March 18, 1958

John W. Reintjes, Fishery Research Biologist
Menhaden Investigations, Beaufort, N. C.

Chief, North Atlantic Fishery Investigations
Woods Hole, Mass.

Ms. "Survey of the ocean fishes off Delaware Bay - Supplemental Report for 1954"

In accordance with our telephone conversation of today, we are enclosing herewith six (6) copies of subject manuscript.

It is suggested that you submit this directly to Washington for publication when you feel it is ready.

Herbert W. Graham

Enclosure--1 (6)

Woods Hole Laboratory
Manuscript Report Number
54-13

ALL ILLUSTRATIONS (FIGURES) ARE MISSING

SURVEY OF THE OCEAN FISHERIES

OFF DELAWARE BAY - SUPPLEMENTAL REPORT FOR 1954

BY

JOHN W. REINTJES

TABLE OF CONTENTS

page

List of illustrations . . . . . .

List of tables. . . . . .

Introduction . . . . . .

Menhaden purse seine fishery . . . . . .

Otter trawl fishery . . . . . .

Surf clam fishery . . . . . .

Purse seine fishery for foodfish . . . . . .

Pot fishery . . . . . .

Pound net fishery . . . . . .

Drift gill net fishery. . . . . .

Trawl line fishery. . . . . .

Hand and troll line fishery . . . . . .

Sport fishery . . . . . .

Summary and conclusions . . . . . .

Literature cited . . . . . .

Appendices. . . . . .

LIST OF ILLUSTRATIONS

PAGE

FIGURE

1. Chart of area . . . . . .
2. Menhaden fishing grounds, 1954 . . . . . .
3. Menhaden landings, in monthly percentages, 1954 . . . .
4. Inshore otter trawl fishing grounds, 1954 . . . . . .
5. Inshore otter trawl landings, in monthly percentages, 1954 . . . . . .
6. Offshore otter trawl landings, in monthly percentages, 1953-1954. . . . . .
7. Surf clam fishing grounds, 1954 . . . . . .
8. Purse seine landings, in monthly percentages, 1954 . . .
9. Pot fishery landings, in monthly percentages, 1954 . . .
10. Hand and troll line landings, in monthly percentages, 1954. . . . . .

LIST OF TABLES

TABLE PAGE

1. Summary data, menhaden purse seine fishery, 1954 . . . . .
2. Species composition, inshore otter trawl landings, in thousands of pounds, 1954 . . . . . .
3. Species composition, offshore otter trawl landings, in thousands of pounds, 1954 . . . . . .
4. Minor species, otter trawl fishery, in percent, 1954 . . .
5. Summary data, inshore otter trawl fishery, 1954. . . . . .
6. Summary data, offshore otter trawl fishery, 1953-1954. . .
7. Summary data, surf clam fishery, 1954. . . . . .
8. Purse seine landings of foodfish, 1954 . . . . . .
9. Summary data, pot fishery, 1954. . . . . .
10. Species composition, pound net fishery, in percent, 1954 .
11. Drift gill net landings of mackerel, by months, in percent, 1954 . . . . . .
12. Species composition, hand and troll line fishery, 1954 . .
13. Summary data, Ocean City, Md. charter boat fishery, 1954 .
14. Species composition, Ocean City, Md. charter boat fishery, 1954. . . . . .
15. Summary data, Indian River, Del. ocean party boat fishery, 1954. . . . . .
16. Species composition, Indian River, Del. ocean party boat fishery, 1954. . . . . .
17. Summary data, southern New Jersey ocean party and charter boat fishery, 1954 . . . . . .

LIST OF TABLES (continued)

PAGE

TABLE

18. Species composition, southern New Jersey ocean party and charter boat fishery, 1954 . . . . . .

19. Catch per unit data, all New Jersey, party and charter boat fishery, 1954. . . . . .

INTRODUCTION

A survey of the ocean fisheries in the vicinity of Delaware Bay was begun in 1952. The collection, tabulation, and analysis of catch records, logbook data, and other pertinent information have been continued routinely. A report on the major and minor fisheries in the area with descriptions of the vessels, gear, methods of fishing, fishing grounds and seasons, and methods of analysis has been published (June and Reintjes, 1956). This earlier report also includes measurements of total production, apparent abundance, fishing effort, and geographical distribution of the various fishes concerned, within the survey area. The previous report presented a detailed historical analysis of the menhaden purse seine fishery from 1939-1953, the surf clam fishery from 1950-1953, and for all other fisheries from 1946-1953.

In this report little of the preceeding published material is repeated. However, for comparative purposes, an average value for the historical period covered, and the 1953 value is presented along with the 1954 value in the appropriate table. Although this method gives some perspective, it does not supersede the material presented in the original report. The historical and field data cover a relatively short period of time and any attempt to interpret the trends of the fisheries with less than all of the material presented in these reports would be hazardous indeed.

The geographical area considered includes the ocean waters of the Atlantic coast between Barnegat Lightship and Winter Quarter Lightship, seaward to the 100 fathom curve (see figure 1). The area marks the range of the fisheries operating out of southern New Jersey, Delaware, and Maryland ports.

The fisheries have been considered separately in this report. Estimates of the replacement value of the various fishing fleets and a list of common and scientific names of fish and shellfish mentioned in the report are in appendices.

ACKNOWLEDGEMENTS

The vast majority of the fishermen and other persons connected with the fishing industries of the area have made this report possible. Dock records, landing receipts, production and daybook accounts were made available by the industry. Logbooks and other personal records were kept and made available by the fishermen. Cooperation by these persons have been gratifying and to these the author extends his thanks.

The cooperation of the University of Delaware Marine Laboratory, in providing data respecting the sport and otter trawl fisheries of the state, is acknowledged. The New Jersey Division of Fish and Game furnished data on the sport fishery of that state. The Maryland Department of Research and Education provided detailed catch records of the commercial fisheries of Ocean City, Maryland.

Data on the menhaden purse seine fishery was prepared by Mr. Fred C. June, Menhaden Investigations, Fish and Wildlife Service.

Mr. Russell Soulen and Mr. Eugene A. Loverde, Market News Specialists, Branch of Commercial Fisheries, Fish and Wildlife Service, furnished certain detailed data which otherwise would have been unavailable.

MENHADEN PURSE SEINE FISHERY

The menhaden fishery continued to dominate the ocean fisheries of the area, producing 582 million pounds or 95 percent of the total landings, worth more than 7.5 million dollars or 67 percent of the total value received by the fishermen. Landings declined from the all time record of 620 million pounds in 1953 to establish the second highest landings for the area.

Summary data for the menhaden purse seine fishery is shown in table 1. Data for the 15-year period, 1939-1953 and for 1953 are included for comparison.

Little change in fleet size was noted, with only one less vessel in the regular fleet during the year. A slight decrease in mean length and mean gross tonnage indicated a trend to all steel vessels with greater speed and range.

No change in methods or other significant features of the fishery. In 1954 all vessels (except the New England otter trawlers converted to menhaden purse seining) were equipped with pumps for bailing the catch from the net. This improvement was introduced during the 1953 season, however.

Table 1.—Summary data, menhaden purse seine fishery

Year	Total Number of Vessels Fishing	Mean Registered Length in Feet	Mean Gross Tonnage	Number of Vessels in Select Fleet	Percent of Total Used in Analysis	Total Catch in Tons	Catch by Vessels in Select Fleet in Tons	Percent of Total Catch Landed by Select Fleet	Total Tons Landed Outside Season	Percent Landed Outside Season	Tons per Boat/week	Calculated Fishing Effort
Average												
1939-1953	25.3	118.0	178.8	22.3	86.7	132,526	113,382	83.8	5012	3.5	297	442
1953	33	123.5	194.8	25	75.8	311,369	231,678	74.4	26,784	8.6	434	717
1954	32	121.7	186.9	29	90.6	290,799	269,227	92.6	34,679	11.9	413	704

Fishing Grounds

The grounds of greatest importance in 1954 were those off Barnegat Inlet and between Little Egg Inlet and Fenwick Island as shown in figure 2. Shaded areas (>4.0 percent) include 49.4 percent; cross-hatched areas (2.0 - 3.9 percent) include 32.9 percent of the total effort; of the remainder, 10.2 percent of the effort was distributed among the lightly stippled area and 7.5 percent from outside of the survey area, mostly to the north along the northern New Jersey and Long Island coasts. Offshore grounds and areas south of Ocean City, Maryland were again of little importance. The waters of Delaware Bay received 3.8 percent of the effort, an increase over the 1.6 percent in 1953, but well below the 10.6 percent expended during 1952. The effort data used to establish the fishing grounds were obtained from logbook records for over 62 percent of the landings in 1954.

Catch

Menhaden landings declined from the record breaking production during 1953 of 311,369 tons to 290,799 tons during 1954. As shown in table 1, landings amounted to more than twice the 15-year average to mark the second highest year on record.

The fishing season was defined, on the basis of catch records, to extend from June 1 through October 4. During the 15-year period, the amount landed outside this period averaged 3.5 percent, including the 1953 extra-seasonal landings of 8.6 percent. Fishing commenced earlier and continued later than during any recent year, accounted for 11.9 percent of the total landings from outside the period defined above.

Menhaden landings in monthly percentages for 1954 (see figure 3) show the change in length of season with sizeable percentages in May and October, months usually contributing little to the annual production. The decline in August was due to unseasonable weather, the effect of tropical cyclones, in part responsible for the decline in total landings and fishing effort.

The decrease in catch per unit of effort reflects the decline in abundance or availability of the fish on the grounds. This decline was not wholly responsible, however, for the change in total production as shown by the slight but similar decrease in fishing effort.

In general, the indices used in this report provide a measure of the broad changes occurring in the fishery and with certain limitations may be considered proportional to the abundance of fish on the grounds.

Figure 3. Menhaden landings, in monthly percentages, 1954.

OTTER TRAWL FISHERY

The principal ocean fishery for foodfish in the area is conducted by two resident fleets using the otter trawl. Landings from these vessels amounted to more than 20 million pounds or 65 percent of the annual foodfish production for the survey area.

In general, the inshore fleet is composed of small vessels fishing the grounds inshore of the 15 fathom contour, returning to port on the same day as departure. The offshore fleet, on the other hand, is made up of medium trawlers fishing in waters beyond the 15 fathom curve and remaining on the grounds from two to six days. As substantial differences in fishing seasons and grounds, catch, and methods of analysis exist between the two fleets, data are presented separately to permit a more critical understanding of the fishery.

Fishing Grounds

The grounds fished by the inshore trawl fleet during 1954 are shown in figure 4. No appreciable change in the fishing grounds has occurred during the past three years. The highly productive grounds just off the mouth of the Delaware Bay received more than 54 percent of the fishing effort.

The offshore fleet continued to fish over a wide range of depths and localities. In general, the resident offshore fleet and other vessels landing their catch in southern New England and Virginia ports, fished extensively over the entire continental shelf. Only partial records of fishing activity were obtained from 4 of the 20 resident trawlers. As these records were not considered sufficient to show unit area fishing effort, no figure for this fishery is presented in this report. No appreciable change occurred in the offshore fishing grounds during the past three years according to logbook and interview data.

Catch

The otter trawl landings for 1954 amounted to nearly 21 million pounds, slightly more than the 1953 production of over 20 million pounds. Inshore landings increased slightly over 1953, however, little change occurred in the landings for the offshore fleet.

Species compositions for the inshore and offshore fleets are shown in tables 2 and 3. Fluke, porgy, and weakfish accounted for 71 percent of the inshore landings. Porgy, sea bass, and fluke comprised 65 percent of the offshore catch. The principal changes occurring in the inshore species composition during 1954 are shown in table 2. Fluke and weakfish declined in importance, while whiting and croaker showed significant gains. Less noticeable changes occurred in the offshore fishery (table 3) as fluke, butterfish, and lobster continued to become more important, and sea bass and squid catches declined. Porgy continued to dominate the catch, comprising nearly half of the total production. Table 4 lists the minor species contributing to the inshore and offshore landings. Composition changes from year to year but shows little cumulative effect upon the fishery.

Table 2.—Species composition, inshore otter trawl landings, in thousands of pounds, 1954

	Average 1946-1953	1953	1954
Fluke	2228	4197	3683
Porgy	1774	1081	1725
Weakfish	1820	1960	1414
Whiting	1082	317	1078
Croaker	314	345	693
Sea bass	243	67	130
Red hake	340	17	109
Butterfish	190	168	235
All others	530	226	495

Table 3.—Species composition, offshore otter trawl landings, in thousands of pounds, 1954.

	Average 1946-1953	1953	1954
Porgy	3968	6036	5586
Sea bass	2121	1853	1349
Fluke	1563	2331	2661
Butterfish	343	606	913
Squid	251	210	107
All others	608	617	427

The seasonal activities of the two fleets are shown by monthly percentages in figures 5 and 6. There have been no major changes in the basic seasonal character of the operations of the two fleets. Figure 5 illustrates the seasonal changes in monthly percentages for the inshore fleet and shows a marked similarity to the average monthly percentages for the period 1946-1953. More than 80 percent of the landings from May through November were comprised of fluke, porgy, and weakfish. Whiting were abundant on the grounds during the winter months comprising more than 70 percent of the combined January and December landings. Market demand for this species remained poor throughout the season and landing dock operators imposed limits curtailing production. The seasonal abundance of the sciaenids or croakers, including weakfish, croakers, and spot were mainly responsible for the increased monthly percentage rise during September.

Throughout the year, whelks or conchs are taken by the inshore otter trawlers. The species is taken incidental to the fluke fishery comprising less than 1 percent of the annual landings. During the past few years conchs have been of some importance to the inshore fleet during June, July, and August. Some vessels have modified the trawl foot rope and have changed fishing grounds and methods so as to increase their catch of this species. Conchs have comprised 50 percent or more of the catch for occasional landings.

The offshore fleet landings in monthly percentages show a decline for December, January, and February (see figure 6) which did not occur in the average monthly percentages for the period 1946-1953. A species analysis shows that the decline was due to a decreased production of fluke and sea bass during these months.

Figure 5. Inshore otter trawl landings, in monthly percentages, 1954.

Figure 6. Offshore otter trawl Landings, in monthly percentages, 1953-1954.

Summary data for the inshore otter trawl fleet (table 5) shows that relatively little change in total fleet or select fleet size has occurred in the past few years. The winter occurrence of whiting was principally responsible for the larger percentage of landings outside of the season. The catch per unit of effort (average catch per boat month adjusted to 1949 as the base year) of 15,712 pounds dropped sharply from the 1953 index of 20,146 pounds. The decrease in catch per unit of effort and slight increase in total production was reflected by a pronounced increase in the index for fishing effort from 416 in 1953 to 576 in 1954. The index for fishing effort is directly effected by the catches made outside of the season and by vessels not in the select fleet. On the other hand, the catch per unit of effort is a measure of abundance within the season and measure by regular vessels landing a minimum of times during the same months in two successive years.

The summary data for the offshore otter trawl fishery is presented in table 6 along with comparative values for the preceding season, 1952-1953 and the 7-year average since 1946. Production and fishing effort continue the upward trend that has prevailed during the past three seasons. Catch per unit of effort expressed as catch per boat per month (adjusted to 1949-1950 season as the base year) has fluctuated around 65,000 pounds during the period covered. In general, no changes of importance have occurred in the offshore otter trawl fishery. Table 6 also shows that only one fourth of the vessels landing one or more times are used in the select fleet analysis, however, these contributed nearly two thirds of the fish landed.

Table 4.—Minor species, otter trawl fishery, in percent, 1954

Inshore		Offshore	
Species	Percent	Species	Percent
Spot	1.3	Whiting	0.9
Cod	0.8	Weakfish	0.7
King whiting	0.7	Tilefish	0.5
Squid	0.7	Croaker	0.2
Conch	0.6	Conger eel	0.2
Shark	0.3	White hake	0.2
Striped bass	0.3	Bluefish	0.2
Black drum	0.2	King whiting	0.1
White perch	0.2	Red hake	0.1
Sturgeon	0.2	Gray sole	0.1
Misc.	0.4	Misc.	0.5

Table 5.—Summary data, inshore otter trawl fishery, 1954

Year	Estimated Total No. of Vessels	No. of Vessels in Select Fleet	Percent of Total Used in Analysis	Estimated Total Catch in Pounds	Catch in Pounds of Select Fleet	Percent of Total Landed by S. Fleet	Total Pounds Landed Outside Season	Percent Landed Outside Season	Average Catch per Boat Month	Calculated Fishing Effort
Average										
1946-1953	76	49.4	65.0	8,476,000	4,545,000	53.6	1,431,000	16.9	16,611	509.7
1953	66	45	68.2	8,373,000	5,846,000	69.8	942,000	11.2	20,146	415.9
1954	68	40	58.8	9,250,000	4,283,000	46.3	1,739,000	18.8	15,712	576.0

Table 6.--Summary data, offshore otter trawl fishery, 1953-1954

Season	Estimated Total No. of Vessels	No. of Vessels in Select Fleet	Percent of Total Used in Analysis	Estimated Total Catch in Pounds	Catch in Pounds of Select Fleet	Percent of Total Landed by S. Fleet	Total Pounds Landed Outside Season	Percent Landed Outside Season	Average Catch per Boat Month	Calculated Fishing Effort
Average										
1946- 1953	53.6	12.6	23.1	8,863,000	4,762,000	53.7	595,000	6.7	60,806	148.5
1952-1953	64	17	26.6	10,115,000	6,643,000	65.7	707,000	7.0	59,776	169.2
1953-1954	66	16	24.2	11,600,000	7,449,000	64.2	819,000	7.2	66,106	175.5

The increased total catch during the 1953-1954 season appears to be caused by an increased abundance of fish on the grounds and by an increase in total fishing effort. The steady increase in total production during the past eight seasons appears to be due, primarily, to increased fishing effort and not to any pronounced change in the abundance or availability of the principal species.

Lobster Fishery

A fishery for northern lobster exists from May through August when vessels of the offshore fleet trawl along the edge of the continental shelf in 80 - 120 fathoms. Until 1950, lobster landed by the otter trawl fleet were taken incidental to the fishery for finfish. Since then certain vessels of the fleet have trawled exclusively for this species.

During the summer of 1954, an average monthly production of nearly 60,000 pounds was maintained by a small fleet of 5 or 6 vessels. More than 126,000 pounds were landed during July in southern New Jersey ports. During August production declined when poor market demand and the occurrence of soft or shedding lobsters in the catch ended the season.

Increased production has been caused by an increasing number of vessels entering the fishery. No change in fishing gear or methods has occurred.

Scallop Fishery

Landings of sea scallop meats in southern New Jersey ports amounted to 127,000 pounds during 1954, less than half the 1953 catch of 293,000 pounds. Three vessels landed 95 percent of the catch during the period from June through October. Interviews with fishing captains concerning the trip length and total catch indicated that the decline in landings is due to a decrease in fishing effort and does not reflect a change in scallop abundance on the grounds. During 1954, no change in fishing gear or methods occurred.

SURF CLAM FISHERY

The surf clam fishery has continued to expand since the autumn of 1949 when a processing plant was established in southern New Jersey. Prior to that, moderate landings averaging 30,000 bushels annually, were used for bait in the sport and commercial hand line fisheries during the summer and the trawl line fishery during the winter. During 1954, 815,000 bushels were landed representing 9.8 million pounds of meats, worth more than 1 million dollars to the fishermen.

During the first two years of the fishery, the principal vessels employed were the small inshore otter trawlers converted to hydraulic clam dredging. Since the initial conversion, expansion has been due to the modification of larger vessels from the finfish, oyster, and shrimp fisheries of the Atlantic and Gulf coasts and from non-fishing coastal vessels. In addition to a more stable fleet of larger vessels especially modified for the fishery, improvements in dredges, hoses, pumps, engines, and other equipment have increased the reliability of the fleet and fishing efficiency.

Summary data presented in table 7 shows the growth of the fishery in terms of average fleet size and annual production for the 4-year period 1950-1953, and in actual numbers for 1953 and 1954.

Table 7.--Summary data, surf clam fishery, 1954

Year	Total No. of Vessels	No. of Vessels in Select Fleet	Percent of Total Used in Analysis	Total Catch in Bushels	Catch in Bushels of Select Fleet	Percent of Total Landed by Select Fleet	Average Catch per Boat Month	Calculated Fishing Effort
Average								
1950-1953	42.5	28.8	51.7	532,976	293,505	52.9	1009	540
1953	68	33	48.5	642,005	351,775	54.8	883	728
1954	70	33	47.1	817,626	428,371	52.4	875	934

During the past two years, the plant has been inoperative for a period of 6 weeks to two months for annual overhaul and maintenance. Some vessels converted to otter trawling, the majority use the time to undergo overhaul and general repair, however.

The index of catch per unit of effort in catch per boat per month has declined steadily since the beginning of the fishery. To some extent the decline during the past three years may be due to the daily boat limit. The index gives a rough measure of the abundance of clams on the grounds in spite of the effect of the limit. Conversely, fishing effort has increased steadily in order to account for an increase in total production for each successive year.

PURSE SEINE FISHERY FOR FOODFISH

A small resident fleet of purse seine vessels fished for foodfish in the area. In 1954, 2.6 million pounds of foodfish were landed in southern New Jersey ports by three vessels. From figure 8 it may be seen that fishing commenced in May and continued through October. July was the month of peak production. Species composition in pounds and percent is shown in table 8. Total production during 1954 was greater than the 7-year average by approximately 250,000 pounds, but below the 1953 production by 350,000 pounds, a decrease of less than 12 percent. The bulk of this decline occurred in the landings of porgy. Weakfish landings doubled over the preceding year and croaker disappeared entirely from the catch. These changes marked differences between two adjacent years but did not differ appreciably from the 7-year average.

Fishing grounds for the purse seine fleet were the shallow coastal waters along New Jersey from Barnegat Inlet to Cape May, within the 10 fathom contour, including the shoaling grounds of Five Fathom Bank.

No purse seine fishery for mackerel occurred in the area during the year.

No apparent change from previous years occurred in fishing methods, season, or grounds during 1954.

Figure 8. Purse seine landings, in monthly percentages, 1954

Table 8.—Purse seine landings of foodfish, 1954

Year	Porgy	Weakfish	Bluefish	Croaker	All others	Total
Average						
1947-1953	1,943,500	254,500	18,800	7,200	10,800	2,234,800
1953	2,719,300	120,800	22,500	50,300	22,100	2,935,000
1954	2,281,600	255,700	33,400	200	19,100	2,590,000

POT FISHERY

During 1954, the pot fishery produced 1.7 million pounds of fish, 97 percent of which were sea bass. Summary data is presented in table 9, including average values for the period 1946-1953 and for 1953 for comparative purposes.

The total number of pots fished remained below 10,000 from 1949 through 1953, a marked expansion occurred in 1954 when more than 12,000 pots were fished, however.

The total catch during the 1952 and 1953 seasons exceeded 2 million pounds, although there was little increase in the number of pots fished. This increased abundance or availability of fish on the grounds was reflected in the catch per unit of effort index of more than 200. In 1954, the catch fell to 1.7 million pounds in spite of the increased fishing effort of more than 2700 pots. The effect of the added effort and decreased catch is shown in the lowest catch per unit of effort index in five years.

Summary data for the fishery is shown in table 9. It can be seen that the total landings within the survey area, a measure of of yield, decreased in spite of the fact that the fishing effort, expressed in terms of number of pots fishing, increased. This decline in calculated index gives some measure of that change in relation to changes occurring during past years.

Sea bass comprised 97.5 percent of the catch (see table 9) and he principal species represented in the "all others" are tautog, t hake, conger eel, and northern lobster.

Pot fishery landings in monthly percentages are shown in figure 9.

No change in the species composition, gear, method of fishing or fishing grounds were apparent during the year.

Table 9.—Summary data, pot fishery, 1954

Year	Estimated total catch in pounds	Percent sea bass	Percent all others	Number of pots fished	Catch per pot per season in lbs.
Average 1946-1953	1, 573,000	96.1	3.9	9664	163.4
1953	2, 041,000	98.1	1.9	9613	212.4
1954	1, 658,000	97.5	2.5	12,369	139.7

Figure 9. Pot fishery landings, in monthly percentages, 1954

POUND NET FISHERY

The pound net fishery continued to decline during 1954 with only two companies remaining in operation off Sea Isle City, N. J. Nets were operated from April through November and 554,000 pounds were landed. Species composition, in percent, is given in table 10. All others included black drum, bluefish, bonito, croaker, flounders, little tuna, porgy, sea bass, shad, spot, and whiting. The only changes in composition from the 1949-1953 average worth noting are an increase of weakfish and a decrease of menhaden. Landings for the fishery fell below the 5-year average of 1.1 million pounds, however, considerably less than half as many nets were operated. High costs of operation and the occurrence of less valuable species of fish have depressed fishing activities to the point of extinction within the survey area.

Table 10.--Species composition, pound net fishery, in percent, 1954

Species	Percent
Weakfish	55.8
Butterfish	21.8
Squid	6.5
Mackerel	2.2
Menhaden	2.0
Sea turtle	1.9
Sea herring	1.8
Sea robin	1.3
King whiting	1.5
All others	4.8

DRIFT GILL NET FISHERY

The drift gill net fishery depends upon mid-winter and spring runs of mackerel as they migrate along the coastal shelf. The occurrence and abundance of mackerel within the survey area has shown marked fluctuations during the past 30 years. The past few years have been relatively unproductive. The drift gill net landings of 312,000 pounds showed a slight increase over the 246,000 pounds landed in 1953, but were well below the 8-year average of 1 million pounds. Mackerel comprised 93.1 percent of the landings while all other species, principally menhaden, whiting, bluefish, sea herring, and mackerel shark, made up the remainder of the catch. The landings of menhaden and sea herring are not representative of the catch of these species. Interviews with the fishermen showed that a very small portion of the catch of these species were landed due to little or no market demand.

Prior to 1950, the bulk of the catch occurred during April and May, since then, the principal landings occurred December through February, however. Table 11 shows the distribution of catch by months in percent for 1954, indicating a return of the spring runs.

Except for more and more nylon netting being used in the fishery, no apparent change in fishing methods or grounds has occurred.

Table 11.--Drift gill net landings of mackerel, by months, in percent, 1954

Month	Percent
January	40.6
February	0
March	2.8
April	42.4
May	13.2

November	0.1
December	0.9

TRAWL LINE FISHERY

The trawl line fishery, principally for cod, is pursued during the winter months and the annual landings reflect the abundance of fish during two successive winters. Landings during 1953 amounted to less than 10,000 pounds, the results of two successively poor years. Although the total landings during 1954 amounted to less than 28,000 pounds, more than 80 percent were landed during December indicating a marked increased abundance of fish on the grounds during the winter of 1954-1955. The total landings did not reflect this abundance for several reasons; 1. several poor seasons cause the fishermen to turn to other fisheries for their livelihood, 2. poor market demand reflected by low prices, and 3. high operating costs of equipment and bait.

The percentage species composition for the year was 94.7 percent cod, 3.6 percent whiting, and 1.7 percent red hake. Landings in monthly percentages were as follows; January 4.5 percent, February 6.7 percent, March 7.5 percent, and December 81.3 percent.

Fishing grounds and species composition showed little change from preceding seasons.

HAND AND TROLL LINE FISHERY

Commercial hand and troll line fishing from small skiffs and power boats contributes little to the annual foodfish production within the survey area. During 1954, the estimated total production amounted to 160,000 pounds. The hand line catch continued to decline from 41,900 pounds reported in 1953 to 20,200 pounds in 1954. The average annual landings for the period 1946-1953 were 69,000 pounds. The bulk of these landings were made by casual and part-time fishermen regularly employed in some other fishery or by sports fishermen with catches exceeding their personal wants.

Trolling catches during 1954 amounted to 139,000 pounds, as compared with 127,700 pounds for 1953 and 97,000 pounds for the 8-year average, 1946-1953.

Species composition for the hand and troll line fishery for the year are shown in table 12. Weakfish represented nearly half of the hand line catch and bluefish the bulk of the troll line catch.

The landings in monthly percentages for the two fisheries combined are presented in figure 12.

No change in the fishing gear, methods, or grounds occurred during the year.

Table 12.--Species composition, hand and troll line fishery, 1954

Hand line		Troll line	
Species	Percent	Species	Percent
Weakfish	49.8	Bluefish	88.9
Fluke	18.3	Bonito	9.9
Swellfish	14.5	Little tuna	0.9
Porgy	9.7	Bluefin tuna	0.3
Sea bass	2.6	Dolphin	< 0.1
Black drum	2.1	Mackerel	< 0.1
Striped bass	1.1		
Tautog	0.5		
All others	1.4		

Figure 10. Hand and troll line landings, in monthly percentages, 1954

SPORT FISHERY

The recreational or sport fishery represented an important portion of the fishing activity within the survey area. An annual estimated production of 4 million pounds of fish were landed by the party and charter boat fleets.

The bulk of the ocean sport fishing fleet is comprised of party, charter, and private boats. Few if any rowboats venture out of the bays and inland tidal waters. Surf fishing occurs on all the open beaches, from data collected during previous surveys, contributes little to the total catch, however.

The surveys were confined to charter and party boats for hire and no adequate methods were developed to estimate the catch or effort of private boats. Alperin (1955) estimated 27 percent of the sport fishing man hours in the New York Marine District were expended from private boats, as compared with 35 percent from open (party) and charter boats combined. It was not apparent that private boat fishing within the survey area amounted to 75 percent of the charter and party boat activities, as estimated in the New York Marine District. However, to increase the sport fishing production to 7 million pounds, to include private fishing, is well within reason.

In general, the party and charter boats available for hire showed little change in total numbers throughout the area, although small changes in fleet size occurred in certain ports.

The information pertinent to the Ocean City, Maryland fishery was collected by the author. Data concerning New Jersey and Delaware sport fisheries were obtained from the state agencies conducting the survey under the auspices of the Dingell-Johnson Act.

No noticeable change in fishing grounds or methods occurred during the year.

Due to differences in methods of compilation and analysis, the fishery within each state is treated separately.

Ocean City, Maryland

The ocean sport fishing fleet of Ocean City, Maryland is composed of three head or party boats, and 45 regular charter boats. These boats operate in the inshore and offshore waters from May to October, with occasional trips outside the season. Party boats fish on shoals near wrecks and catch, principally, sea bass and porgy. No records were available from these boats.

The charter boat fleet is engaged in three diverse fisheries during the season; 1. handline fishery for porgy, sea bass, and weakfish inshore near shoals and wrecks, 2. troll line fishery for bluefish and other small pelagic species from 2 to 20 miles offshore, and, 3. troll line fishery for white marlin from nearshore to more than 50 miles offshore. Often trolling for white marlin and bluefish will be conducted during the same trip, usually after several hours of unsuccessful fishing for the former species.

Summary data for the charter boat fishery is presented in table 13. The number of boats has increased during the past three years, other than that relatively little change has occurred in the fishery. The average number of hours per trip increased and the number of pounds per trip decreased indicating a decline in fish availability or fishing success during 1954.

Species composition by numbers and weight are given for the fishery. Bluefish and white marlin dominated the fishery during the year.

The area fished by the fleet extends from Fenwick Island light to Winter Quarter Lightship along the coast and to a distance of 50 miles offshore in a southeasterly direction from Ocean City Inlet. Trips seeking white marlin are going farther offshore as vessels with improved cruising speed and range enter the fishery.

Table 13.—Summary data, Ocean City charter boat fishery, 1954

Number of boats	45
Estimated total number of trips	2818
Average number of hours per trip (hours actually fishing)	5.4
Average number of fishermen per trip	4.7
Estimated total catch in pounds	414,000
Number of pounds per trip	147
Pounds per fisherman	31.3
Pounds per fisherman per hour	5.8

Delaware

Ocean sport fishing fleets in Delaware are located at Indian River and Lewes. Summary data respecting the Indian River party boat fishery is presented in table 14. No data were available pertaining to the Lewes fleet during 1954.

The size of the fleet decreased from 101 in 1953 to 92 boats in 1954. Fewer trips were made, the estimated number of fishermen increased slightly due to a revised estimate in the average number of fishermen per trip. The total number of fish caught and the number of fish per man hour declined. Using average weights obtained during the survey of the Ocean City, Md. charter boat fishery, the estimated total production for the Indian River party boat fleet is 1.5 million pounds, with 3.5 pounds of fish per man hour. This value is lower than the 5.8 pounds calculated for the Ocean City, Md. fishery. This difference may be caused by the difference in average number of hours spent fishing per trip (10.3 hours for Indian River party boats and 5.4 hours for Ocean City charter boats). No direct comparison can be made between the two fleets from these data. Fishing methods, grounds, and species taken are substantially different.

Species composition in percent of catch by numbers is shown in table 15.

No change in the fishing grounds used by the Indian River party boat fleet have occurred.

No survey of the surf fishery was conducted during the year.

Table 14.--Species composition, Ocean City, Maryland charter boat fishery, 1954

Species	Percent of catch by numbers	Percent of catch by weight	Average weight
Bluefish	66.3	74.8	4.0
Bonito	2.1	2.4	4.0
Dolphin	0.7	0.8	4.5
Little tuna	0.6	0.8	5.0
Porgy	21.5	4.9	0.8
Sea bass	5.2	1.5	1.0
Weakfish	1.2	0.3	1.0
White marlin	0.9	13.9	55.9
All others	1.5	0.6	---

Table 15.--Summary data, Indian River, Delaware ocean party boat fishery, 1954

Number of party boats	92
Number of trips	5,272
Number of fishermen	41,080
Average number of fishermen per trip	7.8
Man hours fished	424,000
Number of fish caught	1,379,500
Fish per man hour	3.3

Southern New Jersey

An inventory of the New Jersey salt water sport fishery was continued through 1954 by the New Jersey Division of Fish and Game. Data pertaining to the survey area from New Gretna, near Atlantic City, to Cape May Point was obtained from that agency.

The principal charter and party boat fleets of southern New Jersey are located at Atlantic City, Wildwood, and Cape May.

Summary data are presented in table 16. In general, little change occurred within the southern New Jersey ocean sport fishery since 1953.

Species composition in percent of numbers of fish is given in table 17. Catch per unit data for each of the principal species was not available for 1954. Table 18 gives some measure for all species combined. As no estimate of the number of hours fished is available, no catch per man hour can be calculated.

No data on the ocean surf fishery are available for 1954.

Table 16.--Species composition, Indian River, Delaware ocean party boat fishery, 1954.

Species	Percent of catch by numbers
Sea Bass	46.9
Croaker	23.0
Porgy	21.2
Bluefish	6.0
All others	2.9

Table 17.--Summary data, southern New Jersey ocean party and charter boat fishery, 1954

	Party	Charter
Number of boats	80	16
Average number of fishermen per trip. . .	16.3	4.3
Number of fishermen interviewed	897	108
Number of fish caught	14,812	1044
Number of fish per man.	16.5	9.7

Table 18.--Species composition, southern New Jersey ocean party and charter boat fishery, 1954

Species	Party Numbers of fish	Percent	Charter Numbers of fish	Percent
Bluefish			785	71.0
Bonito			144	13.0
Porgy	10,041	67.8		
Sea bass	2,709	18.3	73	6.6
Tautog	160	1.1	21	1.9
Red hake	560	3.8	62	5.6
Fluke	375	2.5	18	1.6
Weakfish	951	6.4	1	0.1
All others	16	0.1	2	0.2

Table 19.--Catch per unit data, all New Jersey, party and charter boat fishery, 1954

Month	Party: Number of fish per man all species combined	Charter: Number of fish per man all species combined
April	---	19.2
May	8.5	13.5
June	12.8	18.7
July	6.5	10.2
August	7.8	8.1
September	5.4	21.7

LITERATURE CITED

Alperin, Irwin M.

1956. Marine sport fishery statistics program in New York. Ann. Rept. Atlantic States Marine Fish. Comm., Middle Atlantic Sec., 1 p. (mimeo.).

Daiber, Franklin C.

1954. Marine sports fishing investigations. Ann. Rept. Fiscal 1954 (Dingell-Johnson Proj.) Marine Lab., U. of Del., 15 pp. (mimeo.).

1955.

June, Fred C.

1956. Condition of the middle Atlantic pound net fishery. U. S. Fish and Wildlife Service, Comm. Fish. Rev., vol. 18, No. 4, 1-5.

June, Fred C. and John W. Reintjes

1956. MS in press. A survey of the ocean fisheries off Delaware Bay. U. S. Fish and Wildlife Service, Spec. Sci. Rept.: Fish. No. ___, ___pp.

Younger, Roy R. and Paul E. Hamer

1955. Inventory of New Jersey's salt water sport fishery, 1954. New Jersey Div. Fish and Game Rept., Proj. F-2-R-7, ___pp.

APPENDIX A

COMMON AND SCIENTIFIC NAMES OF FISH AND SHELLFISH

Black drum	*Pogonias chromis*
Bluefin tuna	*Thunnus thynnus*
Bluefish	*Pomatomus saltatrix*
Bonito	*Sarda sarda*
Butterfish	*Poronotus triacanthus*
Cod	*Gadus callarias*
Conger eel	*Conger oceanica*
Croaker	*Micropogon undulatus*
Dolphin	*Coryphaena hippurus*
Fluke	*Paralichthys dentatus*
Gray sole	*Glyptocephalus cynoglossus*
King whiting	*Menticirrhus saxatilus*
Little tuna	*Euthynnus alletteratus*
Mackerel	*Scomber scombrus*
Mackerel shark	*Isurus nasus*
Menhaden	*Brevoortia tyrannus*
Porgy	*Stenotomus chrysops*
Puffer	*Sphoeroides maculatus*
Red hake	*Urophycis chuss*
Scup	*Stenotomus chrysops*
Sea bass	*Centropristes striatus*

Sea herring	*Clupea harengus*
Sea robin	*Prionotus* species
Shad	*Alosa sapidissima*
Spot	*Leiostomus xanthurus*
Striped bass	*Roccus saxatilus*
Sturgeon	*Acipenser brevirostrum* and *A. oxyrhynchus*
Swellfish	*Sphoeroides maculatus*
Tautog	*Tautoga onitis*
Tilefish	*Lopholatilus chamaeleonticeps*
Weakfish	*Cynoscion regalis*
White hake	*Urophycis tenuis*
White marlin	*Makaira albida*
White perch	*Morone americana*
Whiting	*Merluccius bilinearis*
Conch	*Busycon canaliculatus* and *B. caricum*
Lobster	*Homarus americanus*
Sea scallop	*Placopecten magellanicus*
Sea turtle	*Caretta* species
Squid	*Loligo pealii*
Surf clam	*Spisula solidissima*

APPENDIX B

FLEET SIZE, ESTIMATED REPLACEMENT VALUE, NUMBER OF FISHERMEN EMPLOYED, AND VALUE OF THE CATCH, 1954

	No. of Vessels	Replacement Value	No. of Fishermen	Value of the Catch
Menhaden Purse Seine	32	6,500,000	928	7,500,000
Otter Trawl	88	3,000,000	291	2,000,000
Surf Clam Dredge	60	1,500,000	160	1,100,000
Purse Seine for Foodfish	3	200,000	24	125,000
Pot	21	250,000	42	166,000
Misc. Commercial	20	125,000	40	200,000
Sport	240	2,000,000	480	1,000,000

Figure 1. Chart of the area

Duplication of chart appearing in
"Survey of the Ocean Fisheries off Delaware Bay"
June and Reintjes, 1956

STANDARD FORM NO. 64

Office Memorandum • UNITED STATES GOVERNMENT

~~TO~~ : Chief, NAFI

DATE: 17 MAR

TO ~~FROM~~ : Edwards

We decided to ship it off to Reinjes to handle down there. Hugh

SUBJECT: Reintjes M.S.

Sally found a memo from you to the effect that Edwards should look at Reintjes M.S.?? I have gone through it quickly in the event that you wished to ask me something about it.

Bob

Bailey has finished figures for this. Is text of report changed? Bailey has a copy of text which Rintjes sent – we have orig. + 6 copies here of version typed in fall of 1956.

11/7

VIRGINIA RYKER

VIRGINA:

I had a note from John Rentfes about the status of the 1954 Delaware Report. I believe DR Graham has this. John is anxious to have the report reach the drafting board as soon as possible. There are some figure changes that he would like to have me supervise.

Would you please let me know when I can get my hands on the Rentfes m.s.

Bob Livingstone

Bailey has figures scheduled. Livingstone advised.

2/8/57 – Bailey says he is delaying work on Rentfes ms. drawings until he hears what changes are to be made in the ms. First report is being revised, which will necessitate changes in supplemental report.

Mr. John W. Reintjes, Beaufort, North Carolina February 12, 1957

Fishery Research Biologist, Woods Hole, Massachusetts

Manuscript - Supplemental Report, 1954

I have your recent instructions on the manuscript.

Frank Bailey says yes.

Robert Livingstone, Jr.

P.S. Enclosed is another monthly Report of Field Obligations and Expenditures. She's getting down there.

L - Mrs Conner
Reintjes

January 3, 1957

Mr. John W. Reintjes
Beaufort, North Carolina

Fishery Research Biologist
Woods Hole, Massachusetts

1954 MS. and miscellaneous — Survey of the Ocean Fisheries of Delaware Bay — Supplemental Report for 1954

Frank Bailey informs that the 1954 MS. is complete except for the following:

(1) Fishing areas and numerical data for figure 2, "Menhaden Fishing Grounds" (missing entirely).

(2) a. "Inshore otter trawl fishing grounds" figure 4.
b. "Surf Clam fishing grounds" figure 7.

Numerical data for shaded areas (not included on either chart).

Also I have enclosed a copy of field and obligations report as of November 30, 1956.

Hope all goes well and Happy New Year.

Robert Livingstone, Jr.

Enclosure

Mr. John W. Reintjes, Portland, Maine August 30, 1956

Chief, North Atlantic Fishery Investigations, Woods Hole, Massachusetts

Manuscript

Your manuscript, "A Survey of the Ocean Fisheries off Delaware Bay—Supplemental Report for 1954," seems to require very little editing. We shall start typing it here next week. We cannot have the figures ready for one or two months. If this seems a serious delay to you and if you can have them done elsewhere sooner, let us know.

Herbert W. Graham

cc: Branch of Fishery Biology

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Woods Hole, Massachusetts

August 30, 1956

MEMORANDUM

TO: All Project Leaders

FROM: Chief, North Atlantic Fishery Investigations

SUBJECT: Reintjes manuscript

A manuscript by John Reintjes entitled "A Survey of the Ocean Fisheries Off Delaware Bay—Supplemental Report for 1954" is available in the library through Tuesday, September 4. If you have any comments regarding this manuscript please leave them with Miss Leonard so that appropriate changes may be made before publication. The manuscript covers lobsters, surf clams, scallops, menhaden, as well as a number of species taken by otter trawl and other types of gear.

Herbert W. Graham