International Commission for the Northwest Atlantic Fisheries

Serial No. 4038
(D.c.9)

ICNAF Res.Doc. 76/XII/142

NINTH SPECIAL COMMISSION MEETING - DECEMBER 1976

The United States Recreational Fishery For Atlantic Mackerel

by

D. J. Christensen, B. L. Freeman, and S. C. Turner

National Marine Fisheries Service
Northeast Fisheries Center
Sandy Hook Laboratory
Highlands, New Jersey 07732, USA

Abstract

Atlantic mackerel (Scomber scombrus) is an important species in the recreational catch along the Middle Atlantic and northeast coasts of the United States. During the past 15 years, it has been among the dozen most important species of fishes to anglers, especially to anglers fishing from party and charter boats. A field survey was conducted to determine the effort and catch of party and charter boat anglers along the coast of New Jersey. Results of the survey indicated that the catch was 1,028 tons from July 1975 through June 1976. Based on the New Jersey catch, the total USA recreational catch for that period was 4,947 tons which is the lowest on record. Recreational catches were found to follow trends indicated by other indices of mackerel abundance.

Introduction

Atlantic mackerel (Scomber scombrus) is an important species in the recreational catch along the Middle Atlantic and northeast coasts of the United States. In nationwide surveys and in a survey of the northeast, mackerel ranked 12th, 7th, 3rd and 7th in 1960, 1965, 1970 and 1974, respectively in total weight of recreational catches from Virginia through Maine (Clark, 1965; Deuel and Clark, 1968; Deuel, 1973; Deuel, personal communication)(Table 1).

Mackerel are seasonal migrants throughout the northeast usually appearing first off Virginia in March and migrating northward along the coast as the season progresses. They pass through the coastal waters of New Jersey and New York from late March into May and then pass around Cape Cod and spend the warmer months in the Gulf of Maine. In October, they begin a southward migration which continues until they have generally left USA coastal waters by the end of December or mid-January. During their seasonal passages through coastal waters between the Virginia Capes and Cape Cod and during their summer residence in the Gulf of Maine they are subject to recreational hook and line harvest (Freeman and Walford, 1974a, 1974b, 1974c, 1974d). In spring, along the Middle Atlantic States, mackerel tend to be present between the times the winter species (cod and winter flounder) leave and summer species (bluefish, summer flounder, and weakfish) arrive. Thus, even though mackerel may only be present from a few weeks to a few months along any area of the Middle Atlantic Coast, they are exploited heavily by recreational fishermen by virtue of the fact that they are abundant when other species are not.

In 1970, the majority of ocean-caught mackerel were taken by anglers fishing from party and charter boats (Deuel, 1973). Party boats are generally 40-120 feet in length and carry 20-120 anglers. Space is sold to the public until the boat is full or the scheduled sailing time is reached. Full-day party boats usually leave the docks around 0800 and return about 1600 hours. Half-day party boats usually leave about 0800 and return at 1230 hours, and then leave again about 1300 and return about 1700 hours. Charter boats range in length from 30 to

85 feet and hire out for the exclusive use of 1-80 anglers. The departure and return time may vary with the desire of the group chartering the vessel and the species sought.

This document reports the results of a survey of the catches of Atlantic mackerel by anglers fishing from party and charter boats docking at ports located along the ocean coastline of New Jersey from July 12, 1975 to September 19, 1976.

Methods

A detailed survey was made of the bay and ocean shoreline in May 1975 to determine the location of every party and charter boat in New Jersey. The northernmost boat was located at Bayonne and the southernmost at Cape May. Boats docked along the shore of Delaware Bay were excluded. The coastline of the state was divided into six sampling areas beginning at Perth Amboy and ending at Cape May (Figure 1) and containing roughly equivalent numbers of party and charter boats. Each sampling area included a port or group of ports with at least one major ocean inlet. Each port included the docking site of one or more boats which could easily be reached by walking from one boat to the next as they returned from fishing.

Ports to be sampled were selected at random, without replacement, from a list weighted in proportion to the number of party and charter boats docking at the port. Direct contact, complete fishing trip interviews were made either at the dock as the various boats returned or aboard a boat while anglers were engaged in fishing. All of the anglers on a charter boat were included in a single interview, and the entire catch was identified, counted and weighed. As many as possible of the anglers on a party boat were interviewed and their catches identified, counted and weighed. Length measurements (fork length) were obtained from a subsample of the catch. Interviews were used to determine the location fished, fishing method, number of fishermen per boat, number of rods per fishermen, time spent fishing, and catch per hour for each species.

A count was made of all the boats by type that were docked or fishing out of each port visited on a scheduled sampling day. The counts were used to determine the potential fleet size and the fraction of boats actually sailing. Separate estimates were made for the number of boats sailing on weekdays and weekend days and holidays. This was necessary because of the disproportionate fraction of boats sailing on these two day classes.

An estimate of total catch was made by summing the catch estimates for anglers aboard each boat type. The catch of party and charter boat anglers was determined by multiplying the potential number of boats by the fraction sailing on scheduled sampling days by the number of days in the sampling period to determine the number of fishing trips. The number of trips was multiplied by catch rates determined from the total number of trips, the mean fishing time, and the total number of fish observed in interviews giving the total number of fish caught. The mean weight of fish was then multiplied by the total catch in numbers of fish to give total weight.

Results

An estimated 10 tons of mackerel were caught by New Jersey party and charter boat anglers during the autumn season which occurred between November 30, 1975 and January 10, 1976 (Table 2). The 1976 spring season lasted from March 21 to May 15, and a calculated 1,018 tons were caught (Table 2). Thus, the total for the November-May season was 1,028 tons. Length frequency distributions of the fall and spring catches are shown in Figure 2.

The number of party and charter boats located along the ocean coasts of Delaware, Maryland, and Virginia which could effectively fish Atlantic mackerel is approximately 25% of the potential New Jersey fleet. Assuming southern boats fished mackerel with similar effort and catch per boat, then the Middle Atlantic (Virginia through New Jersey) catch by party and charter boats during the time of this survey is estimated at 1,285 tons. Deuel (1973) indicated that 62.8% of the 1970 Middle Atlantic catch of mackerel was made by charter and party boat anglers, and that the total northeast angler catch from Maine to New York was 141.8% of that made by Middle Atlantic anglers. Using expansion factors based on Deuel's estimate, the total Middle Atlantic angler catch and total USA angler catch was 2,046 and 4,947 tons, respectively, from July 1975 through June 1976.

Discussion

A variety of factors affects angler harvest of mackerel including population size, availability of more desirous species, and weather conditions during the relatively brief Middle Atlantic fishing season. For example, a few weeks of windy, wet, and cold weather coinciding with the passage of mackerel could reduce both the number of boat trips and the mean number of fishermen per party boat trip. Therefore, it does not necessarily follow that the recreational catch is directly proportional to mackerel stock size. Nonetheless, it is believed that angler catches follow general trends set by other indicators of stock size.

The estimated recreational catch from various surveys (Clark, 1965; Deuel and Clark, 1968; Deuel, 1973), from an unpublished survey (Deuel, personal communication), and from the survey reported in this paper were compared with several indicators of stock size. Indicators included in the comparison are current biomass estimates, USA research vessel autumn and spring bottom trawl survey indices (Anderson et al.,1976), and the international catch per standard USA day fished (Anderson, 1976). The trends in recreational mackerel catch (Tables 1 and 3) exhibit a similar pattern. Recreational catches increased from low levels in 1960 to a maximum in 1970 and then declined. Length frequency data from this survey indicates that recreational fishermen primarily harvest the larger size mackerel which are part of the spawning stock. The estimated spawning stock biomass follows a similar trend, increasing between 1965 and 1970 followed by a decrease in 1974 and 1976. The recreational catch followed the trend in international catch per standard USA day fished except in 1974. The catch per USA day fished in 1974 was lower than might be expected in comparison with biomass estimates and research vessel survey indices. Recreational catches also followed the trends indicated by the USA trawl surveys. It is apparent that changes in recreational catches are due in part to changes in stock size, and that the recent decline in stock abundance has been accompanied by recreational catches declining to the lowest level on record despite an increase in angler effort.

Literature Cited

Anderson, E. D. 1976. Measures of abundance of Atlantic mackerel off the northeastern coast of the United States. ICNAF Res. Doc. 76/VI/12, Ser. No. 3781.

_____, P. W. Wood, B. B. Ackerman, and F. P. Almeida. 1976. Assessment of the mackerel stock in ICNAF SA 3-6. ICNAF Res. Doc. 76/XII/137, Ser. No.4033 .

Clark, J. R. 1965. The 1960 salt-water angling survey. U.S. Fish Wildl. Serv., Circ. 153, 36 pp.

Deuel, D. G., and J. R. Clark. 1968. The 1965 salt-water angling survey. U.S. Fish Wildl. Serv., Resource Publication 67, 51 pp.

Deuel, D. G. 1973. The 1970 salt-water angling survey. U.S. Dept. Comm., Cur. Fish. Stat. No. 6200, 54 pp.

Freeman, B. L., and L. A. Walford. 1974a. Angler's guide to the United States Atlantic coast. Section I, Passamaquoddy Bay, Maine to Cape Cod. U.S. Govt. Print. Office, Wash., D.C., 16 p.

_____. 1974b. Angler's guide to the United States Atlantic coast. Section II, Nantucket Shoals to Long Island Sound. U.S. Govt. Print. Office, Wash., D.C., 16 p.

_____. 1974c. Angler's guide to the United States Atlantic coast. Section III, Block Island to Cape May, New Jersey. U.S. Govt. Print. Office, Wash., D.C., 21 p.

_____. 1974d. Angler's guide to the United States Atlantic coast. Section IV, Delaware Bay to Fake Cape, Virginia. U.S. Govt. Print. Office, Wash., D.C., 17 p.

TABLE 1. Species ranking by total weight of catch of recreational anglers fishing along the northeastern United States coast

	1960	1965	1970	1974
1	striped bass	bluefish	bluefish	bluefish
2	bluefish	striped bass	striped bass	striped bass
3	Atlantic cod	Atlantic cod	Atlantic mackerel	summer flounder
4	flounder[1/]	summer flounder	winter flounder	Atlantic cod
5	flounder[1/]	winter flounder	Atlantic cod	weakfish
6	sharks	puffers	puffers	winter flounder
7	pollock	Atlantic mackerel	spot	Atlantic mackerel
8	tautog	perches	summer flounder	tautog
9	scup	scup	tautog	perches
10	black sea bass	tautog	weakfish	scup
11	red drum	black sea bass	perches	spot
12	Atlantic mackerel	spot	sea robins	black sea bass

1/ Winter and summer flounder were combined as "flatfish" in the 1960 survey

TABLE 2. Estimated catch of mackerel by New Jersey party and charter boat anglers July, 1975 through June, 1976

	Number of Boat Trips			Catch (kg) of Mackerel per Boat Trip			Estimated Catch (kg) for Time Periods			
		1/2-Day			1/2-Day			1/2-Day		
	Party Boats	Party Boats	Charter Boats	Party Boats	Party Boats	Charter Boats	Party Boats	Party Boats	Charter Boats	Total
Autumn season 1975-1976										
11/30-12/13	285	0	0	2	0	0	591	0	0	591
12/14-12/27	209	31	71	32	13	5	6,894	402	386	7,682
12/28-1/10	377	0	0	3	0	0	1,247	0	0	1,247
Total							8,732	402	386	9,520
Spring Season 1976										
3/21-4/3	806	42	350	1/	0	0	254	0	0	254
4/4-4/17	621	183	131	769	183	104	477,277	33,545	13,638	524,460
4/18-5/1	619	230	188	325	118	58	201,177	27,088	10,956	239,221
5/2-5/15	554	238	302	330	110	151	183,070	26,121	45,615	254,806
Total							861,524	86,754	70,209	1,018,487
Annual Total										1,028,007

1/ Less than 1 mackerel caught per boat trip

Table 3. Comparison of USA recreational catch with selected indicators of mackerel abundance.

Year	USA Recreational catch (10^3 tons)	Spawning stock biomass (10^3 tons)	International mackerel catch per standard USA day fished ICNAF SA 5-6	USA research vessel bottom trawl survey catch per tow index	
				Spring	Autumn
1960	5.0	-	-	-	-
1965	8.6	416.3	.84	-	.046
1970	32.2	1613.8	2.07	.471	.068
1974	7.6	718.9	.17	.277	.046
1976[1/]	4.9	246.9	-	.144	.043

1/ This estimate is for the time period 7/12/75 to 7/11/76, but virtually all of the catch is in 1976.

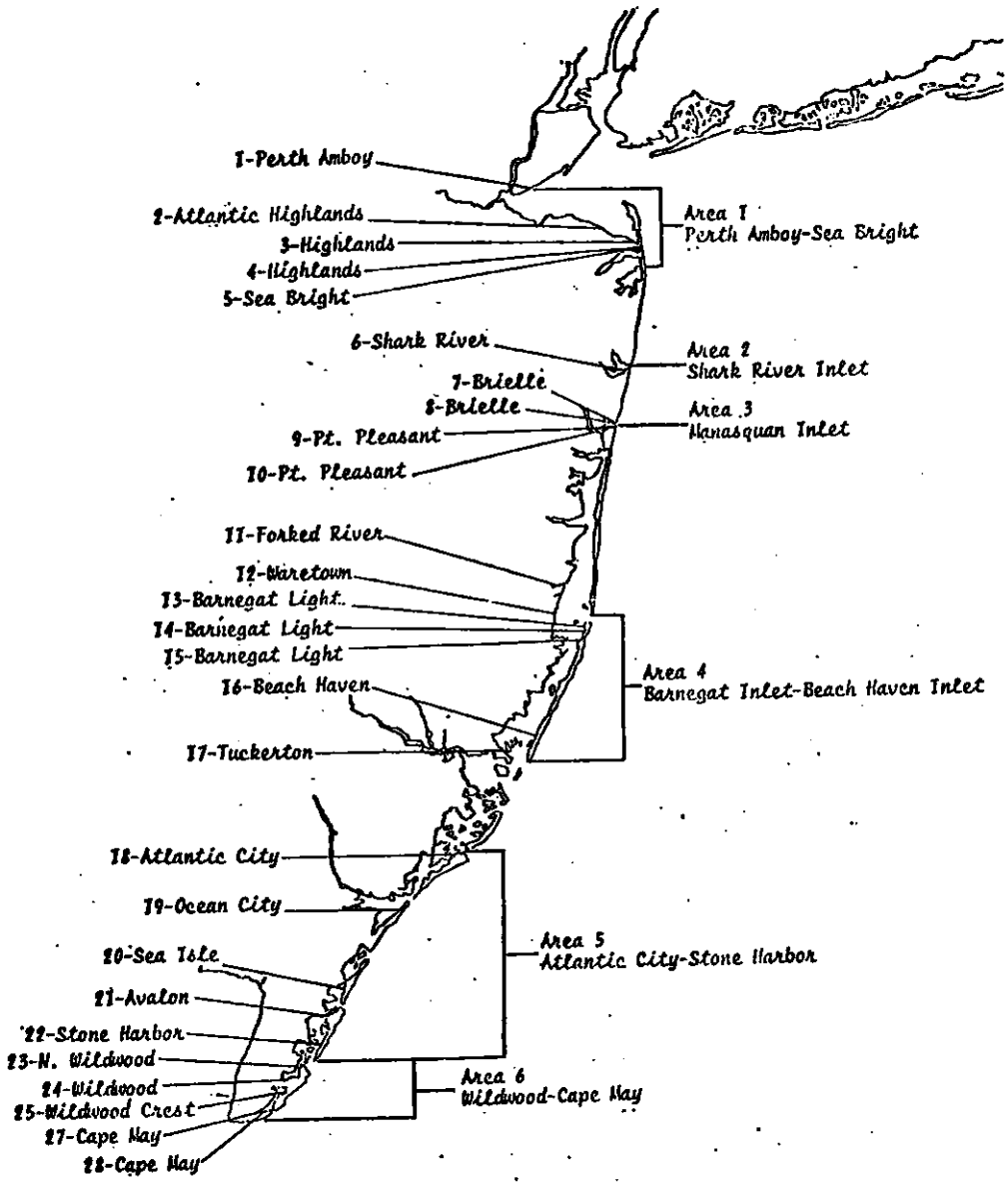

Fig. 1. Sampling areas and ports containing charter and/or party boats sampled in this survey.

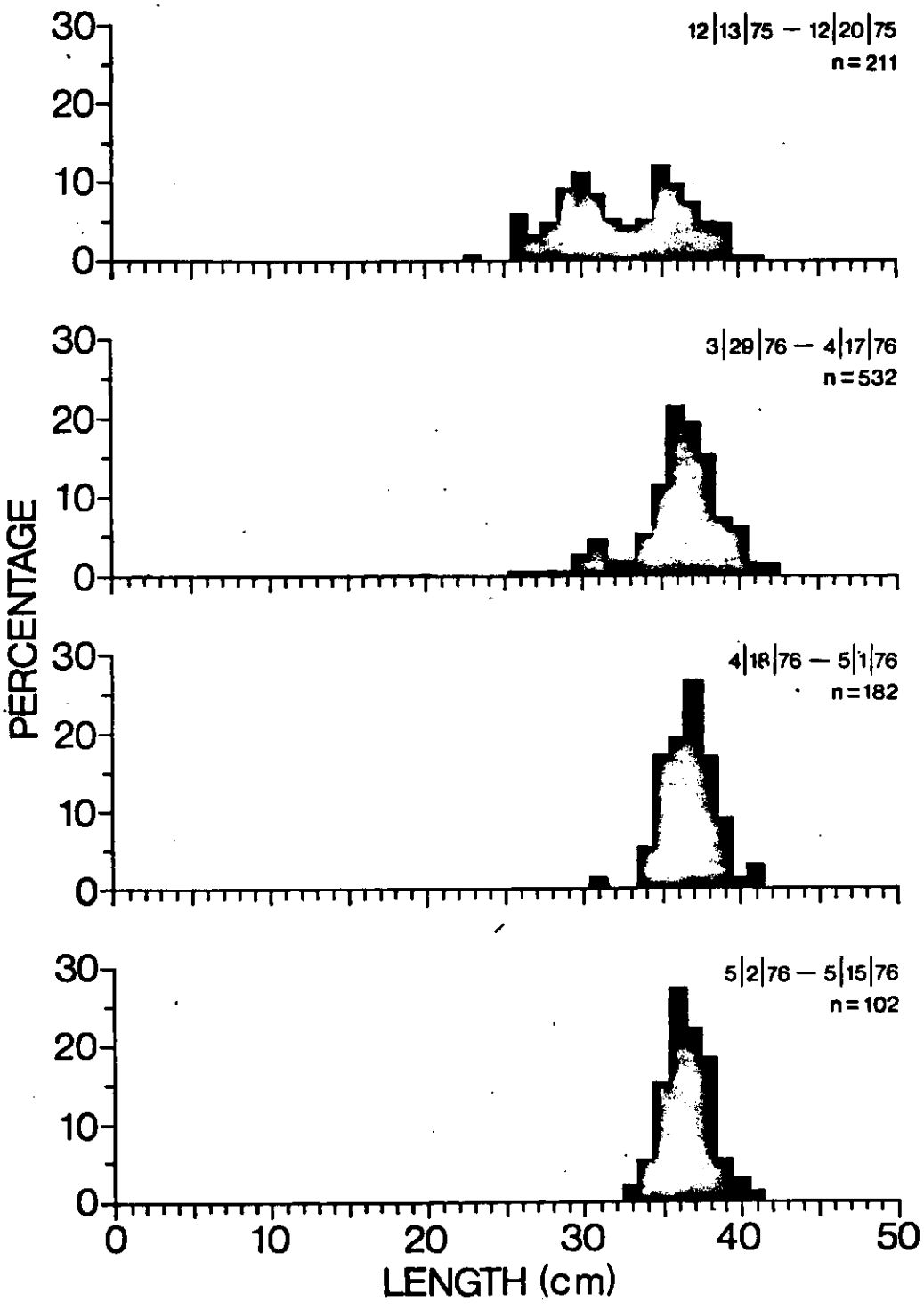

Fig. 2. Length frequency (fork length) of mackerel caught by New Jersey party and charter boat anglers.