

Edwards

A SYNOPSIS OF GROUND FISH SURVEY CRUISES

(ALBATROSS III, DELAWARE I) 1948-1962

by

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This report was prepared from survey logs, sailing orders, cruise reports, unpublished work by Robert Livingstone, Jr., Marvin D. Grosslein, and other miscellaneous information. The data are not available on magnetic tape at this time, but are on computer cards. Refer to the Species Data Table before consulting the appropriate cruise description for further details. The data format of these old cruises is the same as the present groundfish surveys and, in most cases, numbers and length frequencies of commercial species will be the only data available on magnetic tape with each cruise having special qualifications as stated in each cruise description.

Survey cruises during 1948-1951 were generally concentrated on Georges Bank with some sampling in the Gulf of Maine and southern New England. Sampling design for this period consisted of stratifying areas by depth and choosing stations from a table of random numbers. Stations were in areas of 7 x 10 miles (10 min. Lat. & Long.), and depth zones were: 1) 0-55 meters, 2) 55-110 meters, and 3) greater than 110 meters. This sampling scheme was more restrictive than the present stratified sampling design because there are approximately 20 times as many station positions available today. As a part of routine operations, replicate tows were made at every second or third station.

The period 1952-1962 was characterized by a shift from stratified random sampling to transects and grid patterns. Cruise coverage increased and included more of the Gulf of Maine and Browns Bank. A grid system was established over the area from Browns Bank to southern New England with stations spaced at regular intervals and concentrations of sampling taken in areas where concentrations of fish were found, particularly haddock.

Sampling methods and designs of these cruises during 1948-1962 were somewhat less effective and efficient than the groundfish surveys conducted since that time, nevertheless, a large volume of valuable data exists, especially for some of the more important commercial species, such as haddock, cod, and silver hake.

SPECIES DATA TABLE

SPECIES	CRUISE															
	105	112	126	133	137	102	154	156	162	165	181	118	212	312	419	512
Haddock	N,LF,S,W	N,LF,S	N,LF,S,W	N,LF,S	N,LF,W	N,LF,W,S	N,LF	N,LF	N,LF,S	N,LF,S	N,LF	N,LF,S	N,LF,S,O	N,LF,S	N,LF	N,LF,S
Cod	N,LF	N,LF	N,LF	N,LF	N,LF,W	N,LF,W	N	N,LF	N,LF	N,LF	N	N,LF	N,LF	N,LF,S,O	N,LF,S,O	N,LF
Pollock	N,LF	N,LF	N,LF	N,LF	N,W	N,LF	N	N	N,LF,S	N	N	N	N,LF	N,LF,S,O	N,LF	N,LF
Silver hake	N,LF	N	N,LF	N	N,W	N,W	N,LF	N,LF	N,LF	N,LF	N,LF	N,LF	N,LF	N,LF	N,LF	N,LF
Redfish	N	N,LF	N,LF	N	N,W	N,W	N	N	N,LF	N	N	N,LF	N,LF	N,LF	N,LF	N,LF
Red hake	N,LF	N	N,LF	N	N,W	N	N	N	N,S	N	N	N	N,LF	N,LF	N,LF	N,LF
White hake	N	N	N	N	N,LF,W	N,LF	N	N,LF	N	N	N	N	N,LF	N,LF	N,LF	N,LF
Yellowtail	N,LF	N,LF	N,LF	N,LF	N,LF,W	N,LF,W	N	N	N,LF	N,LF	N	N	N,LF	N,LF	N,LF	N,LF
Winter flounder	N,LF	N,LF	N,LF	N,LF	N,W	N	N	N	N	N	N	N	N,LF	N,LF	N,LF	N,LF
American dab	N,LF	N	N,LF	N,LF	N,W	N,W	N	N	N	N	N	N,LF	N,LF	N,LF	N,LF	N,LF
Witch flounder	N	LF	N,LF	N,LF	N,W	N	N	N	N	N	N	N	N,LF	N,LF	N,LF	N,LF
Atlantic herring	N	-	N,LF	N	N,W	N,W	N	N	N	N	N	N	N	N,LF	N,LF	-
Squid	N	-	N	-	-	V,W	-	-	-	-	-	-	-	-	-	-
Scallop	-	-	-	-	-	V,W	-	-	-	-	-	-	-	-	-	N,W
Lobster	N,W	N,LF	N,LF	N,W	N,LF,W	N,LF	-	N,LF	-	-	-	-	-	-	-	-

LEGEND: N = Numbers    LF = Length Frequencies    W = Weight    V = Volume    S = Scales    O = Otoliths

## GROUND FISH SURVEY CRUISES 1948-1962

VESSEL	CRUISES	CODE	DATE	YEAR	SEASON	NO. OF STATIONS	AREA OF INVESTIGATION	TRAWL TYPE	SPEED RPM
Albatross III	5,6,7,9	105	13 Jul-10 Sep	1948	Summer	120	Georges Bank to West of Channel	1-1½ Iceland	180-200
Albatross III	10,11,12,14	112	29 Sep- 9 Dec	1948	Fall	93	Off Maine to Hudson Canyon	1-1½ Iceland	200
Albatross III	26,27,28	126	27 Jul-16 Sep	1949	Summer	181	Gulf of Maine to Hudson Canyon	1-1½ Iceland	200
Albatross III	33,34,35	133	15 Mar-18 May	1950	Spring	187	Nova Scotia to Hudson Canyon	1-1½ Iceland	200-210
Albatross III	37,37A,38	137	6 Jul-31 Aug	1950	Summer	191	Gulf of Maine to off Long Island	1-1½ Iceland	200-210
Delaware I	51-2,51-3	102	14 Aug- 4 Sep	1951	Summer	101	Georges Bank to Cape Cod	1-1½ Iceland	-
Albatross III	54,55	154	1 Sep-25 Sep	1953	Fall	86	Gulf of Maine to Hudson Canyon	No. 36 Yankee	-
Albatross III	56	156	1 Feb-13 Feb	1955	Winter	49	Georges Bank	No. 36 Yankee	-
Albatross III	62	162	6 Jun-18 Jun	1955	Spring	88	Browns & Georges Banks to Cape Cod	No. 36 Yankee	210
Albatross III	65,66	165	8 Sep-28 Sep	1955	Fall	129	Nova Scotia to Hudson Canyon	No. 36 Yankee	-
Albatross III	81,82	181	2 Nov-21 Nov	1956	Fall	85	Nova Scotia to Hudson Canyon	No. 36 Yankee	210
Albatross III	118,119,120	118	22 Sep-17 Oct	1958	Fall	132	Nova Scotia to Hudson Canyon	No. 36 Yankee	210
Delaware I	59-12,59-13	212	23 Sep-27 Oct	1959	Fall	142	Nova Scotia to Hudson Canyon	No. 36 Yankee	210
Delaware I	60-12	312	2 Nov-21 Nov	1960	Fall	112	Nova Scotia to Hudson Canyon	No. 36 Yankee	210
Delaware I	61-19	419	25 Oct-20 Nov	1961	Fall	152	Nova Scotia to Hudson Canyon	No. 36 Yankee	210
Delaware I	62-12,62-13	512	9 Oct- 4 Nov	1962	Fall	137	Nova Scotia to West of Channel	No. 36 Yankee	210

Cruise Code No. 105  
ALBATROSS III, Summer Cruises 5,6,7,9

Purpose: To census the groundfish populations on Georges Bank to west of the Great South Channel.

Inclusive dates: July 13 to September 10, 1948.

Trawl stations: 120 tows, all 30-minute duration, in depths from 37 to 274 meters, with several stations having double tows.

Sampling design: Stratified sampling, the area was stratified by depth and stations were chosen at random.

Gear: 1½ Iceland trawl with rollers and liner in codend and belly; vessel speed was 180-210 rpm.

Operations schedule: 24 hrs/day, except Cruise No. 9, 7:15 p.m. to 6:05 a.m.

Fisheries statistics available: All species counted and identified without weights taken. Haddock length frequency information is almost complete. Some good data on cod, pollock and silver hake available, with 50-90% of catches measured. Limited amount of red hake, yellowtail, winter flounder, and American dab, with 50-90% of catches measured. Atlantic herring numbers on #1 listing.

Miscellaneous biological data: Haddock scales taken, weights taken but not available on #1 listing. Squid numbers, but no identification. Lobsters, some numbers and weights taken.

Cruise Code No. 112  
ALBATROSS III, Fall Cruises 10,11,12,14

Purpose: To census the groundfish populations from west central Gulf of Maine to Hudson Canyon, with some coverage of southwest Georges Bank.

Inclusive dates: September 29 to December 9, 1948.

Trawl stations: 93 tows, all 30-minute duration, in depths up to 366 meters, with several stations having double tows.

Sampling design: Stratified sampling, the area was stratified by depth and stations were chosen at random.

Gear: 1½ Iceland trawl with rollers and liner in codend and belly; vessel speed was 200 rpm.

Operations schedule: 24 hrs/day.

Fisheries statistics available: All species counted and identified without weights taken. Haddock, cod and pollock length frequencies are essentially complete. Redfish, silver hake, red hake, length frequencies for 50-90% of catches. Yellowtail, winter flounder, American dab and witch flounder, length frequencies are available for 50-90% of catches. Atlantic herring numbers available on #1 listing; some length frequencies also available.

Miscellaneous biological data: Haddock scales taken, weights taken, but not available on #1 listing. Some squid counts. Lobsters were counted and measured.

Cruise Code No. 126  
ALBATROSS III, Summer Cruises 26,27,28

Purpose: To census the groundfish in western southern Gulf of Maine and southern New England.

Inclusive dates: July 27 to September 16, 1949.

Trawl stations: 181 tows, all 30-minute duration, in depths up to 274 meters, with several stations having double tows.

Sampling design: Stratified sampling, the area was stratified by depth and stations were chosen at random.

Gear: 1½ Iceland trawl with rollers and liner in codend and belly; vessel speed was 200 rpm.

Operations schedule: 24 hrs/day.

Fisheries statistics available: All species counted and identified without weights taken. Haddock and cod length frequencies are essentially complete. Redfish and pollock available for 50-90% of catches. Yellowtail, winter flounder and witch flounder length-frequencies are 50-90% complete. Atlantic herring numbers available on #1 listing.

Miscellaneous biological data: Haddock scales taken. Lobsters were counted and measured.

Cruise Code No. 133  
ALBATROSS III, Spring Cruises 33,34,35

Purpose: To census the groundfish populations from Hudson Canyon to northeast Georges Bank and conduct exploratory fishing and census of the western Nova Scotian Banks.

Inclusive dates: March 15 to May 18, 1950.

Trawl stations: 187 tows, all 30-minute duration, in depths from 55 to 432 meters, with several stations having double tows.

Sampling design: Stratified sampling, the area was stratified by depth and stations were chosen at random.

Gear: 1½ Iceland trawl with rollers and liner in codend and belly; vessel speed was 200-210 rpm.

Operation schedule: 24 hrs/day.

Fisheries statistics available: All species counted and identified without weights taken. Haddock length frequency data is essentially complete. Some data on cod and pollock, with 50-90% of catches measured. Yellowtail, winter flounder, American dab and witch flounder, length frequency data available with 50-90% of catches measured. Atlantic herring numbers available on #1 listing.

Miscellaneous biological data: Haddock scales taken. Some lobster weights recorded.

Cruise Code No. 137

ALBATROSS III, Summer Cruises 37,37A, 38

Purpose: To census the groundfish populations from southern Browns Bank to Long Island.

Inclusive dates: July 6 to August 31, 1950.

Trawl stations: 191 tows, all 30-minute duration, in depths up to 274 meters, with several stations having double tows.

Sampling design: Stratified sampling, the area was stratified by depth and stations were chosen at random.

Gear: 1½ Iceland trawl with rollers and liner in codend and belly; vessel speed was 200-210 rpm.

Operation schedule: 24 hrs/day.

Fisheries statistics available: All species counted and identified. Weights of commercial species recorded, but not available on #1 listing. Haddock length frequencies are almost complete. Cod catches were measured 50-90% of time. Length frequencies available for yellowtail and winter flounder, 50-90% complete. Atlantic herring numbers available on #1 listing.

Miscellaneous biological data: Haddock scales taken. Lobster lengths and weights recorded. Some YOY haddock length frequency data may not be available on #2 listing.

Cruise Code No. 102  
DELAWARE I, Summer Cruises 51-2,51-3

Purpose: To census the groundfish populations on Georges Bank.

Inclusive dates: August 14 to September 4, 1951.

Trawl stations: 101 tows, all 30-minute duration.

Sampling design: Stratified sampling, the area was stratified by depth and stations were chosen at random; these were to be compared to sampling a grid pattern of stations.

Gear: 1½ Iceland trawl with rollers and liner in codend and belly; vessel speed is not available.

Operations schedule: 24 hrs/day.

Fisheries statistics available: All species counted and identified. Some weights are available and complete. Haddock length frequencies are available and complete. There is some length frequency data available on cod, yellowtail, pollock and winter flounder. Atlantic herring numbers available on #1 listing.

Miscellaneous biological data: Haddock scales were taken. Volume and weight estimates of squid and scallops. Lobsters were counted and measured.

Cruise Code No. 154  
ALBATROSS III, Fall Cruises 54,55

Purpose: To study distribution of YOY haddock and other groundfish from Georges Bank to southern New England.

Inclusive dates: September 1 to September 25, 1953.

Trawl stations: 86 tows, 67 were 20-minute tows, the rest 30-minute duration.

Sampling design: Several transects were chosen with stations spaced at intervals along them.

Gear: No. 36 Yankee trawl with rollers and liner ( $\frac{1}{2}$  inch) in codend and belly; vessel speed is not available.

Operations schedule: 24 hrs/day.

Fisheries statistics available: All YOY were counted and identified. Haddock and silver hake, YOY length frequencies are the only useful data available.

Cruise Code No. 156  
ALBATROSS III, Winter Cruise 56

Purpose: To census the groundfish populations of Georges Bank.

Inclusive dates: February 1 to February 13, 1955.

Trawl stations: 49 tows, all 30-minute duration, in depths from 37 to 110 meters.

Sampling design: Several transects were chosen for Georges Bank and stations were spaced at intervals along these transects.

Gear: No. 36 Yankee trawl with rollers and liner ( $\frac{1}{2}$  inch) in codend and belly; vessel speed was 200 rpm.

Operations schedule: 24 hrs/day.

Fisheries statistics available: All species counted and identified. Weights of some catches were recorded, but are not available on #1 listing. Haddock length frequencies are complete. Cod and silver hake are from 50-90% complete. Yellowtail length frequencies are complete. Atlantic herring numbers available on #1 listing.

Miscellaneous biological data: Haddock scales were taken. Lobsters were measured.

Cruise Code No. 162  
ALBATROSS III, Spring Cruise 62

Purpose: To census groundfish populations on Georges and Browns Banks.

Inclusive dates: June 6 to June 18, 1955.

Trawl stations: 88 tows, all 30-minute duration.

Sampling design: Transects were chosen for Georges and Browns Banks and stations were spaced at intervals along these transects.

Gear: No. 36 Yankee trawl with rollers and liner ( $\frac{1}{2}$  inch) in codend and belly; vessel speed was 210 rpm.

Operations schedule: 24 hrs/day.

Fisheries statistics available: All species counted and identified. Haddock, cod and silver hake length frequencies are complete. Pollock, redfish and yellowtail length frequencies are 50-90% complete. Atlantic herring numbers available on #1 listing.

Miscellaneous biological data: Haddock, pollock and red hake scales were taken.

Cruise Code No. 165  
ALBATROSS III, Fall Cruises 65,66

Purpose: To census groundfish populations from Browns Bank to Hudson Canyon.  
To determine the distribution and abundance of YOY haddock.

Inclusive dates: September 8 to September 28, 1955.

Trawl stations: 129 tows, all 30-minute duration.

Sampling design: Stratified sampling, the area was stratified by depth and stations were chosen at random.

Gear: No. 36 Yankee trawl with rollers and liner ( $\frac{1}{2}$  inch) in codend and belly; vessel speed is not available.

Operations schedule: 24 hrs/day.

Fisheries statistics available: All species counted and identified. Some good length frequency data available for haddock, cod and silver hake. Length frequency data available for yellowtail. Atlantic herring numbers are available on #1 listing. Most commercial species have numbers on #1 listing.

Miscellaneous biological data: Haddock scales were taken

Cruise Code No. 181  
ALBATROSS III, Fall Cruises 81,82

Purpose: To determine the distribution and numbers of young of year fish, older demersal fish, and undertake special silver hake studies concerned with the distribution of the two stocks, food habits and age growth, from Browns Bank to Hudson Canyon.

Inclusive dates: November 2 to November 21, 1956.

Trawl stations: 85 tows, all 30-minute duration.

Sampling design: Stations were placed at intervals along a grid pattern.

Gear: No. 36 Yankee trawl with rollers and liner ( $\frac{1}{2}$  inch) in codend and belly; vessel speed was 210 rpm.

Operations schedule: 24 hrs/day.

Fisheries statistics available: All species counted and identified. Numbers and length frequencies for haddock and silver hake are complete. Only numbers are available for other commercial species. Atlantic herring numbers are available.

Miscellaneous biological data: Silver and red hake length frequency data available by sex, but not on #1 listing.

Cruise Code No. 118  
ALBATROSS III, Fall Cruises 118,119,120

Purpose: To study the distribution of young of year groundfish, primarily haddock, on the Gulf of Maine, Georges Bank and the southern New England Banks.

Inclusive dates: September 22 to October 17, 1958.

Trawl stations: 132 tows, all 30-minute duration.

Sampling design: Stations were placed at intervals along a grid pattern.

Gear: No. 36 Yankee trawl with rollers and liner ( $\frac{1}{2}$  inch) in codend and belly; vessel speed was 210 rpm.

Operations schedule: 24 hrs/day.

Fisheries statistics available: All species counted and identified. Cod and haddock length frequencies are complete and on #1 listing. A limited amount of length frequency data is available for silver hake, American dab and redfish. Numbers are available on #1 listing for the following: red hake, white hake, winter flounder, witch flounder and Atlantic herring.

Miscellaneous biological data: Haddock scales taken.

Cruise Code No. 212  
DELAWARE I, Fall Cruises 59-12,59-13.

Purpose: To census groundfish populations from Browns Bank to southern New England with special emphasis on YOY and older haddock.

Inclusive dates: September 23 to 27 October, 1959.

Trawl stations: 142 tows, all 30-minute duration, except for the following stations: 49 was 20 minutes, 52 was 25 minutes, 62 was 10 minutes, and 79 was 20 minutes.

Sampling design: Transects were made in specific areas, stations were non-random.

Gear: No. 36 Yankee trawl with rollers, mesh size of codend and belly liner not available, but probably  $\frac{1}{2}$  inch; vessel speed was 210 rpm.

Operations schedule: 24 hrs/day.

Fisheries statistics available: All species counted and identified. Haddock and cod length frequencies are almost complete. Pollock, redfish, silver hake, red hake, white hake, yellowtail, winter flounder and American dab length frequencies are 50-90% complete. Atlantic herring numbers are available on #1 listing.

Miscellaneous biological data: Haddock scales and otoliths were taken.

Cruise Code No. 312  
DELAWARE, Fall Cruise 60-12

Purpose: To survey the groundfish populations from Browns Bank to the Great South Channel with particular emphasis on the distribution and abundance of YOY haddock.

Inclusive dates: November 2 to November 21, 1960.

Trawl stations: 112 tows, all 30-minute duration, except stations 88 and 103-109 were 15 minutes.

Sampling design: Transects were made in specific areas, stations were non-random.

Gear: No. 36 Yankee trawl with rollers and liner ( $\frac{1}{2}$  &  $\frac{3}{4}$  inch) in codend and belly; vessel speed was 210 rpm.

Operations schedule: 24 hrs/day.

Fisheries statistics available: All species counted and identified. Length frequencies are essentially complete for haddock, cod, pollock, redfish silver hake, red hake, white hake, yellowtail, winter flounder, American dab and Atlantic herring.

Miscellaneous biological data: Haddock scales, cod scales and otoliths, pollock scales and otoliths were taken.

Cruise Code No. 419  
DELAWARE I, Fall Cruise 61-19

Purpose: To determine the distribution and relative abundance of YOY haddock and all other groundfish from Browns Bank to Hudson Canyon.

Inclusive dates: October 25 to November 20, 1961.

Trawl stations: 152 tows, all 30-minute duration, except station 29 was 20 minutes and station 40 was 2 hours.

Sampling design: Stations were non-random and concentrated in specific areas especially the northern edge of Georges Bank.

Gear: No. 36 Yankee trawl with rollers and liner (3/4 inch) in codend and belly; vessel speed was 210 rpm.

Operations schedule: 24 hrs/day.

Fisheries statistics available: All species counted and identified. Length frequencies for all commercial species are complete and on #2 listing.

Miscellaneous biological data: Cod scales and otoliths taken.

Cruise Code No. 512  
DELAWARE I, Fall Cruises 62-12,62-13

Purpose: To determine the distribution and abundance of YOY haddock and other groundfish from Browns Bank to south of Martha's Vineyard.

Inclusive dates: October 9 to November 4, 1962.

Trawl stations: 137 tows, all 30-minute duration, except station 48 was 20 minutes and station 109 was 40 minutes.

Sampling design: Stations were non-random and concentrated in specific areas of interest.

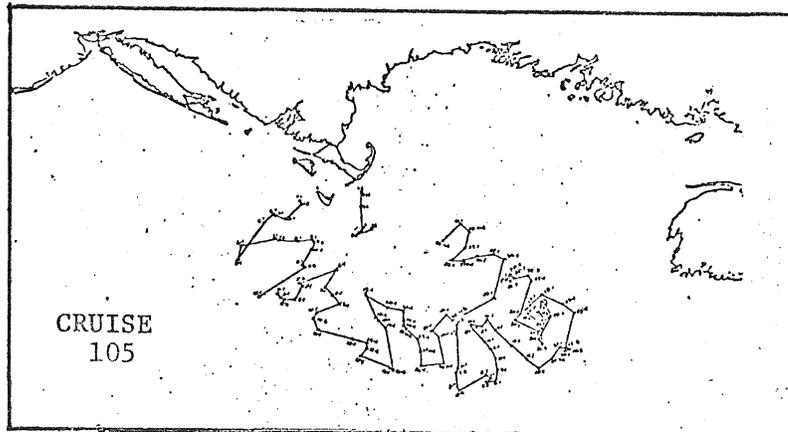
Gear: No. 36 Yankee trawl with rollers and liner (3/4 inch) in codend and belly; vessel speed was 210 rpm.

Operations schedule: 24 hrs/day.

Fisheries statistics available: All species counted and identified. Length frequencies for all important commercial species are available on #2 listing with few exceptions.

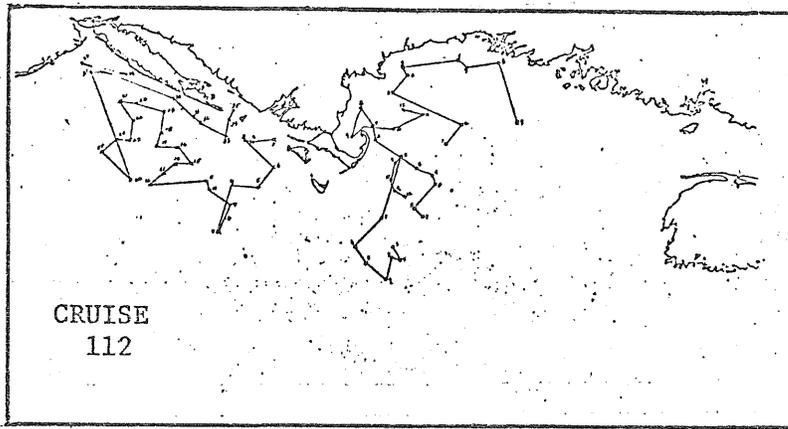
Miscellaneous biological data: Haddock scales taken, squid numbers are available. Lobster weights were taken.

Cruise	105	112	126	133
Strata	Tows	Tows	Tows	Tows
1		9		
2		8		3
3		3		4
4				2
5		7	5	1
6		13	10	12
7		2	1	
8				2
9	7	2	10	4
10	15		15	11
11	4		3	7
12				2
13	15		12	19
14	7		4	10
15			2	1
16	25		20	18
17	7		3	3
18				
19	10	1	15	19
20	2			1
21	10		2	3
22	1		4	2
23	2	7	5	2
24	2	8	13	3
25	3	2	3	
26		9	7	
27		5	3	
28		9	13	
29	10		8	15
30				1
31				6
32				5
33				
34			1	1
35			1	
36			3	5
37		3	3	
38		2	11	
39			2	
40		3	2	
41				21
42				4
49				
61				
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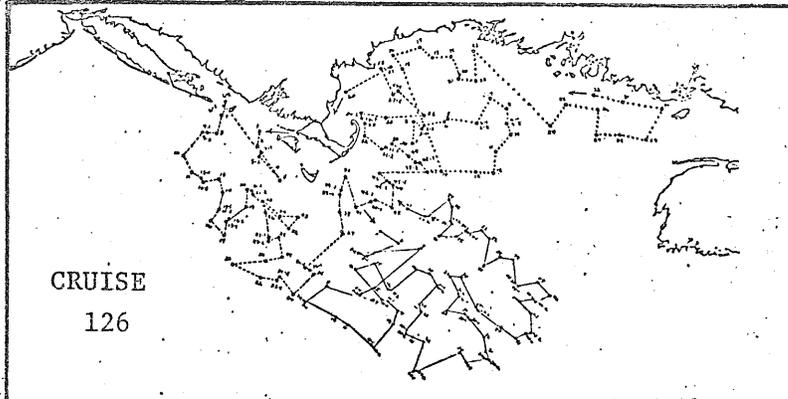
CRUISE  
105

SUMMER 1948  
13 Jul-10 Sep  
ALBATROSS III  
Cr. #5,6,7,9  
120 Stations  
Code 105



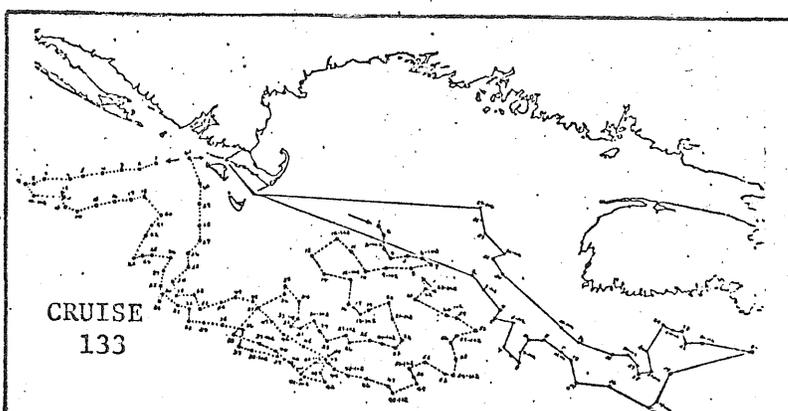
CRUISE  
112

FALL 1948  
29 Sep-9 Dec  
ALBATROSS III  
Cr. #10,11,12,14  
93 Stations  
Code 112



CRUISE  
126

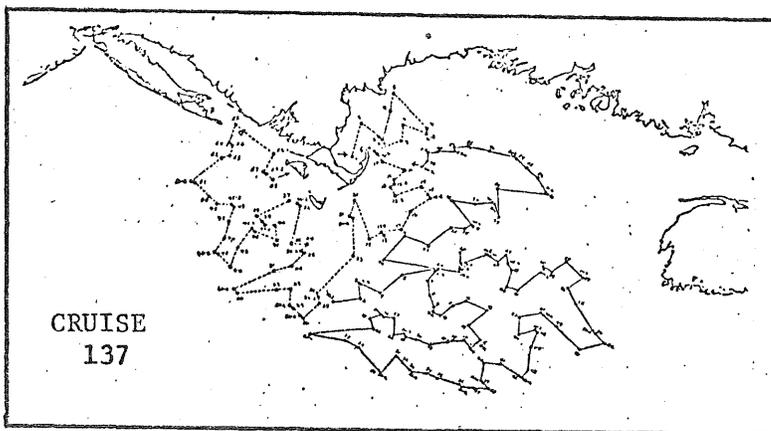
SUMMER 1949  
27 Jul-16 Sep  
ALBATROSS III  
Cr. #26,27,28  
181 Stations  
Code 126



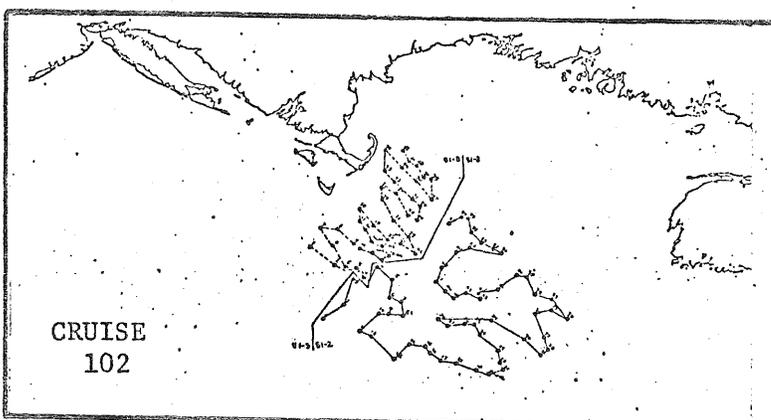
CRUISE  
133

SPRING 1950  
15 Mar-18 May  
ALBATROSS III  
Cr. #33,34,35  
187 Stations  
Code 133

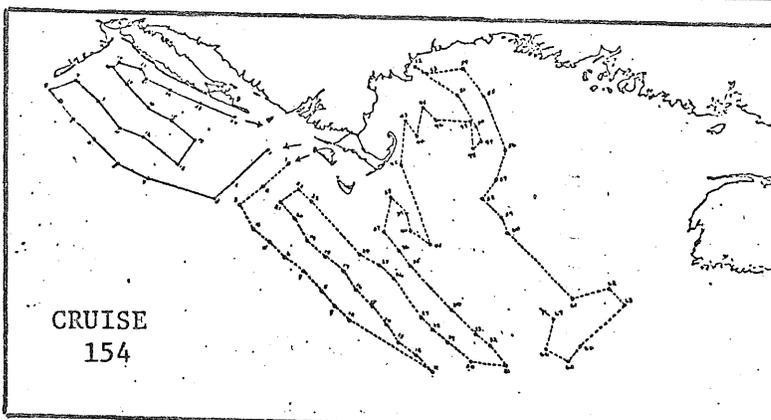
Cruise	137	102	154	156
Strata	Tows	Tows	Tows	Tows
1			10	
2			4	
3			1	
4				
5	6		4	
6	8		4	
7	3		2	
8				
9	13	3	3	1
10	15	3	11	5
11				
12	3			
13	11	9	5	7
14	5	3	3	1
15				
16	18	13	6	9
17	1	2		
18				
19	17	11	2	5
20	3	2		4
21	2	3		1
22	3	3		5
23	4	11	5	5
24	10	22	4	1
25	6	3		1
26	6		2	
27	1	1	4	
28	14	6	3	
29	20	6	3	4
30	3			
31	4		1	
32	3		1	
33				
34				
35				
36	8			
37	4		4	
38				
39				
40			1	
41				
42				
49				
61				
62				
63				
64				
65				
66				
67				
68				
69				
70				
71				
72				
73			3	
74				
75				
76				



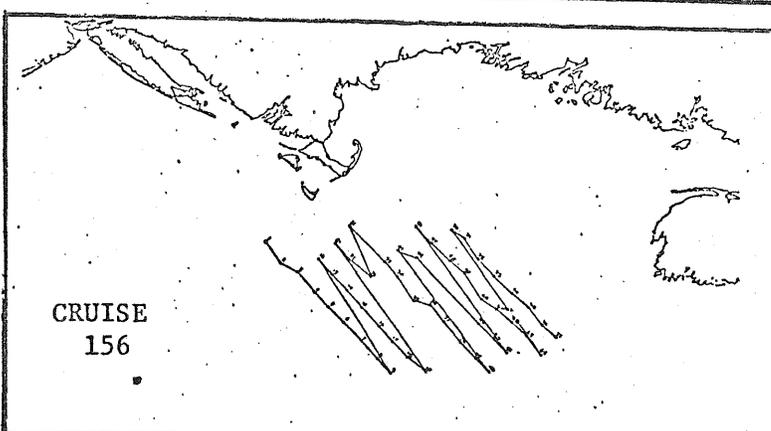
SUMMER 1950  
6 Jul-31 Aug  
ALBATROSS III  
Cr. #37,37A,38  
191 Stations  
Code 137



SUMMER 1951  
14 Aug-4 Sep  
DELAWARE I  
Cr. #51-2,51-3  
101 Stations  
Code 102

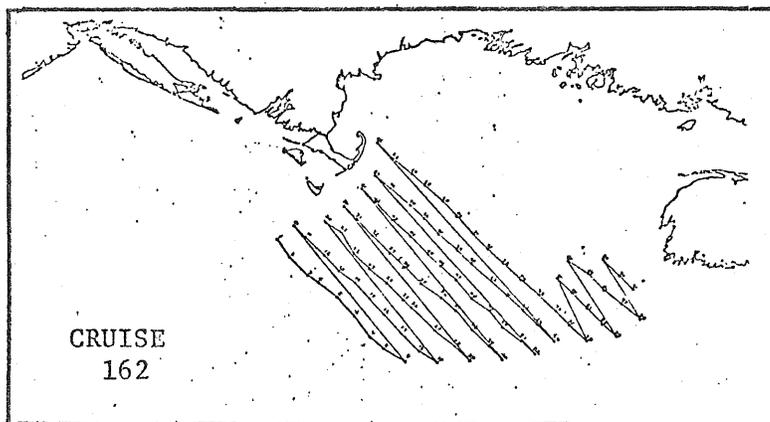


FALL 1953  
1 Sep-25 Sep  
ALBATROSS III  
Cr. #54,55  
86 Stations  
Code 154

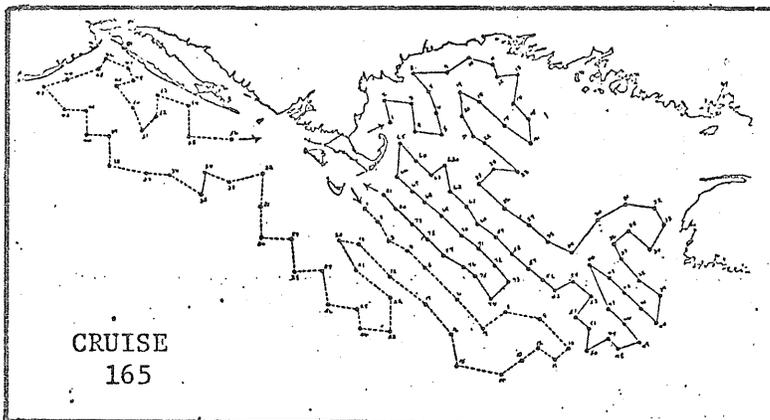


WINTER 1955  
1 Feb-13 Feb  
ALBATROSS III  
Cr. #56  
49 Stations  
Code 156

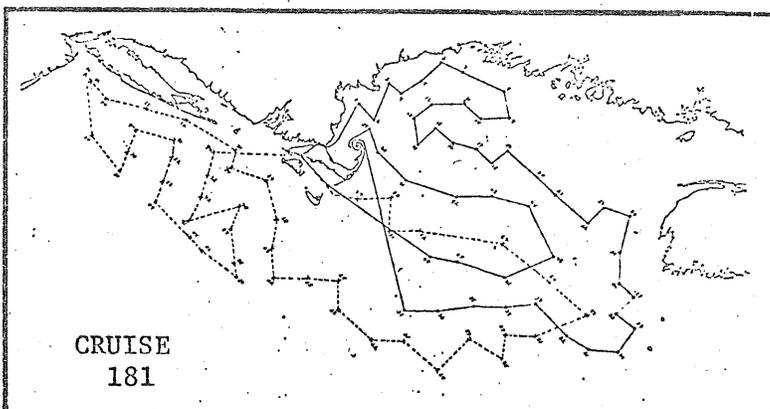
Cruise	162	165	181	118
Strata	Tows	Tows	Tows	Tows
1		15	6	5
2		4	2	3
3				2
4				
5			3	4
6		6	9	2
7			2	1
8			2	2
9	3	1	3	2
10	5	7	3	6
11			2	
12				
13	8	4	4	5
14	2	1		2
15				
16	12	7	6	5
17		1		2
18		1		
19	11	4	1	4
20	4	6		1
21	2		1	
22	3	4	2	2
23	5	3	1	2
24	10	10	2	6
25	2	2		4
26		3	4	3
27	1	3	2	3
28	2	7	6	5
29	7	10	5	10
30	1	2	1	
31	5	6	2	6
32	5	4	2	3
33		2		4
34		2	1	4
35				
36		2	6	12
37		7	3	4
38		2	3	5
39				
40		3	1	1
41				8
42				
49				
61				
62				
63				
64				
65				
66				
67				
68				
69				
70				
71				
72				
73				
74				4
75				
76				



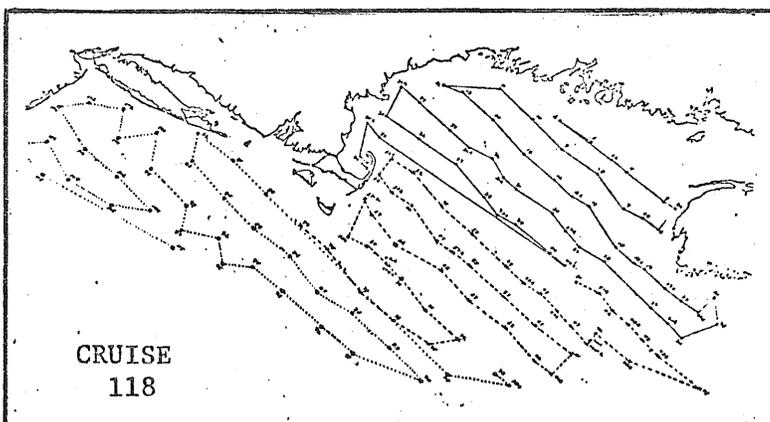
SPRING 1955  
6 Jun-18 Jun  
ALBATROSS III  
Cr. #62  
88 Stations  
Code 162



FALL 1955  
8 Sep-28 Sep  
ALBATROSS III  
Cr. #65,66  
129 Stations  
Code 165

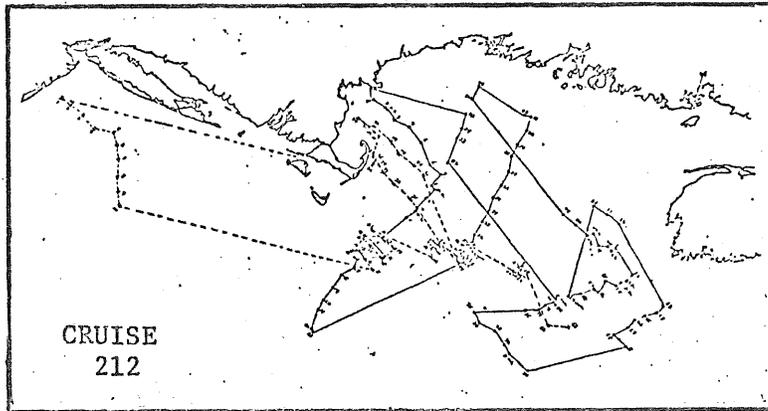


FALL 1956  
2 Nov-21 Nov  
ALBATROSS III  
Cr. #81,82  
85 Stations  
Code 181

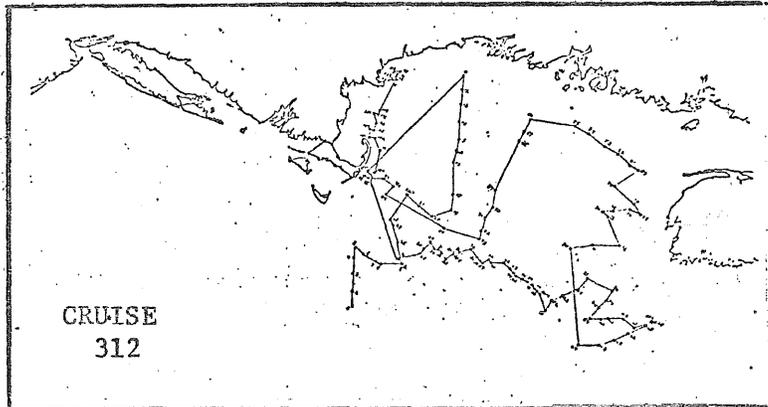


FALL 1958  
22 Sep-17 Oct  
ALBATROSS III  
Cr. #118,119,120  
132 Stations  
Code 118

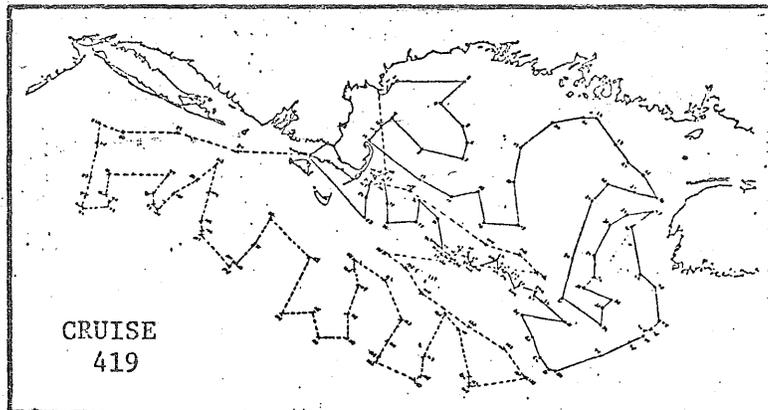
Cruise	212	312	419	512
Strata	Tows	Tows	Tows	Tows
1	6		3	
2	3		2	
3	1		4	
4			4	
5			2	
6			5	
7			2	
8			2	
9			2	4
10	5		2	2
11			2	2
12			2	3
13		2	4	4
14			6	5
15	1			
16	7	1	5	9
17	1		5	4
18	1	1	1	1
19	1		4	3
20	3	1	6	1
21	13	18	11	8
22	16	4	10	6
23	12	10	5	8
24	12	12	12	14
25	1	1		1
26	8	8	3	9
27				
28	10	3	4	5
29	10	7	7	5
30			2	
31	4	7	10	13
32	5	6	1	4
33	5	1	2	2
34	2	7	5	8
35				
36	7	5	4	7
37	1	4	4	3
38	5	5	2	1
39			2	2
40		8	2	2
41	2	1	3	1
42				
49				
61				
62				
63				
64				
65				
66				
67				
68				
69				
70				
71				
72				
73				
74				
75				
76				



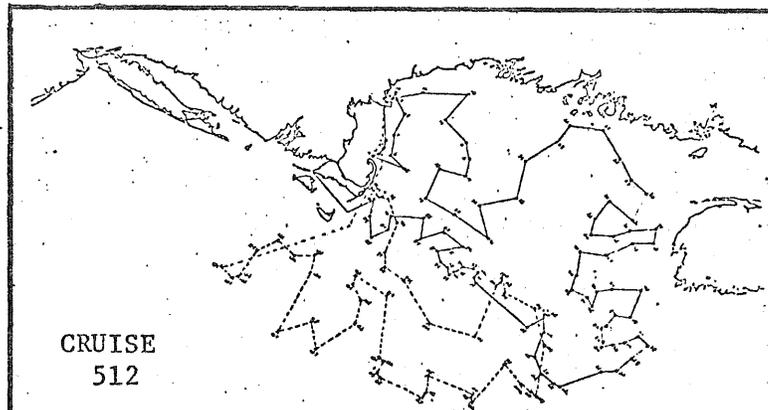
FALL 1959  
 23 Sep-27 Oct  
 DELAWARE I  
 Cr. #59-12,59-13  
 142 Stations  
 Code 212



FALL 1960  
 2 Nov-21 Nov  
 DELAWARE I  
 Cr. #60-12  
 112 Stations  
 Code 312



FALL 1961  
 25 Oct-20 Nov  
 DELAWARE I  
 Cr. #61-19  
 152 Stations  
 Code 419



FALL 1962  
 9 Oct-4 Nov  
 DELAWARE I  
 Cr. #62-12,62-13  
 137 Stations  
 Code 512