FISH COMMISSION EXPLORATORY AND OCEANOGRAPHIC CRUISES FOR ALBACORE, 1959-67

James M. Meehan

and

Larry H. Hreha

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

FISH COMMISSION EXPLORATORY AND OCEANOGRAPHIC CRUISES FOR ALBACORE, 1959-67

INTRODUCTION

The magnitude of annual albacore tuna, Thunnus alalunga (Bonnaterre), catches off the Oregon coast has varied widely (Figure 1). These fluctuations are in part the result of changes in the movement or migration habits of albacore, which are in turn influenced by modification in oceanographic conditions. The need for more information concerning the time of occurrence, movement of albacore, and changes in oceanographic conditions prompted an exploratory and oceanographic cruise during the early summer of 1959. Since then, except for 1963, the cruises have been carried out each year.

The objectives of the cruises were: (1) to participate in a cooperative coast-wide, long-term albacore prediction program carried on by the states of California and Oregon in conjunction with the Bureau of Commercial Fisheries; (2) to tag all albacore caught in suitable condition for migration studies; and (3) to help locate the initial influx of albacore early in the season.

METHODS AND GEAR

Vessels and itinerary

All Fish Commission of Oregon (FCO) exploratory cruises, except 1960, have been conducted on chartered commercial fishing vessels. The vessel chartered in 1960 was not a commercial fishing vessel. Statistics of the chartered vessels are listed in Table 1.

In 1959 the Flicker, fishing out of Newport, Oregon, was chartered. It departed Newport June 30 and returned July 9. The course of the vessel

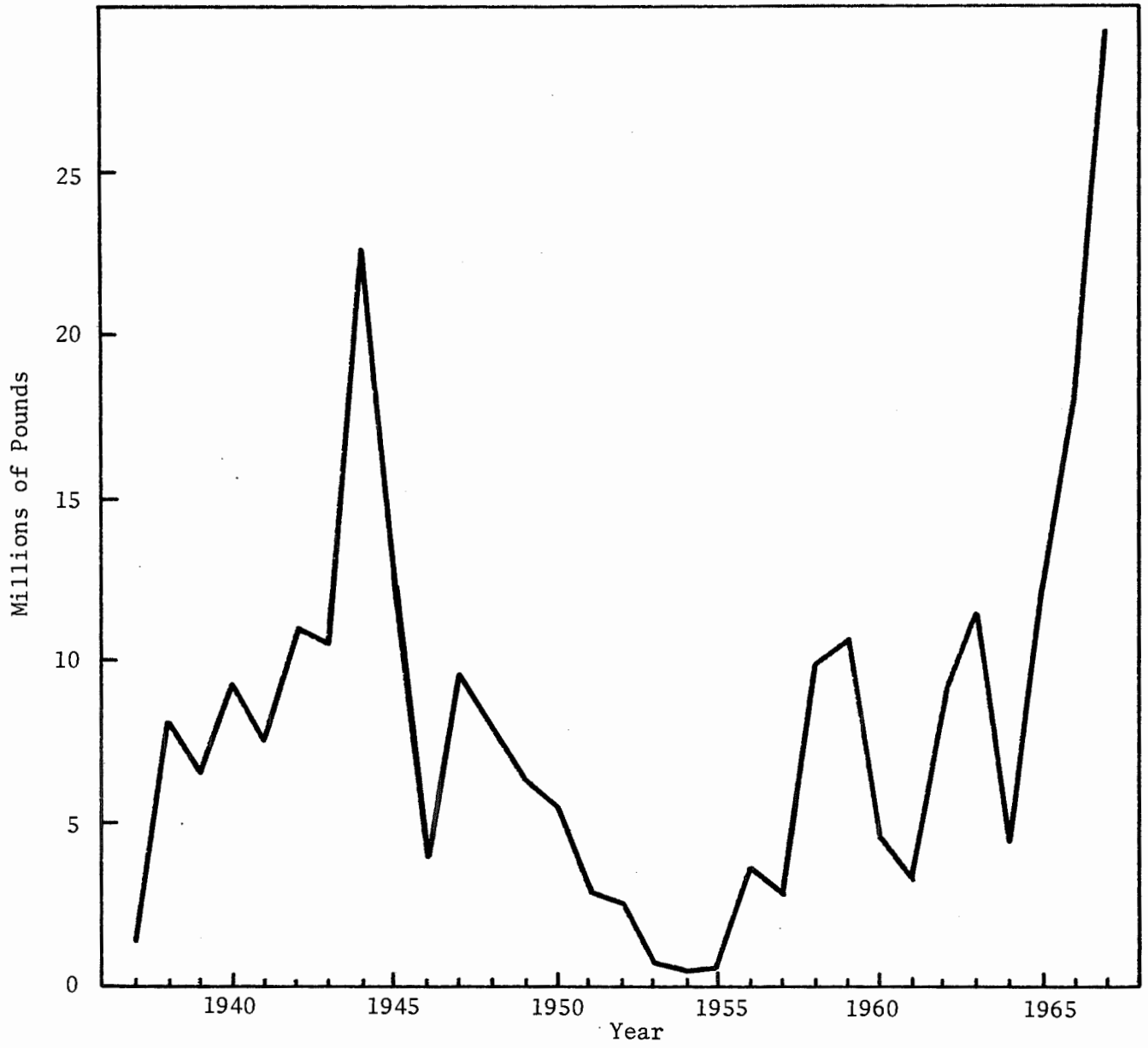

Figure 1. Annual Oregon albacore landings, 1937-67

Table 1. Chartered vessel statistics 1/

Year	Vessel	Tonnage		Registered dimensions		
		Gross	Net	Length	Breadth	Depth
1959	Flicker	34	23	44.2	14.2	8.0
1960	Morning Star	143	97	100.8	19.2	10.2
1961	Minnie B.	69	55	75.5	18.0	8.2
1962	Sandra Lee	25	17	40.0	12.7	7.6
1964	Chelan	34	18	49.7	14.5	6.8
1965	Nestucca	39	21	49.9	15.1	7.0
1966-67	Sunrise	44	30	52.3	15.7	8.0

1/ *From Merchant Vessels of the United States, 1962. Bureau of Customs, United States Treasury Department.*

and location of the hydrographic stations are indicated in Figure 2. This course was chosen after consultation with the staffs of the departments of Oceanography at Oregon State University (OSU) and University of Washington. Results of the North East Pacific Albacore Survey cruises by the Pacific Oceanic Fishery Investigations (Graham, 1959) were considered in determining the course of the track. Stations were located at approximately 30-mile intervals.

The 1960 charter vessel was the Morning Star of Portland, Oregon. It departed from Astoria, Oregon, June 29 and returned July 14. Inclement weather caused the vessel to make two unscheduled stops--first at Eureka, California, July 5-6 and the second at Crescent City, California, July 8-9. The 1960 cruise was carried out cooperatively with the OSU Department of Oceanography. The cruise track and the locations of hydrographic and

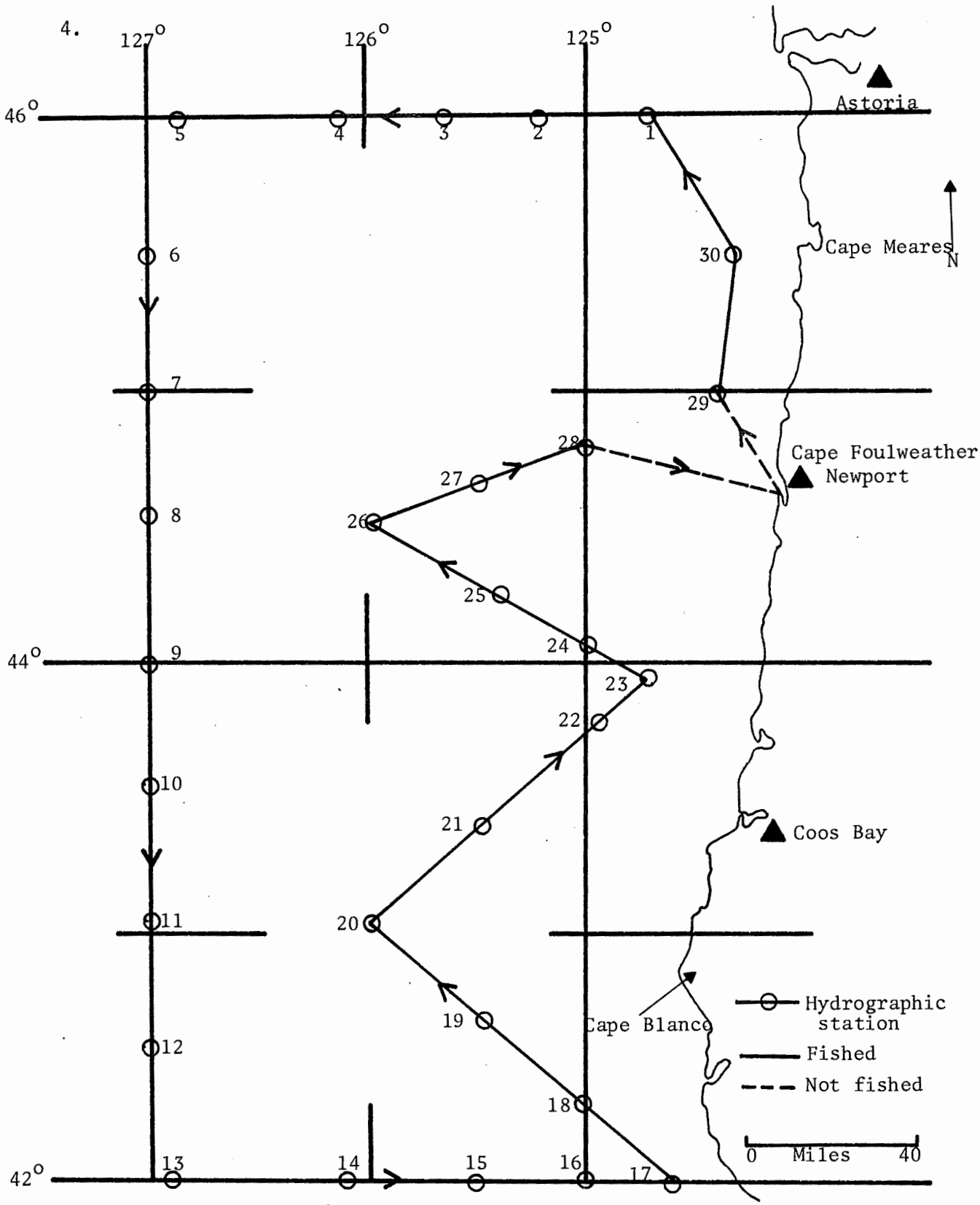

Figure 2. Track of the 1959 cruise

bathythermographic stations (Figure 3) were modified from the 1959 track to include four lines of special interest to the Department of Oceanography. The lines run to a distance of 45 miles offshore from Astoria, Newport, Coos Bay and Brookings and are denoted by the letter H in the station number. Sampling on the regular track was also intensified by shortening the station intervals from 30 miles to 20 miles.

The 1961 cruise was conducted on the Minnie B. departing from Astoria. The cruise, starting on June 29, was beset with a series of mechanical difficulties and periods of inclement weather. This resulted in a series of unscheduled stops (Astoria, June 30-July 4; Crescent City, July 8-11; Newport, July 13) which delayed the termination at Astoria to July 16. Hydrographic stations and cruise track are shown in Figure 4. Stations 22, 30 and 39 were bypassed because of time lost in unscheduled stops.

The 1962 charter vessel, Sandra Lee, departed Coos Bay June 28 and returned July 8. The cruise was completed without interruption, although inclement weather hampered operations much of the time. The locations of the stations (Figure 5) are essentially the same as those of the 1961 cruise.

No cruise was made in 1963 because of a reduction in funds.

Discussions with local fishermen on the location of albacore catches early in the season plus the findings of previous preseason cruises led to a one-half degree southerly shift of the 1964 cruise track (Figure 6). This cruise, on the vessel Chelan, departed Newport July 5 and returned July 15. A small electrical fire early in the cruise caused severe damage to the navigation equipment which resulted in an unscheduled stop at Newport July 8-9.

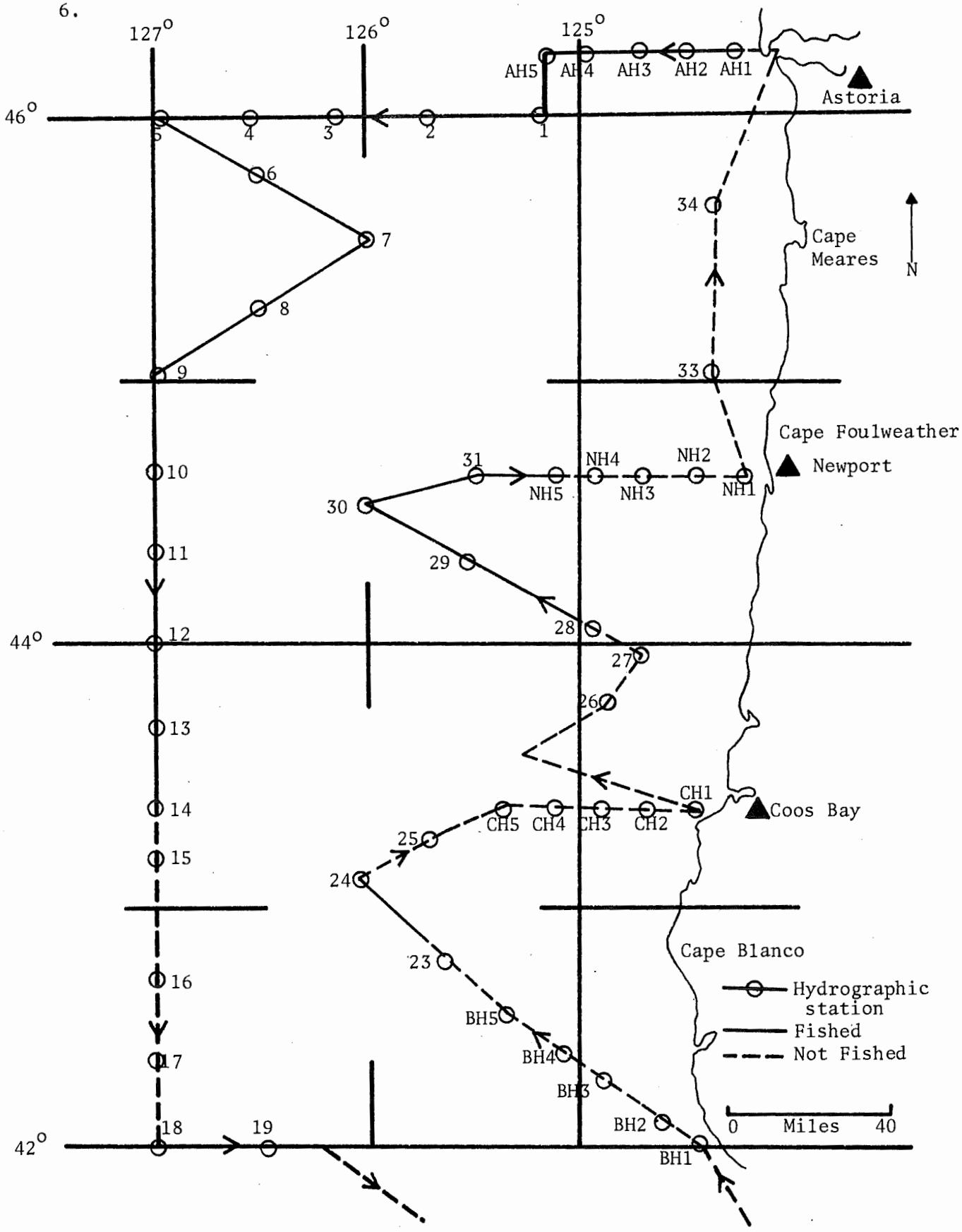

Figure 3. Track of the 1960 cruise

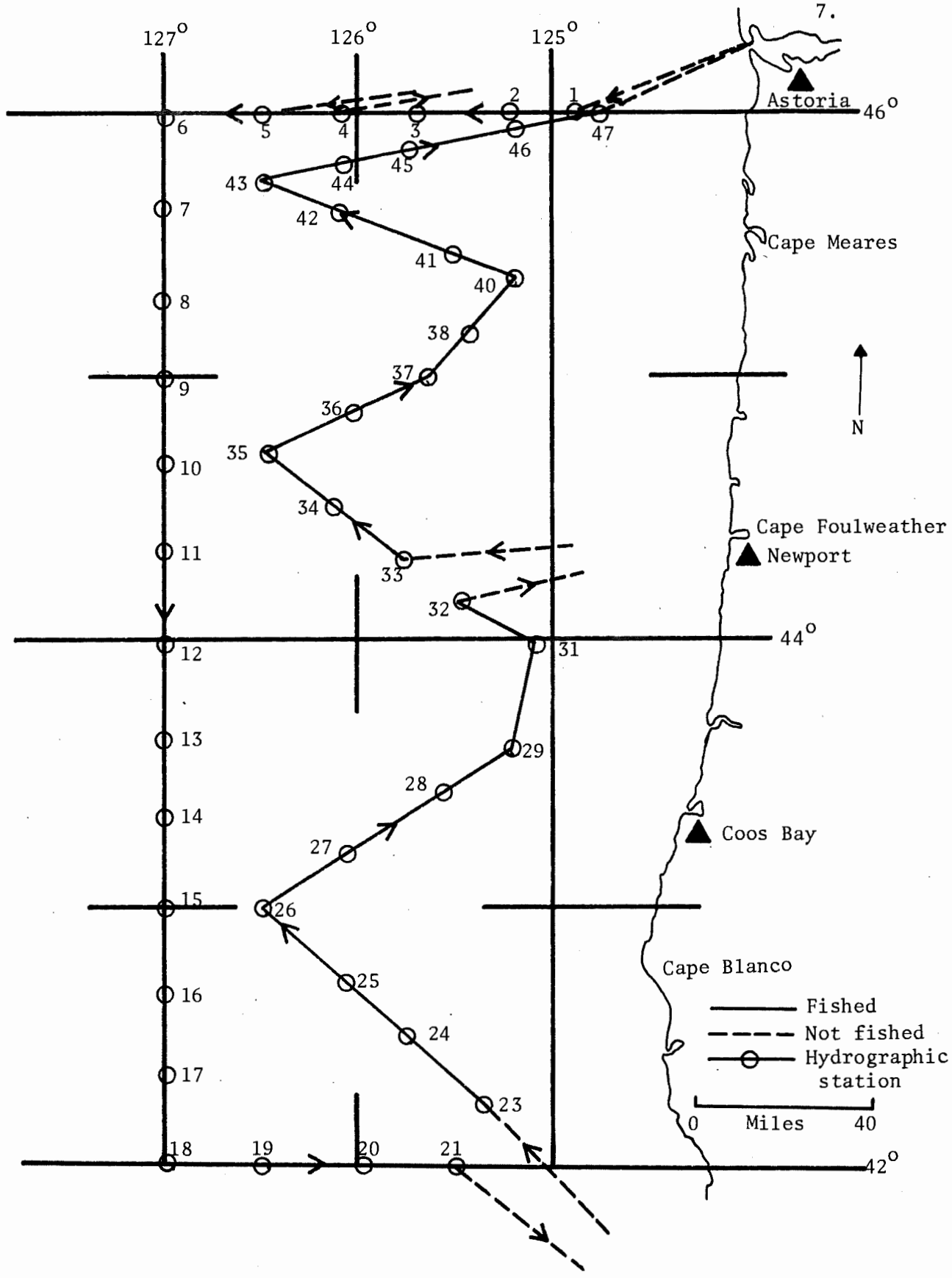

Figure 4. Track of the 1961 cruise

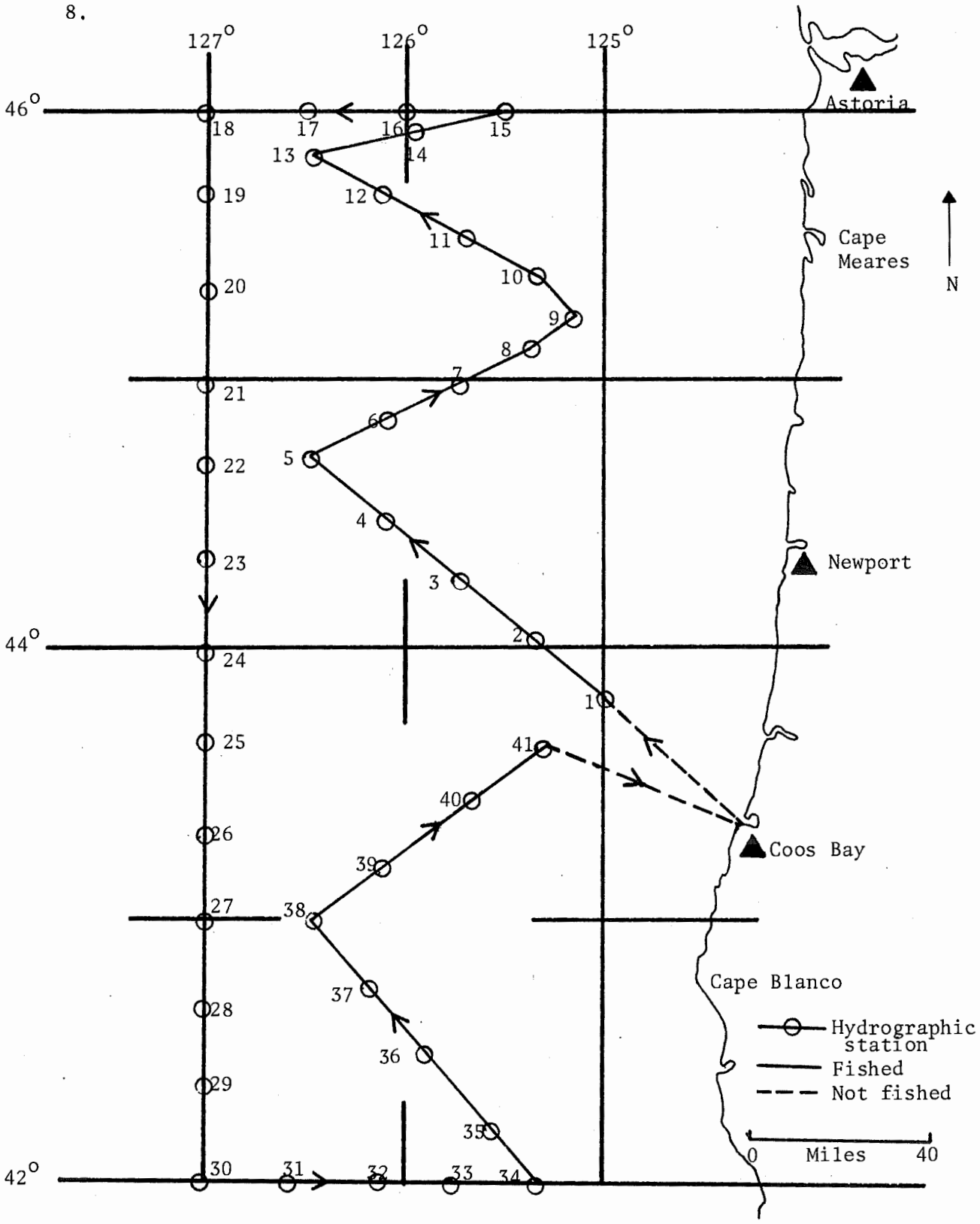

Figure 5. Track of the 1962 cruise

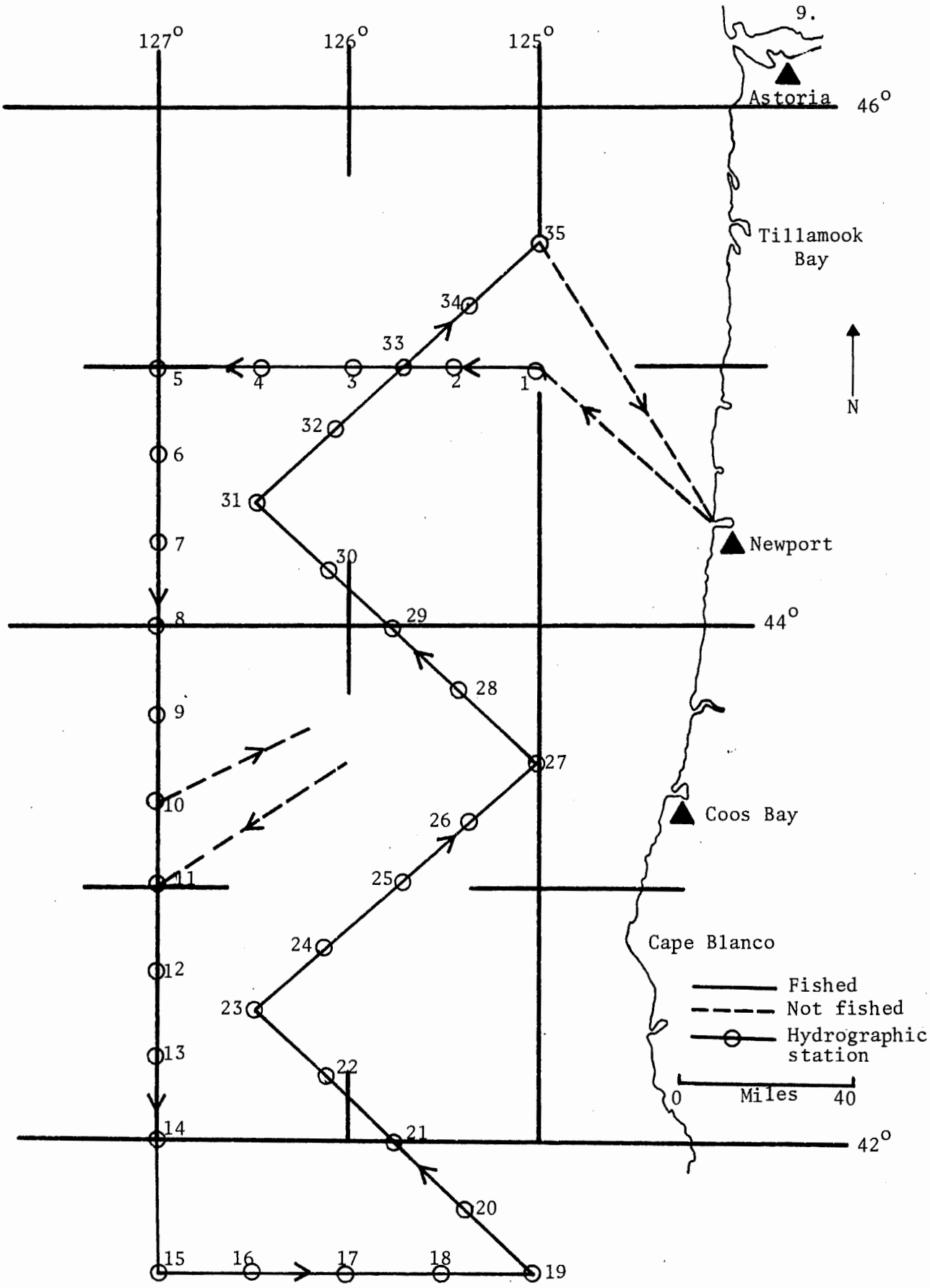

Figure 6. Track of the 1964 cruise

The 1965 cruise was conducted on the Nestucca of Warrenton, Oregon. The vessel departed Astoria on July 1 and proceeded along the cruise track shown in Figure 7. Strong winds of 30 to 45 knots and high seas forced the vessel into Crescent City, California, after completing Station 18 on the morning of July 4. The vessel returned to sea on July 9 and reached Station 19 that afternoon. The cruise terminated at Astoria on July 12.

In 1966 the commercial fishing vessel Sunrise of Astoria was chartered for the entire year by the Fish Commission. The Sunrise departed July 1 from Astoria and proceeded along the cruise track shown in Figure 8. Engine failure on the evening of July 3, about 10 miles north of Station 11, delayed the cruise 4 days while the Coast Guard towed the vessel to Coos Bay for repairs. We returned to sea on July 7 and reached Station 11 early on July 8. The cruise terminated at Astoria on July 12. Stations 30-38 were omitted because of strong northwest winds and the commitment of the vessel to another cruise.

The 1967 cruise was again carried out aboard the Sunrise which departed from Astoria on July 3 after delays because of radio difficulties. The cruise track, with the stations occupied, is shown in Figure 9. The cruise was terminated on July 12 at Astoria. Exceptionally fine weather was enjoyed throughout the cruise.

Fishing methods

The method of fishing employed during these cruises was the same as that commonly utilized by the majority of the albacore troll fishermen. Four nylon lines of varying lengths (9-60 feet) were secured to outriggers on each side and two or three lines of intermediate length (15 feet) were

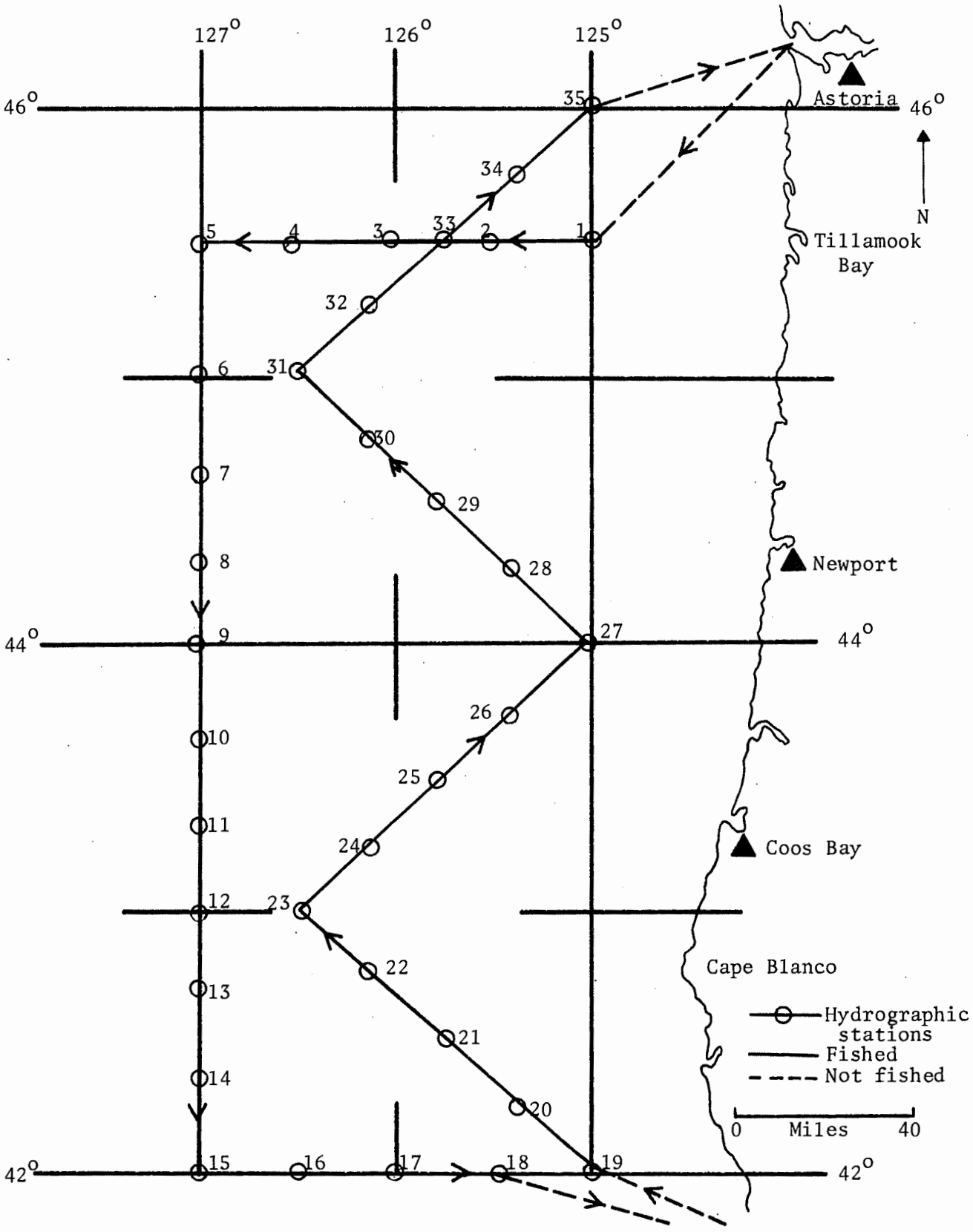

Figure 7. Track of the 1965 cruise

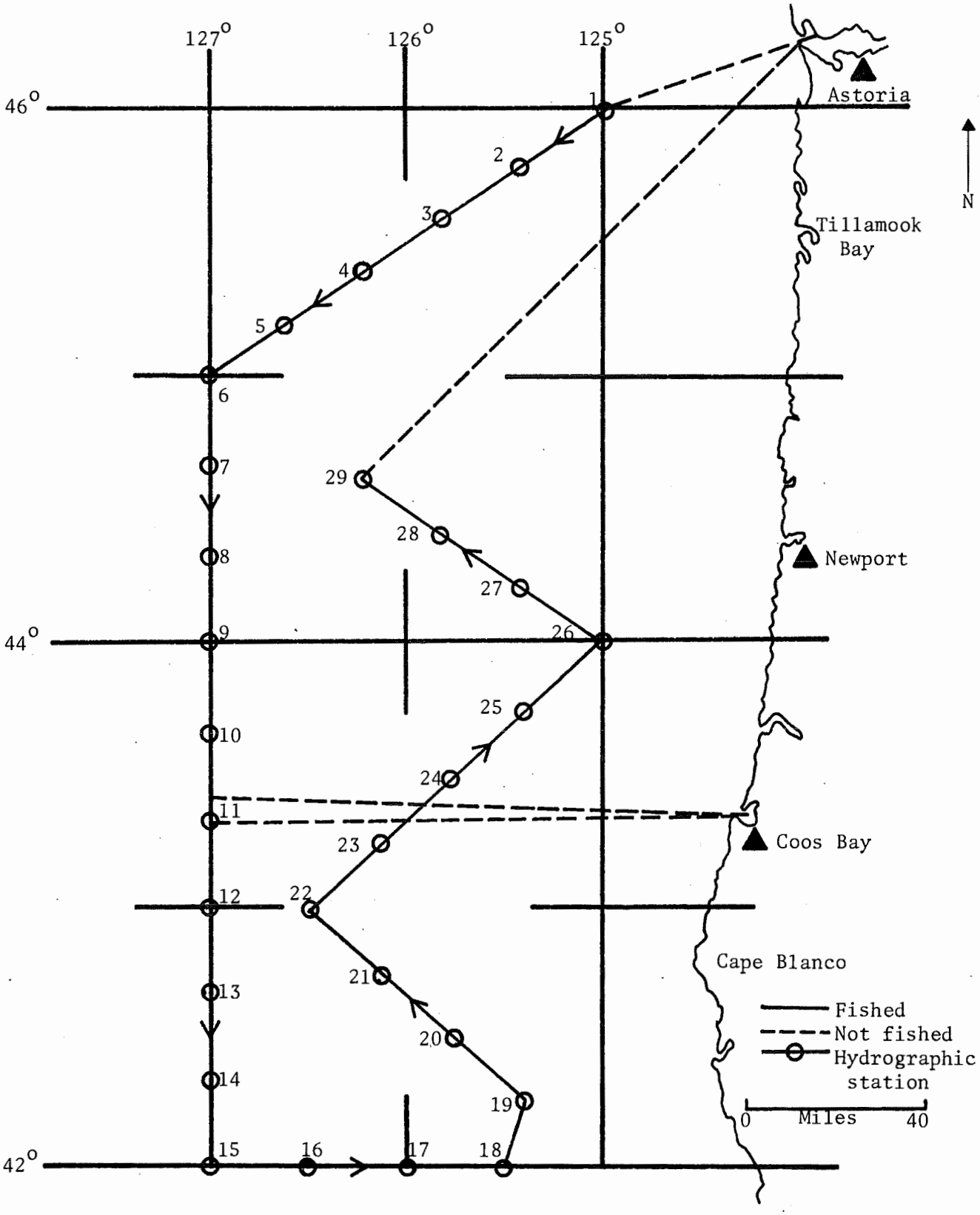

Figure 8. Track of the 1966 cruise

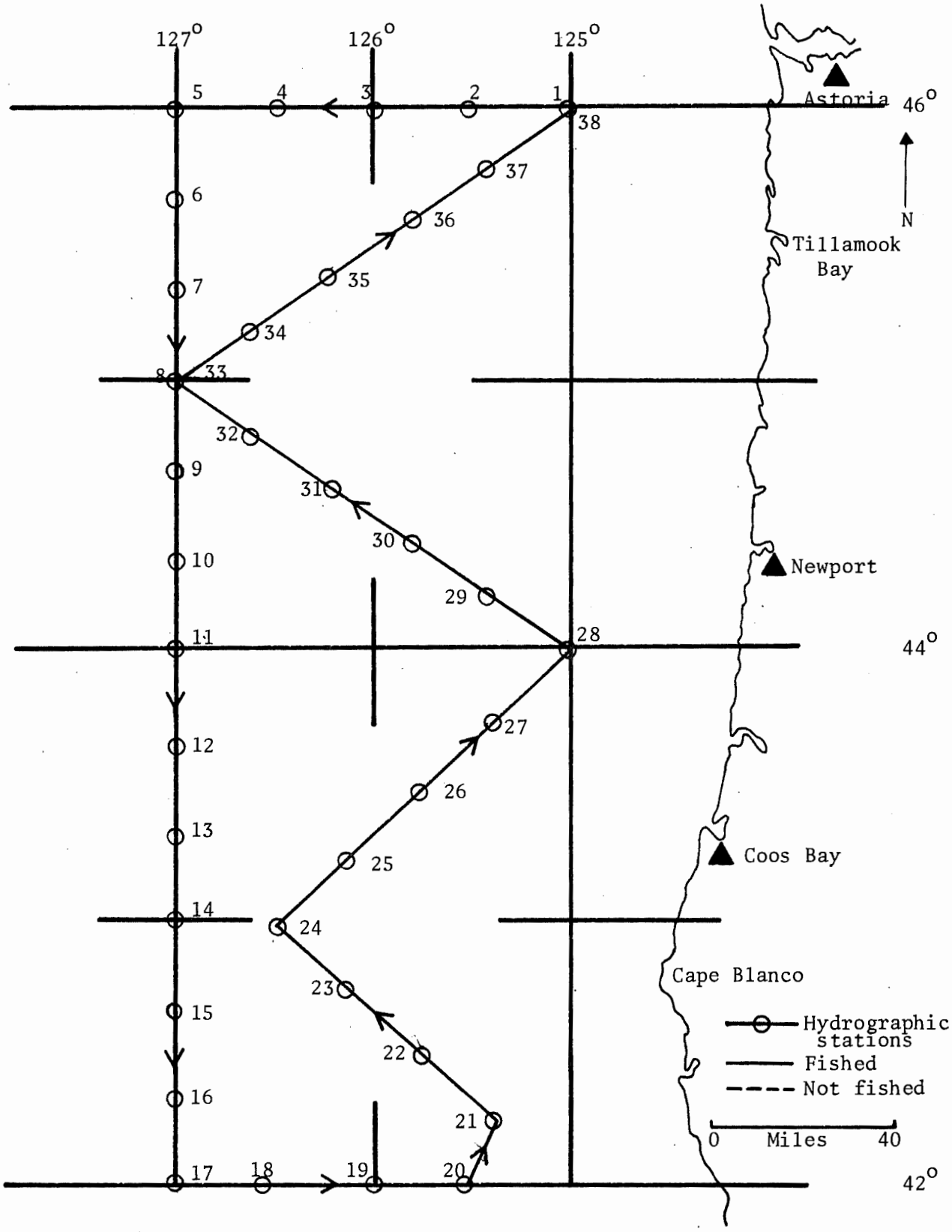

Figure 9. Track of the 1967 cruise

attached to the stern (Figure 10). A feathered jig with a 1 1/2-ounce head was attached to each line and trolled on the surface at a speed of 6-8 knots. The normal fishing day was 15 to 16 hours.

Trolling speed was maintained and jigs were trolled during the entire track in all years except 1960. During 1960 jigs were trolled whenever surface temperatures were reasonably high and when wind and sea conditions were favorable. Because of the unstable nature of the Morning Star and the presence of extensive areas of cold upwelled water, only 61% of the track was trolled in 1960 (Figure 3).

Biological sampling

Night-light observations were made at various locations in 1960, '61, '62 and 1967 with a total of 23 stations being sampled. In addition, during the 1960 cruise, a 1/2-meter plankton net was used at 29 stations for vertical plankton tows to a depth of 200 meters and at five stations for oblique plankton tows to a depth of 200 meters. A Clark-Bumpus sampler with a #6 mesh net was used at 35 stations of oblique plankton tows to 200 meters of wire length. All plankton samples from the 1960 cruise and specimens from night-light sampling were preserved and cataloged at OSU.

In 1961 albacore blood samples were collected for racial analysis studies by scientists of the Honolulu Biological Laboratory, Bureau of Commercial Fisheries. During the 1964 and 1966 cruises, albacore livers were collected for use by the OSU Department of Oceanography in an AEC sponsored study of radioactive waste takeup by pelagic fish.

Hydrographic sampling

Bathythermograph casts were made, and bucket surface temperature and salinity samples were collected at 20- to 30-mile intervals along the cruise

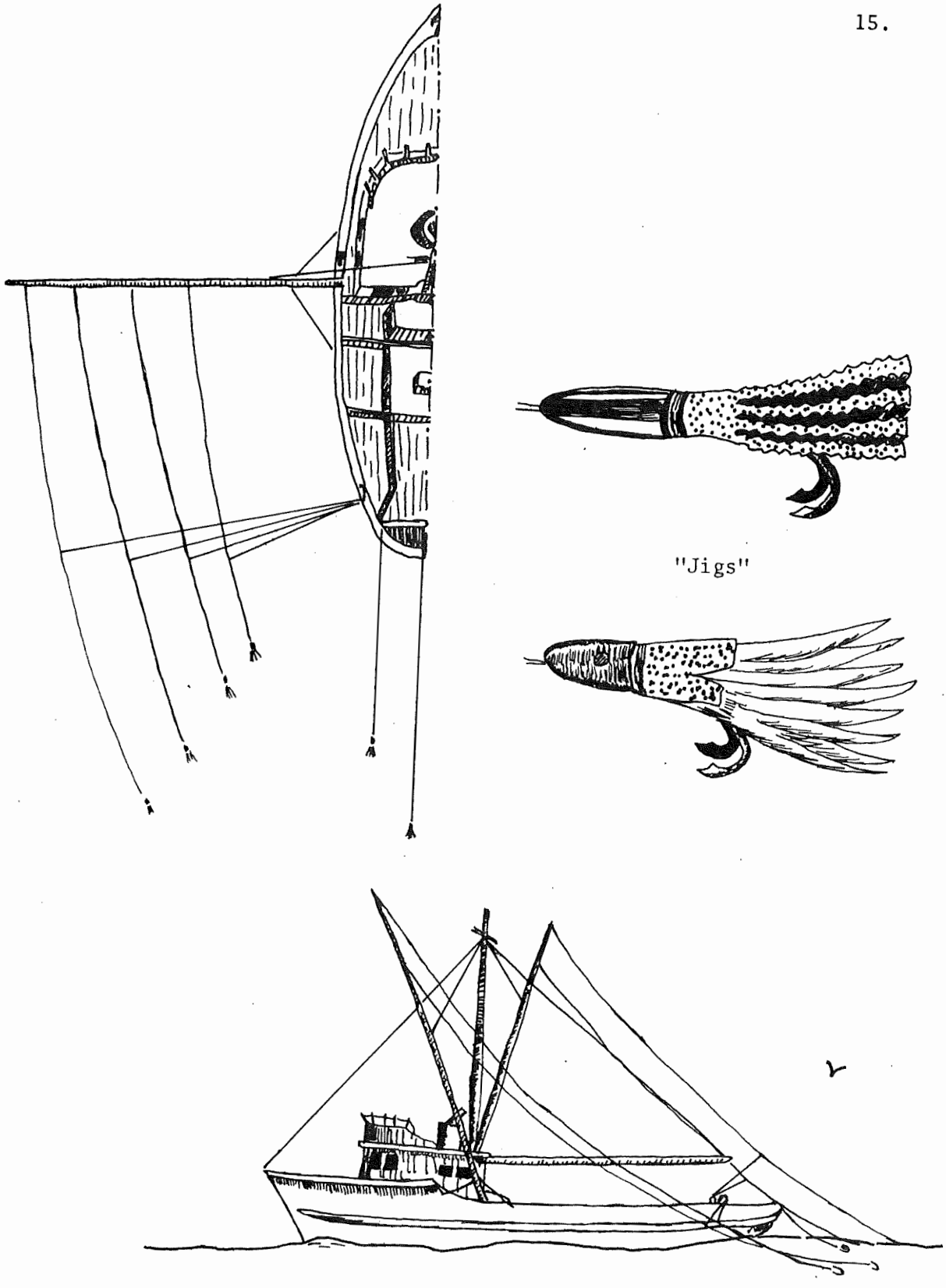

Figure 10. Troll boat rigged for albacore tuna fishing with jigs

track during every cruise. A standard 900 foot depth model bathythermograph, calibrated in ^{o}F and feet, was used on each cruise except in 1960 when one calibrated in ^{o}C and meters was used. The 1960 data were converted to ^{o}F and feet in order to conform to the other years. Stations 17 and 18, of the 1960 cruise, were sampled by using a parachute as a sea anchor. The use of the parachute allowed the vessel to heave to and lie with the seas instead of in the trough. The height of the seas at that time and the unstableness of the vessel made it impossible to work while the vessel was lying in the trough. An airplane target towing winch, modified for oceanographic use, was used in making casts and for towing nets in all years except 1959 and 1967. In 1959 commercial trolling gurdies on the Flicker were used, and in 1967 a newly acquired hydrographic winch was used. In addition to the normal sampling in 1960, Nansen bottles containing standard reversing thermometers were used to obtain subsurface temperatures and water samples. The water samples were used to determine salinity and dissolved oxygen from 0, 10, 50, 100, 150 and 200 meter depths.

RESULTS

In 1959 the total catch was 114 albacore. Of this total, 113 were tagged with California-style spaghetti tags (Clemens, 1961). In 1960 only 13 fish were taken. Four of these were tagged with spaghetti tags and seven were tagged with Floy FT-1 dart tags. In 1961 a total of 19 fish were caught of which 15 were tagged with dart tags and four were used for blood samples. In 1962 and 1964 the livers of all fish caught (six and four, respectively) were collected for radioanalysis at OSU. No fish were taken in 1965. In 1966 a total of 70 albacore were caught. The livers of six injured fish were collected

for radioanalysis and 64 were tagged with dart tags. In 1967, three fish were caught and one was tagged with a dart tag.

Surface temperatures and salinities collected at hydrographic stations are listed by station number and location in Appendix A. The surface temperatures for the eight cruises ranged from 47° F to 66° F, with the majority of the stations having temperatures between 55° F and 63° F. Surface salinities ranged from a low of 15.23 ppt to a high of 33.85 ppt. Subsurface temperatures, salinities and dissolved oxygen for the 1960 cruise have been previously published (Wyatt and Kujala, 1962).

Because of equipment failure and rough sea conditions, night-light stations were not sampled on a systematic basis. The data are limited to a short table (Table 2) presenting a simple list of organisms and their frequency of occurrence.

Bathythermograms were secured at all stations for the eight cruises and are presented in Appendix B.

Table 2. Frequency of night-light stations and observation of tuna forage organisms during preseason albacore cruises 1960, '61, '62 and 1967

	Number of night-light stations at which each organism was observed				
	1960	1961	1962	1967	Total
Saury (Cololabis saira)	2	6	1	4	13
Lanternfish (Tarletonbeania crenularis)	1	6	1	3	11
Squid (Loligo opalescens)	3	6	1	0	10
Sablefish (Anoplopoma fimbria)	0	1	0	0	1
Number of stations sampled each year	5	8	5	5	23

DISCUSSION

Environmental requirement for albacore occurrence

Trolling data for the cruises show a wide variation in catch success. The observed relationship between albacore catches and bathythermograph traces supports the findings of other authors (Clemens, 1961; Johnson, 1961; Alverson, 1961) in that albacore occurrence is subject to the presence of a layer of warm, mixed water of sufficient thickness to provide living space between the surface and the 57° F isotherm. This isotherm is usually at or near the thermocline. Figure 11 and Appendix B show that these conditions existed at most of the stations during 1959 and in specific areas of the other cruises (Stations 19 through 33 of the 1962 cruise for example). It can be seen from Table 3 that in most cases, a thermocline depth of at least 40 feet and a water temperature above 57° F were present in the vicinity of fish catches. The exceptions occurred in 1961 at Station 16 where the thermocline was at 30 feet, in 1960 at Station 29, in 1966 at Station 14, and in 1967 at Stations 15, 16, 23 and 24 where no thermocline existed. The BT traces for these stations show essentially a constant decrease in temperature from the surface to below 100 feet in depth. Figure 11 also shows that the 57° F isotherm was shallower than 30 feet on only two occasions. In 1966 at Station 14 the 57° isotherm was at 20 feet but the last albacore taken was approximately 3 miles from that station. In 1967 at Station 23 the 57° F isotherm was 10 feet deep but the two albacore taken between Stations 23 and 24 were much closer to Station 24 where the 57° isotherm was 50 feet deep.

Surface salinities from all the stations for the years 1959-67 varied from 15.23 to 33.82 ppt. The range at the stations nearest to albacore catches was much narrower, 28.96 to 33.20 ppt. Of the 218 albacore caught, 207 were caught between stations where the surface salinities ranged from

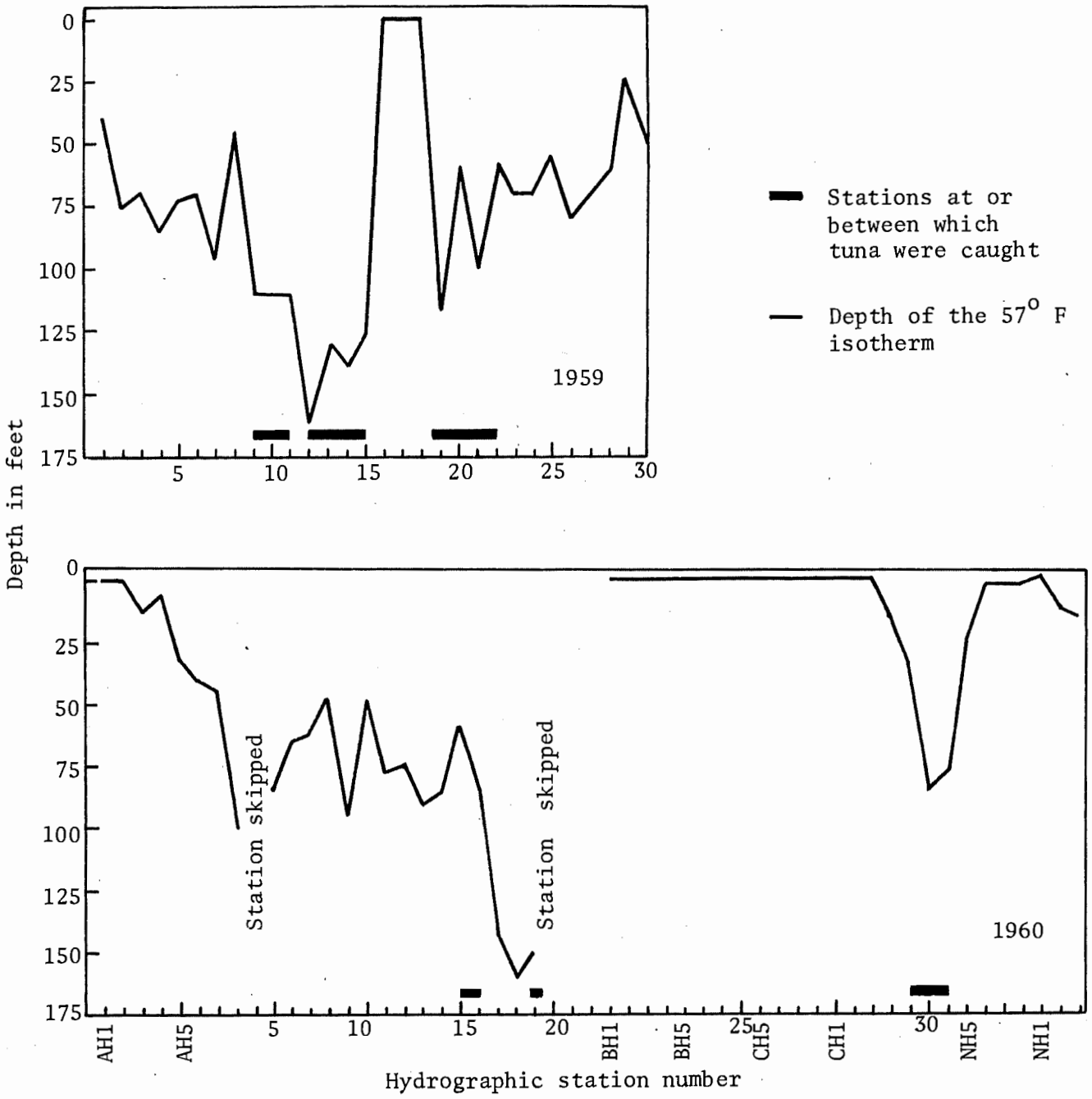

Figure 11. Depth of the 57° F isotherm in relation to the albacore catch on cruises in 1959-67

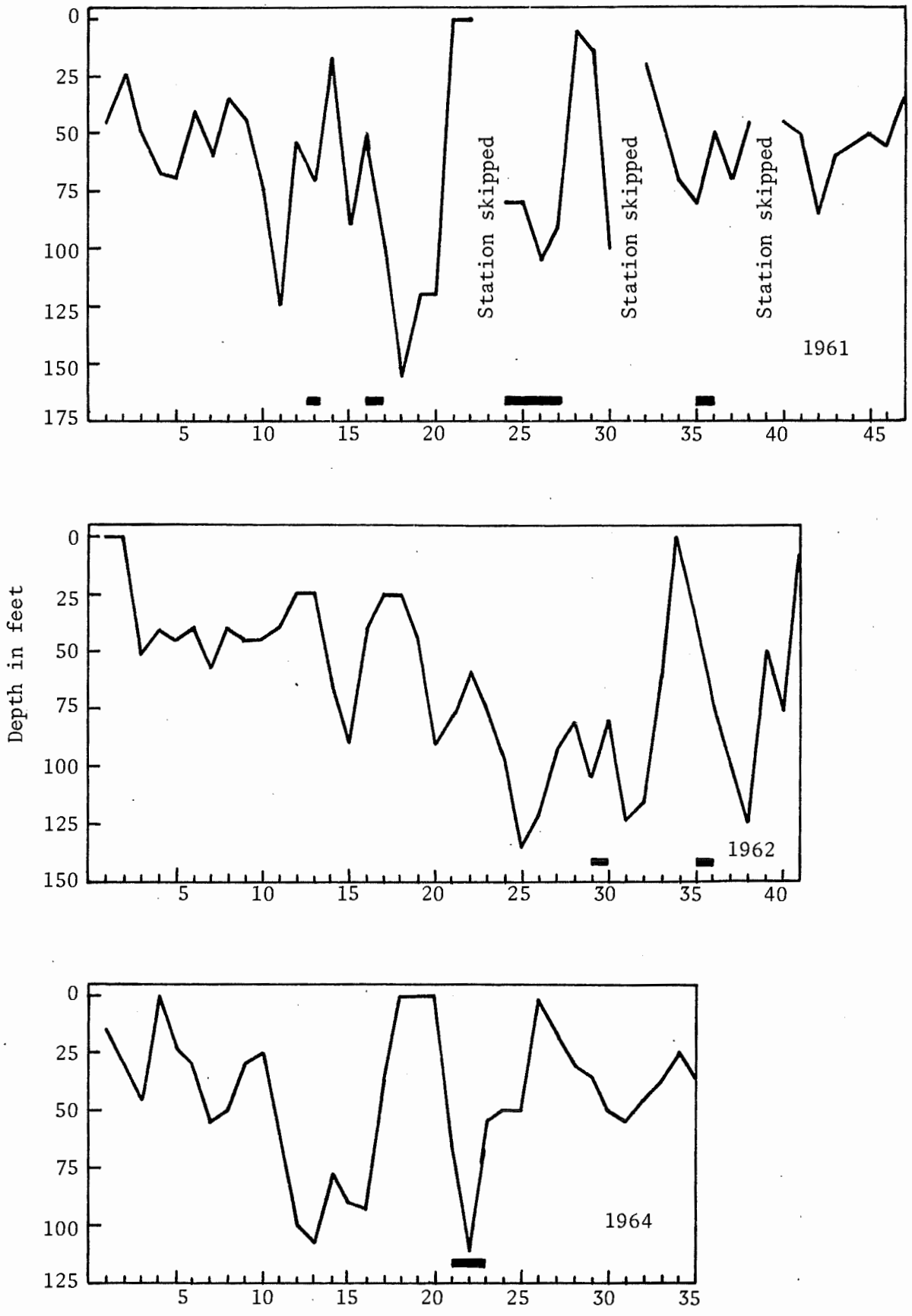

Figure 11. (Continued)

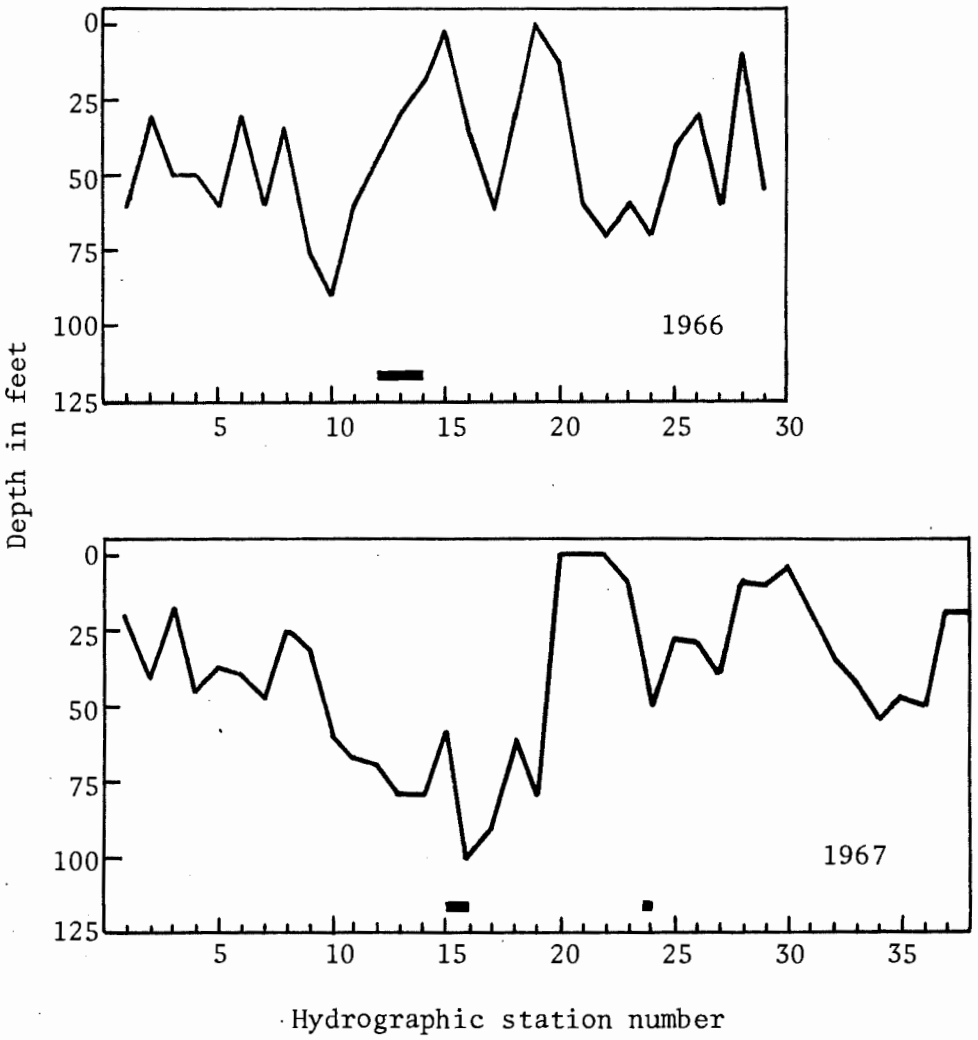

Figure 11. (Continued)

Table 3. Ocean conditions in the area of exploratory albacore catches, 1959-67

Stations	Surface temp. (°F)	Surface salinity (o/oo)	Depth of thermo-cline	Temp. at 10'	Depth at which 57° occurs	No. of fish and surface temperature (°F)
1959						
9	59.5	32.70	100'	59.4	110'	
						5 (60.2)
10	60.2	32.09	80'	60.1	110'	
						3 (60.2)
						2 (60.5)
11	59.5	33.20	100'	59.4	110'	
12	60.2	32.56	140'	60.1	160'	
						4 (61.3)
13	61.5	31.84	100'	61.3	130'	
						2 (61.5)
						1 (----)
14	60.0	31.98	100'	60.0	140'	
						1 (59.8)
15	59.8	32.17	100-125'	59.5	125'	
19	61.1	32.60	55'	60.8	115'	3 (61.1)
						7 (61.5)
						21 (61.0)
20	60.8	30.34	50'	60.5	60'	
						1 (61.0)
						10 (61.3)
						2 (61.6)
						3 (----)
21	62.5	31.20	90'	60.0	100'	
						5 (62.5)
						32 (63.9)
						1 (61.8)
22	61.8	30.13	45'	61.5	57'	
1960						
15	59.0		90'	58.8	160'	
						2 (59.5)
16	57.7	32.16	135'	57.7	85'	
19	59.3	32.47	150'	59.0	150'	3 (58.5)
29	60.6	31.89	No therm.	60.0	35'	
						4 (60.8)
30	61.0	29.29	60'	60.8	85'	
						4 (61.5)
31	62.4	29.45	97'	61.8	78'	

Table 3. (Continued)

Stations	Surface temp. (°F)	Surface salinity (o/oo)	Depth of thermo-cline	Temp. at 10'	Depth at which 57° occurs	No. of fish and surface temperature (°F)
1961						
13	63.2	30.99	45'	62.2	70'	1 (63.2)
16	59.9	32.38	30'	59.7	50'	1 (59.7)
17	59.7	32.77	70'	59.7	100'	
24	61.9	32.10	70'	59.5	80'	4 (61.8) 1 (----)
25	61.8	32.4	70'	61.0	80'	1 (64.0) 1 (----)
26	64.0	32.12	90'	61.5	105'	2 (64.0)
27	63.6	31.98	80'	61.0	190'	5 (63.6)
35	63.8	29.72	40'	63.8	80'	3 (63.8)
36	63.7	28.96	40'	63.5	50'	
1962						
29	58.7	31.64	100'	58.7	105'	3 (58.7)
30	59.1	31.83	40'	59.1	80'	
35	57.5	31.86	40'	57.2	35'	3 (58.0)
36	58.5	32.03	65'	58.5	75'	
1964						
21	58.2	31.98	80'	57.5	70'	2 (60.6)
22	60.3	31.81	105'	59.8	110'	2 (60.7)
23	60.8	31.62	50'	60.8	55'	
1966						
12	59.6	31.84	60'	58.5	40'	42 (59.6)
13	59.2	32.18	65'	59.6	30'	28 (59.2)
14	59.8	32.09	30'	58.0-59.0	20'	

Table 3. (Continued)

Stations	Surface temp. (°F)	Surface salinity (o/oo)	Depth of thermo-cline	Temp. at 10'	Depth at which 57° occurs	No. of fish and surface temperature (°F)
1967						
15	59.5	32.07	No therm.	59.5	60'	1 (59.2)
16	59.0	32.35	"	59.0	100'	
23	57.8	32.35	"	57.0	10'	2 (60.2)
24	60.4	31.93	"	60.4	50'	

30.13 to 33.20 ppt. Craig and Caneday, 1962, present data from a 1960 pre-season cruise which shows salinity varied from 32.95 to 33.55 ppt., a much narrower range than our data.

A detailed picture of the salinity structure along with catch records is necessary to determine any actual salinity preference by albacore as pointed out by Craig and Dean, 1968. This should be done during the season when fish are numerous and have a chance to select their environment as opposed to early season when they are just moving into the area and perhaps not yet in their preferred habitat.

Exploratory fishing benefits

The location of albacore as they move inshore and the time of their arrival is very important to the commercial fishermen. The annual cruise has contributed substantially to the early season success during several years, 1959, '60, '66 and 1967, in particular. Not only did the cruise save scouting time for the fleet, but it has helped us to better understand the ocean environment during the period covered. It has also furnished the opportunity to tag albacore for migration, age and growth studies.

All the information we gather in conjunction with other agencies allows us to tell the fishermen where they might find albacore. As more data are gathered and our knowledge of all the factors that control movements, timing and abundance of albacore improves, the predictions will become more accurate and, consequently, more valuable to the industry.

Value to other agencies

Information on sea surface temperature and albacore catch during the cruise is supplied to the tuna forecasting section of the Bureau of Commercial Fisheries, Tuna Resources Laboratory in San Diego. These temperature data are used by the forecasting section to plot the movement of water masses. Temperature and catch information has also been supplied to the Bureau office in Seattle for use on their albacore exploratory cruise, which in past years started immediately after the Fish Commission cruise. Temperature, salinity, and bathythermograph information has been sent to OSU Department of Oceanography to assist them in their studies of the Columbia River plume and coastal upwelling. All oceanographic information is transferred to the National Oceanographic Data Center for filing in their archives.

ACKNOWLEDGMENTS

The authors wish to acknowledge the participation of Mr. Robert Ayers, who was project leader and party chief for the cruises in 1959 through 1962. We wish to thank the chartered boat skippers and crewmen for their cooperation and the summer aides who contributed to the success of the cruises. We also want to thank Mr. Bruce Wyatt of the OSU Department of Oceanography for his help in having the salinity samples analyzed.

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Appendices

Appendix A
Surface temperatures and salinities, by year and cruise station, 1959-67

Station number	Latitude N.	Longitude W.	Surface temperature (°F)	Surface salinity	Date
		1959			
1	45° 59'	124° 39'	61.9	15.23	6/30/59
2	46° 02'	125° 18'	59.5	32.21	7/1/59
3	46° 01	125° 39'	60.5	32.24	"
4	45° 59'	126° 08'	60.2	32.18	"
5	45° 58'	126° 51'	59.0	32.53	7/2/59
6	45° 31'	127° 04'	58.0	32.44	"
7	45° 00'	127° 00'	59.8	32.38	"
8	44° 30'	126° 58'	58.9	32.41	7/3/59
9	43° 59'	127° 05'	59.5	32.70	"
10	43° 30'	126° 58'	60.2	32.09	"
11	42° 59'	127° 05'	59.5	33.20	7/4/59
12	42° 31'	126° 57'	60.5	32.56	"
13	42° 00'	126° 55'	61.5	31.84	"
14	41° 59'	126° 08'	60.0	31.98	7/5/59
15	42° 02'	125° 32'	59.8	32.17	"
16	42° 06'	125° 00'	59.0	32.18	"
17	42° 01'	124° 35'	51.0	33.68	"
18	42° 23'	125° 04'	52.9	32.71	7/6/59
19	42° 39'	125° 32'	61.1	31.60	"
20	42° 59'	126° 01'	60.8	30.34	"
21	43° 28'	125° 31'	62.5	31.20	7/7/59
22	43° 42'	124° 56'	61.8	30.13	"
23	43° 54'	124° 41'	61.7	27.59	7/8/59
24	44° 03'	125° 00'	61.7	28.75	"
25	44° 21'	125° 25'	63.0	27.32	"
26	44° 30'	126° 00'	61.9	30.25	"
27	44° 39'	125° 30'	63.5	26.46	7/9/59
28	44° 47'	125° 02'	63.6	25.40	"
29	44° 59'	124° 23'	58.8	29.69	3/30/59
30	45° 31'	124° 20'	61.5	27.27	"
		1960			
AH1	46° 14'	124° 13'	55.5	25.66	6/28/60
AH2	46° 14'	124° 27'	56.8	31.69	6/29/60
AH3	46° 14'	124° 42'	57.5	31.36	"
AH4	46° 14'	125° 56'	57.7	31.38	"
AH5	46° 14'	125° 11'	58.6	30.90	"
1	46° 00'	125° 11'	58.5	30.68	"
2	46° 00'	125° 40'	59.1	31.29	6/30/60
3	46° 00'	126° 08'	59.0	32.47	"
4	46° 00'	126° 34'	59.1	31.44	"

Appendix A (Continued)

Station number	Latitude N.	Longitude W.	Surface temperature (°F)	Surface salinity	Date
		1960 (Continued)			
5	46° 00'	127° 00'	59.0	30.57	6/30/60
6	45° 45'	126° 30'	59.1	31.09	7/1/60
7	45° 30'	126° 00'	59.1	31.64	"
8	45° 15'	126° 29'	60.4	29.85	"
9	45° 00'	127° 00'	59.1	32.50	7/2/60
10	44° 39'	127° 00'	59.5	31.92	"
11	44° 20'	127° 00'	60.6	32.01	"
12	44° 00'	127° 00'	58.8	32.63	"
13	43° 40'	127° 00'	57.5	32.72	7/3/60
14	43° 20'	127° 00'	58.4	32.74	"
15	43° 09'	126° 58'	59.5	-	"
16	42° 40'	127° 00'	57.7	32.16	7/4/60
17	42° 21'	127° 04'	57.9	32.39	"
18	41° 58'	126° 58'	59.1	32.52	7/7/60
19	42° 00'	126° 25'	59.3	32.47	"
BH1	42° 03'	124° 24'	49.6	33.77	7/9/60
BH2	42° 03'	124° 37'	47.0	33.82	7/10/60
BH3	42° 12'	124° 51'	48.3	33.66	"
BH4	42° 22'	125° 05'	50.5	33.26	"
BH5	42° 30'	125° 18'	50.0	33.86	"
23	42° 45'	125° 36'	55.0	32.45	"
24	43° 00'	126° 00'	56.3	32.47	7/11/60
25	43° 14'	125° 41'	55.9	32.20	"
CH5	43° 20'	125° 23'	57.0	32.21	"
CH4	43° 21'	125° 10'	53.0	32.52	"
CH3	43° 21'	124° 56'	53.0	32.56	"
CH2	43° 21'	124° 43'	50.9	32.59	"
CH1	43° 21'	124° 29'	49.0	32.40	"
26	43° 44'	124° 54'	56.6	31.91	7/12/60
27	43° 55'	124° 40'	54.1	32.27	"
28	44° 05'	124° 59'	57.5	32.01	"
29	44° 17'	125° 30'	60.6	30.37	"
30	44° 30'	126° 00'	61.0	29.29	7/13/60
31	44° 39'	125° 30'	62.4	29.45	"
NH5	44° 39'	125° 07'	61.7	30.10	"
NH4	44° 39'	124° 53'	60.8	31.29	"
NH3	44° 39'	124° 39'	58.6	31.49	"
NH2	44° 39'	124° 25'	58.4	31.17	"
NH1	44° 39'	124° 11'	57.2	30.14	"
33	45° 00'	124° 20'	58.6	29.79	7/14/60
34	45° 40'	124° 20'	58.4	32.00	"

Appendix A (Continued)

Station number	Latitude N.	Longitude W.	Surface temperature (°F)	Surface salinity	Date
		1961			
1	46° 01'	124° 52'	60.4	31.11	6/29/61
2	46° 00'	125° 12'	61.3	30.46	"
3	46° 00'	125° 39'	61.5	30.26	"
4	46° 00'	126° 06'	62.1	27.16	"
5	46° 00'	126° 33'	61.6	30.07	7/5/61
6	46° 00'	127° 00'	61.7	32.43	"
7	45° 40'	127° 00'	61.9	28.42	"
8	45° 20'	127° 00'	61.2	32.38	"
9	45° 00'	127° 00'	60.6	32.25	"
10	44° 40'	127° 00'	59.9	32.05	"
11	44° 19'	127° 00'	62.6	29.70	7/6/61
12	44° 00'	127° 00'	62.3	30.05	"
13	43° 39'	127° 00'	63.2	30.99	"
14	43° 20'	127° 00'	61.4	32.10	"
15	42° 59'	127° 00'	61.7	31.78	"
16	42° 40'	127° 00'	59.9	32.38	"
17	42° 20'	127° 00'	59.7	32.77	7/7/61
18	42° 00'	127° 00'	60.1	32.68	"
19	42° 00'	126° 30'	60.8	32.59	"
20	42° 00'	126° 00'	61.4	32.18	"
21	42° 00'	125° 30'	56.7	32.54	"
23	42° 15'	125° 22'	58.5	32.57	7/11/61
24	42° 30'	125° 45'	61.9	32.10	"
25	42° 45'	126° 08'	61.8	32.14	7/12/61
26	43° 00'	126° 30'	64.0	32.12	"
27	43° 11'	126° 07'	63.6	31.98	"
28	43° 25'	125° 37'	61.6	31.44	"
29	43° 37'	125° 11'	58.6	31.11	"
31	44° 01'	125° 06'	60.5	31.36	7/13/61
32	44° 12'	125° 27'	60.2	30.59	"
33	44° 23'	125° 47'	62.6	30.01	7/14/61
34	44° 42'	126° 09'	63.4	29.22	"
35	44° 45'	126° 30'	63.8	29.72	"
36	44° 53'	126° 03'	63.7	28.96	"
37	45° 00'	125° 37'	63.4	29.23	"
38	45° 12'	125° 24'	63.5	30.44	7/15/61
40	45° 24'	125° 11'	63.0	30.59	"
41	45° 33'	125° 37'	63.2	29.69	"
42	45° 41'	126° 04'	63.7	29.92	"
43	45° 50'	126° 30'	63.8	30.70	"
44	45° 53'	126° 04'	63.8	29.00	"
45	45° 55'	125° 38'	63.4	30.72	"
46	45° 58'	125° 11'	63.2	30.44	7/16/61
47	46° 00'	124° 50'	61.8	31.18	"

Appendix A (Continued)

Station number	Latitude N.	Longitude W.	Surface temperature (°F)	Surface salinity	Date
		1962			
1	43° 50'	125° 00'	56.0	31.74	6/28/62
2	44° 03'	125° 22'	56.3	31.56	"
3	44° 17'	125° 44'	58.9	30.32	6/29/62
4	44° 31'	126° 07'	58.9	31.38	"
5	44° 45'	126° 30'	58.6	31.44	"
6	44° 52'	126° 07'	59.4	29.49	6/30/62
7	45° 00'	125° 45'	59.4	30.04	"
8	45° 08'	125° 22'	58.3	31.00	"
9	45° 15'	125° 10'	57.7	31.44	7/1/62
10	45° 24'	125° 22'	57.8	31.94	"
11	45° 32'	125° 45'	57.9	32.27	"
12	45° 41'	126° 07'	57.1	32.56	"
13	45° 50'	126° 30'	56.7	32.57	"
14	45° 56'	125° 56'	58.1	32.10	7/2/62
15	46° 00'	125° 30'	57.7	32.11	"
16	46° 00'	126° 06'	58.0	32.55	"
17	46° 00'	126° 33'	56.7	33.16	"
18	46° 00'	127° 00'	56.7	32.65	"
19	45° 40'	127° 00'	58.7	31.04	7/3/62
20	45° 20'	127° 00'	59.2	30.61	"
21	45° 00'	127° 00'	60.0	29.88	"
22	44° 44'	127° 00'	59.2	31.94	"
23	44° 20'	127° 00'	58.5	32.27	"
24	44° 00'	127° 00'	58.0	32.68	7/4/62
25	43° 40'	127° 00'	58.3	32.60	"
26	43° 20'	127° 00'	58.8	32.45	"
27	43° 00'	127° 00'	59.6	31.04	"
28	42° 40'	127° 00'	59.0	31.19	"
29	42° 20'	127° 00'	58.7	31.64	7/5/62
30	42° 00'	127° 00'	59.1	31.83	"
31	42° 00'	126° 35'	58.3	32.59	"
32	42° 00'	126° 10'	59.2	32.18	"
33	42° 00'	125° 45'	58.6	32.10	"
34	42° 00'	125° 20'	55.6	32.27	7/6/62
35	42° 15'	125° 37'	57.5	31.86	"
36	42° 30'	125° 54'	58.5	32.03	"
37	42° 45'	126° 12'	58.1	31.61	7/7/62
38	43° 00'	126° 30'	59.1	30.89	"
39	43° 12'	126° 08'	58.1	31.00	"
40	43° 24'	125° 35'	58.0	31.35	"
41	43° 36'	125° 22'	56.5	31.60	"

Appendix A (Continued)

Station number	Latitude N.	Longitude W.	Surface temperature (°F)	Surface salinity	Date
		1964			
1	45° 00'	125° 01'	59.6	26.65	7/5/64
2	45° 00'	125° 29'	60.8	26.81	"
3	45° 00'	126° 00'	61.3	23.35	"
4	44° 59'	126° 30'	60.6	23.53	7/6/64
5	44° 39'	126° 58'	60.5	26.91	"
6	44° 39'	127° 00'	58.8	31.95	"
7	44° 18'	127° 00'	59.6	31.64	"
8	44° 00'	127° 01'	58.6	32.27	7/7/64
9	43° 39'	126° 59'	58.9	32.35	"
10	43° 20'	127° 01'	58.8	32.43	"
11	43° 01'	127° 00'	59.7	32.11	7/10/64
12	42° 41'	127° 00'	60.2	32.14	"
13	42° 17'	127° 00'	60.7	32.25	"
14	42° 01'	126° 59'	61.1	32.28	"
15	41° 30'	127° 00'	60.6	32.24	"
16	41° 29'	126° 31'	60.2	31.94	"
17	41° 30'	125° 56'	57.3	32.81	7/11/64
18	41° 31'	125° 27'	56.4	33.21	"
19	41° 31'	125° 00'	54.4	33.36	"
20	41° 45'	125° 23'	55.9	32.58	"
21	42° 01'	125° 46'	58.2	31.98	7/12/64
22	42° 14'	126° 08'	60.3	31.81	"
23	42° 34'	126° 28'	60.8	31.62	"
24	42° 45'	126° 05'	61.0	31.41	7/13/64
25	43° 01'	125° 44'	60.4	31.52	"
26	43° 14'	125° 23'	57.7	31.87	7/13/64
27	43° 29'	124° 59'	60.1	30.67	"
28	43° 44'	125° 22'	61.6	30.33	7/14/64
29	44° 00'	125° 45'	61.5	29.73	"
30	44° 15'	126° 08'	62.7	30.66	"
31	44° 30'	126° 30'	63.5	27.80	"
32	44° 45'	126° 08'	62.6	27.58	"
33	45° 00'	125° 45'	61.0	28.72	7/15/64
34	45° 15'	125° 22'	62.0	27.42	"
35	45° 32'	125° 00'	61.2	29.85	"
		1965			
1	45° 30'	125° 00'	56.5	32.02	7/1/65
2	45° 29'	125° 30'	57.7	31.41	"
3	45° 30'	126° 01'	59.6	30.47	"
4	45° 30'	126° 26'	58.2	32.08	"
5	45° 30'	126° 53'	58.4	31.77	7/2/65
6	44° 58'	127° 01'	58.4	30.96	"
7	44° 40'	127° 00'	58.3	31.03	"

Appendix A (Continued)

Station number	Latitude N.	Longitude W.	Surface temperature (°F)	Surface salinity	Date
		1965 (Continued)			
8	44° 21'	127° 00'	58.8	31.17	7/2/65
9	44° 00'	126° 59'	58.5	30.12	"
10	43° 41'	126° 57'	58.7	30.81	"
11	43° 21'	127° 00'	59.2	30.80	7/3/65
12	43° 00'	127° 01'	58.4	31.15	"
13	42° 40'	127° 01'	57.8	31.60	"
14	42° 21'	127° 03'	57.9	32.17	"
15	42° 00'	126° 59'	58.2	32.48	"
16	42° 00'	126° 30'	58.4	32.48	"
17	42° 00'	125° 00'	58.1	32.21	7/4/65
18	42° 00'	125° 31'	56.5	31.76	"
19	42° 00'	125° 03'	54.6	32.43	7/9/65
20	42° 15'	125° 22'	54.4	32.54	7/10/65
21	42° 31'	125° 45'	55.0	32.56	"
22	42° 45'	126° 07'	53.4	33.17	"
23	43° 00'	126° 30'	57.9	31.69	"
24	43° 15'	126° 09'	57.6	31.84	"
25	43° 30'	125° 45'	57.8	32.00	"
26	43° 46'	125° 21'	59.6	31.95	"
27	44° 00'	125° 01'	58.4	32.20	7/11/65
28	44° 14'	125° 20'	58.4	32.04	"
29	44° 30'	125° 46'	58.3	31.10	"
30	44° 44'	126° 08'	59.8	30.61	"
31	45° 01'	126° 30'	60.4	30.87	"
32	45° 15'	126° 08'	61.0	30.55	"
33	45° 30'	125° 47'	61.4	29.57	"
34	45° 50'	125° 22'	60.0	32.05	7/12/65
35	46° 05'	125° 01'	59.3	32.23	"
		1966			
1	46° 00'	125° 00'	59.0	32.10	7/1/66
2	45° 48'	125° 24'	59.2	32.34	7/2/66
3	45° 36'	125° 48'	59.2	32.29	"
4	45° 24'	126° 12'	58.6	32.54	"
5	45° 12'	126° 36'	58.6	32.50	"
6	45° 00'	127° 00'	58.4	32.24	"
7	44° 40'	127° 00'	59.0	32.35	7/3/66
8	44° 20'	127° 00'	59.2	32.37	"
9	44° 00'	127° 00'	60.2	31.95	"
10	43° 40'	127° 00'	60.4	32.00	"
11	43° 20'	127° 00'	60.0	31.90	7/8/66
12	43° 00'	127° 00'	59.6	31.84	"
13	42° 40'	127° 00'	59.2	32.18	"

Appendix A (Continued)

Station number	Latitude N.	Longitude W.	Surface temperature (°F)	Surface salinity	Date
		1966 (Continued)			
14	42° 20'	127° 00'	59.8	32.09	7/8/66
15	42° 00'	127° 00'	57.4	32.25	"
16	42° 00'	126° 30'	59.8	31.71	"
17	42° 00'	126° 00'	60.0	31.78	7/9/66
18	42° 00'	125° 30'	59.2	31.46	"
19	42° 15'	125° 22'	55.4	32.20	"
20	42° 30'	125° 45'	59.6	31.05	"
21	42° 45'	126° 08'	59.8	31.75	7/10/66
22	43° 00'	126° 30'	59.2	31.89	"
23	43° 15'	126° 08'	60.8	31.98	"
24	43° 30'	125° 45'	60.8	31.81	"
25	43° 45'	125° 22'	60.6	31.97	7/11/66
26	44° 00'	125° 00'	59.6	30.39	"
27	44° 12'	125° 24'	60.0	31.84	"
28	44° 24'	125° 48'	61.0	31.35	"
29	44° 36'	126° 12'	59.2	32.29	"
		1967			
1	46° 00'	125° 00'	58.8	31.30	7/3/67
2	46° 00'	125° 30'	59.6	30.39	7/4/67
3	46° 00'	126° 00'	61.2	29.88	"
4	46° 00'	126° 30'	62.8	31.87	"
5	46° 00'	127° 00'	60.4	32.36	"
6	45° 40'	127° 00'	60.3	32.06	"
7	45° 20'	127° 00'	61.6	29.54	7/5/67
8	45° 00'	127° 00'	61.6	28.93	"
9	44° 40'	127° 00'	61.8	29.75	"
10	44° 20'	127° 00'	61.6	30.71	"
11	44° 00'	127° 00'	60.8	31.08	"
12	43° 40'	127° 00'	60.8	31.07	7/6/67
13	43° 20'	127° 00'	60.5	31.70	"
14	43° 00'	127° 00'	60.6	31.94	"
15	42° 40'	127° 00'	59.5	32.07	"
16	42° 20'	127° 00'	59.0	32.35	"
17	42° 00'	127° 00'	58.6	32.51	7/7/67
18	42° 00'	126° 30'	58.6	32.44	"
19	42° 00'	126° 00'	58.8	32.42	"
20	42° 00'	125° 30'	54.2	32.68	"
21	42° 15'	125° 22'	56.4	32.44	"
22	42° 30'	125° 45'	56.4	32.38	7/8/67
23	42° 45'	126° 00'	57.8	32.34	"
24	43° 00'	126° 30'	60.4	31.93	"
25	43° 15'	126° 08'	59.6	31.74	"
26	43° 30'	125° 45'	58.8	31.85	7/9/67

Appendix A (Continued)

Station number	Latitude N.	Longitude W.	Surface temperature (°F)	Surface salinity	Date
		1967 (Continued)			
27	43° 45'	125° 22'	59.8	32.07	7/9/67
28	44° 00'	125° 00'	58.8	32.04	"
29	44° 12'	125° 24'	59.8	31.89	"
30	44° 24'	125° 48'	59.0	32.07	7/10/67
31	44° 36'	126° 12'	62.2	30.67	"
32	44° 48'	126° 36'	66.0	28.20	"
33	45° 00'	127° 00'	63.4	29.43	"
34	45° 12'	126° 36'	64.5	28.74	"
35	45° 24'	126° 12'	62.2	28.69	7/11/67
36	45° 36'	125° 48'	63.6	30.53	"
37	45° 48'	125° 24'	64.4	27.65	"
38	46° 00'	125° 00'	62.0	31.79	"

Appendix B
Temperature (^{o}F) at selected depths from bathythermograph casts taken during albacore cruises, 1959-67

Depth in feet	Station														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
								1959							
Surface	61.0	59.5	60.5	60.5	59.0	58.0	59.5	58.5	59.5	60.5	59.5	60.5	61.5	60.0	59.5
20	61.0	59.4	60.2	60.2	59.0	58.0	59.4	58.4	59.4	60.3	59.4	60.2	61.2	60.0	59.3
40	57.0	59.2	59.6	59.7	59.0	58.0	59.3	58.2	59.3	60.1	59.3	59.9	60.8	60.0	59.1
60	51.0	59.0	58.4	59.2	59.0	57.5	59.2	58.0	59.2	59.7	59.2	59.7	60.4	60.0	58.7
80	48.3	56.0	56.0	57.4	56.5	54.0	59.1	56.6	59.1	59.0	59.1	59.5	60.0	60.0	58.4
100	47.0	53.0	55.0	56.0	55.6	52.3	56.0	55.7	59.0	57.5	59.0	59.4	59.0	60.0	58.0
20	46.3	51.6	52.5	55.3	55.0	51.8	55.0	53.6	56.5	56.7	56.7	59.2	57.5	59.3	57.2
40	45.9	51.0	51.6	53.6	53.5	51.5	52.2	52.2	55.2	56.2	56.3	59.0	56.7	57.0	56.0
60	45.8	50.6	51.0	52.3	52.3	51.2	51.0	51.6	53.0	55.0	55.3	57.0	56.2	52.5	55.2
80	45.7	50.2	50.5	51.0	51.3	50.6	50.4	51.1	51.9	53.0	54.0	56.0	55.0	51.0	53.8
200	45.6	49.7	50.0	50.4	50.6	49.5	49.6	50.3	51.5	52.4	53.5	54.0	54.0	50.0	53.6
20	45.5	49.0	49.7	50.0	50.0	48.8	48.8	49.7	51.0	51.9	53.0	53.0	53.0	49.0	53.3
40	45.3	48.7	49.4	49.2	49.3	48.6	48.4	49.3	50.6	51.4	52.0	52.6	52.4	48.7	53.0
60	45.2	48.4	49.2	48.6	48.8	48.3	48.0	48.8	50.2	51.0	51.6	52.2	51.6	48.3	52.8
80	45.1	48.2	48.9	48.1	48.6	48.1	47.7	48.0	49.7	50.6	51.3	51.8	50.8	48.0	52.5
300	45.0	48.0	48.7	47.9	48.3	47.8	47.3	47.5	49.0	50.3	50.7	51.3	50.4	47.7	52.2
50			48.3	47.7	46.9	47.0	46.7	46.4		49.3	49.1	50.2	49.4	47.0	51.7
400			47.9	47.4	46.0	46.0	46.2			47.7	47.8	49.1	48.0	46.6	51.2
50			47.5	47.1		45.6				47.0		48.2	47.5	46.2	
500			47.1			45.2						47.5	47.0		
50															
600															

Appendix B (Continued)

Depth in feet	Station														
	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
							1959 (Continued)								
Surface	59.0	51.0	53.0	61.0	60.5	62.5	61.5	61.5	61.5	63.0	62.0	63.5	63.5	58.0	61.5
20	50.6	44.6	49.4	60.6	60.3	59.8	61.2	61.3	61.3	61.0	60.0	63.2	63.0	58.0	61.0
40	49.0	43.8	48.8	60.3	60.1	59.4	60.3	61.2	61.0	59.3	59.6	62.0	61.0	55.0	58.0
60	48.7	43.4	48.1	59.5	57.0	59.1	56.0	58.5	60.2	56.7	59.1	59.0	57.0	53.0	56.0
80	48.3	43.0	47.2	58.6	56.3	58.4	53.0	54.0	55.5	55.3	57.0	56.0	54.0	50.6	54.0
100	48.0	42.7	46.0	58.0	55.0	57.0	51.0	50.0	54.0	54.0	56.0	54.2	53.6	49.3	49.0
20	47.7	42.4	45.5	56.5	53.0	51.0	50.4	49.0	52.0	50.5	54.0	51.0	50.5	48.6	48.3
40	47.3	42.1	45.0	55.0	52.0	50.0	49.8	48.0	49.0	49.5	51.2	50.0	49.5	48.0	47.9
60	47.0	41.9	44.8	53.0	51.8	48.5	49.0	47.0	48.0	48.5	50.3	49.5	48.5	47.3	47.8
80	46.5	41.8	44.7	52.7	51.3	47.5	48.2	46.9	47.0	47.4	49.2	49.0	47.8	46.9	47.6
200	46.0	41.7	44.5	52.4	50.6	46.7	46.9	46.8	46.9	46.7	48.7	48.6	47.4	46.7	47.4
20	45.8	41.6	44.3	52.1	50.0	46.0	46.7	46.7	46.8	46.2	48.3	48.2	47.0	46.6	47.3
40	45.7	41.4	44.2	51.7	49.3	45.8	46.6	46.5	46.7	45.8	47.9	47.9	46.9	46.5	47.1
60	45.6	41.3	44.1	51.5	48.8	45.6	46.4	46.4	46.6	45.6	47.7	47.8	46.8	46.4	46.9
80	45.5	41.2	43.8	51.2	48.4	45.3	46.3	46.3	46.5	45.4	47.5	47.7	46.7	46.3	46.7
300	45.4	41.1	43.6	50.7	48.0	45.1	46.1	46.2	46.4	45.2	47.3	47.6	46.6	46.2	46.5
50	45.1	40.7	43.1	49.0	47.2	44.7	45.9	45.9	46.2	44.6	46.3	47.4	46.4	46.1	46.0
400		40.3		47.5	46.7	44.2	45.7	45.2	46.0	44.0	45.7	47.2	46.1	46.0	45.6
50				46.7	46.2		45.3	44.7	45.5	43.2	45.2	46.8	45.8		45.2
500				46.1			45.1	44.2	45.0			46.5	45.1		
50												46.1			
600															

Appendix B (Continued)

Depth in feet	Station														
	AH-1	AH-2	AH-3	AH-4	AH-5	BT-1	H-2	BT-3	H-5	BT-6	H-7	H-8	H-9	BT-10	H-11
							1960								
Surface	55.6	56.8	57.5	57.7	58.6	58.4	59.1	59.0	59.3	59.1	59.1	60.4	59.0	59.0	60.2
20	54.3	55.7	56.5	55.2	57.9	58.1	58.5	59.0	58.8	58.8	58.9	59.8	58.9	59.0	59.1
40	52.9	51.3	55.6	54.1	55.1	57.2	57.4	59.0	58.1	57.9	58.4	59.0	58.3	58.6	59.0
60	51.2	49.3	55.5	53.5	52.4	53.6	56.6	58.7	57.6	57.2	57.5	56.3	57.4	56.5	58.3
80	49.2	48.7	53.8	52.1	50.0	51.8	56.0	58.1	56.9	55.9	55.0	55.6	57.2	55.7	57.4
100	46.2	48.2	51.8	50.0	49.4	49.1	54.0	57.6	56.3	54.6	52.7	54.5	56.6	51.3	56.7
20	45.9	47.8	50.2	49.4	48.0	48.8	50.8	54.3	52.4	52.7	51.5	53.1	52.7	50.3	52.3
40	45.4	47.4	48.7	48.9	47.5	48.4	50.2	51.8	51.7	51.8	50.5	51.5	51.0	49.5	51.0
60	45.0	47.0	48.0	48.7	47.4	48.0	49.8	50.5	49.7	50.0	50.0	50.4	50.0	48.9	49.6
80	44.6	46.4	47.8	48.5	47.2	47.7	49.4	49.8	49.5	49.8	49.9	49.9	49.1	48.3	48.7
200		46.1	47.6	48.2	47.0	47.5	49.2	49.7	49.3	49.7	49.9	49.6	48.8	47.1	48.1
20		46.0	47.4	48.0	46.8	47.4	49.1	49.4	48.9	49.5	49.9	49.3	48.5	46.8	48.0
40		45.9	47.2	47.8	46.7	47.3	48.9	49.0	48.3	49.3	49.9	49.0	48.2	46.8	47.8
60		45.7	47.0	47.6	46.5	47.3	48.7	48.6	47.8	49.2	49.8	48.8	47.8	46.7	47.6
80		45.4	46.8	47.4	46.3	47.0	48.5	48.2	47.6	49.0	49.8	48.4	47.6	46.6	47.5
300		45.2	46.6	47.1	46.1	46.7	48.2	47.9	47.8	48.7	49.7	48.2	47.3	46.6	47.3
50		44.5	46.4	46.7	45.6	46.3	47.6	47.5	46.4	47.8	48.6	47.6	46.6	46.0	46.5
400		44.1	46.0	46.5	45.2	45.7	46.9	46.2	45.6	47.0	47.6	46.8	45.7	45.4	45.8
50		43.9	45.7	46.1	44.9	45.3	46.4	45.5	45.2	46.2	47.2	46.2	45.6	44.8	45.2
500		43.8	45.5	45.4	46.3	44.9	46.2	45.0	44.9	45.6	46.7	45.6	45.2	44.4	44.5
50				45.0	44.2	44.3	45.8	44.7	44.5	45.0	46.0	45.1	44.9	44.0	43.9
600				44.6	43.8	43.9	45.3	44.3	44.0	44.8	45.4	44.5	44.8	43.5	
50							44.7	43.9	43.4		45.0	43.8			

Appendix B (Continued)

Depth in feet	Station														
	H-12	BT-13	H-14	BT-15	BT-16	H-17	H-18	BT-19	BH-1	BH-2	BH-3	BH-4	BH-5	BT-23	H-24
							1960 (Continued)								
Surface	58.8	57.5	58.5	59.0	57.7	57.9	59.1	59.3	49.6	47.3	48.3	50.3	50.0	54.8	56.3
20	58.8	57.5	57.8	58.8	57.7	57.5	58.7	58.3	47.4	45.9	46.4	49.0	46.5	51.4	55.4
40	58.7	57.5	57.7	58.6	57.7	57.5	58.7	58.2	45.8	45.9	46.4	48.9	46.1	49.6	55.4
60	58.0	57.5	57.6	58.1	57.7	57.5	58.7	58.1	43.9	45.9	46.4	48.9	45.9	48.8	54.9
80	56.7	57.5	57.5	56.5	57.3	57.5	58.4	58.1	43.9	45.9	45.8	47.5	45.3	48.2	53.2
100	55.4	54.8	56.4	55.4	56.7	57.5	58.3	58.0	43.9	45.9	45.3	47.0	45.4	48.2	51.3
20	51.6	53.2	55.8	52.2	55.4	57.4	58.2	57.7	43.9	45.9	45.2	46.4	45.0	48.4	50.6
40	50.6	50.9	54.0	51.2	53.8	57.1	58.0	57.5	43.9	45.5	45.0	45.8	45.0	47.7	50.0
60	49.4	50.0	53.1	50.8	51.9	56.5	57.2	55.6	43.9	45.1	45.0	45.9	45.0	47.0	48.8
80	48.7	49.4	52.2	50.4	50.2	54.7	54.2	52.7	43.9	44.9	45.0	45.7	45.0	46.8	48.7
200	48.2	48.7	51.7	49.9	49.3	52.0	52.9	51.8		43.9	45.0	45.8	44.9	47.1	48.6
20	48.1	48.3	50.6	49.3	48.9	51.1	52.0	50.9		43.9	45.0	45.7	44.9	46.8	48.5
40	47.9	48.2	50.0	49.1	48.5	50.6	51.5	50.9		43.7	44.8	45.6	44.9	46.5	48.1
60	47.6	47.7	50.0	48.2	48.3	50.2	51.2	50.2		43.4	44.8	45.5	44.9	46.5	47.8
80	47.3	47.3	49.7		48.0	49.3	50.6	49.6		43.4	44.7	45.3	44.9	46.6	47.5
300	46.9	47.3	48.9		47.7	48.8	50.0	49.3		43.4	44.6	45.2	44.9	46.5	47.1
50	46.0	46.8	48.6		47.0	47.3	49.3			43.3	44.4	45.0	44.6	46.0	46.4
400	45.4	45.8	47.2		46.6	46.0	48.5			43.0	44.1	44.8	44.3	45.7	45.7
50	45.4	45.5	46.3		45.6	45.3	47.8				44.0	43.9	44.0	45.3	44.8
500	45.2	45.0	45.4		45.2	44.3	46.8				42.8	43.1	43.0	44.1	44.1
50	44.8	44.7	44.7		44.7	43.7	45.9					42.2			
600	44.1	43.7	43.9												
50															

Appendix B (Continued)

Depth in feet	Station														
	BT-25	CH-5	CH-4	CH-3	CH-2	CH-1	BT-26	H-27	H-28	BT-29	H-30	H-31	NH-5	NH-4	NH-3
							1960 (Continued)								
Surface	55.9	56.5	53.0	53.0	50.9	49.3	56.8	54.1	57.5	60.6	61.0	62.4	61.7	60.8	58.6
20	54.1	56.0	52.0	51.3	49.8	47.7	56.3	52.0	57.1	57.2	60.4	60.6	59.0	56.2	54.8
40	52.9	55.7	51.3	49.9	47.6	47.0	52.4	47.5	56.6	54.3	60.1	58.6	54.0	54.3	52.7
60	52.7	52.7	50.1	49.6	46.9	46.4	51.3	46.7	53.2	52.7	58.5	58.3	53.6	51.8	49.5
80	50.9	52.5	50.0	49.1	47.6	45.7	51.1	46.4	51.5	52.7	57.2	57.4	53.0	50.0	48.0
100	50.0	50.4	49.3	48.2	47.6	45.3	50.6	46.6	51.1	50.3	56.0	54.5	52.0	48.6	47.8
20	49.1	49.4	49.3	47.7	47.3	45.3	49.3	46.8	50.7	49.1	54.5	52.0	50.0	47.5	47.3
40	48.4	49.1	48.9	47.5	46.7	44.8	48.8	46.6	50.5	48.3	52.0	51.1	49.5	47.3	46.6
60	48.4	48.3	48.9	47.5	45.8	44.3	49.1	46.6	50.3	47.9	51.3	50.2	48.6	47.1	46.6
80	48.2	47.7	48.9	47.3	45.7		48.9	46.4	50.2	47.6	50.9	49.7	48.3	46.9	46.5
200	47.9	47.8	48.6	46.3	45.7		48.8	46.1	49.4	47.6	50.2	49.3	47.9	47.0	46.4
20	47.6	47.8	47.9	45.7	45.6		48.6	45.6	49.3	47.6	49.8	49.2	47.6	46.7	46.3
40	47.3	47.7	47.5	45.6	45.4		48.3	45.1	48.9	47.5	49.5	49.0	47.3	46.8	46.1
60	46.7	47.6	47.0	45.3	45.1		48.0	44.4	48.5	47.4	49.2	48.0	46.7	46.5	46.0
80	46.4	47.3	46.7	45.0	44.9		47.8	43.9	48.2	47.0	48.9	47.1	46.4	46.2	45.7
300	46.1	47.0	46.5	44.8	44.7		47.5	43.1	48.2	46.7	48.8	46.3	46.1	45.9	45.2
50	45.6	46.2	46.0	44.2	44.0		46.6	42.6	47.7	45.5	47.4	45.3	45.4	45.3	44.0
400	44.4	45.8	45.2	43.3	43.4			42.0	46.4		46.1	44.1	43.6	43.9	42.7
50		44.9	44.2	42.2	42.2			41.0	45.1		45.0	42.5		42.3	
500		43.7	43.0												
50															
600															
50															

Appendix B (Continued)

Depth in feet	Station			
	NH-2	NH-1	H-33	H-34
	1960 (Continued)			
Surface	58.4	58.2	58.6	58.4
20	51.3	46.6	54.4	56.0
40	47.0	47.3	53.2	55.4
60	46.4	47.1	51.2	48.6
80	46.4	46.7	47.0	47.3
100	46.4	46.1	46.8	46.2
20	46.8	45.0	46.4	46.0
40	46.4		46.0	45.8
60	45.9		46.2	45.6
80	45.9			45.4
200	45.2			45.5
20	45.0			45.3
40				45.0
60				44.9
80				44.6
300				
50				
400				
50				
500				
50				
600				
50				

Appendix B (Continued)

Depth in feet	Station														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
							1961								
Surface	60.4	61.3	61.5	62.1	61.6	61.7	61.9	61.2	60.6	59.9	62.6	62.3	63.2	61.4	61.7
20	60.4	60.0	61.0	62.0	61.0	58.7	60.5	59.3	59.5	59.5	62.5	61.0	62.5	58.5	61.2
40	60.0	57.0	58.0	60.5	60.0	58.5	59.5	59.0	58.0	59.0	61.5	59.3	61.5	56.7	60.5
60	57.0	53.0	57.0	58.0	58.0	57.5	58.5	55.5	57.0	58.4	60.0	58.0	59.0	56.5	59.5
80	51.0	52.0	55.0	57.0	57.0	56.0	57.0	55.0	56.5	57.0	59.5	56.0	55.5	56.3	58.0
100	49.0	51.5	52.0	55.0	55.5	55.0	56.2	55.0	55.4	55.5	59.0	54.5	54.0	55.5	57.5
20	48.5	51.3	51.0	53.0	52.0	54.0	55.0	54.0	54.0	54.0	58.5	53.5	53.0	54.5	54.5
40	48.0	50.5	50.0	52.0	52.0	52.0	53.4	52.0	52.0	53.8	57.0	51.5	52.0	52.5	52.5
60	48.0	50.0	50.0	51.0	51.0	51.0	51.0	51.0	50.5	53.0	54.0	51.0	51.0	51.5	51.5
80	48.6	49.5	49.8	50.5	50.5	49.0	50.4	50.5	50.0	51.0	51.5	50.5	50.4	50.5	51.4
200	47.5	49.3	49.5	50.0	49.0	48.3	49.5	50.0	49.0	49.5	50.8	50.0	50.2	50.5	50.5
20	47.5	49.2	49.0	49.5	48.5	48.3	49.0	49.0	48.0	49.0	50.4	49.5	49.8	50.3	50.0
40	47.5	49.2	49.0	49.5	48.0	48.3	49.0	48.7	48.0	49.0	50.0	49.0	49.1	50.0	49.8
60	47.5	49.2	47.8	49.3	47.3	48.3	49.0	48.3	47.5	48.3	49.5	48.5	48.8	49.8	49.2
80	47.5	49.0	47.8	49.0	47.0	48.3	48.5	48.0	47.0	48.1	49.0	48.0	48.8	49.6	49.0
300	46.8	48.8	47.5	48.5	46.0	47.0	48.4	48.0	47.0	48.0	48.4	48.0	48.8	49.5	48.8
50	46.5	48.0	47.0	47.5	45.5	47.0	48.0	47.0	47.0	47.0	47.4	48.0	48.0	47.5	47.5
400	46.0	47.5	46.5	47.0	45.0	46.3	46.5	46.5	47.0	46.5	47.0	46.5	47.0	47.0	47.3
50	45.0	46.0	46.5	46.5	45.0	46.0	46.0	46.0	46.0	45.7	46.2	46.0	46.3	47.0	47.0
500	45.5	46.0	46.0	45.8		46.0	45.7	45.5	46.0	45.5	46.0	46.0	46.0	46.4	46.3
50	45.0	45.0	46.0	45.0		45.5		45.0	45.5	45.5	45.5	45.5	45.5	46.0	46.0
600	44.0	45.0		45.0		45.0		45.0	45.0	45.0	45.0	45.0	45.2	45.7	45.7
50	44.0			44.5		45.0		44.5	44.7	44.8	45.0	44.4	45.0	45.0	45.3
700	43.5			44.3		44.4		44.0	44.4	44.5	44.5	44.0	44.5	45.0	45.5
50	43.0			44.0		43.8		44.0	44.2	44.0		43.4	44.0	44.5	
800	43.0			44.0				48.5	44.0	43.5		43.0	43.8		

Appendix B (Continued)

Depth in feet	Station														
	16	17	18	19	20	21	23	24	25	26	27	28	29	31	32
							1961 (Continued)								
Surface	59.9	59.7	60.1	60.8	61.4	56.7	58.5	61.9	61.8	64.0	63.6	61.6	58.6	60.5	60.2
20	59.0	59.7	60.1	60.0	60.8	56.7	54.0	59.8	61.8	61.5	60.5	57.0	57.0	60.5	57.0
40	57.5	59.7	59.5	60.0	60.8	56.7	52.0	59.8	61.8	61.0	60.5	55.5	55.0	60.5	55.0
60	57.0	59.0	59.5	59.5	60.0	55.0	51.0	59.8	61.8	61.0	60.0	55.0	53.0	57.0	51.5
80	56.8	57.5	58.8	59.0	59.7	51.5	49.5	57.0	57.0	61.0	60.0	55.0	50.0	54.0	50.5
100	56.5	57.0	58.5	57.5	58.8	51.0	49.3	55.0	56.0	57.0	57.0	53.0	50.0	51.0	50.0
20	55.0	55.0	58.0	57.0	58.0	51.0	49.3	54.0	55.0	53.0	54.0	51.0	49.5	49.5	49.5
40	54.0	53.0	57.3	55.5	56.0	49.7	48.7	53.5	53.0	51.0	53.0	50.0	49.5	48.5	49.0
60	52.5	52.0	56.5	54.5	52.5	49.2	48.0	52.5	52.0	50.0	51.5	49.0	49.0	48.0	48.5
80	52.0	51.0	55.5	52.5	51.5	48.7	48.0	52.0	51.0	50.0	51.0	49.0	47.5	48.0	48.0
200	51.3	51.0	54.5	51.5	51.0	48.6	48.0	51.0	50.5	49.3	50.5	48.5	47.0	48.0	48.0
20	50.5	50.7	54.5	51.0	50.5	48.6	48.0	50.5	50.0	48.8	50.0	47.8	47.5	48.0	48.0
40	50.5	50.7	53.5	51.0	50.5	49.5	47.8	50.0	50.0	48.0	49.8	47.8	47.0	48.0	48.0
60	50.1	50.2	53.0	50.5	50.3	49.5	47.5	49.5	49.5	48.0	49.5	47.2	47.0	47.5	47.7
80	50.0	50.0	53.0	50.0	50.0	49.0	47.3	49.5	49.2	47.5	49.0	47.2	47.0	47.0	47.5
300	49.0	49.6	52.8	50.0	49.7	48.5	47.0	49.0	49.0	47.5	47.8	47.0	46.8	47.0	47.0
50	49.0	49.0	50.0	49.5	49.0	48.0	47.0	48.0	48.0	47.0	47.5	47.0	46.0	46.0	46.5
400	48.2	49.0	49.5	49.0	48.0	46.7	46.2	47.4	47.0	46.0	47.0	46.0	46.0	46.0	46.0
50	48.0	48.0	49.0	47.5	47.0	46.3	45.5	47.0	46.5	46.0	47.0	45.8	46.0	45.5	45.0
500	47.2	48.3	48.0	47.2	46.8	46.0	45.3	46.0	46.0	45.6	46.0	45.5	45.5	45.3	45.0
50	46.7	46.5	47.0	47.0	46.0	46.0	45.0	46.0	45.5	45.3	45.5	45.0	45.0	45.3	45.0
600	45.2	46.0	46.7	46.8	45.5	45.5	44.5	45.5	45.0	45.0	45.0	45.0	45.0	45.0	44.8
50	45.2	45.5	45.0	46.2	45.2		44.0	45.0	45.0	44.7	44.5	49.7	44.8	44.8	44.0
700	45.0			46.0				45.0							
50	44.5			46.0				44.7							
800	43.5			46.3											

Appendix B (Continued)

Depth in feet	Station													
	33	34	35	36	37	38	40	41	42	43	44	45	46	47
	1961 (Continued)													
Surface	62.6	63.4	63.8	63.7	63.4	63.5	63.0	63.2	63.7	63.8	63.8	63.4	63.2	61.8
20	62.0	63.0	63.8	63.0	63.4	62.5	63.0	63.2	63.0	63.8	60.0	63.0	60.0	61.8
40	57.0	61.0	63.8	61.0	59.4	57.0	57.5	57.1	61.0	62.5	60.5	60.0	60.0	57.2
60	55.0	60.5	59.0	57.5	57.5	53.0	56.0	56.0	60.0	57.5	57.0	57.5	57.0	55.0
80	52.0	57.0	57.0	55.0	56.2	52.0	55.0	55.0	59.0	56.0	55.0	52.5	56.0	49.0
100	50.5	52.0	56.0	53.0	55.0	51.0	57.5	52.0	57.5	52.5	51.0	52.1	54.0	47.5
20	49.5	52.0	55.0	51.5	53.0	50.5	52.0	50.0	50.5	51.5	50.5	51.0	52.0	47.5
40	49.0	50.5	53.0	51.2	50.0	50.0	51.5	50.0	49.5	50.5	50.0	50.5	51.0	47.0
60	48.8	49.5	52.0	51.0	49.5	49.5	49.5	49.5	49.0	50.0	49.5	50.1	50.5	47.0
80	48.5	49.0	51.0	50.5	49.5	49.0	48.5	49.0	49.0	49.0	48.8	50.0	50.0	47.0
200	48.0	48.7	50.0	50.0	49.0	49.0	48.0	48.5	48.0	48.5	48.5	49.8	49.8	47.0
20	47.5	48.0	49.0	49.5	48.5	48.5	48.0	48.3	47.5	47.8	48.0	49.8	49.5	47.0
40	47.5	48.0	49.0	49.0	48.5	48.5	47.5	48.0	47.0	47.5	48.0	49.8	49.0	47.0
60	47.5	48.0	48.5	48.5	48.5	48.5	47.5	48.0	47.0	47.5	47.7	49.5	48.8	47.0
80	47.5	48.0	48.2	48.0	48.5	47.5	47.3	47.0	47.0	47.5	47.5	49.5	48.5	46.7
300	47.5	48.0	48.0	47.8	48.0	47.5	47.0	47.0	46.5	47.0	47.5	49.0	48.0	46.5
50	47.0	47.0	47.5	47.0	47.0	47.5	46.5	47.0	47.0	46.0	47.5	49.0	47.5	45.5
400	46.5	46.3	47.5	46.5	47.0	46.7	46.0	46.5	46.5	45.6	47.0	48.5	47.0	45.0
50	46.2	46.0	47.0	46.0	46.5	46.0	45.5	46.0	46.0	45.0	46.5	47.5	47.5	44.5
500	45.5	45.5	46.5	46.0	46.0	46.0	45.1	45.8	46.0	45.0	46.0	47.0	46.5	44.0
50	45.0	45.0	46.0	45.5	45.0	45.5	44.5	45.0	45.2	44.8	45.5	46.5	46.0	44.0
600	45.0	45.0	45.5	45.2	45.0	45.0	44.5	44.8	45.0	44.5	45.0	46.0	45.5	44.0
50	44.5	44.5	45.0	45.0	44.5	45.0	44.5	44.5	44.5	44.0	44.5	45.5	45.0	43.8
700	44.0	44.0	44.5	44.5	44.0		44.0	44.0	44.0	44.0		45.0		
50	44.0		44.0						43.5	43.8				
800										43.5				

Appendix B (Continued)

Depth in feet	Station 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
							1962								
Surface	56.0	56.3	58.9	58.9	58.6	59.4	59.4	58.3	57.7	57.8	57.9	57.1	56.7	58.1	57.7
20	55.5	56.3	58.9	58.9	58.6	59.4	59.4	58.3	57.7	57.8	57.9	56.0	56.0	58.1	57.7
40	55.5	56.0	58.9	58.9	58.6	59.4	59.4	58.3	57.7	57.0	57.0	56.0	56.0	57.5	57.2
60	53.0	54.0	58.9	56.5	57.0	55.0	59.4	56.0	51.0	56.0	56.5	56.0	55.0	57.0	57.2
80	50.0	52.0	56.0	54.0	55.0	54.5	56.0	53.5	50.0	53.0	56.0	55.0	54.0	57.0	57.0
100	49.0	50.0	54.5	54.0	54.5	52.5	54.0	52.0	49.5	52.5	54.0	54.0	53.0	54.5	54.0
20	48.5	49.5	53.0	53.0	53.5	51.5	52.5	51.0	48.5	52.0	52.0	53.0	52.0	54.0	52.0
40	48.5	49.0	51.0	51.0	52.5	50.5	50.5	50.5	48.0	51.0	50.5	52.0	50.0	52.5	50.0
60	48.0	48.8	50.0	50.0	51.0	50.0	50.0	50.0	48.0	50.0	50.0	50.0	49.0	51.0	49.0
80	47.5	48.8	49.5	50.0	50.0	49.5	49.5	49.5	48.0	49.5	49.5	49.5	48.5	50.0	48.2
200	47.5	48.5	49.0	49.8	49.0	49.0	49.5	49.0	48.0	49.0	49.0	49.2	48.0	49.0	48.0
20	47.3	48.0	48.5	49.0	48.5	48.8	49.0	48.8	48.0	48.5	49.0	49.0	48.0	49.0	47.5
40	47.0	48.0	48.5	47.5	48.5	48.0	49.0	48.0	47.5	48.0	48.5	48.5	47.5	48.5	47.0
60	47.0	47.5	48.0	47.0	48.0	47.8	48.5	47.5	47.5	47.5	48.0	48.0	47.5	48.0	47.0
80	46.8	47.2	48.0	47.0	47.5	47.5	48.5	47.2	47.5	47.5	47.5	47.5	47.5	47.5	47.0
300	46.3	47.0	48.0	47.0	47.0	47.5	48.0	47.0	47.5	47.5	47.5	47.2	47.5	47.5	47.0
50	46.0	47.0	48.0	47.0	47.0	47.5	47.0	47.5	47.2	47.0	46.5	47.5	47.0	47.0	47.0
400	46.0	46.5	47.5	47.5	46.8	47.0	46.5	47.5	47.2	46.5	46.5	47.0	47.0	47.0	47.0
50	44.5	46.0	47.5	46.5	46.0	47.0	46.0	47.0	47.0	46.0	46.5	47.0	47.0	46.0	47.0
500	44.0	46.0	47.5	46.0	46.0	46.5	46.0	46.5	47.0	45.5	46.5	47.0	47.0	46.0	46.5
50	43.5	45.5	46.5	45.5	45.5	46.0	45.5	46.5	46.5	45.0	46.0	46.5	46.8	45.5	46.2
600	43.0	45.0	46.0	45.5	45.0	46.0	45.5	46.0	46.0	45.0	46.0	45.5	46.5	45.2	46.0
50	43.0	44.8	45.5	45.0	45.0	45.0	45.0	45.5	46.0	44.8	45.0	45.0	46.0	45.0	45.8
700	43.0	44.5	45.3	45.0		45.0	45.0	45.0	46.5	44.0		44.5	46.0	44.5	45.5
50	42.5						44.5	44.8		44.0		44.0			
800															

Appendix B (Continued)

Depth in feet	Station														
	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
	1962 (Continued)														
Surface	58.0	56.7	56.7	58.7	59.2	60.0	59.2	58.5	58.0	58.3	58.8	59.6	59.0	57.8	59.1
20	58.0	56.7	56.0	58.7	59.0	59.5	59.0	58.0	58.0	58.3	58.8	59.6	59.0	59.0	59.1
40	57.0	56.0	56.0	57.0	59.0	58.5	58.5	58.0	58.0	58.3	58.8	59.6	59.0	58.8	59.1
60	57.0	56.0	56.0	57.0	58.0	58.0	56.0	57.0	58.0	58.3	58.8	58.0	58.0	58.8	58.0
80	56.5	55.5	56.0	56.0	57.0	57.0	55.0	54.2	58.0	58.3	58.0	58.0	57.0	58.8	57.2
100	55.0	54.5	56.0	54.5	56.0	55.0	54.0	53.0	57.0	58.0	57.5	57.8	56.0	58.5	57.0
20	54.0	53.0	51.2	53.0	54.0	54.0	53.0	52.0	54.5	58.0	57.0	56.0	55.5	57.0	56.0
40	53.5	52.0	51.2	51.0	50.5	53.0	52.0	50.0	54.0	58.0	56.0	55.5	55.5	57.0	55.5
60	52.0	50.5	50.0	50.5	50.0	51.0	51.0	49.0	52.0	55.5	55.5	55.0	54.0	56.0	55.2
80	50.0	49.5	50.0	50.0	49.0	49.5	50.0	48.5	51.0	55.0	54.0	53.0	53.0	54.0	54.8
200	49.0	49.0	49.5	49.5	49.0	49.0	49.0	48.5	50.5	54.5	53.0	51.5	52.5	51.0	54.0
20	49.0	49.0	49.0	49.0	48.5	48.5	49.0	48.0	50.0	54.0	52.0	50.5	51.5	50.0	52.0
40	48.5	48.5	48.5	48.5	48.5	48.0	48.5	47.5	49.0	52.5	51.0	50.5	50.0	50.0	51.0
60	48.0	48.0	48.5	48.0	47.5	48.0	48.0	47.2	48.5	51.0	50.0	50.0	50.0	49.5	50.5
80	48.0	47.8	48.0	47.5	47.5	47.5	47.5	46.5	48.0	50.0	49.5	49.5	49.5	49.2	50.0
300	47.5	47.5	47.5	47.5	47.5	47.5	47.2	46.0	47.5	50.0	49.5	49.0	49.0	49.2	50.0
50	47.0	47.0	47.5	47.0	47.0	46.5	46.5	46.5	46.5	49.5	48.2	48.0	48.5	48.2	48.8
400	47.0	46.5	47.0	47.0	47.0	46.0	46.0	45.5	46.2	48.8	48.0	48.0	48.5	48.0	48.8
50	46.5	46.5	47.0	46.0	46.5	45.5	45.0	45.5	46.0	48.0	48.0	47.5	48.0	48.0	48.2
500	46.0	46.5	47.0	45.5	46.5	45.5	45.0	45.5	46.0	47.8	47.5	47.0	47.5	47.5	48.0
50	46.0	46.0	46.5	45.5	46.0	45.2	44.5	45.0	46.0	47.5	47.5	47.2	47.2	47.0	47.5
600	46.0	45.5	46.0	45.5	45.5	45.0	44.0	45.0	46.0	47.0	47.2	47.2	47.0	47.0	46.5
50	45.0	45.0	45.5	45.0	45.0	44.0	44.0	44.5	45.5	47.0	47.0	47.2	46.5	46.5	46.0
700	45.0		45.0	44.0		44.0	43.7	44.0	45.0	46.5	46.5	47.0	46.0	46.2	45.5
50	44.5		44.5	43.5		42.5	43.5		45.0	46.0	46.0	46.2	45.5	46.0	
800	44.5														

Appendix B (Continued)

Depth in feet	Station										
	31	32	33	34	35	36	37	38	39	40	41
						1962 (Continued)					
Surface	58.3	59.2	58.6	55.6	57.5	58.5	58.1	59.1	58.1	58.0	56.5
20	58.3	59.2	58.6	55.0	57.5	58.5	58.1	59.1	58.1	58.0	56.5
40	58.3	58.0	58.6	55.0	55.0	58.5	58.1	59.1	58.1	58.0	56.5
60	58.3	58.0	58.0	55.0	54.5	58.5	58.1	58.0	56.0	58.0	50.5
80	58.3	57.5	56.5	54.0	54.0	58.5	57.8	58.0	54.5	57.5	49.5
100	58.0	57.0	55.0	53.0	54.0	54.0	57.5	58.0	54.0	56.0	49.5
20	58.0	57.0	54.0	52.5	52.0	51.0	57.0	57.5	52.0	54.0	49.0
40	57.0	55.5	53.0	52.5	51.0	50.0	56.0	57.0	51.0	52.0	48.8
60	56.5	55.0	52.8	52.0	50.0	49.5	55.5	56.0	50.5	50.5	48.0
80	55.5	54.8	52.0	50.5	49.5	49.0	52.5	55.0	50.0	50.0	48.0
200	55.0	54.0	51.0	49.0	49.0	48.0	49.0	52.5	49.5	49.5	47.5
20	54.0	53.0	50.0	49.0	48.5	48.0	49.0	50.5	49.0	49.0	47.0
40	52.0	52.5	49.5	48.7	48.5	47.5	49.0	50.0	49.0	48.0	47.0
60	51.0	51.0	49.0	48.4	48.5	47.5	48.5	49.5	48.5	48.0	47.0
80	50.5	49.0	49.0	48.0	48.0	47.5	48.0	49.0	48.2	47.5	47.0
300	50.5	47.5	48.8	47.8	48.0	47.5	47.5	48.0	48.0	47.0	47.0
50	50.0	47.5	48.0	47.5	47.5	47.0	47.0	48.0	48.0	47.0	46.5
400	49.0	47.5	47.5	47.2	47.2	47.0	47.0	47.5	48.0	46.5	46.0
50	48.0	47.5	47.0	47.0	46.5	46.5	47.0	47.5	48.0	47.0	45.5
500	48.0	47.2	47.0	46.8	46.2	46.0	46.5	47.0	48.0	46.5	45.0
50	47.5	47.0	47.0	46.2	46.0	46.0	46.0	46.5	46.5	46.0	44.0
600	47.0	47.2	46.5	46.0	46.0	45.5	45.5	46.0	46.0	46.0	43.5
50	47.0	46.0	46.0	45.5	45.0	44.5	45.0	46.0	46.0	45.5	43.0
700	46.5	46.0	46.0	45.0	45.0	44.2	45.0	45.5	45.5	45.0	43.0
50	46.0	45.0			44.0	44.0			45.0		43.0
800											

Appendix B (Continued)

Depth in feet	Station														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
							1964								
Surface	59.6	60.8	61.3	60.6	60.5	58.8	59.6	58.6	58.9	58.8	59.7	60.2	60.7	61.1	60.6
20	58.0	58.0	59.5	57.0	58.0	58.5	58.0	58.6	58.9	58.0	59.7	60.2	60.0	59.0	59.0
40	55.0	57.0	57.5	56.0	57.5	57.5	57.5	58.0	58.0	57.0	59.7	59.0	59.0	58.0	58.5
60	51.0	57.0	55.0	54.0	57.0	53.5	56.5	57.0	56.0	55.0	57.5	58.5	58.0	57.0	58.0
80	49.0	54.0	52.0	52.0	56.0	52.0	54.0	53.0	53.0	53.0	57.0	58.5	58.0	56.0	57.5
100	48.0	52.5	50.0	50.5	55.0	49.0	51.5	51.0	52.0	52.5	55.0	58.0	58.0	54.5	56.5
20	47.0	50.0	48.5	49.0	54.0	48.5	49.5	49.0	51.5	51.5	51.2	55.0	56.5	54.0	52.0
40	46.8	49.0	47.5	48.0	53.0	48.0	48.5	48.0	50.0	49.5	51.0	54.0	56.0	52.0	51.0
60	46.2	48.0	47.5	47.5	52.0	48.0	48.5	48.5	50.0	49.0	49.5	53.0	53.0	51.0	50.0
80	46.2	47.0	47.5	47.0	50.0	48.0	48.0	48.5	49.0	48.5	49.2	52.0	52.0	51.0	50.0
200	46.0	46.5	47.5	47.0	49.0	47.8	47.8	48.0	49.0	48.0	49.0	50.5	50.0	50.0	50.0
20	46.0	46.2	47.0	47.0	48.5	47.5	47.5	47.5	48.5	48.0	48.5	50.0	49.5	49.5	49.0
40	46.0	46.2	47.0	47.0	48.0	47.5	47.5	47.0	48.5	48.0	48.5	49.0	49.0	49.0	49.0
60	46.0	46.2	46.5	46.5	47.5	47.5	47.4	47.0	48.5	48.0	48.0	48.5	48.8	49.0	49.0
80	46.2	46.2	46.5	46.5	47.0	47.5	47.0	47.0	48.2	47.8	47.5	48.0	48.5	49.0	48.5
300	46.0	46.2	46.5	46.5	47.0	47.5	47.0	47.0	48.0	47.5	47.2	48.0	48.5	49.0	48.0
50	46.2	46.2	46.2	46.5	46.8	46.5	46.0	46.5	47.5	47.2	47.0	47.5	48.5	49.0	47.5
400	46.2	46.2	46.0	46.0	46.8	46.0	46.0	46.0	47.0	47.5	46.5	47.5	48.5	48.5	47.5
50	46.0	45.5		46.0	46.0	46.0	45.5	45.5	46.0	48.0	46.2	47.0	48.0	48.0	47.0
500	45.8	45.5			46.0	46.0	45.5	46.0	45.5	48.0	47.0	46.8	48.0	48.0	46.8
50						45.5	45.5	45.5	45.0	47.5	46.5	46.5	47.5	47.5	46.0
600							45.5		45.0		46.8	46.2	46.0	47.2	46.0
50												46.0			
700															
50															
800															

Appendix B (Continued)

Depth in feet	Station														
	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
							1964 (Continued)								
Surface	60.2	57.3	56.4	54.4	55.9	58.2	60.3	62.2	61.5	60.0	57.7	62.0	62.0	62.0	62.7
20	60.0	57.3	56.4	54.0	55.5	58.2	60.0	62.2	61.5	60.0	56.0	55.0	58.0	58.0	61.0
40	59.5	56.0	56.4	52.0	54.0	58.0	60.0	62.2	60.0	60.0	56.0	52.0	56.0	57.0	58.0
60	59.0	49.0	55.0	50.0	53.0	57.5	59.8	59.0	56.0	55.0	50.0	49.0	54.0	54.0	57.0
80	59.0	49.0	50.5	49.5	53.5	56.0	59.8	56.0	55.0	54.0	47.0	48.5	52.0	51.0	55.0
100	57.0	48.0	50.0	49.0	53.5	50.0	59.8	54.5	53.5	52.0	47.0	48.5	50.0	49.0	53.0
20	53.0	48.0	49.0	48.5	48.5	49.0	57.5	53.5	51.0	50.0	46.8	48.5	48.0	48.5	50.0
40	51.0	49.0	48.0	48.0	48.5	48.0	51.0	52.0	50.0	49.0	46.8	48.0	48.0	48.0	49.0
60	50.0	49.5	47.5	48.0	48.2	47.5	50.0	51.0	49.5	48.0	47.8	47.5	47.0	47.5	48.0
80	49.0	49.5	47.0	48.0	48.2	47.0	49.0	49.5	49.0	47.0	46.5	47.0	47.0	47.5	48.0
200	49.0	48.8	47.0	48.0	47.8	47.0	48.0	48.5	49.0	47.0	47.0	47.0	47.0	47.5	47.5
20	48.5	48.2	47.0	47.5	47.5	47.0	47.5	48.5	48.5	47.0	47.0	46.8	47.0	47.5	47.0
40	48.0	48.2	47.0	47.0	47.5	47.0	47.0	48.5	48.2	47.0	47.0	46.8	46.8	47.0	47.0
60	48.0	47.5	47.0	46.7	47.2	47.0	47.0	48.0	48.0	47.0	47.0	46.8	46.8	47.0	46.5
80	48.0	47.5	46.5	46.5	47.0	47.0	47.0	47.5	48.0	47.0	46.5	46.5	46.8	47.0	46.5
300	48.0	47.0	46.5	46.2	47.0	47.0	47.0	47.5	48.0	47.0	46.2	46.5	46.8	46.5	46.5
50	47.5	46.5	46.5	45.5	46.5	46.5	47.0	47.2	48.0	47.0	46.2	46.2	46.5	46.5	46.2
400	47.5	46.0	46.0	45.2	46.2	46.2	47.0	47.0	48.0	46.5	46.0	46.0	46.0	46.0	46.0
50	47.5	46.0	45.5	45.0	46.0	46.0	46.5	46.5	46.0	46.5	45.8	46.0	45.5	46.0	46.0
500	47.0	45.5	45.2	45.0	45.5	46.0	46.5	46.2	45.8	46.0	45.5	45.5	45.0	46.0	46.0
50		45.2	45.0	45.0	45.0	45.5	46.0	46.0	45.5	45.5	45.0	45.2	45.0	46.0	45.5
600		45.0	44.5	45.0		45.5	46.0	46.0	45.5	45.5	45.0	45.0	44.8	45.5	45.0
50		49.5	44.0	44.5		45.5	45.5		45.0	45.0	44.2			45.5	45.0
700							45.0		45.0	45.0				45.0	
50										44.5					
800															

Appendix B (Continued)

Depth in feet	Station 31	32	33	34	35
	1964 (Continued)				
Surface	63.5	62.6	61.0	62.0	61.5
20	60.0	58.0	59.5	61.0	59.0
40	58.0	57.8	56.0	55.0	56.0
60	57.0	57.5	52.0	53.0	52.5
80	56.0	54.5	50.0	50.5	51.0
100	52.0	52.5	48.0	49.0	49.0
20	50.5	51.0	47.5	48.0	48.0
40	49.0	49.0	47.0	47.0	48.0
60	48.5	48.5	47.0	46.5	47.0
80	48.5	48.0	46.8	46.5	46.5
200	48.2	48.0	46.5	46.0	46.0
20	48.0	47.5	46.0	46.0	46.0
40	47.5	47.2	46.0	46.0	46.0
60	47.2	47.0	46.5	46.0	46.0
80	47.0	47.0	46.5	46.0	46.0
300	46.5	47.0	46.5	46.0	46.0
50	47.0	46.5	46.5	46.0	46.2
400	46.5	46.0	46.0	46.0	46.0
50	46.0	46.0	45.5	46.0	46.0
500	46.0	46.0	45.5	45.5	45.5
50	45.5	45.5	45.5	45.5	45.5
600	45.5	45.2	45.2	45.0	45.0
50	45.0				
700	44.5				
50					
800					

Appendix B (Continued)

Depth in feet	Station 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
							1965								
Surface	56.5	57.7	59.6	58.2	58.4	58.4	58.3	58.8	58.5	58.7	59.2	58.4	57.8	57.9	58.2
20	56.4	57.2	57.5	57.2	57.4	57.0	58.6	58.5	58.2	57.5	59.0	58.0	57.8	57.6	58.0
40	56.2	56.3	56.5	57.1	55.8	56.0	58.5	57.5	57.5	57.0	55.6	56.8	57.8	56.6	57.8
60	55.1	55.0	55.0	56.7	55.0	55.0	56.0	56.0	56.6	54.6	52.8	54.2	57.2	55.0	57.4
80	51.6	53.8	52.0	54.5	54.5	54.0	54.8	53.8	54.7	51.4	51.6	51.5	56.0	53.0	57.2
100	49.6	51.2	47.5	54.2	54.0	53.5	53.4	52.2	51.5	50.0	50.2	50.0	55.0	51.8	56.6
20	49.1	50.5	46.8	53.6	53.6		51.6	49.6	49.8	49.5	49.0	49.2	51.8	50.6	56.0
40	48.5	49.6	46.0	50.0	49.6		50.0	49.2	49.2	48.6	48.4	48.6	51.2	49.6	55.8
60	48.0	48.8	45.3	48.9	48.2		49.6	47.6	48.8	48.0	48.0	48.0	51.0	48.5	54.8
80	47.6	48.4	45.0	48.1	47.6		49.2	47.2	48.6	47.4	47.8	47.2	50.6	48.0	52.8
200	47.8	47.6	44.4	47.5	47.0		48.6	47.0	47.8	47.0	47.0	47.0	49.5	47.8	51.4
20	46.8	47.0	44.0	47.2	46.6		48.4	46.8	47.2	46.8	46.6	46.6	48.5	47.2	50.6
40	46.2	46.5	43.8	46.8	46.2		47.6	46.6	47.0	46.6	46.4	46.2	48.1	46.8	50.0
60	46.0	46.9	43.6	46.4	46.0		47.0	46.4	46.8	46.5	46.2	46.0	47.5	46.4	49.4
80	46.0	46.8	43.4	46.2	45.8		46.6	46.2	46.7	46.4	46.2	46.0	47.0	46.2	48.8
300	46.1	45.7	43.2	45.8	45.2		46.2	46.0	46.5	46.0	46.0	45.9	46.8	46.0	48.2
50	46.2	45.8		45.4	44.8		45.8	40.5	46.5	46.0	46.0	45.9	46.0	45.5	47.1
400	46.2	45.9		45.0	44.5		45.4	40.0	45.8	46.2	45.8	46.0	45.6	45.2	46.9
50		45.7		44.8	44.5		45.0	40.1	45.6	46.2	45.7	46.0	45.4	45.1	46.6
500		44.8		45.0	44.5		44.8	40.4		46.0		45.9	45.2	45.0	46.5
50		44.6			44.5										
600		44.6													
50		44.5													
700															
50															
800															

Appendix B (Continued)

Depth in feet	Station														
	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
							1965 (Continued)								
Surface	58.4	58.1	56.5	54.6	54.4	55.0	53.4	57.9	57.6	57.8	59.6	58.4	58.4	58.3	59.8
20	58.6	57.6	56.5	52.4	52.0	53.4	51.8	53.8	55.4	51.4	54.8	50.5	54.6	55.6	59.5
40	58.2	57.5	56.4	52.2	51.6	52.8	50.8	53.2	55.0	50.6	52.6	50.0	53.6	55.4	57.2
60	58.0	57.4	55.8	52.0	48.0	52.1	50.0	51.5	53.6	50.5	51.8	49.0	50.4	55.0	54.8
80	57.8	56.8	55.4	51.8	47.0	51.8	49.4	50.6	48.5	49.6	50.8	46.8	48.8	53.6	55.0
100	57.2	55.2	55.0	51.4	48.0	50.8	48.6	49.7	47.2	48.6	49.4	46.0	45.8	51.0	54.4
20	55.4	54.8	54.8	48.6	48.8	48.6	48.0	48.7	46.5	48.2	47.6	45.6	45.6	48.6	53.0
40	54.2	54.4	54.5	47.8	47.6	47.6	47.8	48.5	46.0	46.8	46.8	45.4	45.2	48.2	50.8
60	51.6	52.8	53.8	47.2	46.4	47.0	47.0	48.3	46.0	46.2	46.8	45.6	45.2	47.6	49.5
80	50.4	49.8	52.0	46.8	46.0	46.8	46.6	47.8	46.1	46.0	46.4	45.7	45.3	47.2	48.5
200	49.8	49.4	51.0	46.6	45.9	46.6	46.0	46.9	46.2	46.0	46.2	45.8	45.5	47.0	48.0
20	49.2	48.4	49.8	46.4	45.8	45.8	45.8	46.4	46.2	46.0	46.0	45.8	45.5	46.6	47.6
40	48.8		49.0	47.4	46.0	45.6	45.8	46.4	46.2	46.0	46.0	45.6	45.5	46.4	47.4
60	48.4		48.6	47.3	47.0	45.5	45.8	46.5	46.2	46.0	46.0	45.4	45.8	46.2	47.0
80	48.0		47.6	47.2	46.8	45.4	45.9	46.5	46.0	45.9	46.0	45.4	46.0	46.2	46.6
300	47.6		47.4	47.0	46.7	45.2	46.0	46.3	45.9	45.9	46.0	45.5	46.0	46.0	46.2
50	47.2		46.4	46.6	46.5	45.0	45.9	46.1	46.0	45.9	46.8	45.4	46.0	46.0	46.0
400	46.8		45.7	46.4	46.2	44.8	45.8	45.9	45.8	45.7	46.2	44.5	45.8	45.8	46.0
50	46.2		45.5	46.2	46.0	44.6	45.7	46.0	45.6	45.5	46.0	44.4	45.4	45.7	45.8
500				46.0	45.6	44.2	45.7	45.6	45.2	45.2	45.6	44.4			45.9
50											45.2				45.8
600															45.6
50															
700															
50															
800															

Appendix B (Continued)

Depth in feet	Station 31	32	33	34	35
	1965 (Continued)				
Surface	60.4	61.0	61.4	60.0	59.3
20	59.2	57.8	59.0	57.2	55.6
40	58.0	57.6	57.1	56.8	55.0
60	56.2	57.4	55.5	55.9	52.0
80	55.0	56.6	54.7	53.5	50.8
100	53.0	54.2	52.2	51.0	47.8
20	52.0	52.4	50.6	50.0	47.4
40	50.0	51.2	49.8	49.2	47.2
60	49.2	49.6	49.2	48.5	47.0
80	48.4	48.8	48.5	48.0	47.2
200	47.5	48.5	48.2	47.5	47.0
20	47.2	48.4	47.6	47.2	46.6
40	46.5	48.2	47.2	46.2	46.4
60	46.4	47.8	46.9	45.8	46.0
80	46.2	47.6	46.6	45.6	45.6
300	46.0	47.2	46.6	45.6	45.2
50	45.4	46.0	46.2	46.0	45.6
400	45.2	45.4	45.6	46.1	45.6
50	44.6	45.5	45.5	46.1	45.5
500	44.6	45.5	45.2	45.9	45.3
50	44.5	45.3	44.7	45.6	45.0
600	44.4		44.5	45.2	
50					
700					
50					
800					

Appendix B (Continued)

Depth in feet	Station														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
							1966								
Surface	59.0	59.2	59.2	58.6	58.6	58.4	59.0	59.2	60.2	60.4	60.0	59.6	59.2	59.8	57.4
20	58.1	58.0	58.7	58.5	58.0	57.8	58.5	58.2	59.5	59.9	59.6	59.0	58.3	57.7	53.7
40	56.7	54.8	57.7	58.0	57.6	56.9	58.5	57.7	59.4	59.7	58.9	58.1	57.6	54.0	53.6
60	53.7	52.7	54.8	55.5	56.3	55.1	58.1	55.4	58.6	59.5	58.0	55.9	56.2	53.0	53.4
80	51.9	52.4	53.6	53.2	52.4	52.8	54.4	54.5	54.5	58.3	57.0	53.8	54.7	53.0	49.6
100	50.1	50.0	52.3	51.7	50.9	50.7	52.6	52.9	53.3	54.0	54.5	51.2	52.6	53.7	49.1
20	48.9	48.8	50.9	50.6	50.6	49.3	51.6	51.8	52.6	53.0	51.8	50.0	50.7	51.5	48.6
40	47.6	48.6	49.8	49.9	49.6	48.3	50.7	50.5	51.0	52.5	51.0	49.5	48.1	49.0	47.7
60	46.7	47.9	49.0	48.9	48.6	47.8	49.7	49.7	49.7	51.2	50.0	49.5	47.6	47.7	47.4
80	46.1	47.2	47.8	48.1	47.6	47.0	48.6	49.5	48.7	49.6	48.8	48.1	47.2	46.9	46.7
200	45.9	46.9	47.0	47.8	47.0	46.6	47.9	48.7	48.1	48.6	48.3	47.2	47.1	46.5	46.2
20	45.7	46.7	46.8	47.1	46.6	46.5	47.5	48.1	47.6	48.0	47.8	47.0	46.6	46.2	46.2
40	45.6	46.7	46.6	47.0	46.2	46.5	47.2	47.6	47.2	47.5	47.6	46.9	46.3	46.1	46.0
60	45.7	46.7	46.0	46.9	45.7	46.6	46.7	46.7	46.9	47.0	47.3	46.6	46.2	46.1	46.0
80	45.7	46.6	46.5	46.9	45.2	46.6	46.6	46.6	46.6	46.7	47.2	46.5	46.2	46.1	46.9
300	45.7	66.5	46.1	46.8	44.9	46.7	46.7	46.6	46.6	46.7	47.0	46.1	45.9	46.1	46.9
50	45.7		46.0	46.4	45.3	46.5	46.8	46.6	46.6	46.3	47.0	45.2		44.9	45.6
400	45.7		46.0	46.2	45.7	46.5	46.7	46.5	46.3	46.5	47.3	45.2		44.8	45.3
50				45.9	45.8						46.8			44.7	45.0
500					45.6						46.2			44.6	
50															
600															
50															
700															
50															
800															

Appendix B (Continued)

Depth in feet	Station													
	16	17	18	19	20	21	22	23	24	25	26	27	28	29
							1966 (Continued)							
Surface	59.8	60.0	59.2	55.4	59.6	59.8	59.2	60.8	60.8	60.6	59.6	60.0	61.0	59.2
20	59.7	59.9	58.0	54.7	56.4	59.6	59.0	60.0	60.2	60.1	58.7	60.0	55.6	59.0
40	59.2	59.8	55.5	52.2	54.3	59.5	59.0	59.9	60.1	57.2	54.9	60.0	53.1	58.5
60	51.8	57.0	52.4	48.3	54.0	55.9	58.9	56.7	60.0	55.0	51.0	58.7	51.1	57.7
80	51.6	52.6	51.9	47.7	53.5	52.6	55.7	54.7	56.0	54.1	49.9	53.2	50.0	53.0
100	50.0	50.7	50.6	47.6	52.9	51.6	53.6	52.0	53.5	52.6	43.4	49.6	48.9	51.2
20	49.1	50.0	49.3	47.2	51.7	50.7	52.5	50.6	52.5	51.6	42.6	48.5	48.0	49.5
40	47.8	48.6	48.6	47.3	50.9	49.5	52.0	50.9	50.6	50.2	41.8	47.7	47.5	48.9
60	47.1	48.2	48.0	47.4	49.6	48.9	50.9	50.0	49.4	49.4	41.8	47.0	46.9	48.3
80	46.8	47.9	47.8	47.4	48.4	48.0	49.8	48.8	48.6	48.6	41.6	46.7	46.4	47.7
200	46.6	47.6	47.1	47.3	48.0	47.5	49.5	48.1	47.8	48.3	41.4	46.4	46.4	47.5
20	46.5	47.3	46.7	47.2	47.9	46.8	49.1	47.7	47.3	48.0	41.1	46.4	46.4	46.7
40	46.4	46.9	46.4	46.9	47.5	46.6	48.6	47.3	46.7	47.5	40.7	46.4	46.3	46.7
60	46.3	46.6	45.9	46.8	47.0	46.5	49.9	46.8	46.5	47.1	40.6	46.4	46.3	46.7
80	46.3	46.5	45.8	46.8	46.7	46.4	47.6	46.6	46.5	46.7	40.5	46.4	46.2	46.7
300	46.3	46.4	45.7	46.7	46.3	46.3	47.4	46.4	46.5	46.5	40.3	46.4	46.2	46.6
50	46.2	46.5	45.5	46.1	46.0	46.3	46.9	46.2	46.4	46.5	40.3	46.2	46.0	46.3
400	45.9	46.5		45.5	45.7	46.3	46.4	46.0	46.6	46.4	40.2	45.8	45.9	
50	45.7	46.4		45.0	45.6		46.1	45.8	45.7	45.6	39.7			
500				44.6	45.5				45.3					
50				44.3										
600														
50														
700														
50														
800														

Appendix B (Continued)

Depth in feet	Station														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
							1967								
Surface	58.8	59.6	61.2	62.8	60.4	61.3	61.6	61.6	61.8	61.6	60.8	60.8	60.5	60.0	59.5
20	57.0	59.0	56.5	60.0	59.5	59.5	59.5	57.5	59.5	59.5		60.8		60.0	59.5
40	54.5	57.0	55.0	57.5	56.5	57.0	58.0	55.5	55.0	58.5	60.8	59.5	60.5	59.0	58.0
60	53.5	55.0	52.5	56.0	54.5	55.0	55.5	54.0	54.0	56.5	57.5	58.0	58.0	58.5	57.0
80	51.5	53.5	51.0	55.0	51.5	53.0	54.0	52.5	52.5	54.0	53.5	55.5	57.0	57.0	56.0
100	50.5	52.0	50.5	52.0	49.5	51.5	52.0	51.5	51.5	53.0	52.5	53.0	54.0	55.0	55.5
20	49.0	51.5	50.0	50.5	49.0	50.5	51.5	51.0	50.5	51.5	52.0	52.0	52.5	54.0	54.5
40		50.5	49.5	50.0	48.5	50.5	51.0	50.5	50.0	50.5	51.0	51.0	51.0	53.0	54.0
60	48.5	50.0	49.0	49.5		50.0	50.5	50.0		50.0	50.5	51.0	51.0	51.5	52.5
80		49.5	48.5	49.0	48.0		50.0	49.5		49.5	50.0	50.5	50.5	51.0	51.5
200			48.0		47.5	49.5	49.5		49.5	49.0	49.0	50.0	50.0	50.5	50.5
20		49.0	48.0	48.0		49.0			49.0		48.5	50.0	49.5	50.0	50.0
40	48.0	48.5	47.5	47.5	47.0		49.0	49.0		48.5		49.0	49.5	49.5	50.0
60			47.5	48.0	47.0	48.5						49.0	49.0	49.0	49.0
80	47.5	48.0	47.0		46.5	48.0		49.0		48.0		48.5	49.0		
300			46.5				48.0	48.5	48.5	48.0	48.5	48.5	48.5	49.0	49.0
50	47.0	47.5	46.5	48.0		47.0	47.0	48.0	48.0	47.5	48.0	48.0	48.0	48.5	48.0
400	47.0		47.0	47.5		47.0		47.5	48.0		47.0	47.5	47.5	47.5	47.5
50	46.5	47.5	47.0		46.5			47.0	47.5	47.5			47.5	47.5	47.0
500				47.0	46.0	46.5	47.0	47.0	47.0	47.0		47.5	47.0	47.0	47.0
50				47.0	46.0	46.5	46.5	47.0	47.0	46.5	47.0	47.0	47.0	46.5	46.5
600									46.5	46.5	46.5			46.5	46.0
50															
700															

Appendix B (Continued)

Depth in feet	Station														
	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
							1967 (Continued)								
Surface	59.0	58.6	58.6	58.8	54.2	56.4	56.4	57.8	60.4	59.6	58.8	59.8	58.8	59.8	59.0
20			58.5		53.0	53.5	54.5	56.0	60.4	57.5	58.0	58.0	54.5	54.0	51.5
40	59.0		58.0	58.8	52.5	52.5	54.0	55.0	58.0	56.0	55.5	57.0	53.5	52.0	50.0
60	58.5	58.6	57.0	58.0	51.5	51.5	53.0	53.5	56.0	53.5	54.0	55.5	50.5	49.5	49.0
80	58.0	58.0	55.5	57.0	51.0	51.5	52.5	52.5	54.0	52.5	52.0	53.0	50.0	48.5	48.0
100	57.0	56.5	54.5	55.0		50.0	51.0	51.5	52.0	52.0	51.0	52.5	50.0	48.0	47.5
20	56.0	55.0	53.5	53.5	51.0	50.0	50.5	50.5	51.5	51.0	50.5	51.0	49.5	48.0	
40	54.5	53.5	52.5	52.5	50.5	49.5	50.0	50.0	51.0	50.5	50.0	50.0	49.0	47.5	
60	52.5	52.0	52.0	51.0	50.5		49.5	49.5	50.5	50.0	50.0	49.5			
80	51.5	51.0	51.0	50.5	50.0		49.5		50.5	49.5	49.0	49.0	49.0	47.5	
200	50.5	50.5	50.5	50.0			49.0	49.5	50.0	49.0	49.0	49.0	48.5	48.0	47.0
20	50.0	50.0	50.0				49.0	49.0	50.0	48.5	48.5	48.5	48.5		
40	49.5	50.0	49.5	50.0		49.5	48.5		49.5	48.0	48.0		48.0		
60	49.0	49.5	49.0	49.5		49.0		49.0	49.0	48.0	48.0	48.5			
80		49.0			50.0	49.0		48.5	49.0	47.5	47.5	48.0	48.0		
300	49.0	49.0	49.0	49.5	49.5	48.5	48.5	48.0	48.5				47.5	48.0	47.0
50	48.0	48.0	48.0	48.5	49.0	48.0	48.0		48.0			48.0	47.0	47.5	
400	47.5	47.5	48.0	47.5	47.5	48.0	47.5	48.0	47.5	47.5	47.5	47.5		47.0	46.5
50	47.0	47.0	47.5	47.0	47.0	47.5	47.0	47.5	47.5	47.0	47.0	47.0	46.5	47.0	46.0
500		47.0	47.5	47.0		47.0		47.0	47.0				46.5	46.5	
50	47.0	46.5	47.0	46.5	47.0	47.0	47.0	46.5		47.0	47.0	47.0	46.0	46.0	46.0
600	46.5	46.0	47.0	46.0	46.5	46.5	46.5	46.5	47.0	46.5	46.5	46.5	46.0	45.5	45.5
50	46.0	46.0	46.5	45.5	46.0							46.0		45.5	
					46.0										

Appendix B (Continued)

Depth in feet	Station 31	32	33	34	35	36	37	38
				1967 (Continued)				
Surface	62.2	66.0	63.4	64.5	62.2	63.6	64.4	62.0
20	57.0	59.0	60.0	61.5	59.5	62.0	57.0	57.0
40	55.0	56.5	57.5	60.0	58.0	58.0	54.0	55.5
60	52.0	54.5	54.5	56.0	55.0	56.0	53.0	52.0
80	51.0	52.5	53.0	53.5	53.5	52.0	52.0	51.0
100	50.5	50.5	51.5	51.0	52.5	51.0	51.0	50.5
20	50.0	50.0	50.5	50.5	51.0	50.5	50.5	50.0
40	49.5	49.0	50.0	50.0	50.5		50.0	
60	49.5	48.5	49.5		50.0	50.0	49.5	49.5
80	49.0	48.5	49.0		49.5	49.5	49.5	49.0
200		48.0	48.5	50.0	49.5		49.0	
20	49.0	48.0				49.0		48.5
40	48.5	47.5		49.5	49.0			48.0
60			48.5			48.5	48.5	
80	48.5	47.5	48.0					47.5
300	48.0	47.0		49.0	48.5	48.0	48.0	
50					48.0			47.0
400	48.0	47.0	48.0	48.5	47.5	47.5	47.5	47.0
50	47.5	46.5	47.5				47.0	
500	47.0	46.0	47.0		47.0	47.0	47.0	46.5
50	46.5	46.0	47.0	48.0	47.0		46.5	46.0
600	46.5	45.5	46.5			46.5		
50								
700								