8 February 2001

CRUISE RESULTS
Fisheries Research Vessel Albatross IV
Cruise No. AL 00-07
Ecosystems Monitoring Survey

CRUISE PERIOD AND AREA

The cruise period was from 30 October to 16 November 2000. The research vessel Albatross IV covered the Mid-Atlantic Bight, Southern New England, Georges Bank and Gulf of Maine regions (Figure 1) as part of the Late Autumn Survey Period.

OBJECTIVES

The objective of the cruise was to collect standardized samples and data to monitor changing biological and physical properties that influence the sustainable productivity of the living marine resources of the Mid-Atlantic Bight, Southern New England, Georges Bank and Gulf of Maine portions of the Northeast Continental Shelf ecosystem.

METHODS

The survey consisted of 120 randomly distributed stations at which the vessel stopped to lower instrumented arrays over the side.

Key parameters which were measured included water column temperature and salinity, ichthyo and zooplankton composition, abundance and distribution; along-track temperature, salinity, chlorophyll-a fluorescence and standard weather observations.

A double oblique tow using the 61-centimeter Bongo sampler and a CTD was made at all stations. The tow was made to approximately 5 meters above the bottom, or to a maximum depth of 200 meters, at a ship speed of 1.5 knots. Plankton sampling gear consisted of a 61-centimeter mouth diameter aluminum bongo frame with 2 333-micron nylon mesh nets. A 45-kilogram lead ball was attached by an 80 centimeter length of 3/8-inch diameter chain below the aluminum Bongo frame to depress the sampler. A digital flowmeter was suspended within the mouth of each sampler to determine the amount

of water filtered by each net. The plankton sampling gear was deployed over the port stern quarter of the vessel by means of a conducting-cable winch and the ship's main boom. Plankton samples were preserved in a 5 percent solution of formalin in seawater. Tow depth was monitored in real time with a Seabird CTD profiler, which was hard-wired to the conductive towing cable, providing simultaneous depth, temperature and salinity data for each plankton tow.

Continuous monitoring of the seawater temperature, salinity, and chlorophyll-a level, at a depth of 2 meters was done along the entire cruise track by means of a thermosalinograph, and a flow-through fluorometer.

The thermosalinograph and flow-through fluorometer were connected to the Scientific Computing System installed in the laboratory area of the vessel by Office of Marine and Aviation Operations personnel. This system recorded output from the thermosalinograph, and the fluorometer every ten seconds, and incorporated a time-date stamp from the GPS unit.

SUMMARY OF SPECIAL ACTIVITIES

- A CTD equipped with a fluorometer (unit #2879) was used at the first 39 of 120 cruise stations until the fluorometer's intake tube broke off while in the Southern New England area. All subsequent stations were sampled using a conventional CTD unit (#1496). Samples for calibration of the Seabird CTD fluorometer were obtained on the 6-12 watch by taking a water sample using both a surface bucket and a 1.7 liter Niskin bottle from 30 or more meters depth at every fifth or sixth station.

- Phytoplankton samples for nitrogen stable isotope analysis samples were drawn from the discharge water of the flow-through instrumentation at 21 locations scattered across the 4 areas of the survey. Sampling sites included inshore areas near major estuaries and offshore locations near the edge of the continental shelf. Samples were collected by filtering 600 to 1000 ml of flow-through water through a Whatman GFF filter. The filter with entrapped phytoplankton was subsequently wrapped in aluminum foil and flash-frozen for analysis ashore by Rick McKinney, the lead investigator on this collaborative effort with the Environmental Protection Agency Marine Laboratory in Narragansett, Rhode Island.

- Sample jars from all stations were examined during the cruise for the presence of large concentrations of <u>Calanus finmarchicus</u>. Large concentrations were defined as <u>Calanus finmarchicus</u> comprising more than 75% of the sample visible to

the eye through the glass sides of the jar. These settled zooplankton heights, in cm, of >75% Calanus finmarchicus were multiplied by the cross-sectional area of the quart sample jars (52.8 cm^2) to produce an estimate of settled volume in cm^3 of Calanus finmarchicus for comparison between stations that were sampled on the cruise. These data were then relayed to Patricia Gerrior, the Coordinator for the Whale Sighting Advisory System based at the NEFSC Laboratory in Woods Hole.

- Samples for Seabird salinity data calibration were obtained on the 12-6 watch by taking a water sample from 30 or more meters depth using a 1.7 liter Niskin bottle at every fifth or sixth station. Calibration of the thermosalinograph and fluorometer in the surface flow-through system was undertaken on the 6-12 watch following the protocol outlined in the Ecosystem Monitoring Program Operations Manual.

- Deep-water CTD casts were made to within 5 meters of the bottom in the Northeast Channel and basins deeper than 220 meters in the Gulf of Maine to provide deep-water hydrographic data to David Mountain, Fisheries Oceanography Branch Chief.

- Plankton sampling equipment and methods were demonstrated to Adele Conover, author of an article on zooplankton for publication in Smithsonian Magazine. A low-power microscope was used during calm weather to show Adele some of the predominant species of zoo- and ichthyoplankton caught at various locations on Georges Bank and the Gulf of Maine.

RESULTS

A summary of survey activities is presented in Table 1. Figure 1 shows the areal coverage achieved during the cruise. The Albatross IV sailed at 1400 EST on Monday 30 October 2000. Work commenced off the coast of New Jersey in the Mid-Atlantic Bight area, with the vessel proceeding south, picking up inshore stations to keep working under the windy conditions prevailing at the start of the cruise. Weather improved by the time the southernmost part of the cruise track was reached off of Cape Hatteras, making it possible to get to the offshore stations of the Mid-Atlantic Bight, as the vessel worked its way back north to the Southern New England area. All of the stations plotted for the western portion of the Southern New England area were sampled without problems and the vessel continued on to the eastern portion and even picked up a few stations on the Georges Bank southwest corner until deteriorating weather made operations in this offshore area unsafe. At this point the decision was made return to Woods Hole for the scheduled exchange of scientific personnel. Working conditions improved closer to shore and two inshore SNE stations were visited prior to the vessel going into Woods Hole on 6 November. The Albatross returned to sea on 7 November, picking up all but two remaining

Southern New England stations that had been missed due to the weather. Engine trouble forced the vessel to return to Woods Hole on 8 November. The vessel returned to sea on 9 November, completing the two remaining SNE stations and proceeding to Georges Bank. The Georges Bank area was sampled in a counterclockwise fashion before the vessel proceeded on to the Gulf of Maine area, which was also sampled counterclockwise, from the southwest corner across to Nova Scotia and then down along the Maine-New Hampshire-Massachusetts coastline. Sampling operations were completed early on 15 November and the vessel returned through the Cape Cod Canal and docked in Woods Hole early the next day on 16 November.

After examination of all sample jars, none were found to have large concentrations of Calanus finmarchicus comprising >75% of the sample as described in the dominant zooplankton volume protocol earlier in this report.

DISPOSITION OF SAMPLES AND DATA

All samples and data, except the CTD data, were delivered to the Ecosystems Monitoring Group of the NEFSC, Narragansett, RI, for quality control processing and further analysis. The CTD data was delivered to the Oceanography Branch of the NEFSC, Woods Hole, MA.

SCIENTIFIC PERSONNEL

National Marine Fisheries Service, NEFSC, Narragansett, RI

Jerome Prezioso[1,2], Chief Scientist

Joseph Kane[1,2], Fishery Biologist

Jacquelyn Anderson[1,2], Biological Technician

Carolyn Griswold,[2] Fishery Biologist

Maureen Taylor,[1] Oceanographer

Smithsonian Magazine, Washington, DC

Adele Conover,[2] Journalist

[1]/Personnel on Leg I (30 Oct. - 6 Nov.)
[2]/Personnel on Leg II (7 - 16 Nov.)

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Table 1. STATION OPERATION REPORT FOR CRUISE AL 00-07

CAST	STA	DATE GMT dd mm yy	TIME GMT	POSITION lat/long		BOTTOM DEPTH (m)	SAMPLE TYPE (b=bongo) (W=water)
001	001	10 31 00	1439	3918.7	7349.7	35	b
002	002	10 31 00	1620	3921.5	7409.2	23	b
003	003	10 31 00	1917	3850.6	7419.2	35	b
004	004	10 31 00	2114	3837.0	7437.8	30	b
005	004	10 31 00	2124	3837.3	7437.8	29	w
006	005	10 31 00	2236	3828.0	7447.8	24	b
007	006	11 01 00	0006	3817.0	7436.3	34	b
008	007	11 01 00	0142	3801.8	7441.0	31	b
009	008	11 01 00	0357	3754.2	7508.1	19	b
010	009	11 01 00	0650	3725.0	7503.2	30	b
011	010	11 01 00	0808	3717.6	7515.1	27	b
012	010	11 01 00	0819	3717.9	7515.0	27	w
013	011	11 01 00	1115	3645.9	7525.2	24	b
014	012	11 01 00	1324	3634.3	7540.6	23	b
015	013	11 01 00	1835	3541.4	7508.0	35	b
016	013	11 01 00	1847	3541.6	7507.9	34	w
017	014	11 01 00	2010	3531.2	7505.9	35	b
018	015	11 01 00	2352	3605.1	7502.9	37	b
019	016	11 02 00	0233	3628.3	7513.3	34	b
020	017	11 02 00	0551	3658.7	7507.5	40	b
021	017	11 02 00	0601	3659.0	7507.4	41	w
022	018	11 02 00	0756	3657.3	7443.3	80	b
023	019	11 02 00	1036	3719.3	7448.9	46	b
024	020	11 02 00	1137	3721.4	7438.8	69	b
025	021	11 02 00	1347	3739.0	7449.3	40	b
026	022	11 02 00	1440	3745.0	7444.6	46	b
027	023	11 02 00	1616	3746.4	7426.2	61	b
028	024	11 02 00	1925	3810.0	7408.1	64	b
029	024	11 02 00	1936	3810.2	7408.1	64	w
030	025	11 02 00	2122	3816.3	7349.6	98	b
031	026	11 02 00	2316	3832.0	7400.8	48	b
032	027	11 03 00	0228	3856.2	7335.0	46	b
033	028	11 03 00	0524	3912.4	7305.8	70	b
034	028	11 03 00	0532	3912.5	7305.7	70	w
035	029	11 03 00	0929	3936.7	7350.3	28	b

Table 1. (Continued) STATION OPERATION REPORT FOR CRUISE AL 00-07

CAST	STA	DATE GMT dd	mm	yy	TIME GMT	POSITION lat/long		BOTTOM DEPTH (m)	SAMPLE TYPE (b=bongo) (W=water)
036	030	11	03	00	1128	3934.3	7326.1	34	b
037	031	11	03	00	1358	3946.2	7259.2	71	b
038	032	11	03	00	1508	3956.4	7259.3	51	b
039	033	11	03	00	1803	4000.7	7336.2	35	b
040	033	11	03	00	1812	4000.9	7336.0	36	w
041	034	11	03	00	2050	4025.7	7318.4	30	b
042	035	11	04	00	0014	4030.8	7234.5	42	b
043	036	11	04	00	0216	4035.6	7208.2	50	b
044	037	11	04	00	0459	4013.4	7229.7	58	b
045	037	11	04	00	0512	4013.4	7230.2	58	w
046	038	11	04	00	0619	4005.2	7240.3	54	b
047	039	11	04	00	0800	4002.2	7220.2	72	b
048	040	11	04	00	1001	3946.2	7205.4	115	b
049	041	11	04	00	1247	4004.7	7143.5	87	b
050	042	11	04	00	1507	4028.5	7138.9	75	b
051	043	11	04	00	1654	4018.8	7121.8	80	b
052	043	11	04	00	1704	4018.7	7122.4	80	w
053	044	11	04	00	1840	4033.9	7114.9	66	b
054	045	11	04	00	2144	4024.1	7037.0	82	b
055	046	11	04	00	2318	4009.6	7031.3	120	b
056	047	11	05	00	0325	4011.5	6942.5	88	b
057	048	11	05	00	0650	4011.7	6901.1	131	b
058	048	11	05	00	0715	4010.7	6901.4	134	W
059	049	11	05	00	0840	4007.5	6846.8	169	b
060	050	11	05	00	0950	4014.8	6844.1	112	b
061	051	11	05	00	1129	4028.1	6834.4	87	b
062	052	11	05	00	1311	4021.6	6814.3	137	b
063	053	11	05	00	1623	4026.8	6735.6	143	b
064	054	11	05	00	1812	4033.7	6757.8	93	b
065	054	11	05	00	1822	4033.9	6758.1	93	w
066	055	11	05	00	1922	4037.2	6811.2	89	b
067	056	11	05	00	2235	4047.6	6851.0	65	b

Table 1. (Continued) STATION OPERATION REPORT FOR CRUISE AL 00-07

CAST	STA	DATE GMT dd	mm	yy	TIME GMT	POSITION lat/long		BOTTOM DEPTH (m)	SAMPLE TYPE (b=bongo) (W=water)
068	057	11	06	00	0039	4038.8	6910.6	67	b
069	058	11	06	00	0337	4030.7	6943.8	67	b
070	059	11	06	00	1339	4112.8	7107.8	36	b
071	060	11	06	00	1431	4120.7	7107.5	26	b
072	061	11	07	00	2214	4118.7	7040.7	20	b
073	062	11	08	00	0149	4059.7	7106.5	47	b
074	063	11	08	00	0358	4059.0	7042.2	47	b
075	064	11	08	00	0550	4053.3	7025.3	47	b
076	064	11	08	00	0559	4053.5	7025.1	47	w
077	065	11	08	00	0844	4038.2	7003.9	50	b
078	066	11	08	00	1101	4050.4	6947.0	32	b
079	067	11	10	00	0342	4123.3	6943.1	24	b
080	068	11	10	00	0443	4125.5	6936.4	27	b
081	069	11	10	00	1059	4053.2	6819.6	50	b
082	070	11	10	00	1257	4115.2	6809.8	39	b
083	071	11	10	00	1443	4104.0	6751.9	50	b
084	072	11	10	00	1635	4105.4	6726.0	57	b
085	073	11	10	00	1811	4048.9	6735.7	74	b
086	073	11	10	00	1825	4048.5	6735.5	73	w
087	074	11	10	00	2141	4039.6	6656.7	190	b
088	075	11	11	00	0027	4102.2	6647.4	72	b
089	076	11	11	00	0203	4118.0	6655.0	68	b
090	077	11	11	00	0426	4107.1	6626.6	161	b
091	078	11	11	00	0558	4117.6	6619.9	94	b
092	078	11	11	00	0609	4117.4	6619.6	94	w
093	079	11	11	00	0737	4129.6	6619.0	89	b
094	080	11	11	00	0945	4143.6	6602.9	97	b
095	081	11	11	00	1116	4149.4	6621.5	80	b
096	082	11	11	00	1232	4200.2	6627.8	84	b
097	083	11	11	00	1500	4140.9	6642.9	68	b
098	084	11	11	00	1919	4209.7	6715.9	155	b
099	084	11	11	00	1937	4209.6	6714.8	145	w
100	085	11	11	00	2115	4212.2	6733.3	218	b
101	086	11	11	00	2348	4155.9	6717.5	54	b
102	087	11	12	00	0217	4137.1	6725.7	55	b

Table 1. (Continued) STATION OPERATION REPORT FOR CRUISE AL 00-07

CAST	STA	DATE GMT dd mm yy	TIME GMT	POSITION lat/long		BOTTOM DEPTH (m)	SAMPLE TYPE (b=bongo) (W=water) (v=vertical)
103	088	11 12 00	0353	4146.7	6736.2	38	b
104	089	11 12 00	0620	4148.8	6801.1	52	b
105	089	11 12 00	0630	4148.6	6800.8	52	w
106	090	11 12 00	0747	4133.2	6759.9	39	b
107	091	11 12 00	1110	4135.2	6825.9	54	b
108	092	11 12 00	1342	4136.1	6857.1	110	b
109	093	11 12 00	1829	4204.5	6841.7	160	b
110	093	11 12 00	1849	4204.7	6840.8	164	w
111	094	11 12 00	2127	4224.2	6859.1	218	b
112	095	11 13 00	0208	4239.5	6810.0	188	b
113	096	11 13 00	0405	4249.2	6754.2	195	b
114	097	11 13 00	0722	4255.6	6714.6	240	b
115	097	11 13 00	0746	4255.8	6713.8	244	w
116	098	11 13 00	1129	4224.9	6643.6	337	b
117	098	11 13 00	1223	4225.1	6643.5	340	v
118	099	11 13 00	1531	4225.4	6604.2	241	v
119	099	11 13 00	1550	4225.2	6604.0	242	b
120	100	11 13 00	1837	4249.2	6612.0	48	b
121	100	11 13 00	1848	4249.2	6611.5	51	w
122	101	11 13 00	2103	4251.3	6639.1	181	b
123	102	11 13 00	2347	4316.2	6644.7	118	b
124	103	11 14 00	0226	4320.1	6721.8	200	b
125	104	11 14 00	0515	4341.9	6656.3	148	b
126	104	11 14 00	0532	4341.6	6655.9	150	w
127	105	11 14 00	0754	4355.7	6628.3	86	b
128	106	11 14 00	1036	4417.2	6643.2	178	b
129	107	11 14 00	1223	4406.1	6659.5	155	b
130	108	11 14 00	1557	4413.5	6748.8	90	b
131	109	11 14 00	1757	4357.6	6750.2	165	b
132	109	11 14 00	1820	4356.9	6751.2	135	w
133	110	11 14 00	1959	4348.9	6814.3	174	b
134	111	11 14 00	2246	4328.9	6844.7	128	b
135	112	11 15 00	0135	4302.3	6858.9	134	b
136	113	11 15 00	0426	4310.5	6938.7	73	b

Table 1. (Continued) STATION OPERATION REPORT FOR CRUISE AL 00-07

CAST	STA	DATE GMT dd mm yy	TIME GMT	POSITION lat/long		BOTTOM DEPTH (m)	SAMPLE TYPE (b=bongo) (W=water) (V=vertical)
137	114	11 15 00	0602	4324.2	6948.9	126	b
138	114	11 15 00	0617	4323.8	6949.4	120	w
139	115	11 15 00	0840	4319.3	7023.4	49	b
140	116	11 15 00	1047	4303.8	7003.9	50	b
141	117	11 15 00	1239	4245.0	7004.5	136	b
142	118	11 15 00	1459	4231.3	6942.2	253	v
143	118	11 15 00	1521	4231.2	6942.0	256	b
144	119	11 15 00	1738	4226.6	6957.3	144	b
145	119	11 15 00	1752	4226.9	6957.4	128	w
146	119	11 15 00	1757	4226.8	6957.3	138	w
147	120	11 15 00	2005	4220.4	7017.0	34	b
148	120	11 15 00	2022	4220.9	7017.0	34	b

TOTALS: CTD Casts = 148

Bongo Casts = 120

Bongo Samples = 240

Water Samples = 23

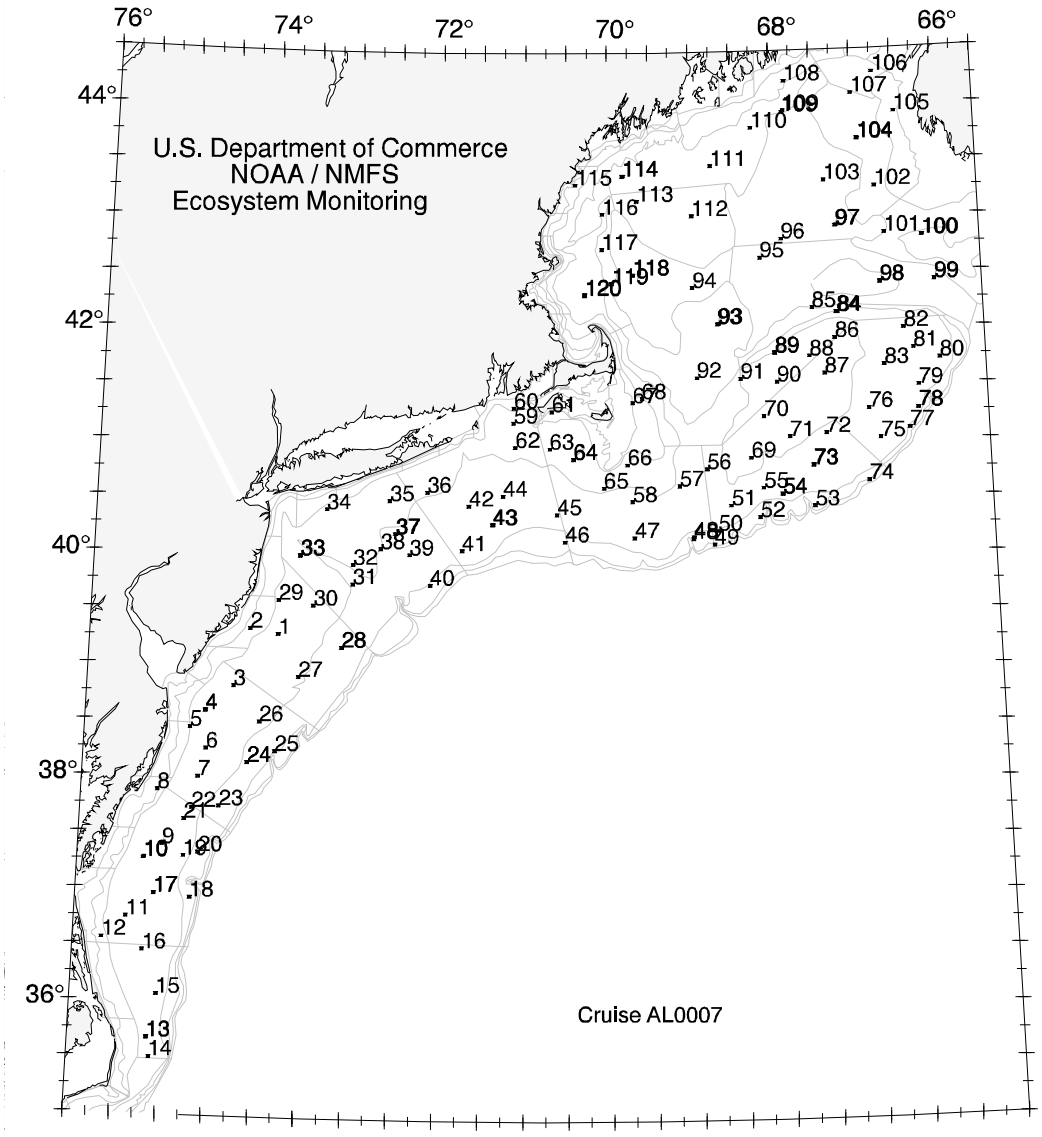

Figure 1. Station locations numbered consecutively for Late Autumn Ecosystems Monitoring Cruise AL 00-07, 30 Oct - 16 November 2000.