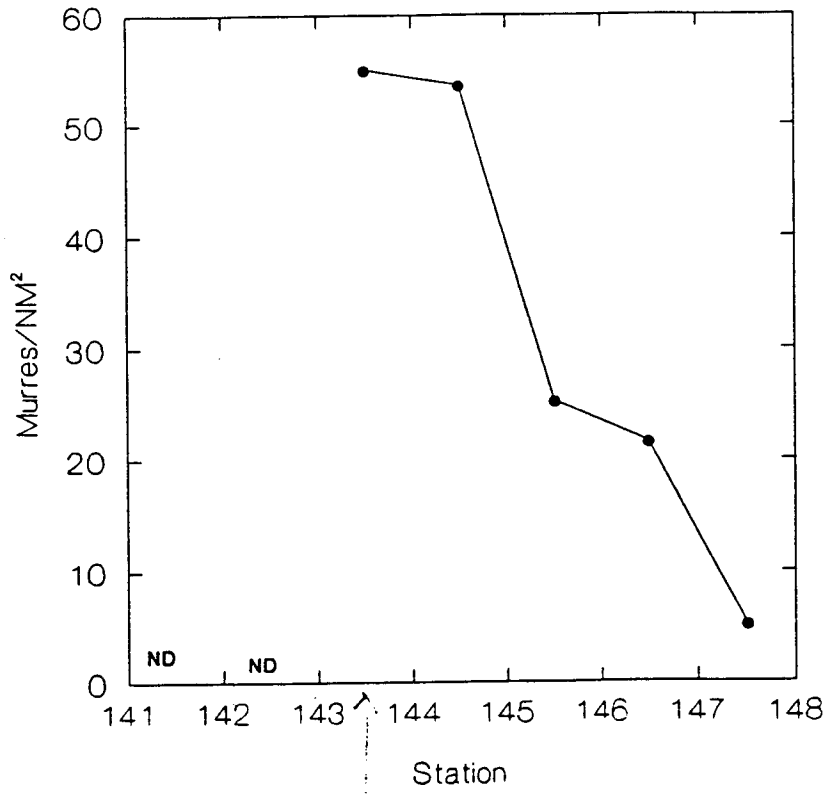


Fig. 54

BIRDS FEEDING OR ON THE WATER, LINE D





Middle Point