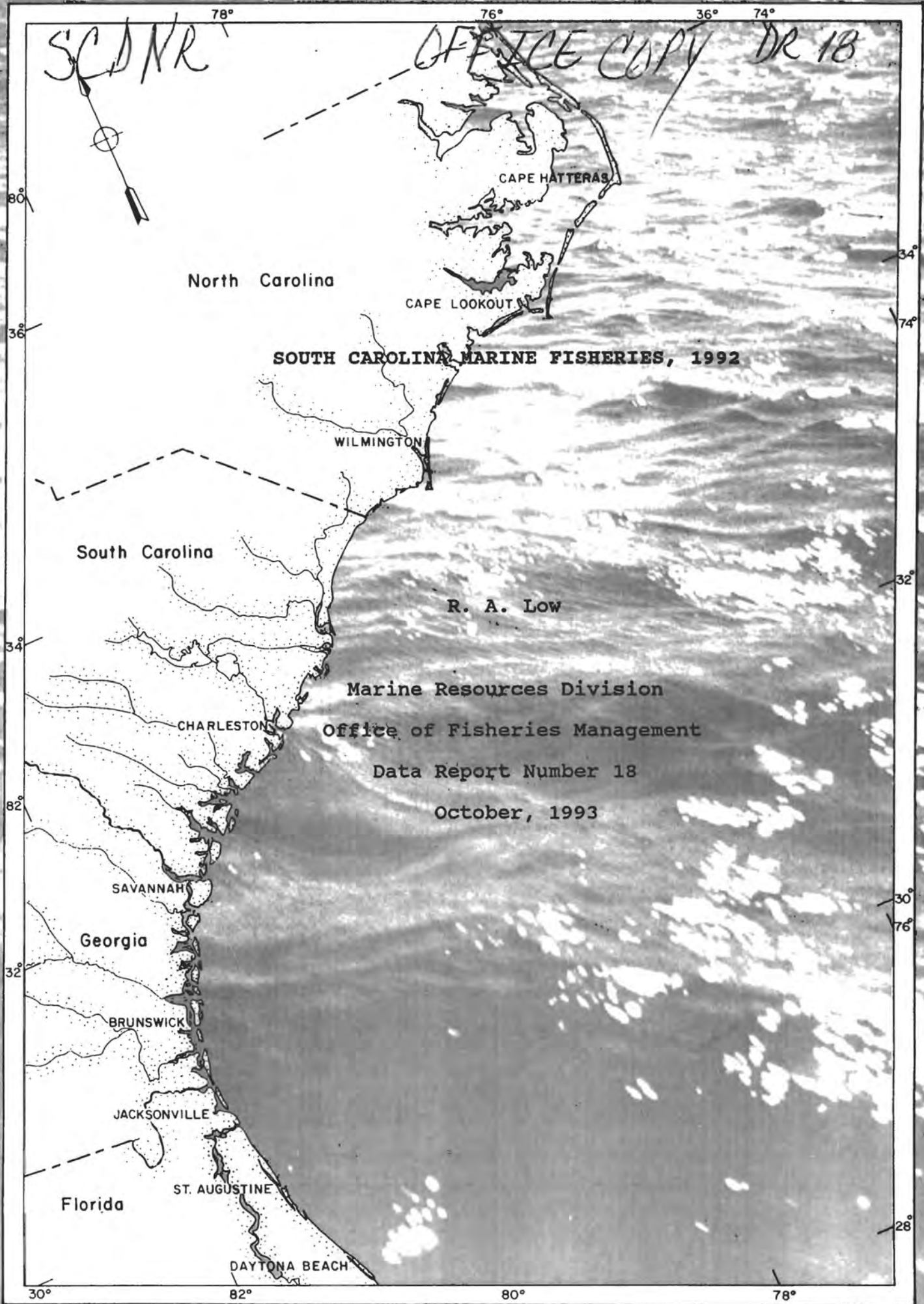


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North Carolina

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SOUTH CAROLINA MARINE FISHERIES, 1992

WILMINGTON

South Carolina

R. A. Low

Marine Resources Division

Office of Fisheries Management

Data Report Number 18

October, 1993

CHARLESTON

SAVANNAH

Georgia

BRUNSWICK

JACKSONVILLE

Florida

ST. AUGUSTINE

DAYTONA BEACH

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INTRODUCTION

This report is a summary of significant events in South Carolina's marine fisheries during 1992. Its' objectives are to 1) update and describe trends in the principal fisheries and 2) provide explanatory information relevant to important developments. The discussion is somewhat subjective in interpretive content but generally represents consensus views of the supervisory staff of the management programs for the various fisheries. The information is intended for a general audience, makes some simplifications, and is not meant to be definitive in the scientific sense.

Publication of landings data for South Carolina's commercial fisheries began in January, 1957, and was based on a monthly reporting system established by the U.S. Fish and Wildlife Service (USFWS). Distribution of information was in the form of monthly bulletins. At that time, from 75 to 80 seafood dealers operated along the coast. Monthly production forms were mailed to these individuals during the last week of the month, on which they were asked to report their landings for the month. These data were then tabulated by the reporting agents and submitted to the USFWS office in Washington, D.C. Some data were also obtained from the South Carolina Division of Commercial Fisheries. The fisheries reporting specialists also prepared monthly narrative reports describing current conditions and trends. This series was discontinued at the end of 1979.

The current series of annual reports was initiated in 1987. The first issue contained a review of trends and events for 1977-1986 and individual annual reports began with the 1987 issue. The narrative is similar in format to that in the former monthly bulletins.

Data on 1992 commercial fisheries catch, effort, and landed value were obtained through 1) mandatory monthly reports by licensed primary wholesale seafood dealers, 2) mandatory shellfish harvest reports, 3) voluntarily submitted weekly shrimp tickets from dock operators, 4) voluntarily submitted offshore fish trip tickets from wholesalers, and 5) reports required in special permit fisheries. In most cases, annual fishing effort by gear type was estimated by dividing total landings compiled from all sources by the average catch per trip calculated from detailed reports such as fish tickets or special permit harvest reports. The percentage of total landings reported by such means, and thus the accuracy of the overall effort estimates, varied greatly according to gear type.

Commercial landings data were for wild stock fisheries only. South Carolina's mariculture industry, based primarily on Pacific white shrimp, expanded moderately in 1992 compared to the previous year with a total volume of about 589,000 pounds of product worth \$1.6M. Pacific white shrimp (heads-off) contributed about 561,000 pounds and \$1.57M.

Commercial landings data were subject to confidentiality if less than three sources provided information. Appreciable volumes of product were involved in some cases. If three or four dealers handled an item but only one contributed most of the volume, this information was also treated as confidential. Confidential data were included in total landings summaries for appropriate categories.

The reliability of commercial landings data was an obvious consideration given the widely held perception of significant incentives for under-reporting to avoid taxes, regulations, quota reductions, etc. The providers were assured that their records could not be accessed for tax assessment or related financial scrutiny. Most reporting was on an honor system, since routine verification was not feasible. Because of health-related considerations, shellfish landings were closely monitored and were considered very accurate. Most of the shrimp landings were reported on weekly tickets which provided detailed information and these data were also considered highly reliable. Landings in most fisheries were obtained primarily from monthly dealer reports and were considered to be reasonably accurate. The least reliable statistics presumably were for the blue crab and shad fisheries, where under-reporting and non-reporting appeared to be fairly common based on anecdotal information.

The major source of recreational fishery data was the Marine Recreational Fishery Statistics Survey (MRFSS) conducted under National Marine Fisheries Service (NMFS) oversight. This was a generalized survey of hook and line fishing from shore or shore-based facilities (piers, docks, bridges, etc.), charterboats, and private boats. A telephone survey of randomly selected coastal households was used to obtain information on participation and effort. An on-site intercept survey (creel census) provided data on catch composition species, catch rates, detailed effort data, and length composition of the catch. MRD personnel conducted the creel census. Results from both survey components were combined by the NMFS to generate estimates of total catch by species, fishing mode, season and fishing area. Although the MRFSS design has remained basically unchanged since the survey's inception in 1979, many adjustments in calculation procedures have been made periodically. The data for 1987 to the present are considered to be the most reliable.

The MRD conducted a State Finfish Survey (SFS) in conjunction with the MRFSS. Coverage was directed at private boat fishermen fishing in inland areas and targeting red drum and spotted seatrout, the state's two most popular estuarine fish species. The principal objectives were to expand the sample sizes for length measurements and catch per unit of effort (CPUE) observations. In 1992, most of these data were provided by the SFS.

The Beaufort, North Carolina Laboratory of the NMFS conducted a survey of fishing activity by headboats utilizing a form for reporting each trip's participation (number of anglers), effort

(hours fished), and catch by species. In 1992, all headboats in South Carolina were required to submit this information to the NMFS (the survey had previously been operated on a voluntary basis, although most of the boats provided information). Statistics for the headboat fishery were provided by the NMFS Beaufort Laboratory.

Legislation was passed by the 1992 General Assembly that required private boat fishermen to obtain a marine fishing stamp, effective 1 July, 1992. Fishermen on piers, charterboats, and headboats were exempt from this requirement, although the operators of such platforms were required to obtain permits and submit monthly reports on their fishing activities. Pier operators had to report the number of anglers daily. Headboats were required to submit the same report to the MRD as to the NMFS. A similar report was also required of charterboat operators listing the number of anglers carried daily, the hours they fished, the number of fish by species retained, the number released, and the weight of the fish kept. Information from these sources was used in conjunction with that from the MRFSS to prepare the appropriate sections on recreational fisheries.

COMMERCIAL FISHERIES

Seafood categories were composed as follows. Shrimp landings included whole (heads-on) weights of all penaeid species (brown, white and pink) and rock shrimp. Crab landings included whole weights of blue crab (hard and peeler or soft) and stone crab claws. Shellfish landings were expressed in weights of meats, with the equivalent volumes in U.S. bushels (oysters and whelks) or 250-count bags (clams) of whole product noted where appropriate. Also included in aggregate shellfish meat landings were squid and octopus. Most fish landings were measured in round (whole) weights, although carcass weights applied for swordfish and larger sharks. Coastal fish included mullet, inshore groundfish (mainly spot, kingfishes or whittings, and flounders), and sharks caught with inshore gears (e.g. gillnets and shrimp trawls). Sharks caught by offshore gear types (longlines and handlines) were included in the offshore fish category. Other components were swordfish, wreckfish, cobia, king mackerel, oceanic pelagics (dolphin, tunas, wahoo, and bonito), and reef fish (primarily groupers, snappers, porgies, sea basses, grunts, amberjacks, and tilefishes). River fish consisted of shads, blueback herring, catfish, and carp.

South Carolina is not a major producer of seafood and ranked 20th among the 23 coastal states in landed volume and value in 1992. Most of the landings were shipped out of state as raw or unprocessed products so that the economy received little benefit from value added. There were 291 primary wholesale dealer licenses issued in 1992, with 24 of these businesses closed. Of the remaining 267 dealers, 84 reported no business. The majority of the operations were small and employed few people besides the dealer. Exclusive of the harvesting sector and the dealers, estimated employment included approximately 340 management/office personnel, 99 dockworkers (e.g. unloaders and fuel/ice handlers), 23 oyster shuckers, 45 crab

pickers, and 493 shrimp headers. Much of this consisted of seasonal, part-time employment. These figures were somewhat higher than those reported in 1991, particularly for shrimp headers. In 1991, no dealers reported employment in this category.

It is difficult to accurately determine the number of commercial fishermen since many individuals held several types of licenses and the totals were therefore not additive. Some participants, e.g. shrimp boat strikers and fishing boat crewmembers, did not need licenses. In order to legally land product, an individual must have either a land-and-sell license or a trawler captain's license. In 1992, the number of licenses issued were as follows: 426 land-and-sell, 623 resident trawler captain, and 292 non-resident trawler captain. Numbers of licenses issued by gear type are mentioned in the appropriate fisheries sections.

Overall volume of seafood landings from wild stocks (18.775 M pounds) declined slightly (Fig. 1) but remained above the 15-year average (Fig. 2). Compared to 1991 production, landings increased for blue crab (+ 31%) and coastal fish (+146%) while declining for shrimp (- 27%). There were less than 5% changes for river fish, offshore fish, and shellfish. In current dollars, total ex-vessel value was \$24.239 M, about 13% less than in 1991. When adjusted for inflation (Fig. 3), ex-vessel value was also well below the 15-year mean (- 17%). This largely reflected continued low prices (compared to historic levels) for shrimp.

South Carolina's commercial seafood production consisted primarily of resources either obtained directly from estuaries or dependent upon these waters during a major phase of their life cycle. These included penaeid shrimp, blue crab, oysters and clams, spot, mullet, and flounders. Total seafood landings have closely reflected the contribution from these resources (Fig. 4). In 1992, aggregate landings in these categories were 14.5 M pounds (mainly shrimp and blue crab) worth \$18.5 M.

In ranking of contribution to landed value, there has been no change since 1987 in the major product categories. Shrimp consistently has led with 45-60% of total ex-vessel value, followed by offshore fish (20-28%) and blue crab (9-15%). Shellfish have represented 7-11% with river fish and coastal fish each accounting for only 1-2%. In volume, shrimp and blue crab have been the leaders with offshore fish consistently third and contributions from the other categories less than 10% in aggregate. The 1992 composition of landings (Fig. 5) was consistent with these trends.

Charleston County was the leading producer in both volume and value (Fig. 6) with 7.1 M pounds worth \$9.4M. Both landings and value were substantially below the 1991 figures. Shrimp was the leading contributor with 2.6 M pounds (heads-on) worth \$5.2M. Offshore fish was the second most valuable category at \$1.7M (1.2 M pounds). The 2.9 M pounds of blue crab landed were worth \$1.4M, up slightly from the 1991 level. Most of the state's shellfish production was landed in Charleston County. The clam harvest (8,490

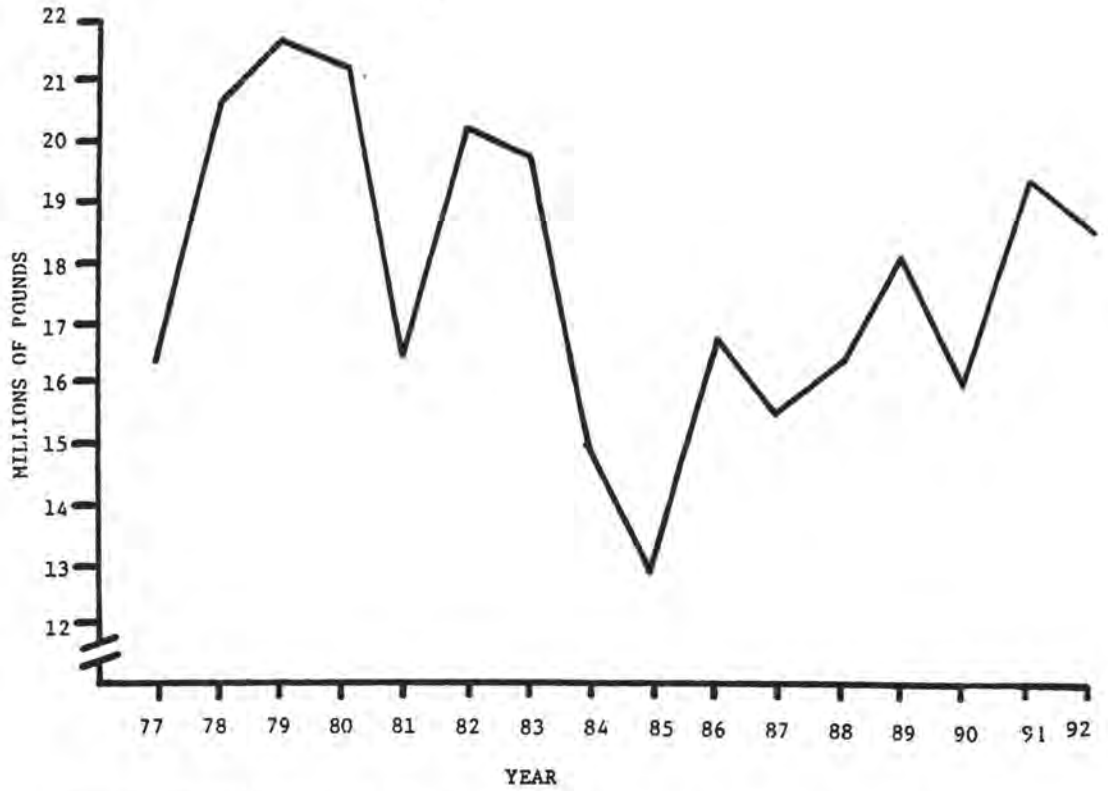


Fig. 1. Total landed weight of commercial marine fisheries products.

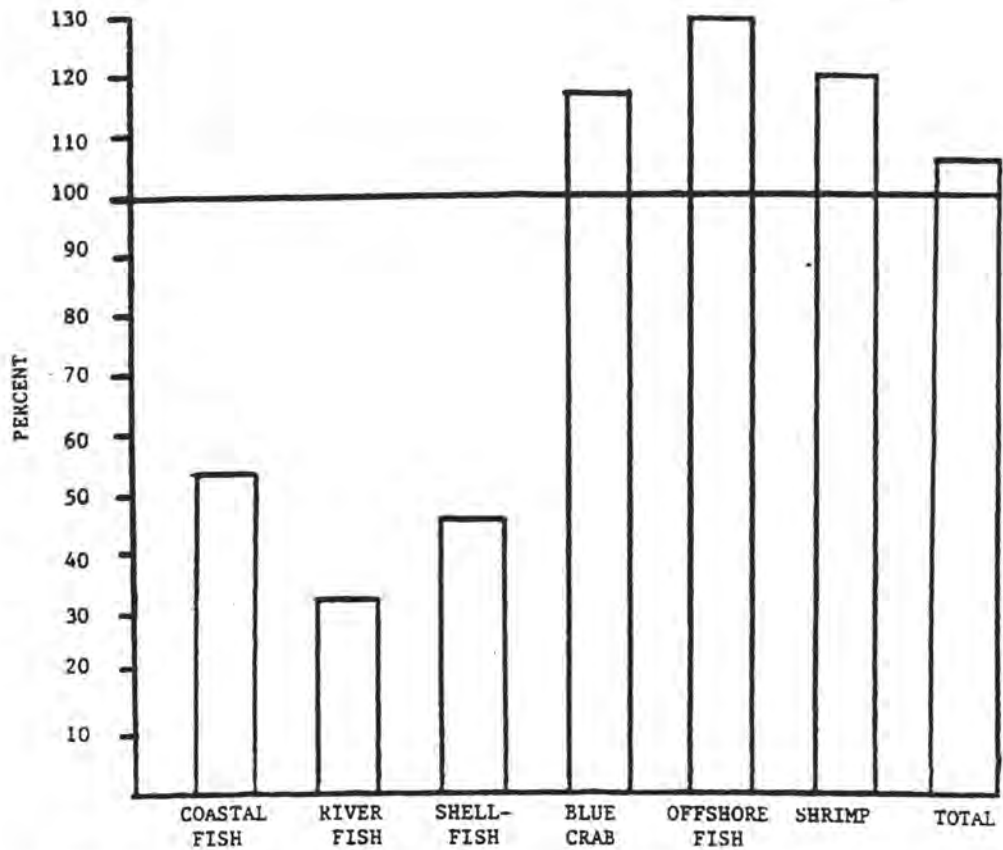


Fig. 2. Production in 1992 compared to 1977-1991 averages. Bars indicate percentages of the averages represented by the 1992 landings.

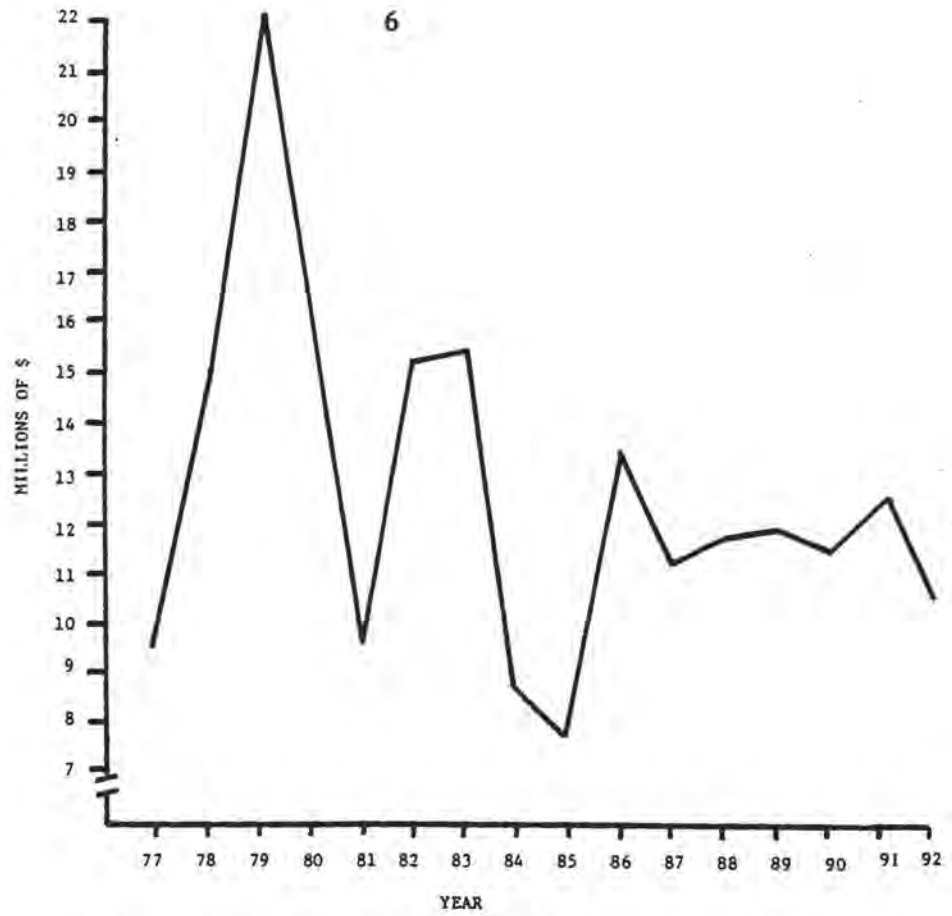


Fig. 3. Total ex-vessel value of commercial landings. Values are adjusted for inflation based on 1977 dollars.

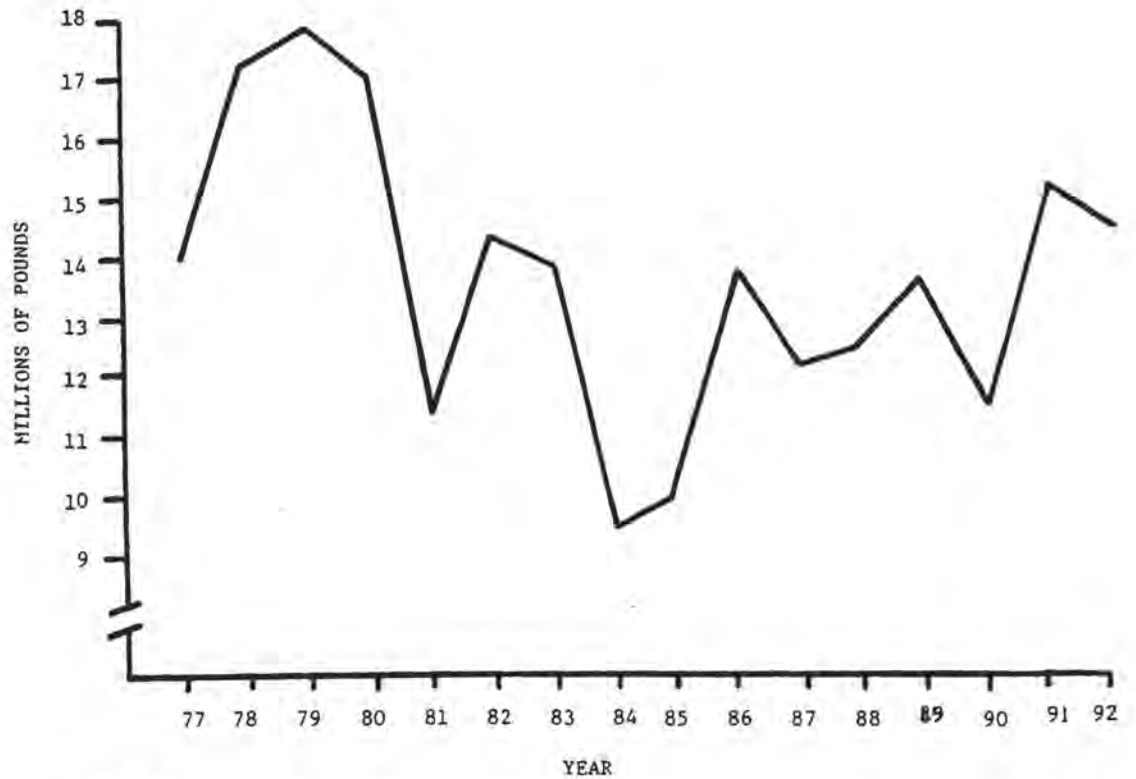


Fig. 4. Trend in production of estuarine-dependent resources.

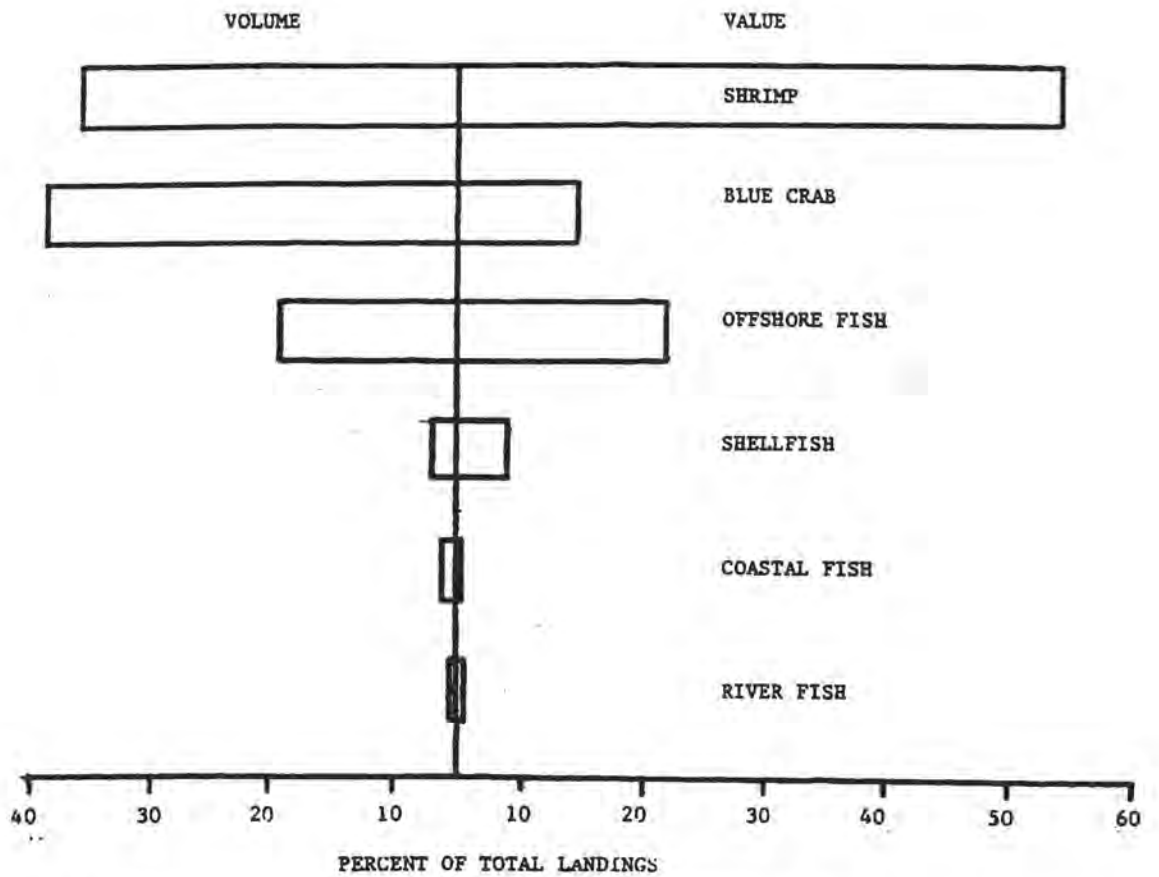


Fig. 5. Weight and value composition of commercial landings in 1992.

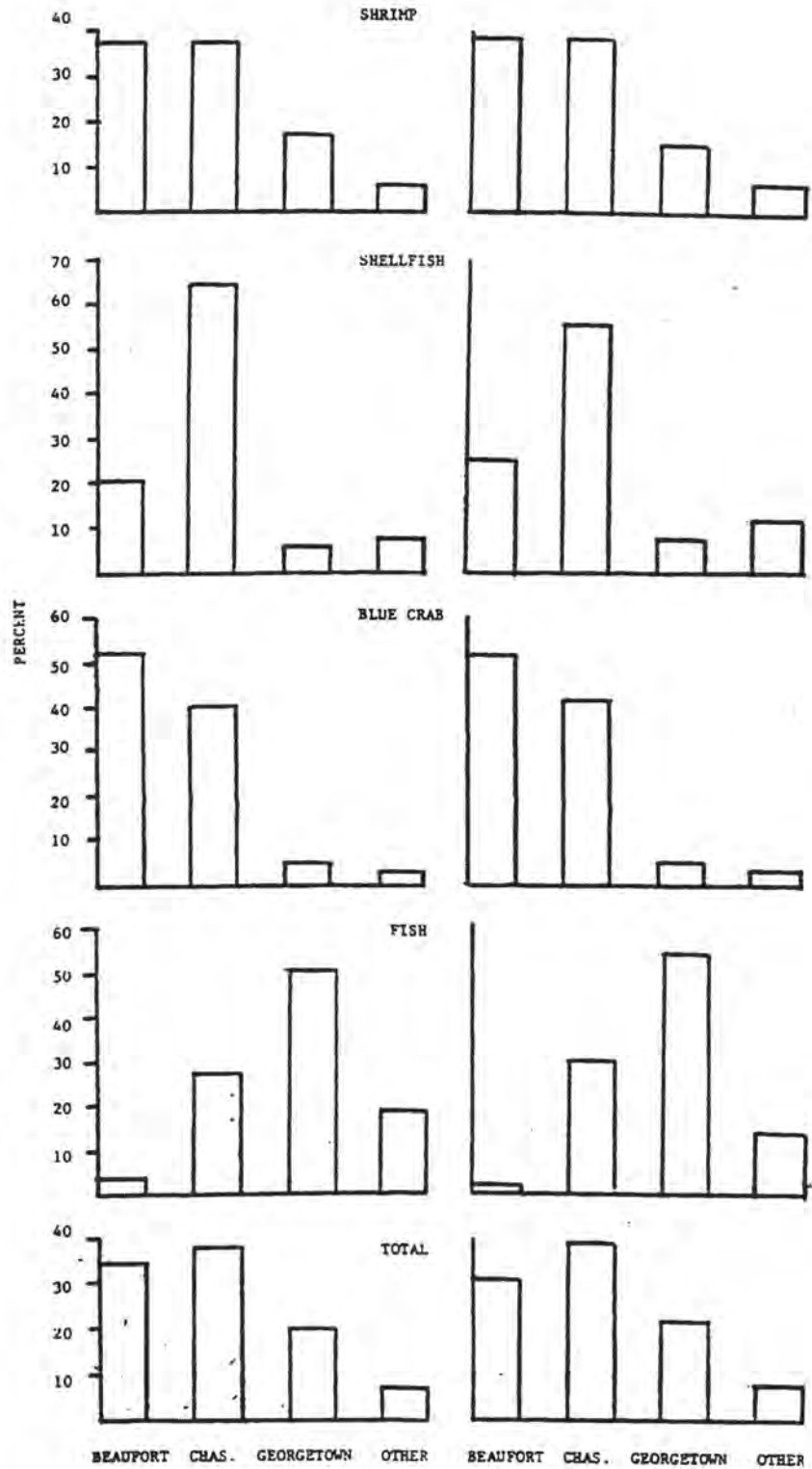


Fig. 6. Distribution of commercial landings by county.

bags) continued to decline and oyster production (65,275 bu.) also dropped from 1991's level, but overall shellfish value (\$1.05M) improved slightly. Fish production was about the same as in 1991.

Beaufort County's landings were 6.6 M pounds valued at \$7.6 M. These figures represented substantial increases over the previous year's production, due mainly to improved blue crab landings (up about 60%). The principal components were shrimp (2.5 M pounds, \$5.2M) and blue crab (3.7 M pounds, \$1.8M). Clam production (4,160 bags) dropped substantially while the oyster harvest (about 31,000 bu.) improved moderately. Fish landings more than doubled due to a big increase in shark catches.

Georgetown County was the major handler of fish with most of the state's shad landings and large amounts of offshore fish. Total seafood production was about 3.7 M pounds worth \$5.4M; about 58% of both volume and value was attributable to fish. Most of the remainder was contributed by shrimp (1.1M pounds worth \$1.96M). The clam harvest (3,538 bags) continued to decline although oyster production (6,171 bu.) increased from the 1991 level.

Other counties contributed about 1.4 M pounds of product worth \$1.7M. Fish from Horry County and shrimp landed in Colleton County were the major components.

SHRIMP

Total penaeid production continued the above-average trend (Fig. 7) of the last few years (+ 23% of the 15-year mean), although it was well below the exceptional 1991 level. Above average white shrimp landings compensated for subnormal brown shrimp production. Total ex-vessel value was \$13.1 M. After adjustment for inflation, this was about 15% below the 1977-1991 mean (not including 1979) and reflected the low unit value that persisted during most of the season (Fig. 8). The average overall unit value was \$2.00/pound (heads-on).

In March sampling, the postlarvae brown shrimp index was relatively high but May sampling produced rather low catch rates in the creeks. Spring weather was wet and windy with cooler than normal water. Results from the June stock assessment suggested moderately high abundance and a relatively large size (59 count). Heavy rains occurred in mid-June and apparently washed many small brown shrimp seaward. Subsequent trawl landings were considerably below average and brown shrimp contributed only 19% of the total penaeid production for the year, the lowest since 1987.

December 1991 sampling indicated that a large population of white shrimp would overwinter locally. Winter water temperatures were well above average and February sampling indicated that the stocks were in very good shape. The March assessment recorded the highest statewide catch rate since the program was initiated, with exceptional abundance in all areas. The shrimp were slightly smaller than in 1991.

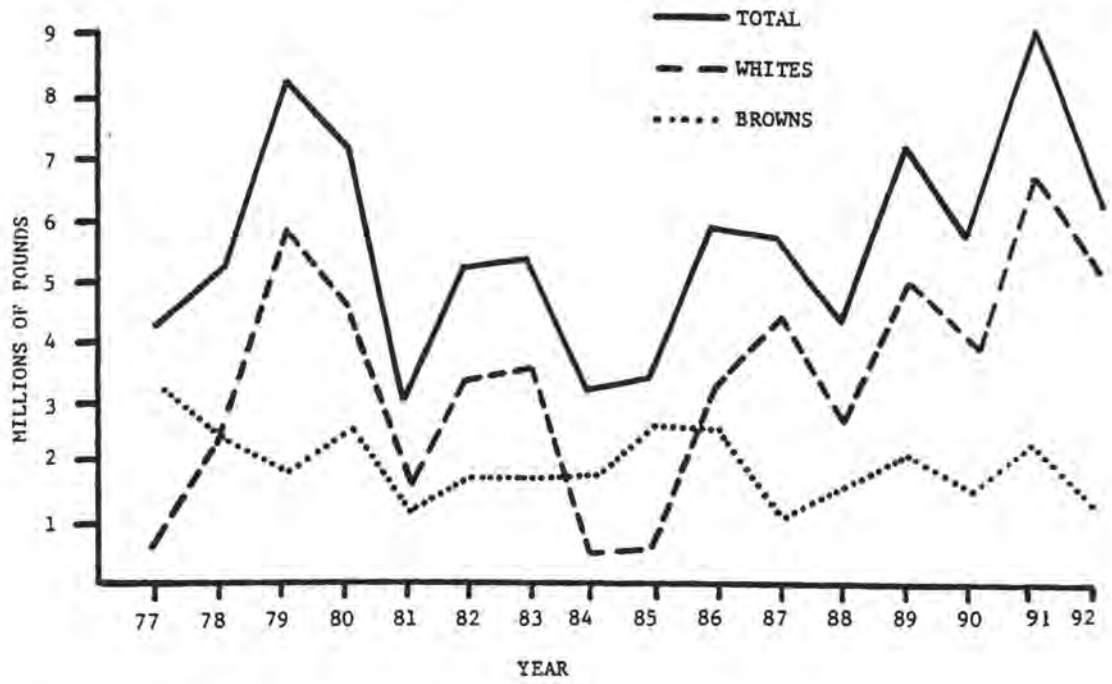


Fig. 7. Annual commercial landings of (heads-on) shrimp.

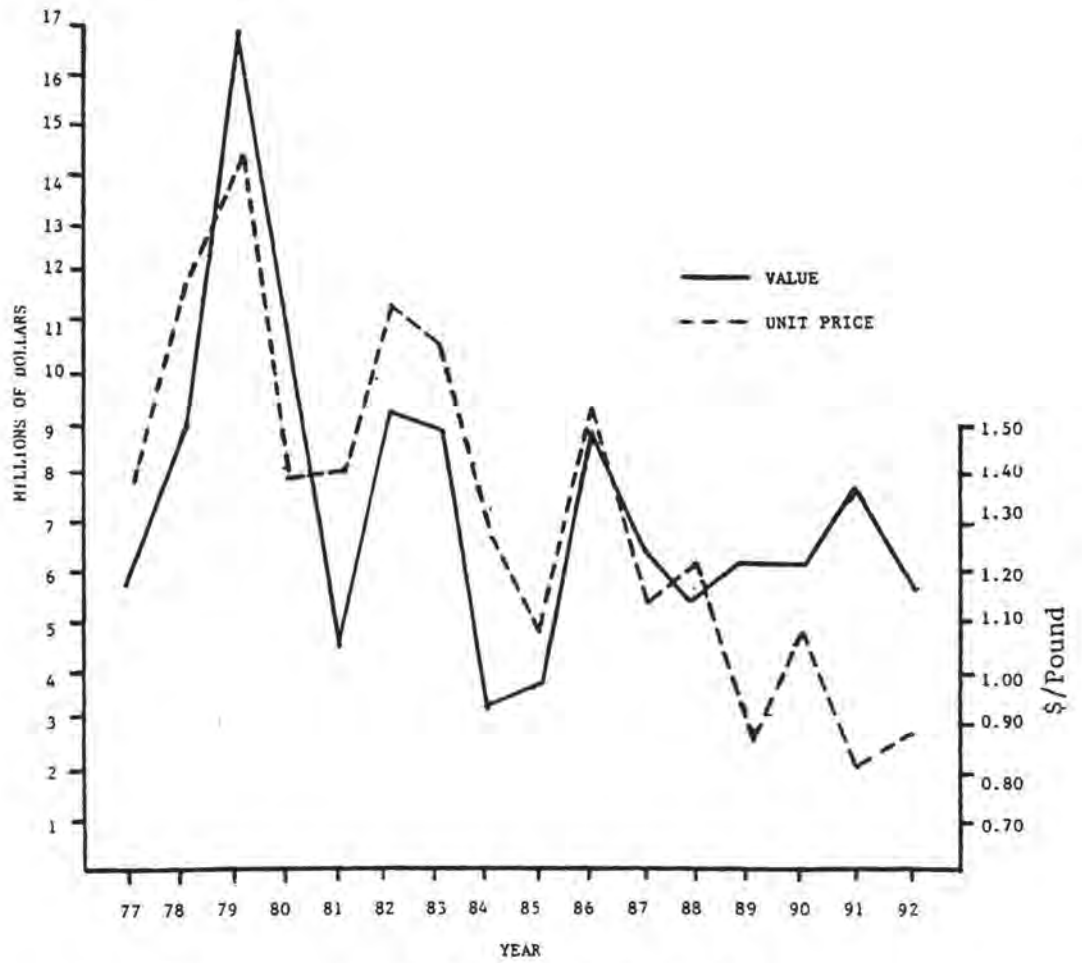


Fig. 8. Annual adjusted ex-vessel value and unit price of shrimp.

The area seaward of the old three mile "radar line" was opened to trawling on April 8. Other state waters were opened on May 20 after sampling indicated heavy spawning in early May. Trawling hours were amended with legal hours being 0500-2100 from opening day through September 15 and 0600-1900 thereafter. Opening week landings were generally good although lower than in 1991 with the shrimp being slightly smaller. Delayed movement of maturing shrimp from the estuaries as a result of reduced growth rates caused a longer than normal roe shrimp season. April-July roe shrimp landings were about 0.96 M pounds of whole shrimp worth \$2.67M.

The June assessment indicated a later than normal peak in postlarval ingress and implied that white shrimp in the creeks in summer would be below average in size. Initial juvenile abundance in July was exceptionally high but hot, dry weather throughout the month may have caused above-average mortality.

Heavy rains began in August and continued into September. Although the August rains appeared to force small shrimp from the estuaries and reduce growth, the effects on trawl landings were not nearly as pronounced as in 1991. The weather continued to be wet throughout the fall and landings were considerably below the expectations based on assessments of spawning and juvenile abundance. The season closed on January 29, 1993.

TED regulations were modified in 1992. Beginning in September, trawlers 25 ft or longer in waters outside the Colreg lines were required to use TEDs. Smaller boats working offshore and all boats fishing inshore of the Colreg lines could limit tow times to 90 minutes instead of using TEDs. On November 1, this was decreased to 75 minutes.

The channel net and trawl fisheries in Winyah Bay and North Santee Bay opened on October 2. The channel net season was extended to December 15 since relatively large numbers of small shrimp remained for extended periods in tidal creeks and upper river reaches. Channel net landings were approximately 135,000 pounds of whole shrimp, just slightly below the 1991 catch.

There were no reported major escapements of Pacific white shrimp from pond-raising operations and incidence (about two dozen) in catch samples inspected by statistics program port agents was negligible.

The number of trawler licenses sold in 1992 continued the long-term decline in participation. Resident licenses (N = 530) declined 8% and non-resident licenses (N = 279) 20% from the 1991 figures.

CRAB

Practically all of the product (7.09 M pounds) in this category was hard blue crab landed by pot fishermen. Although commercial landings often are regarded as indicative of abundance, they also reflect levels of effort. Market conditions influence effort and

thus landings, particularly on a short-term basis.

Interpretation of landings data is dependent upon their reliability. Prior to the mid-1980's, most crab was sold ungraded to a few local picking houses and their reports probably reflected total production rather accurately. With the growth of the "basket" trade, many crabbers have graded and distributed much of their product independently and overall landings have probably been under-reported. "Basket" trade refers to live hard crab, primarily large males, shipped in bushel baskets to Mid-Atlantic distributors.

Total blue crab landings (Fig. 9) were 7.16 M pounds worth \$3.5M. Volume was the largest since 1979 and adjusted ex-vessel value (Fig. 10) was about 25% above the 15-year average. The average unit value of potted hard crab was \$0.48/pound. The inflation-adjusted figure was higher than in 1991 but well below 1990's record level. Licenses were issued to 302 crabbers, up from 294 in the previous year.

Late in November, the MRD received reports of Chesapeake Bay crabbers operating in local waters, including Bulls Bay, Charleston Harbor, and St. Helena Sound. At least three non-resident crabbers set large numbers of pots in lower Charleston Harbor, offloaded the crab at local dealers, and shipped the product to Virginia. Fishing continued for a couple of weeks before the vessels left. Frequent checks by Law Enforcement officers indicated that all vessels were properly licensed and complying with state laws.

There has been speculation about cyclical fluctuation in local blue crab stocks, since one or two years of low production have occurred every six or seven years. Studies in South Carolina and Georgia suggest that the principal factor affecting abundance of legal crab is summer/early fall rainfall in the previous year. July and August were abnormally wet in 1991. Sampling in March 1992 indicated high abundance of both juvenile and adult blue crab. In June, catch rates of mature females in lower Charleston Harbor were extremely high. Commercial landings during the rest of the year confirmed the high abundance indicated in sampling. The combination of high abundance of spring sponge crab and wet August-September weather suggests that legal crab will be abundant in 1993 as well.

SHELLFISH

The winter/spring season for oysters and clams closed on May 14. Spring oyster production was 60,835 bu. worth \$759,493. Clark Sound (Charleston County) was cleared for shellfish harvest by DHEC and opened for commercial harvesting on February 10. Winyah Bay was opened to clam harvest by hydraulic escalator for four days in April, having last been harvested in the spring of 1989. Production was curtailed due to mechanical problems. New growth was less than expected and there was little indication of juvenile recruitment. Because of its size, however, the area was judged to have good potential for reopening in 1993.

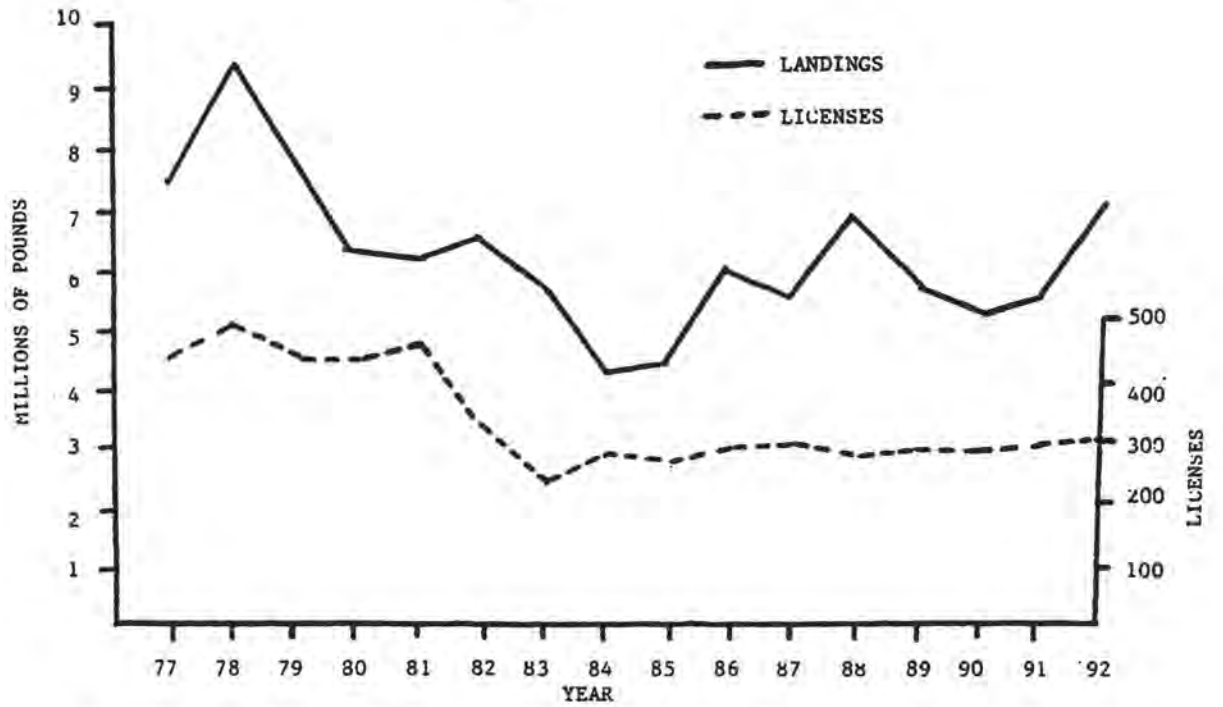


Fig. 9. Annual commercial landings of blue crab and number of crab pot licenses.

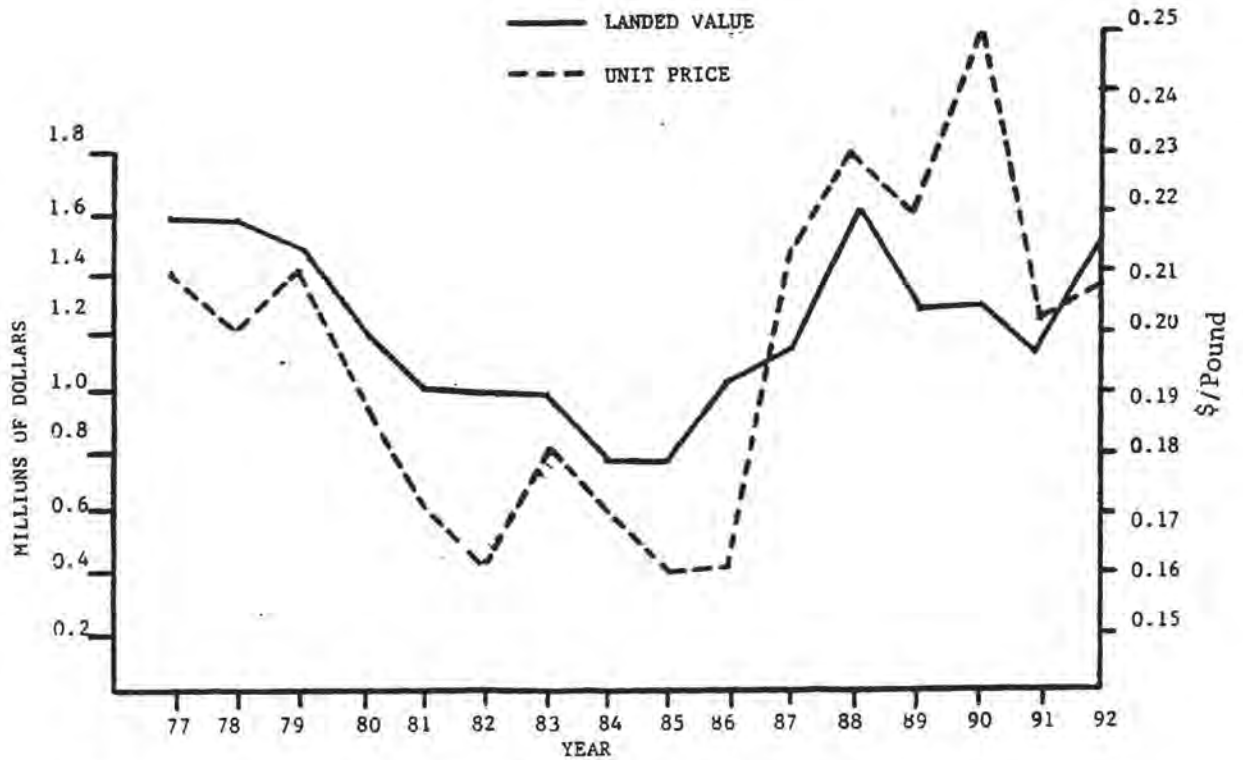


Fig. 10. Adjusted ex-vessel value and unit price of commercial blue crab landings.

Fall openings were September 16 for clams and October 1 for oysters. Heavy and widespread rainfall in coastal areas on October 8-9 resulted in closure of all shellfish areas on October 9 by DHEC. This was lifted in most areas on October 13. The other areas (except Murrells Inlet) reopened on October 24. The fall oyster harvest was 39,549 bu. worth \$418,127.

Total oyster (0.323 M pounds of meats) and clam (0.152 M pounds) production for 1992 was down from the previous year's figures (Fig. 11). About 29% of the oyster harvest came from public grounds. Winter oyster prices were slightly lower than in 1991 but the overall market remained strong with local producers getting about \$25/bu. for selects and singles on the New York market. The adjusted value (Fig. 12) of the total oyster harvest was about 16% higher than for the 1991 production. In contrast, the adjusted value of clams dropped sharply to the lowest levels since 1977. Unit prices were down, reflecting weakened demand due to health concerns, a restaurant recession, and strong supply. Reopenings of previously polluted areas in new England plus increased mariculture production contributed to the availability of product.

Whelk season was opened on February 7 and closed on May 4. About 10,500 bu. (210,000 pounds of meats) were reported landed worth about \$104,000. A major local buyer closed early in the year, which may have curtailed production since there are few markets for this product (most of which is canned for export by northern processors).

OFFSHORE FISH

The volume of offshore fish (3.5 M pounds) declined slightly (-3%) from that landed in 1991 (Fig. 13). Ex-vessel value dropped 18% in current dollars (21% after adjustment for inflation). Production was down in the handline (including wreckfish, -9%), surface longline (-26%), and trap (-64%) fisheries, while the bottom longline fishery reported a substantial gain (197%) (Fig. 14).

Among the principal species groups, volume gains over 1991 landings were reported only for sharks (+ 540%), tilefishes (+61%), and wreckfish (+ 10%) (Fig. 15). Increases in landed value (current dollars) were 296% for sharks, 62% for tilefishes, and 18% for wreckfish. There was relatively little change in the landings of king mackerel and groupers. Declines in landings were appreciable in the other categories (snappers, porgies, swordfish, and black sea bass).

The handline fishery was the most important offshore fishery in terms of landed volume and value. There were three main components: 1) a troll fishery conducted with electric reels and/or rod and reel directed at pelagic species, 2) a snapper (primarily electric) reel fishery for demersal fish, and 3) a deepwater hydraulic reel fishery for wreckfish. Total aggregate landings were 2.24 M pounds worth about \$3.6M.

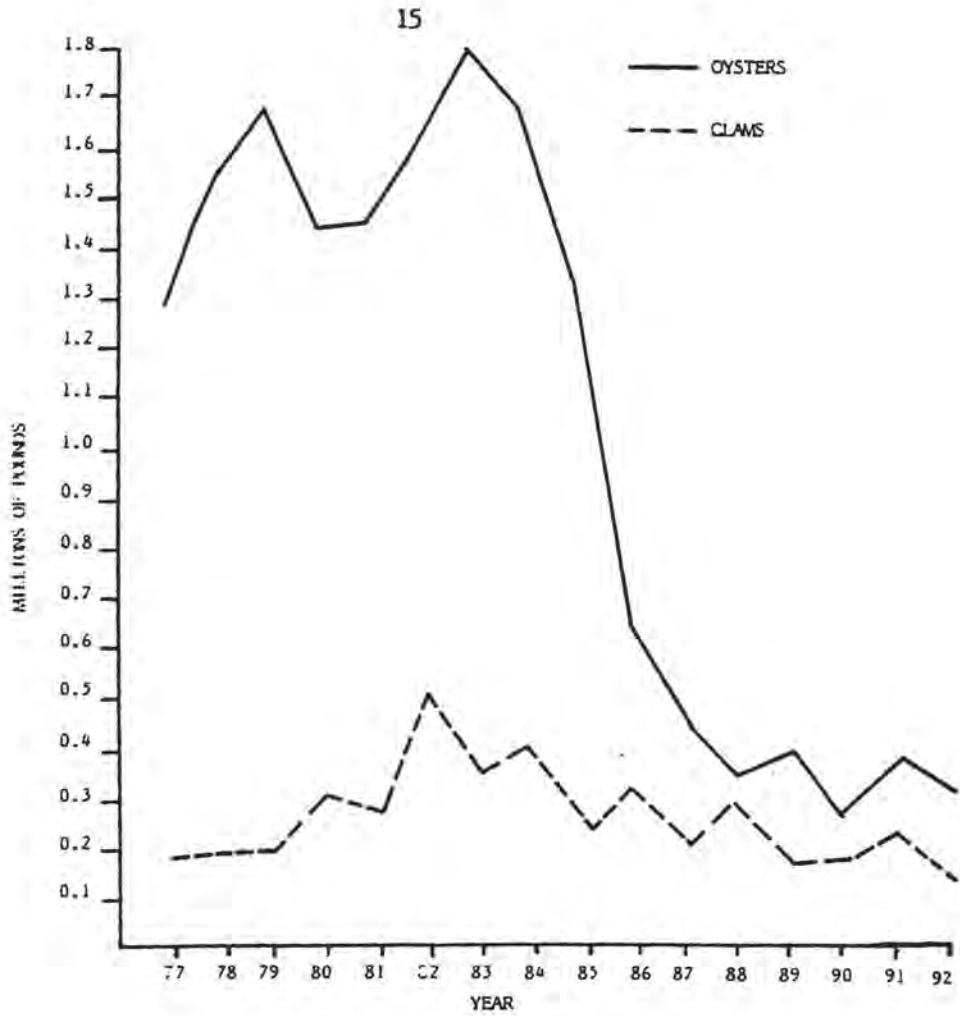


Fig. 11. Annual commercial shellfish landings.

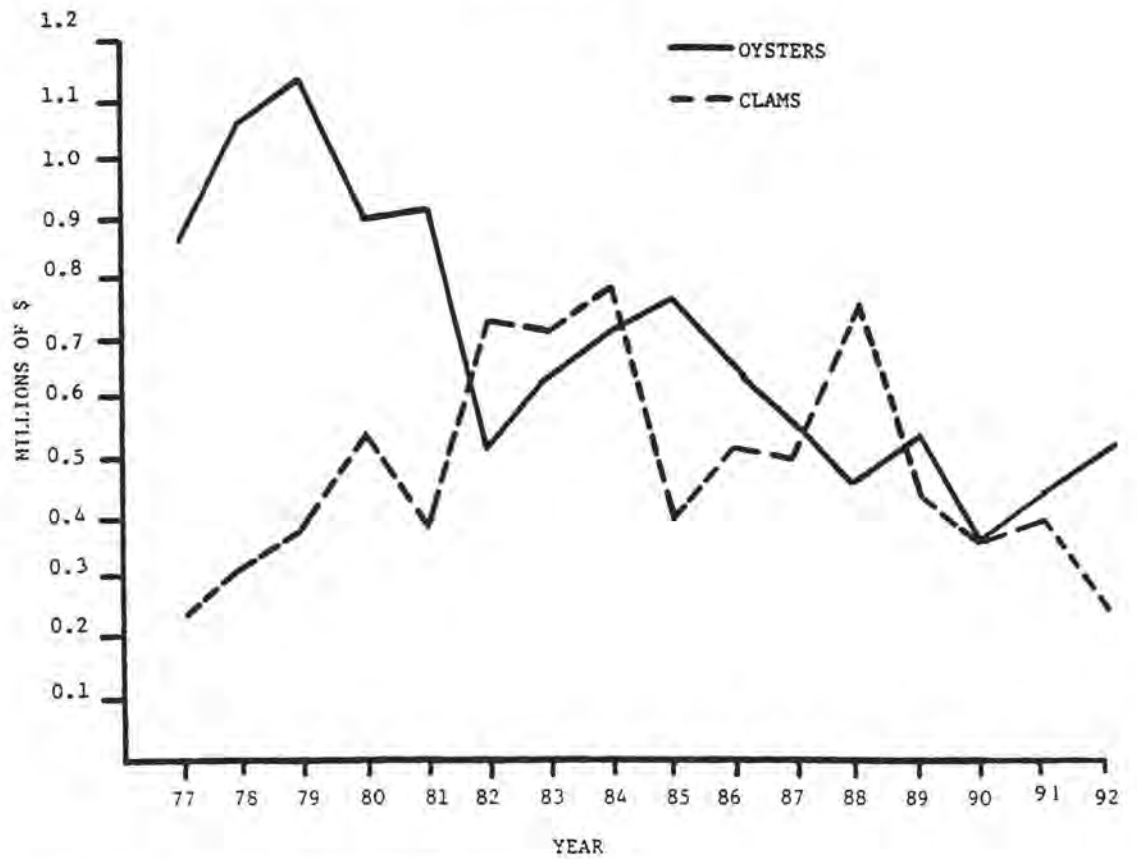


Fig. 12. Adjusted value of shellfish landings.

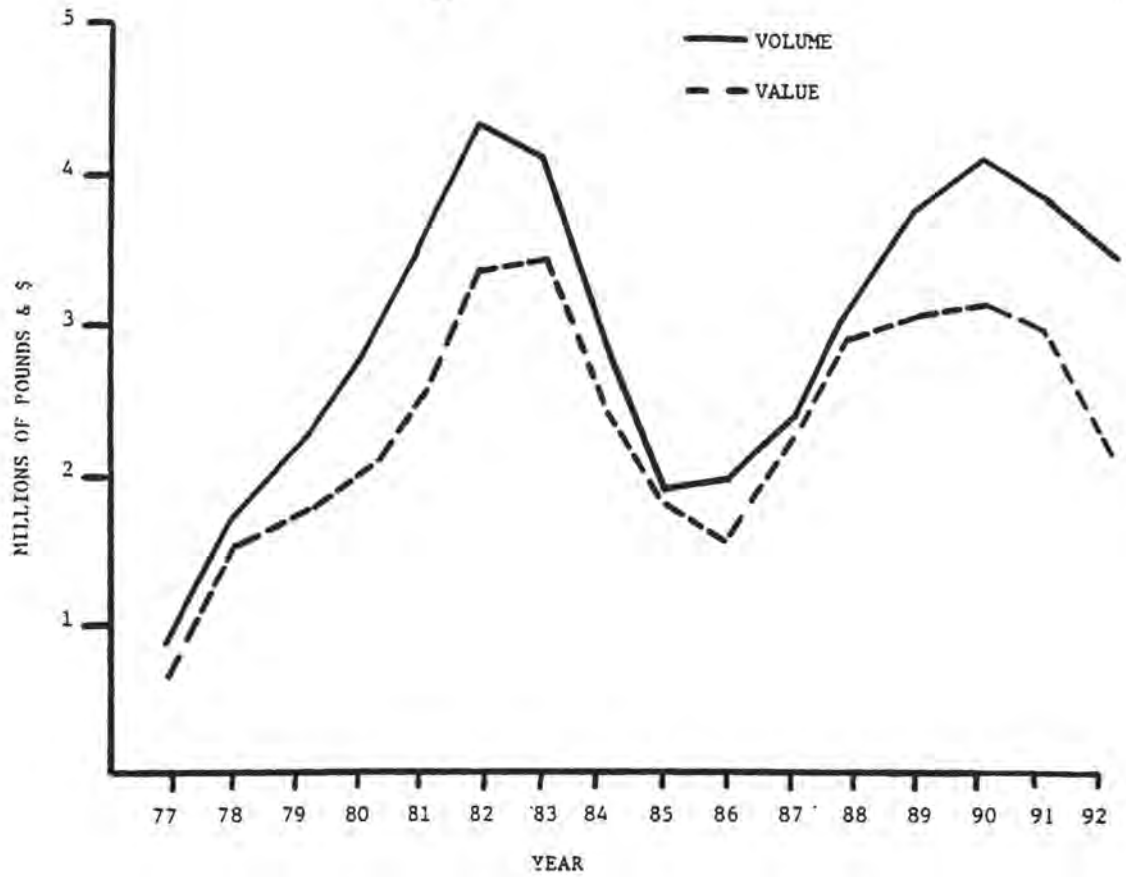


Fig. 13. Annual commercial landings and adjusted ex-vessel value of offshore fish.

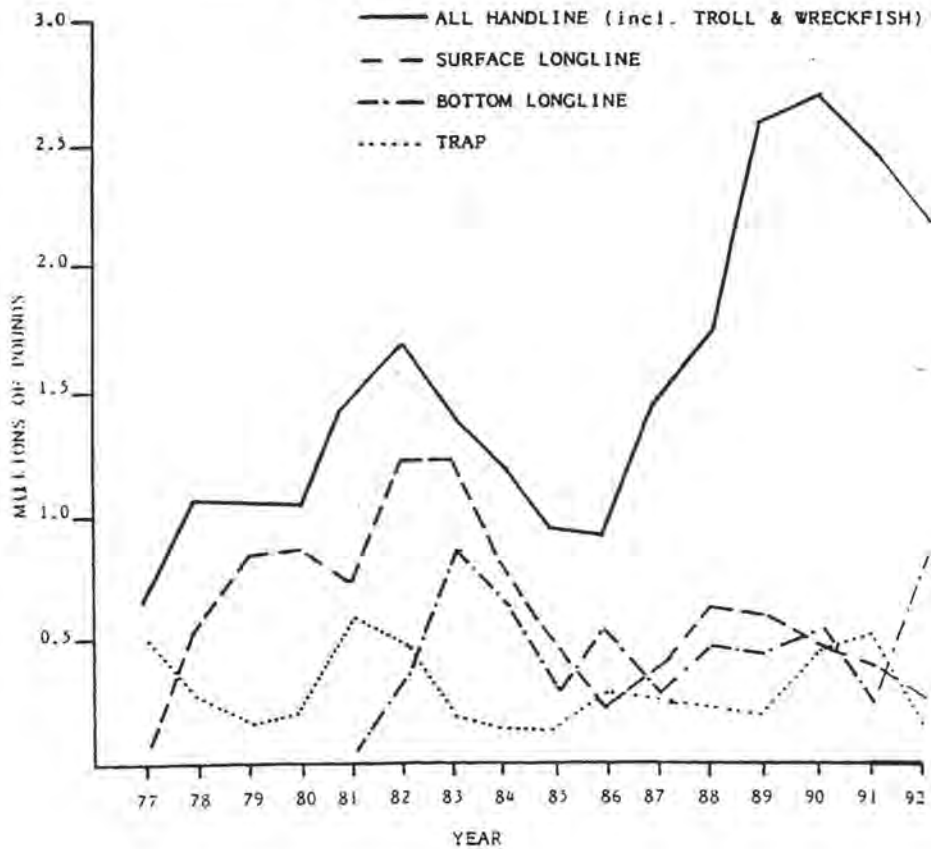


Fig. 14. Annual commercial landings of offshore fish by gear type.

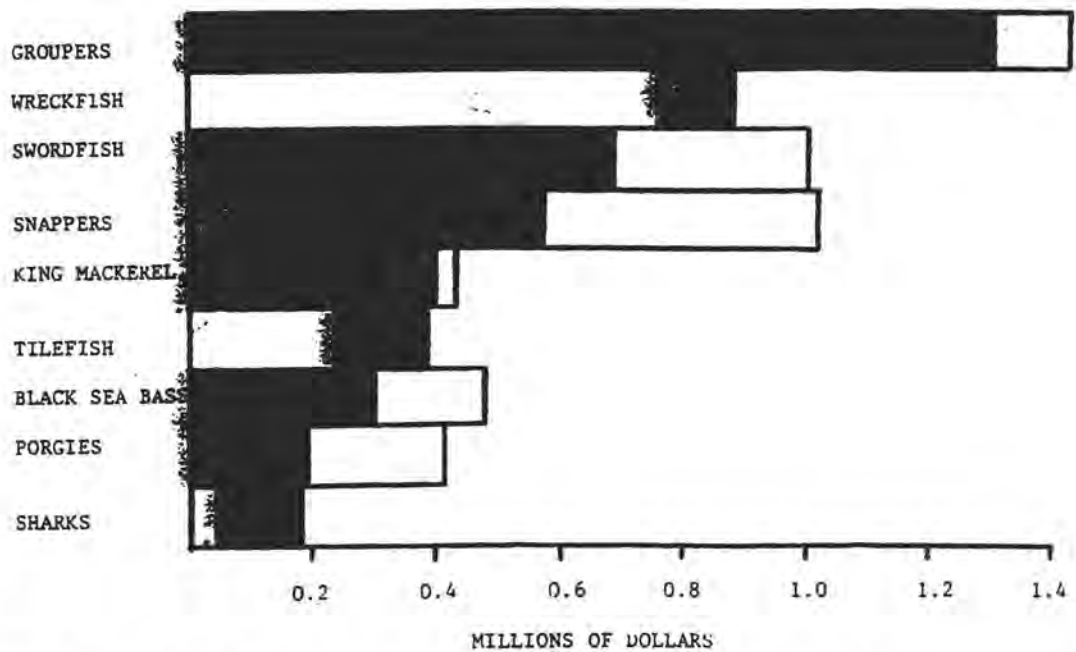
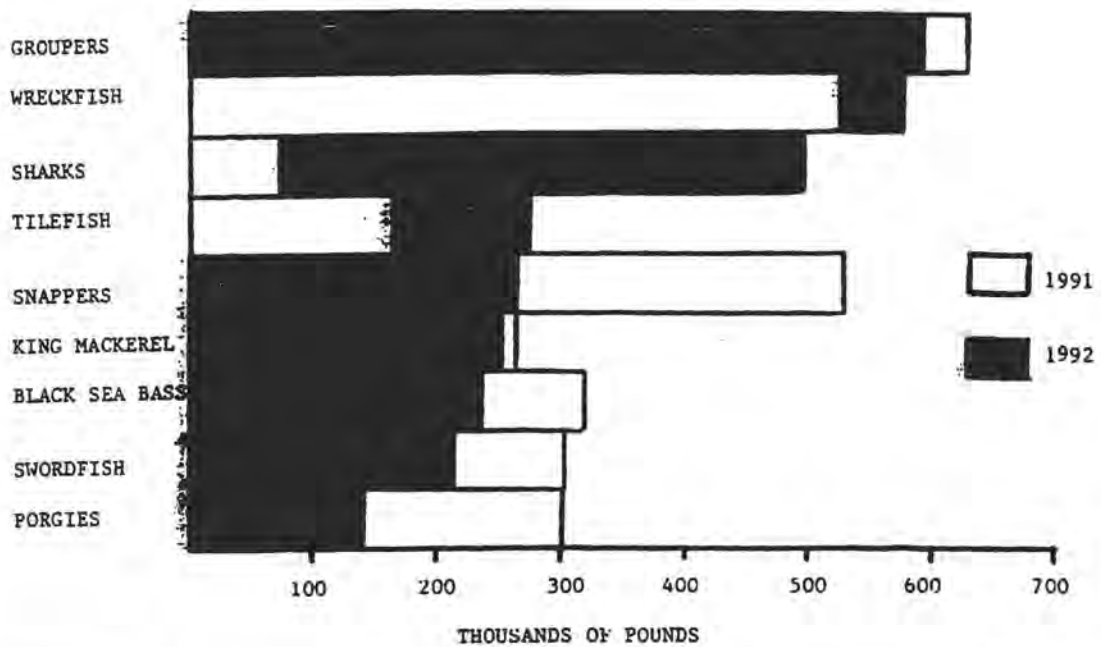


Fig. 15. Landings of major offshore fish groups in 1992 compared to those in 1991.

The troll fishery landed about 0.15 M pounds worth \$0.252M. Landings consisted almost entirely of king mackerel with trollers contributing 56% of the total commercial king mackerel catch of 0.256 M pounds (\$0.4M). Snapper reel fishermen accounted for the rest. Length distribution of kings (Fig. 16) was similar to that in 1991, although the average size was slightly smaller. About 30% of the gear total landings were reported by tickets with 16 boats reporting. Their average CPUE was 660 pounds/trip.

The snapper reel fishery was the largest offshore fish commercial fishery. Participants included full-time commercial boats, part-time boats, moonlighting charterboats, and private boat fishermen with appropriate licenses. A state land-and-sell license was required to land any type of commercial product and, beginning in January, 1992, a federal permit was required to land species included in the snapper-grouper management plan.

Total fleet size was difficult to estimate given its diverse composition and large differences in CPUE associated with each component. Fifty boats reported landings through the trip ticket system, but only 12 averaged more than 1,000 pounds/trip. About 28% of the trips landed were for less than 200 pounds. Overall CPUE was 642 pounds/trip.

Total landings in the snapper reel fishery were 1.514 M pounds worth \$2.462M, down 18% in volume and 23% in value from 1991's figures. Based on ticket CPUE, estimated total effort was 2,358 trips, somewhat less than in 1991. Major volume components were groupers (34%), snappers (17%), and porgies (10%). King mackerel and amberjacks each contributed 7% and black sea bass represented 5%. Sharks, grunts, triggerfish, and a variety of miscellaneous species comprised the remainder.

Total grouper landings were 0.595 M pounds worth \$1.302M. The handline fishery landed 88% and the bottom longline fishery 12% of the volume. The main species was gag, taken almost entirely by snapper reel, with overall landings (0.323 M pounds) equalling the 1981-1991 average (Fig. 17). Amendment 4 to the snapper-grouper management plan, effective in January, 1992, included a 20 in (50.8 cm) total length minimum size limit on gag. About 7% of the sampled 1991 catch by number was below 20 in, suggesting that the impact on the 1992 landings would be minimal. Length distribution of the 1992 catch is shown in Fig. 18. Although the minimum size was in effect, the average size was somewhat less than in 1991 and fish 90 cm were relatively scarce.

The second most important contributor to overall grouper landings was scamp. Overall landed volume was 0.143 M pounds, practically all of which was taken on snapper reels. Overall landings were down appreciably from those of the past few years, although still high by historical standards. The snapper reel landings were down only slightly and some of the decline reflected elimination of the directed trap fishery for species other than black sea bass. In 1991, about 16% of the scamp catch was taken

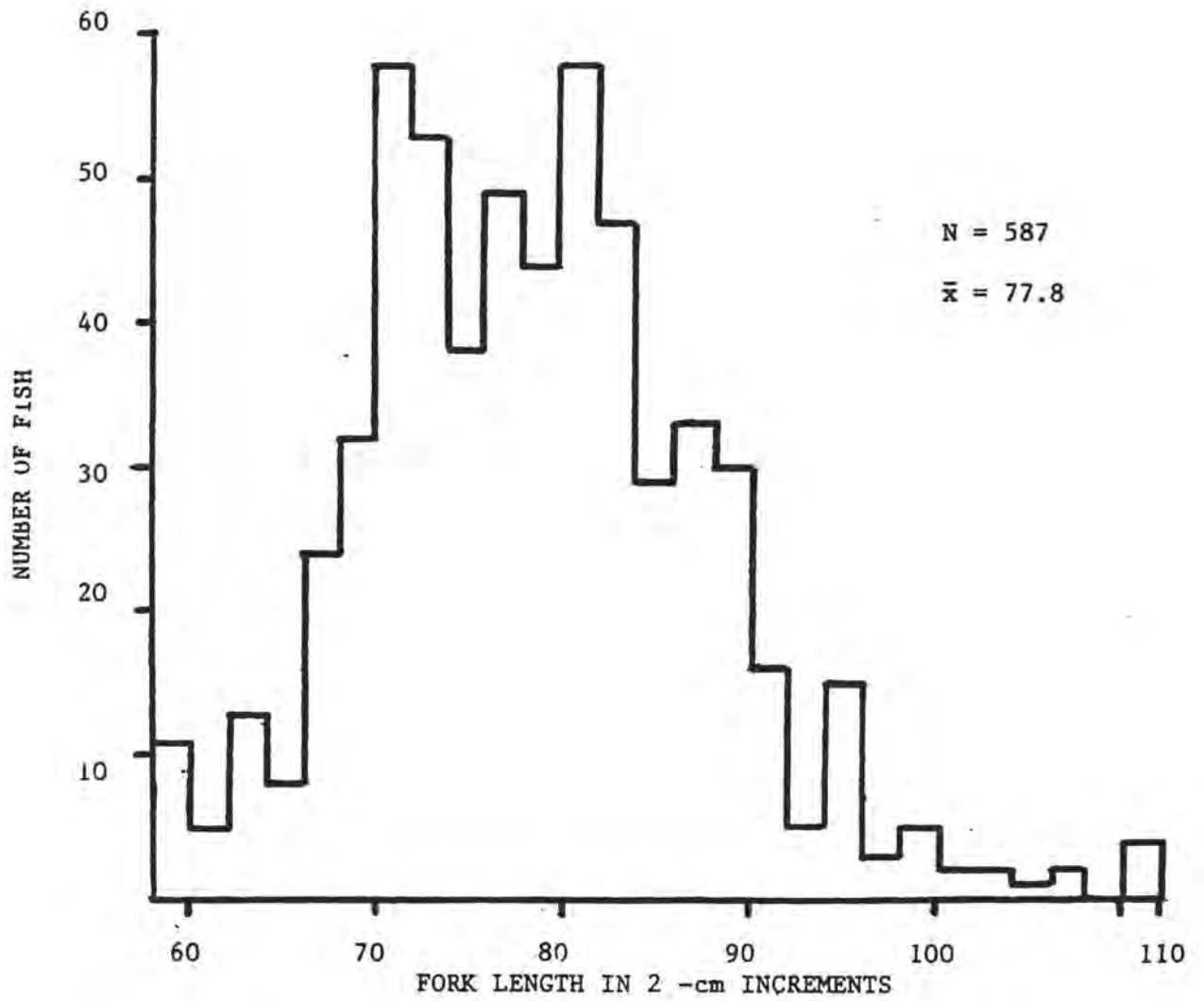


Fig. 16. Length distribution of commercially landed king mackerel in 1992.

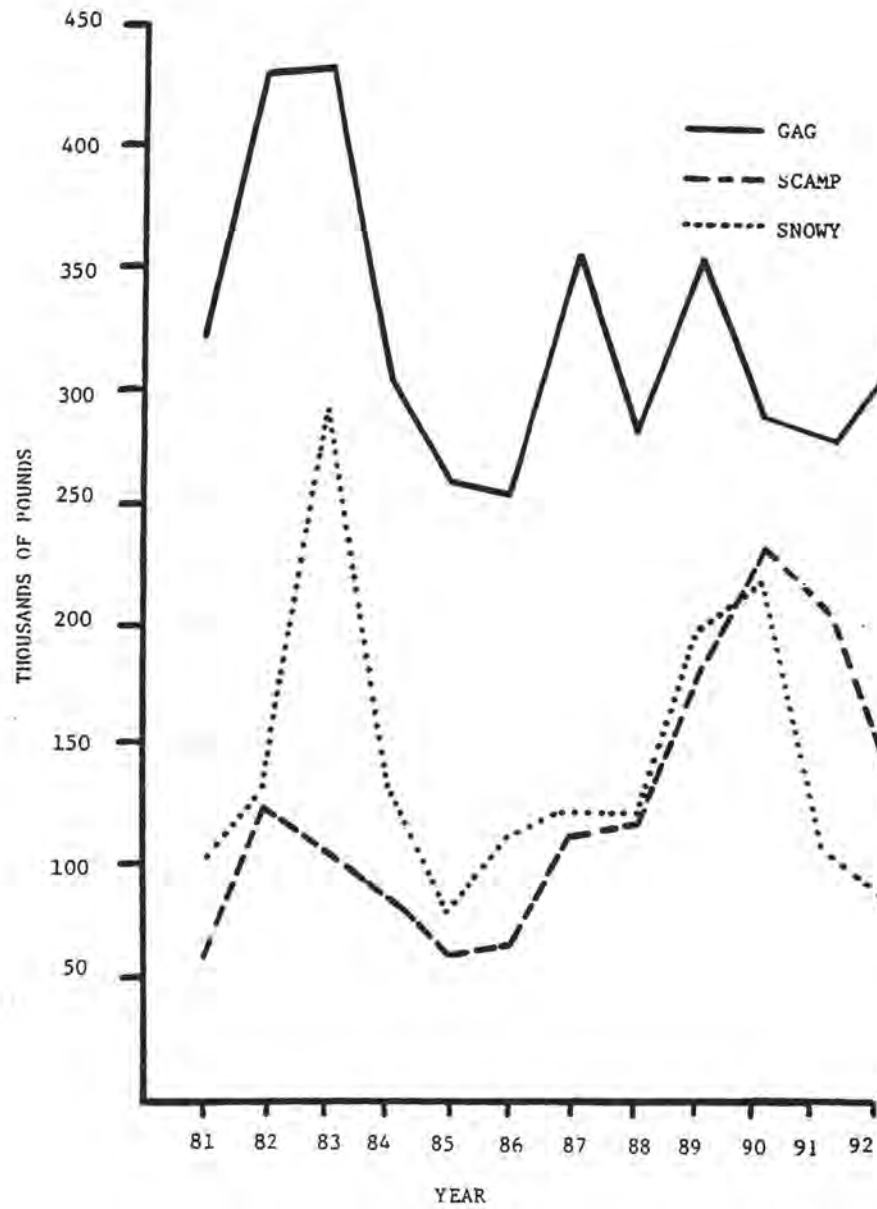


Fig. 17. Annual commercial landings of gag, scamp, and snowy groupers.

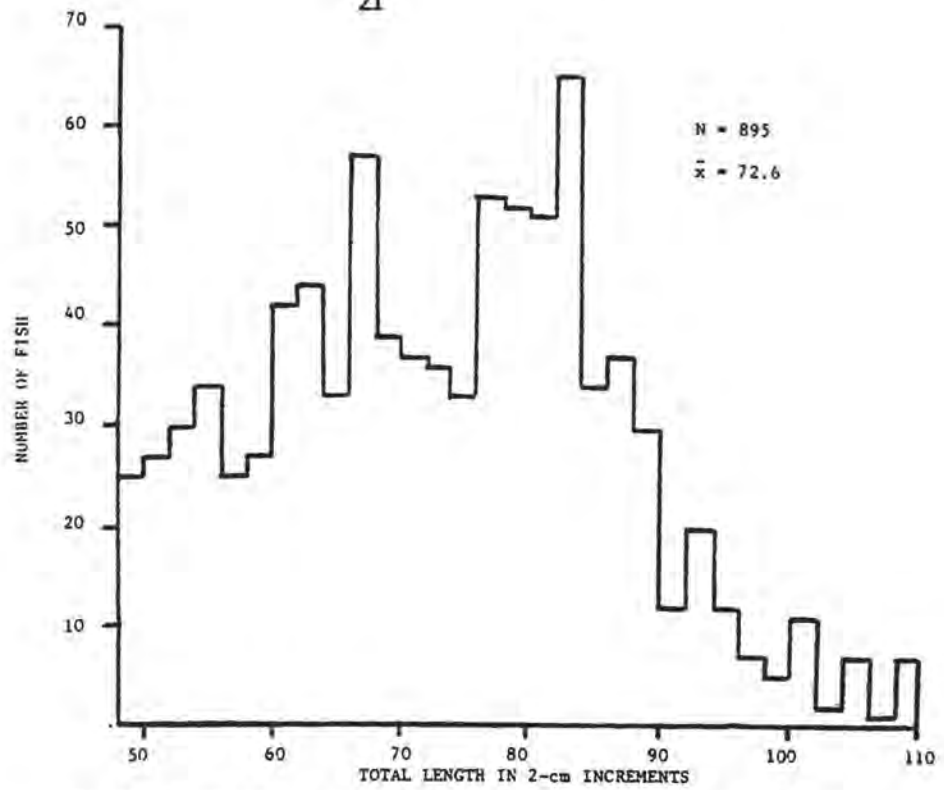


Fig. 18. Length distribution of commercially landed gag groupers in 1992.

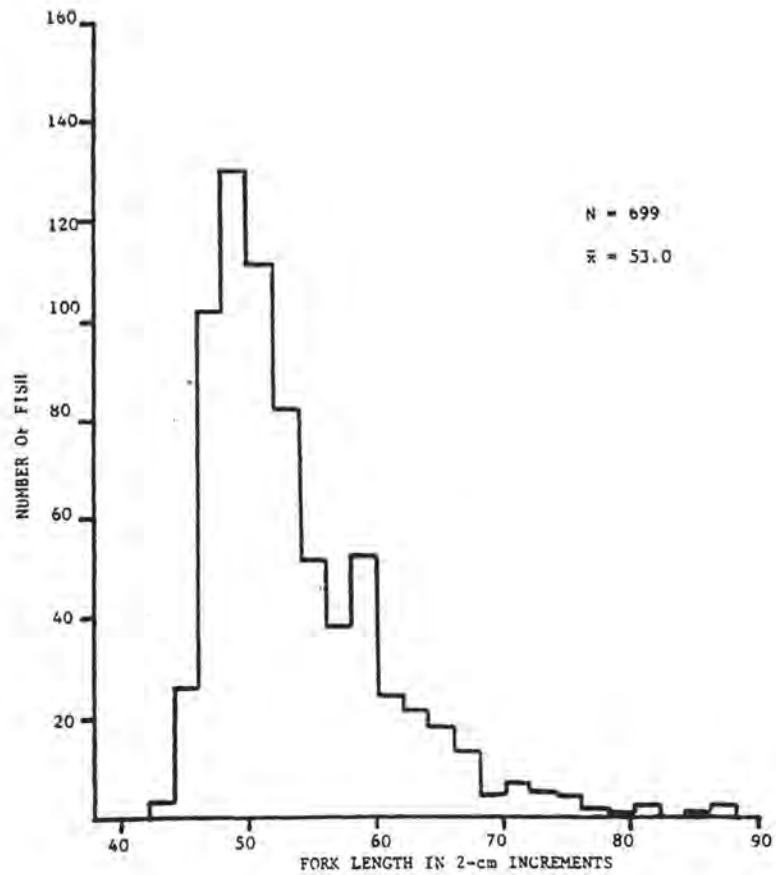


Fig. 19. Length distribution of commercially landed scamp groupers in 1992.

with traps.

The 20 in minimum size limit (equivalent to a fork length of about 18 in or 45 cm) also appeared to have an appreciable impact, since about 24% of the inspected catch (from all gears) in 1991 was below this. About 20% of the trap-caught fish in 1991 were below 45 cm fork length, compared to 26% of the snapper reel catch. Length distribution of the 1992 catch is shown in Fig. 19.

The principal snapper landed by snapper reel fishermen was the vermilion snapper. In 1992, snapper reel fishermen landed 0.227 M pounds worth \$0.477M, compared to 0.447 M pounds (\$0.914M) in 1991. Total landings of this species declined by 53% (Fig. 20). In 1991, trap-caught fish accounted for only 7% of the total landings, so the elimination of trap landings was probably not much of a factor. The impact of the 12 in (30 cm) total length minimum size limit contained in Amendment 4 accounted for most of the decline, since half of the 1991 overall catch was below this size. Fig. 21 illustrates the length distribution of the 1992 landings.

Landings of red snapper were influenced by imposition of a larger size limit in 1992 (20 in compared to 12 in 1991). Overall landings declined by 40%. Nearly 65% of the fish measured in 1991 were less than 50 cm (about 20 in). Length distribution of the fish measured in 1992 is shown in Fig. 22.

Historically, red porgy was one of the most important species of offshore fish, representing over 25% of the snapper reel landings by weight in the late 1970's. In 1992, the species contribution was about 9% and snapper reel landings were the lowest to date (Fig. 23). Part of the decline in 1992 landings reflected elimination of the directed trap fishery, since about 29% of the 1991 catch was landed by trap boats. Amendment 4's 12 in minimum size limit apparently had an appreciable effect, since 19% of the 1991 snapper reel sampled catch was below this. Length distribution of the 1992 sample is shown in Fig. 24.

In 1992, the wreckfish fishery was managed under an individual transferable quota (ITQ) system, wherein the number of participants was limited and each had a quota composed of shares. These shares could be transferred between participants and shareholders could take their allocations during the open season as conditions warranted. Some gear restrictions applied and the season was closed during the January 15-April 15 spawning period. In 1992, eight boats reported on the ticket system and averaged 7,112 pounds/trip. Total South Carolina effort was estimated at 81 trips. South Carolina fishermen have generally accounted for about one-quarter of the regional effort and landings. Length distribution was as shown in Fig. 25.

The surface longline fishery was directed at swordfish. Landings of this species continued to decline and were the lowest since 1988. For only the second time since 1978, ex-vessel value fell below \$1 M (in current dollars). Surface longliners took most

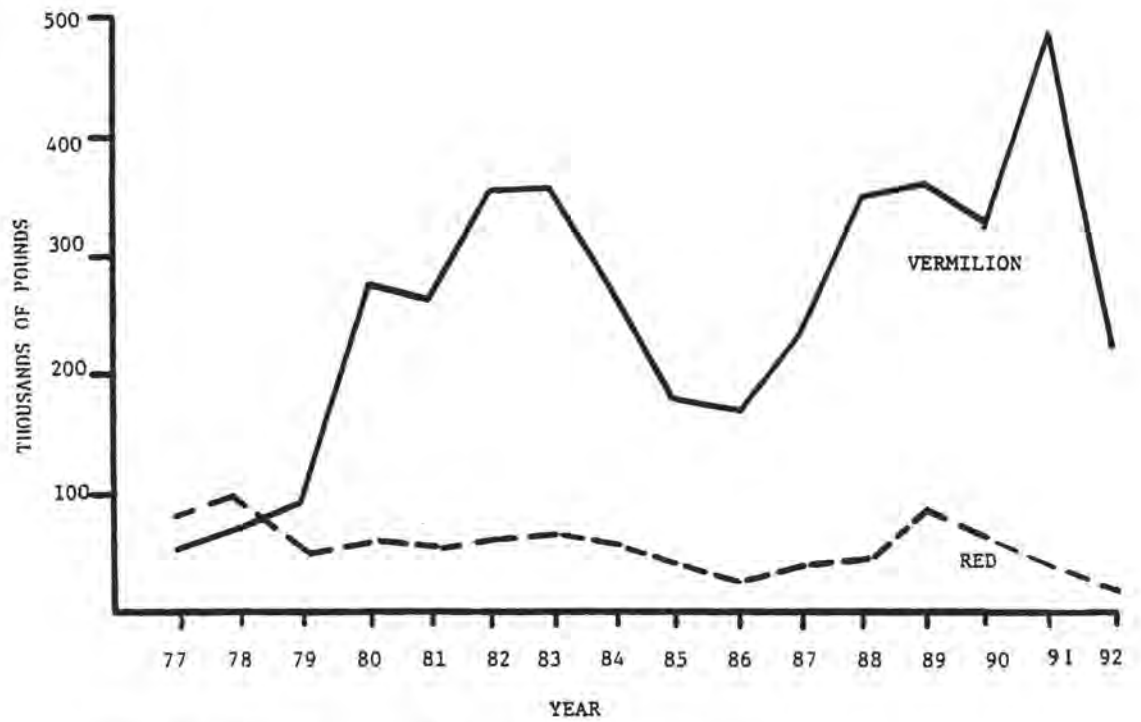


Fig. 20. Annual commercial landings of snappers.

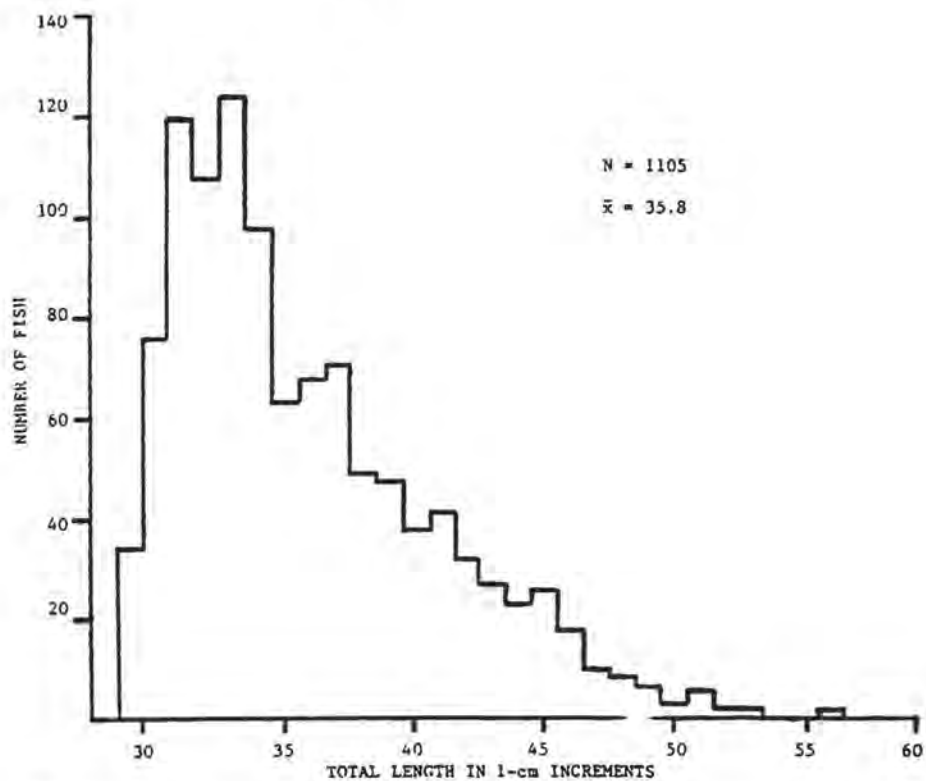


Fig. 21. Length distribution of commercially landed vermilion snappers in 1992.

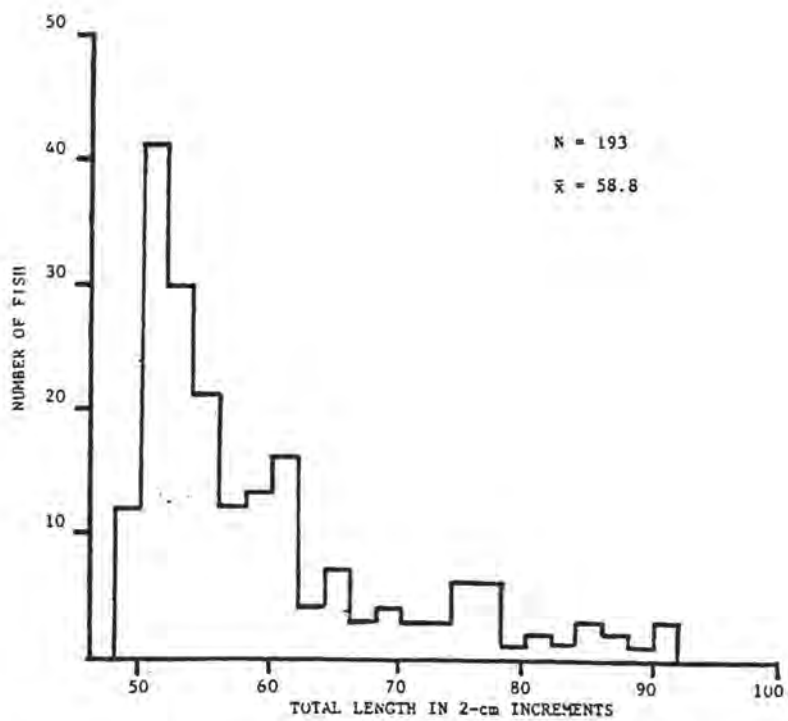


Fig. 22. Length distribution of commercially landed reo snappers in 1992.

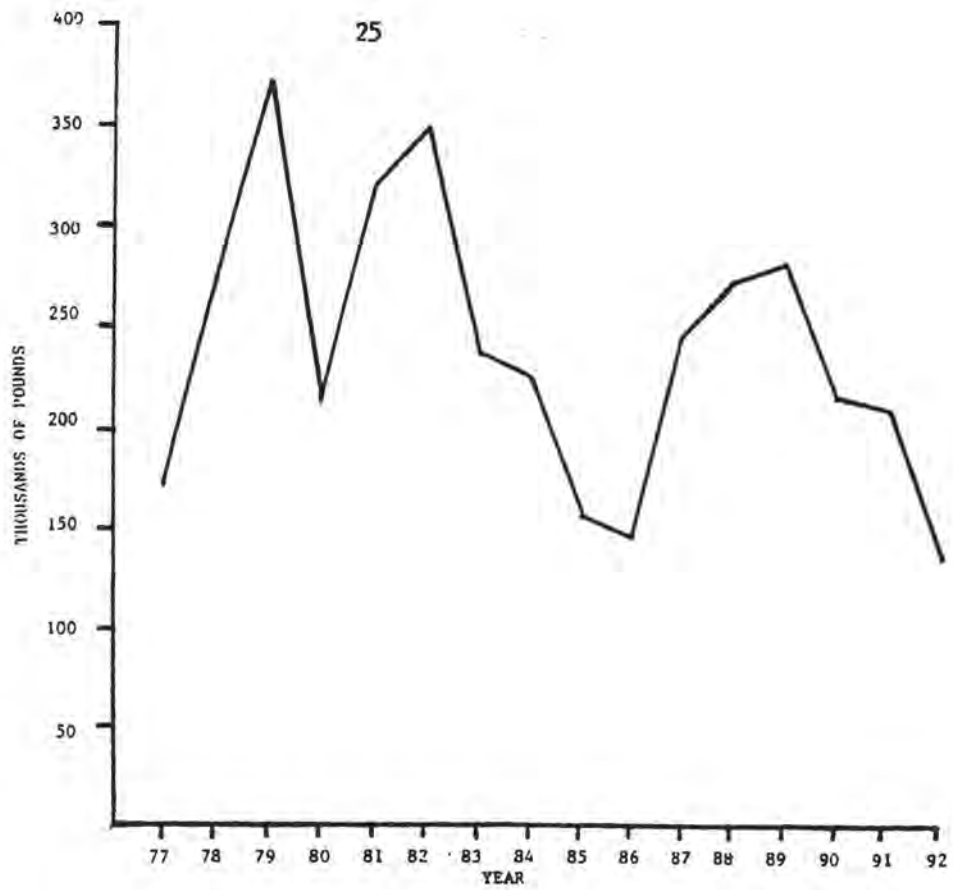


Fig. 23. Landings of red pogy with snapper reels.

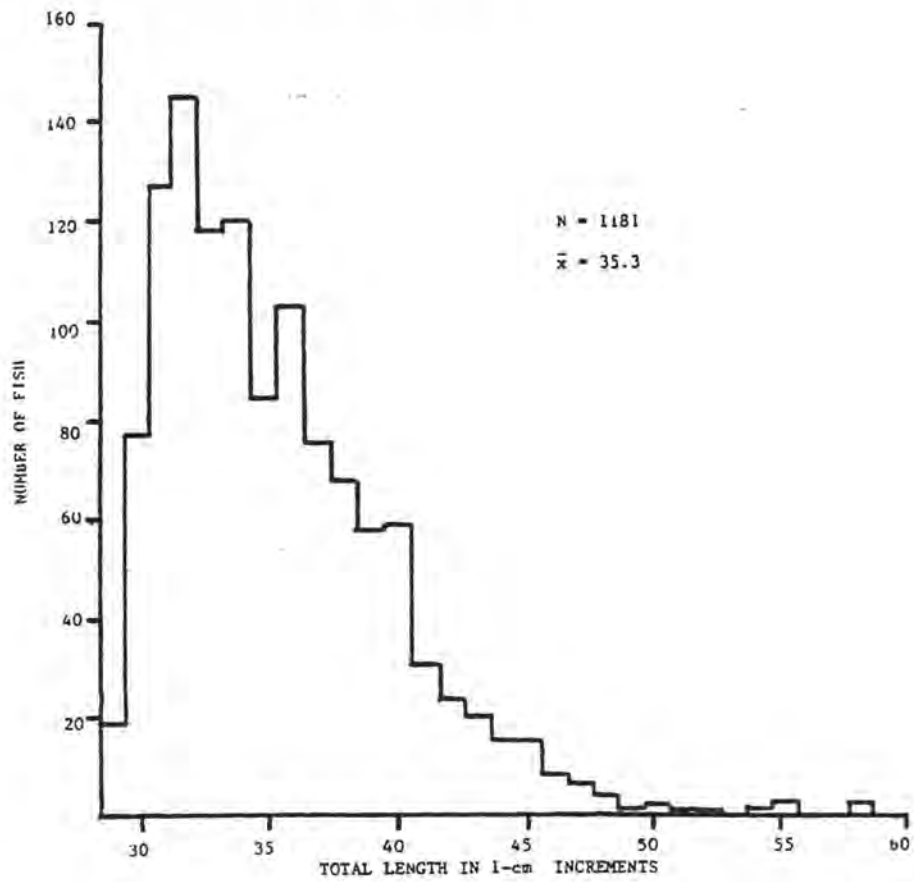


Fig. 24. Length distribution of commercially landed red pogy in 1992.

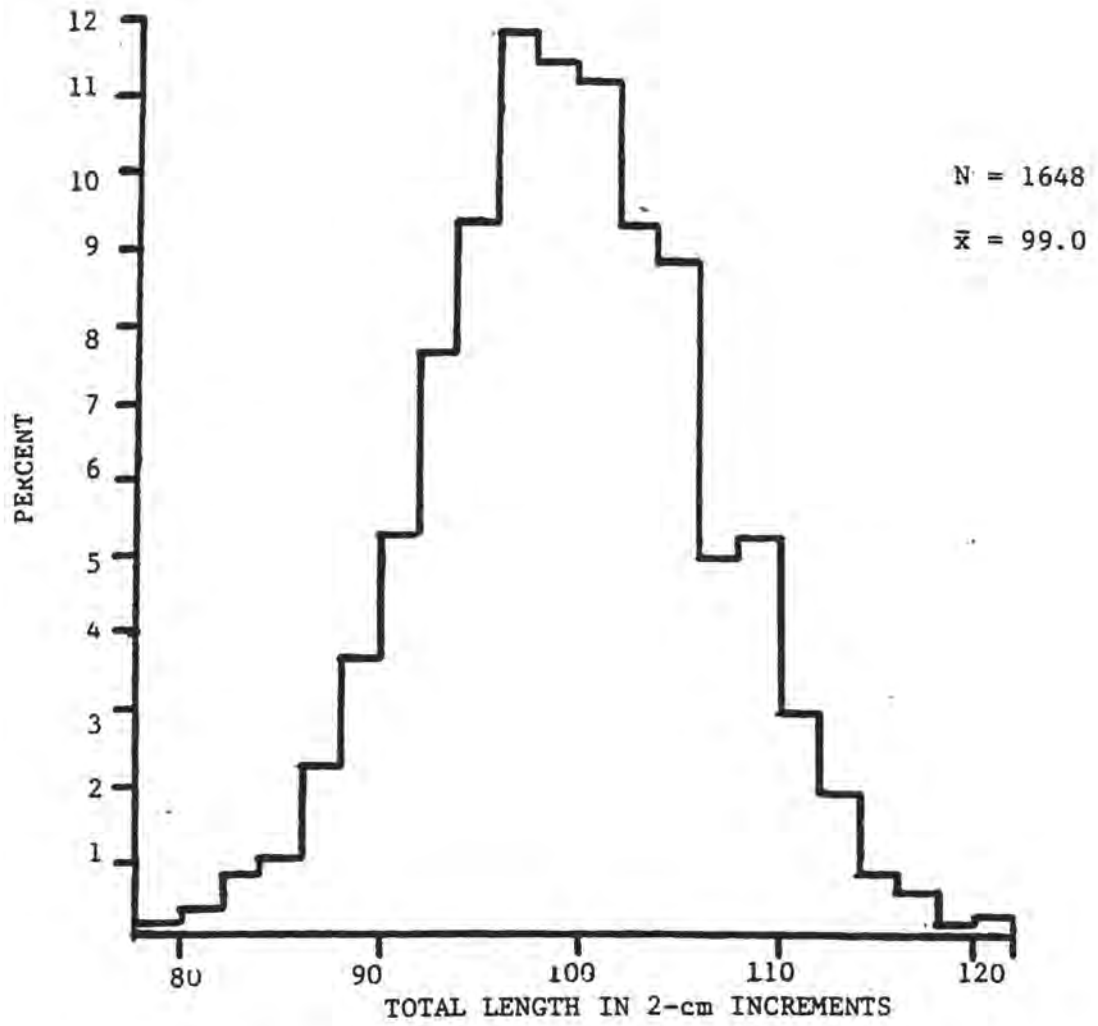


Fig. 25. Length distribution of wreckfish in 1992.

of the catch of oceanic pelagics (dolphin, wahoo, and tunas). Tunas, principally yellowfin, represented 13% of the total longline landings, sharks 10%, and dolphin 9%. Overall landings of oceanic pelagics (dolphins, wahoo, and tunas) were down 21% from those in 1991 (Fig. 26). Average CPUE reported by the ticket boats (N = 15) was about 2,400 pounds/trip for all species combined (including swordfish), substantially less than in recent years. The estimated total number of trips was 133.

The use of bottom longline for snapper-grouper in less than 50 fathoms was prohibited effective in January as was longlining for wreckfish. Sharks represented 51% of the volume and 22% of the ex-vessel value. Average CPUE on bottom longline trips targeting sharks was 2,741 pounds/trip with an estimated 149 shark trips. Bottom longliners contributed 69% of the overall shark catch, which was the largest to date (Fig. 27). Offshore shark landings consisted of fish caught with offshore gears (i.e., longlines and snapper reels), while inshore landings included sharks caught in various gill nets and shrimp trawls. The bottom longline catch represented 82% of the offshore component, snapper reel 12%, and surface longline 6%. Most of the inshore landings came from gill nets, particularly shad set nets. Overall unit value (about \$0.35/pound) was appreciably lower than in recent years.

The principal other species landed by bottom longliners was golden tilefish. Total landings of this species were 0.242 M pounds, virtually all landed by longliners, the largest since 1986 (Fig. 28). Length distribution is shown in Fig. 29. The average size was slightly lower than in 1991. Landings of blueline tilefish, mostly by longliners, were also relatively high and exceeded those of snowy grouper (by longline gear) for the first time.

Longline landings of snowies (54,255 pounds) were the lowest since the beginning of the longline fishery in 1981. Length distribution is shown in Fig. 30. The overall average size increased slightly in 1992. Snowies taken by longline in 1991 averaged 56.9 cm, while those in 1992 averaged 61.4 cm. The percentage of longline fish in the overall 1991 sample was a little lower than that in 1992. (Fig. 30 includes snapper reel and longline fish).

The average CPUE for bottom longline trips targeted at species other than sharks was 2,452 pounds/trip. The estimated number of trips was 159.

The remaining major offshore fish fishery was the trap fishery. Effective in January, only black sea bass pots were allowed and species other than sea bass could not be retained during most of the year. Thus, the 1992 landings consisted almost entirely of black sea bass (0.162 M pounds). Thirteen boats reported landings through the ticket system, half the 1991 participation. Average CPUE was 837 pounds/trip (two-thirds of the 1991 mean) and the estimated number of trips was 203, down 45%. Graded trap landings contained

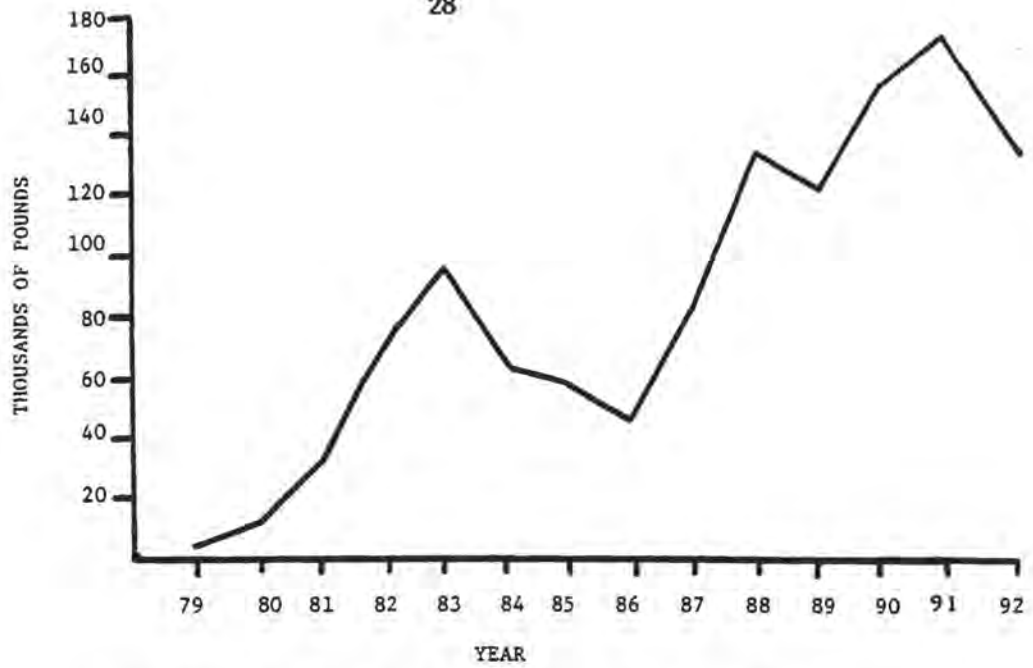


Fig. 26. Annual commercial landings of pelagic species.

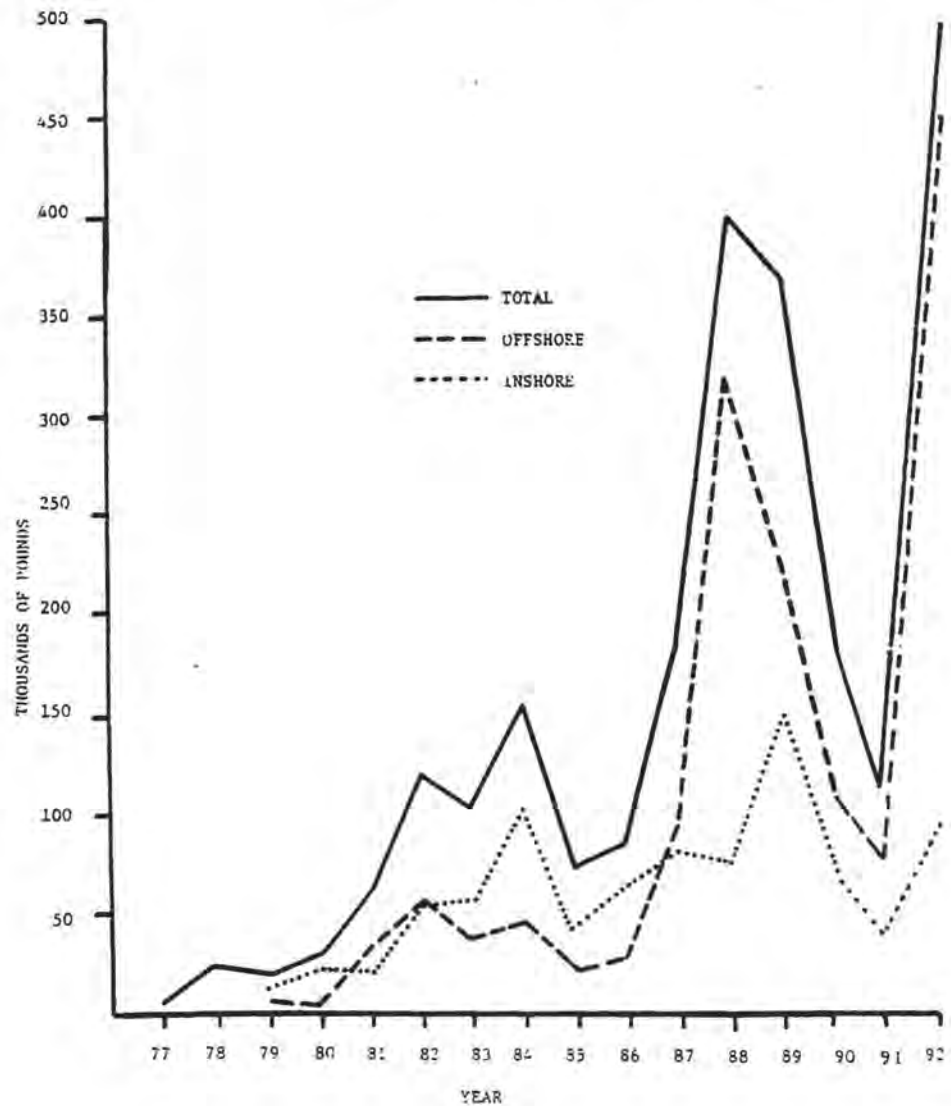


Fig. 27. Annual commercial landings of sharks.

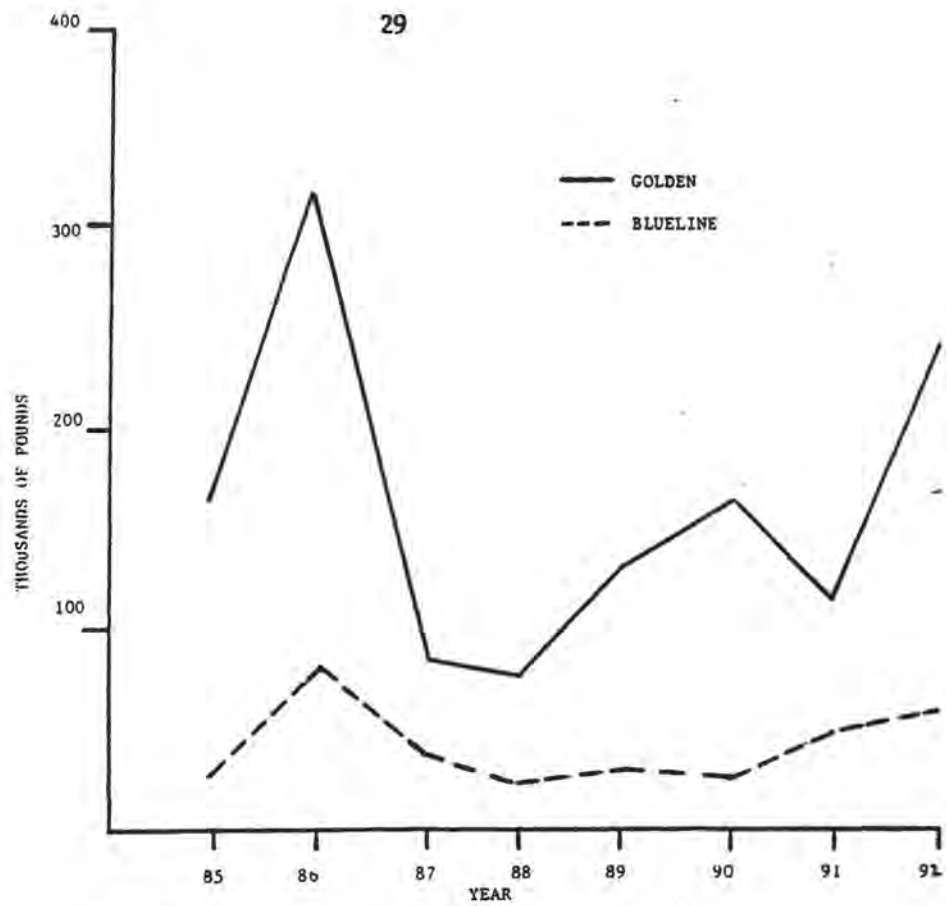


Fig. 28. Annual commercial landings of tilefishes.

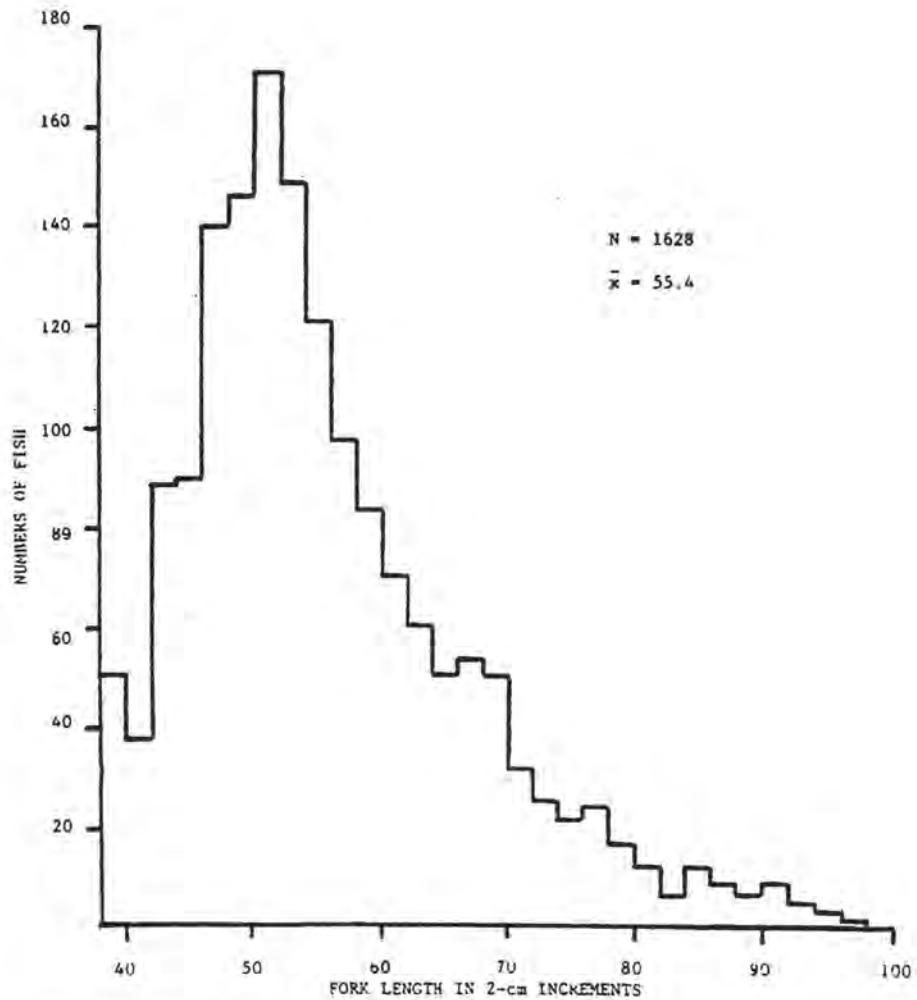


Fig. 29. Length distribution of golden tilefish in 1992.

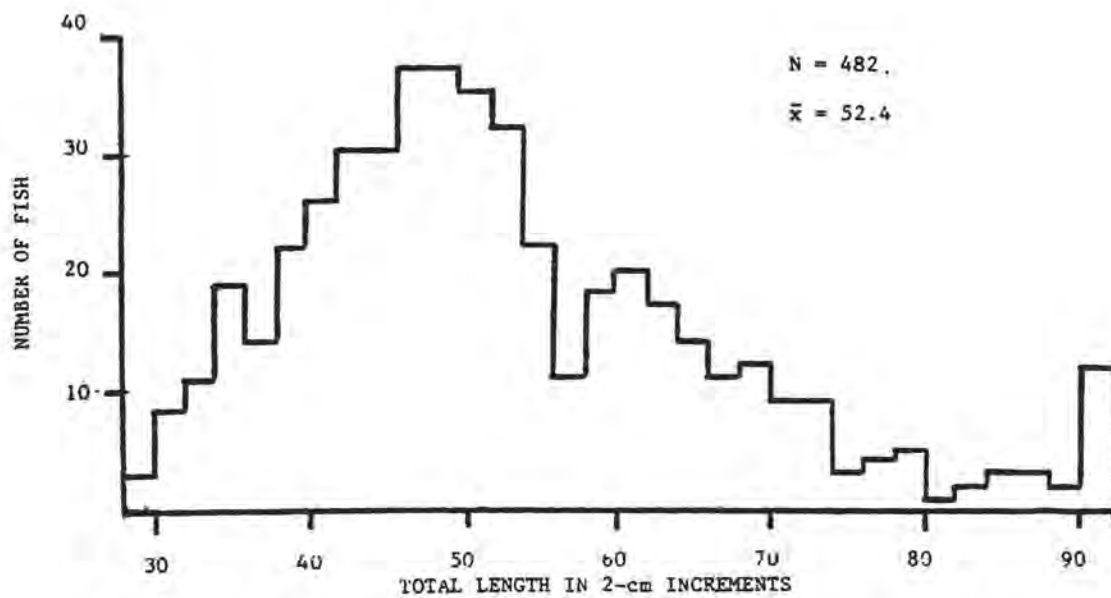


Fig. 30. Length distribution of commercially landed snowy groupers in 1992.

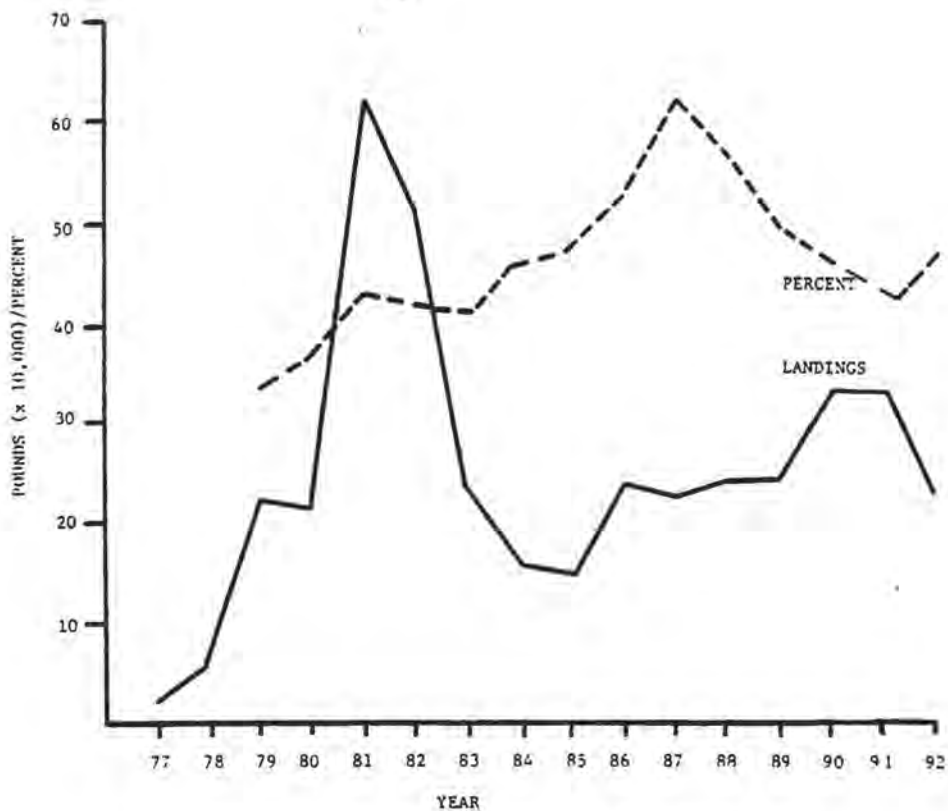


Fig. 31. Annual commercial landings of black sea bass and percentage of small fish in graded trap landings.

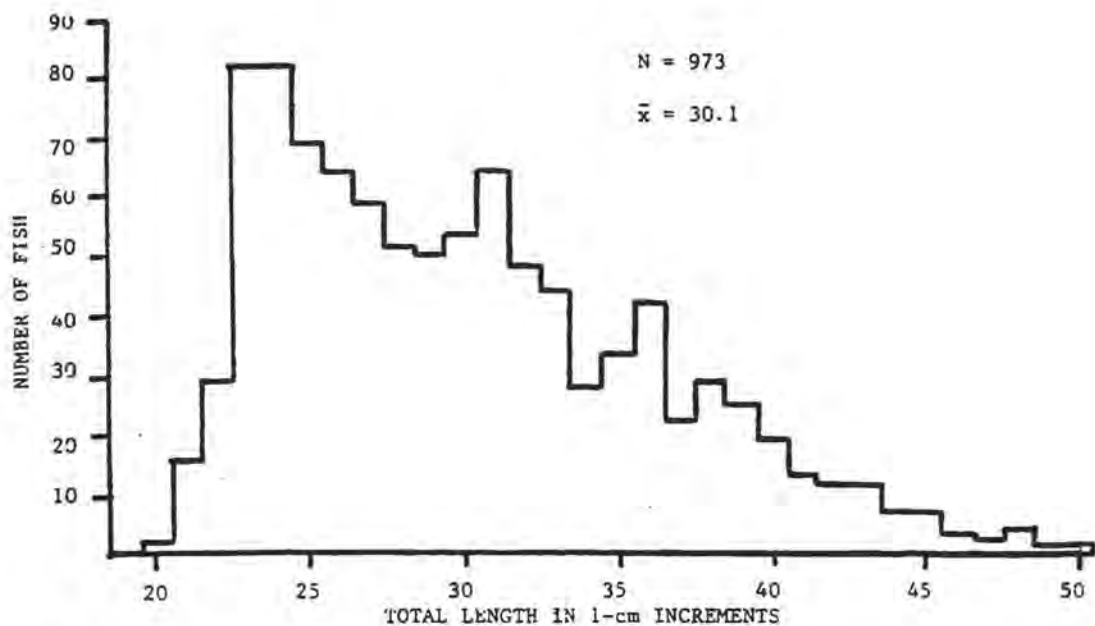


Fig. 32. Length distribution of trap-caught black sea bass in 1992.

48% small fish, a slightly higher percentage than in the past two years (Fig. 31). About 67% of the total landings shown in Fig. 31 consisted of trap-caught fish. Length distribution of sampled trap landings is shown in Fig. 32. The average size remained virtually unchanged.

COASTAL FISH

Overall landings were 0.442 M pounds worth \$0.150 M. Volume was the highest since 1988, due mainly to increased haul seine landings of spot, with increases in each major gear category.

The haul seine fishery averaged more than 0.5 M pounds a year prior to Hurricane Hugo. The storm struck immediately prior to the 1989 season, fouling the beaches and driving migrating fish offshore. The fishery depends on mullet and spot. In recent years, beach access has become increasingly limited and the number of net gangs has steadily declined. There also appears to have been a weakening in demand for locally produced fish, which were primarily marketed to inland low-income consumers. All of the 1992 mullet production was attributable to the haul seine fishery and, while up appreciably from 1991, remained very low by historical standards (Fig. 33). After several years of minimal landings, spot production improved substantially.

In recent years, a substantial portion (38% in 1992) of the coastal fish catch has consisted of incidental landings of the shrimp trawlers. Most of this has consisted of kingfishes (whitings), sharks, and spot. Flounders were formerly a significant component but not in recent years. Overall landings of kingfishes (nearly all from shrimp trawlers) increased moderately in 1992 (Fig. 34) and were slightly above the 15-year average. Shark landings from trawlers were also a little above average. Flounder landings were almost entirely from the trawlers and remained very low by historical standards. The 12 in minimum size limit and TED usage appear to be significant underlying causes for the low landings in recent years.

Gill netters produced 16% of the coastal fish in 1992, nearly all of it sharks. The use of gill nets has been severely restricted in recent years because of opposition from sport fishermen and conservation concerns.

RIVER FISH

Virtually all of the landings in 1992 consisted of American shad. Nearly 96% of the shad were roe fish (0.236 M pounds worth about \$0.216M). The unit value of roe fish (\$0.92/pound) was appreciably above the 1991 price. Shad landings (Fig. 35) were virtually identical to those in 1991 and were taken under similar conditions, i.e., above-average rainfall and cool weather, that probably reduced catchability. The 1992 landings were about 75% of the 15-year average. Total landings were probably under-estimated since much of the upriver production was typically unreported.

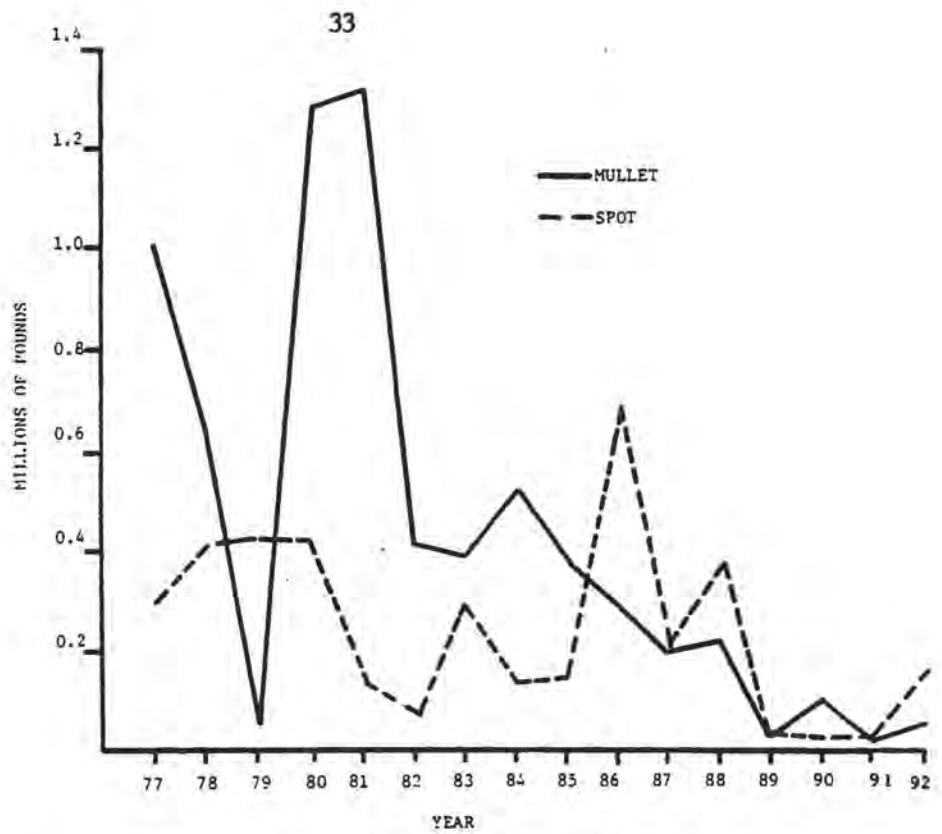


Fig. 33. Annual commercial landings of mullet and spot.

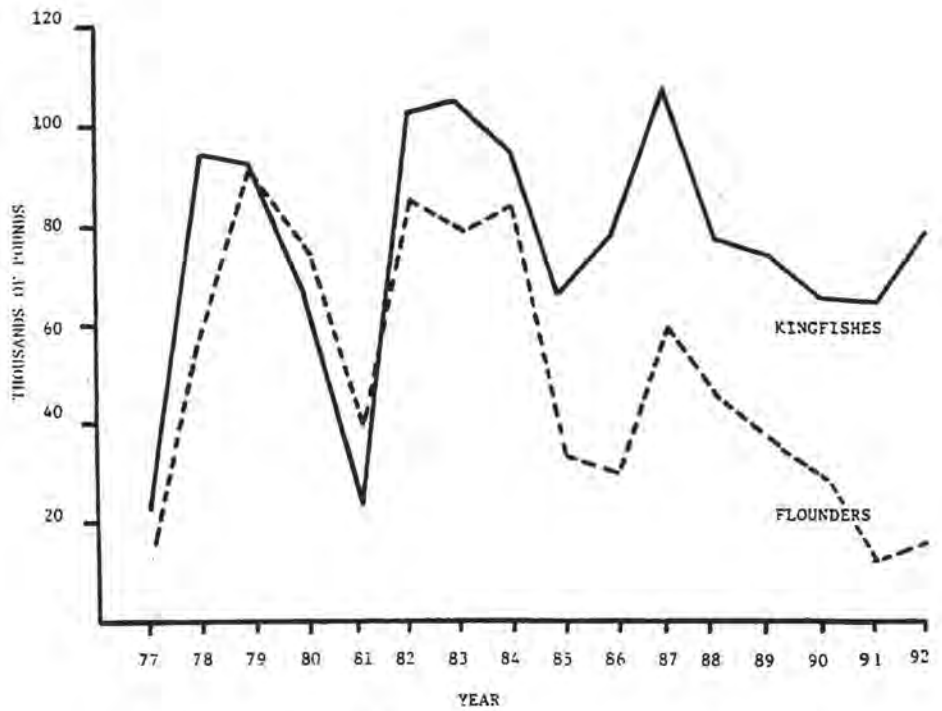


Fig. 3a. Annual commercial landings of kingfishes (whiting) and flounders.

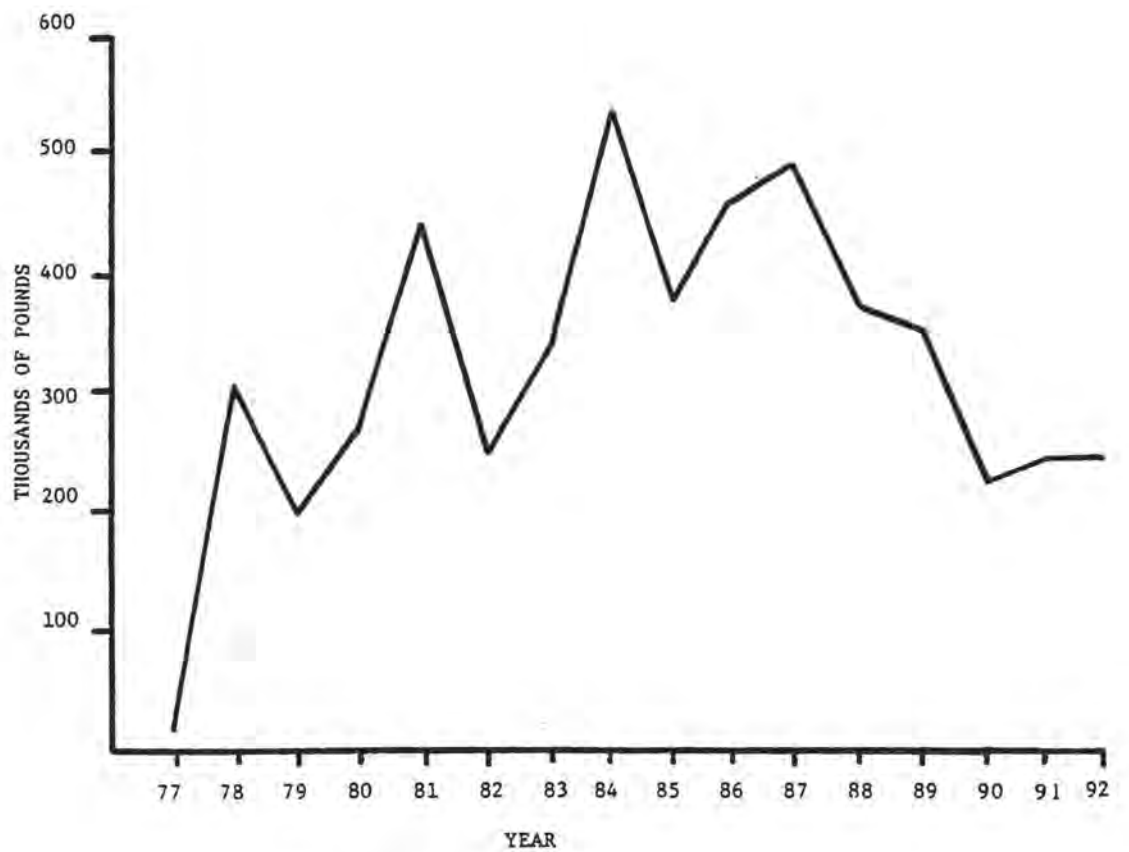


Fig. 35. Annual commercial landings of shad.

RECREATIONAL FISHERIES

The most significant legislative action affecting marine recreational fisheries in 1992 was the Recreational Fisheries Conservation and Management Act. Signed into law in May of 1991 and effective beginning July 1, 1992, this legislation is intended to provide information and funding necessary for proper management and conservation of the state's marine recreational fishery resources. It requires the purchase of a stamp by recreational fishermen for the harvesting of shellfish and/or anglers fishing from private boats. Pier, charterboat, and headboat operators are required to purchase annual permits; fishermen utilizing these facilities are not required to have a stamp. Shore-based anglers are also exempt from the stamp requirement. Roughly 80,000 stamps were sold during FY 1992/1993. During 1992, 107 charterboats, 22 headboats, and 10 piers obtained permits.

Effective in January, 1992, several changes in minimum size and bag limits for offshore reef species were promulgated by amendment to the South Atlantic Fishery Management Council's snapper-grouper plan. These included: 1) a 10 in TL size limit and 10 fish per day bag limit for vermilion snapper, 2) a 12 in TL size limit on red porgy, 3) a 20 in TL size limit and two fish bag limit on red snapper, 4) a five fish in aggregate bag limit for most groupers, 5) a 20 in TL size limit for gag, scamp, and red groupers, and 6) a 28 in FL and three fish bag limit on amberjack. The king mackerel bag limit remained at five fish and that for Spanish mackerel at 10 with a 14 in TL (12 in FL) minimum size for both species.

Catch and effort statistics for the headboat fishery were based on the independent NMFS survey and are discussed separately. The following sections refer to the shore-based, charterboat, and private boat modes. Although charterboat operators were required by the stamp act to submit reports of their daily fishing activity beginning July 1, the following information (except where noted) is based only on data collected during the MRFSS. It is emphasized that the information presented is based on preliminary MRFSS figures, since the final estimates were not available at the time the report was prepared.

PARTICIPATION AND EFFORT

Total participation in the shore, charterboat, and private boat modes was estimated at 315,000 fishermen, the lowest since the MRFSS's inception in 1979 with the exception of the hurricane year of 1989 (Fig. 36). This represented a 28% decrease from the previous year and was far below the projected level (dashed line in Fig. 36). Since 1979, the average annual increment in overall participation has been only about 0.125%. There were an estimated 81,000 state residents of coastal counties, 57,000 noncoastal residents, and 178,000 anglers from out of state. In each

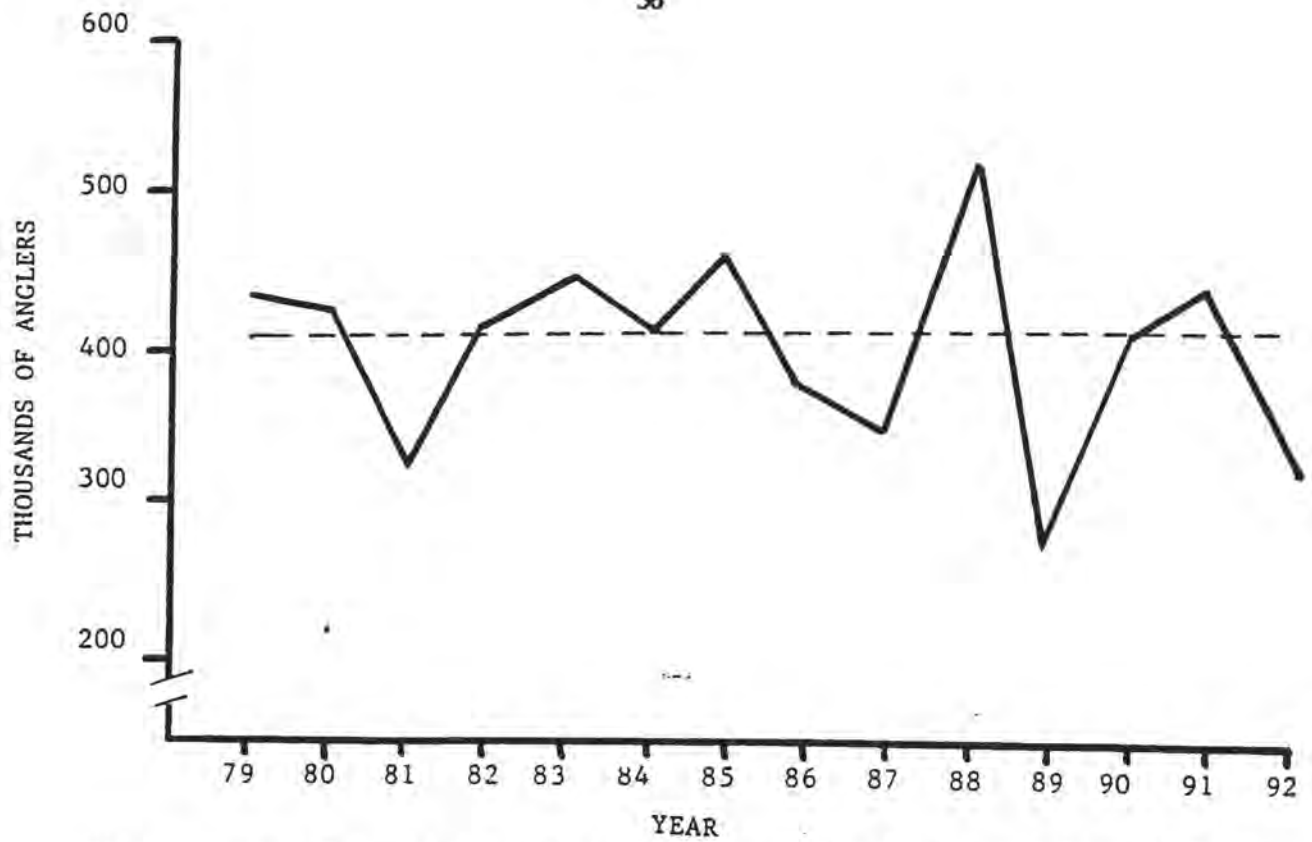


Fig. 36. Annual participation in the recreational hook-and-line fishery (by shore, charterboat, and private boat anglers).

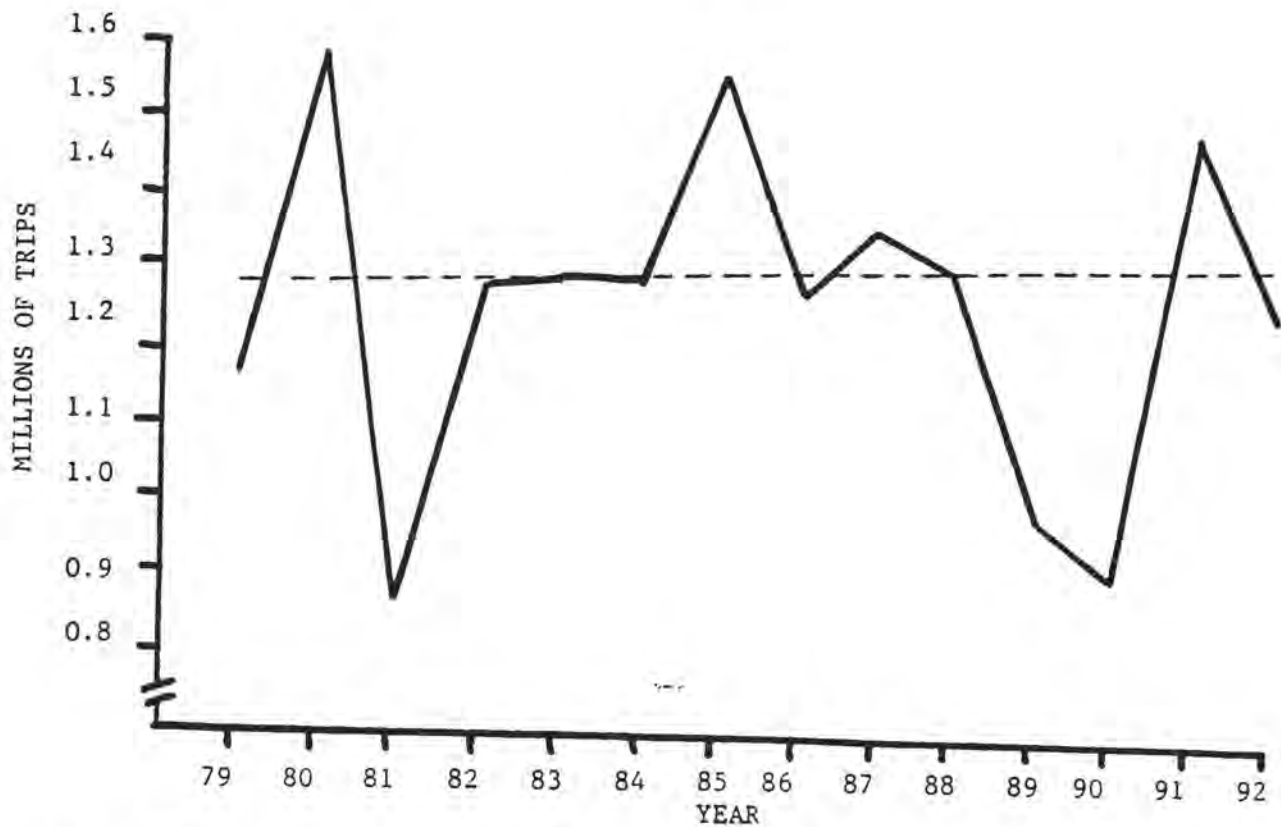


Fig. 37. Annual effort in the recreational hook-and-line fishery.

category, the 1992 figure was well below average.

The trend in total effort has been similar to that in participation with an average annual increment of only 0.145% since 1979 (Fig. 37). The estimated total number of trips in 1992 was 1.216 M. This included 736,000 trips by coastal residents, 176,000 by noncoastal residents, and 304,000 by out of state fishermen.

About 19% of the coastal households contacted during the MRFSS phone survey indicated that at least one member had fished in salt water sometime during the past 12 months. Fishing from private boats was the most popular followed by angling from piers or docks. State residents made very little use of for-hire vessels (charterboats and headboats). Shore fishermen interviewed (in wave 6) reported fishing an average of about 33 days during the past 12 months (i.e., in 1992). Private boat anglers averaged about 35 days while charterboat fishermen reported less than two days of fishing.

CATCH AND CATCH RATES

MRFSS catch estimates are vulnerable to large sampling errors associated with the numbers of fishermen interviewed and catches inspected (sample size), the range in numbers of fish in individual catches, and the frequency of occurrence of unusually large catches. Misidentification and confusion over fish names can cause substantial errors in the estimated landings of similar species. Only catches inspected by the creel clerks can be verified and, for species having large percentages of the catch either released or discarded, the estimated total landings can be quite inaccurate. For the most frequently caught fish, relative ranking and trends in catch appear to be reasonably reliable when considered in conjunction with commercial landings and anecdotal information.

The total catch in 1992 (Table 1) was estimated at 3.475 M fish, slightly above the 1991 figure. Oceanic pelagic species represented less than 1%, while reef fish comprised about 11%. Coastal pelagic species (mainly mackerels) contributed 6% of the overall landings. Inshore sportfish represented 24% and inshore bottomfish were the dominant group with 45%. Sharks comprised about 4% and miscellaneous species made up the remaining 10%.

The principal oceanic pelagic species were dolphin and yellowfin tuna. Dolphin catches were well below average compared to those in the last three years while tuna landings were considerably improved.

The most numerous offshore bottom (reef) species landed was the black sea bass. Landings in recent years have fluctuated widely but the 1992 catch appeared to be well below average. Catches of other major groups (snappers, porgies, etc.) showed mixed trends. The private boat and charterboat sectors contributed

Table 1. NMFS estimates of recreational landings (in thousands of fish) by South Carolina anglers (1992 figures preliminary, NR = not reported).

	1986	1987	1988	1989	1990	1991	1992
<u>Oceanic Pelagics</u>							
Dolphin	72	<30	26	11	14	8	3
Tunas/other	65	<30	1	3	1	2	5
<u>Reef Fish</u>							
Black sea bass	531	732	798	444	148	506	268
Groupers	<30	<30	4	7	14	8	6
Snappers	<30	<30	26	34	11	10	10
Red porgy	<30	<30	27	70	23	16	24
Other porgies	NR	47	17	3	4	7	6
Grunts	NR	<30	55	49	4	12	6
<u>Coastal Pelagics</u>							
King mackerel	254	71	118	74	51	90	108
Spanish mackerel	163	69	103	170	114	123	61
Bluefish	159	177	147	297	126	46	38
Barracuda	62	<30	25	9	1	3	7
Little tunny	34	<30	18	9	4	2	2
<u>Inshore Sportfish</u>							
Red drum	196	509	542	150	183	182	138
Spotted Seatrout	576	444	345	203	126	414	268
Weakfish	78	<30	1	7	7	14	24
Flounders	206	110	150	68	68	179	61
Sheepshead	70	<30	75	54	93	158	338
<u>Inshore Bottomfish</u>							
Kingfishes	1049	474	424	169	82	243	200
Spot	1863	757	1810	1125	148	589	1257
Croaker	616	227	254	287	385	103	87
<u>Other</u>							
Sharks	207	391	168	111	53	251	141
Miscellaneous	1228	2161	1624	1096	446	455	417
Total	7527	6416	6897	4558	2133	3421	3475

a minor part of the overall recreational landings of most reef fish and trends in the headboat fishery are more meaningful indicators of stock status.

Most ocean-going fishermen targeted coastal pelagic species with the king mackerel being by far the most popular. The king mackerel catch was the highest since 1988. King mackerel is the main target of the offshore charterboat fleet and its catch rate (CPUE) is considered to be indicative of abundance. Landings in 1992 were good, particularly during the fall, as expressed in a relatively high CPUE (or CPH) calculated by the NMFS Panama City charterboat survey staff (Fig. 38). The MRD provided copies of all charterboat reports to this group for inclusion in their database. The annual catch rate estimated by them was 1.22 king mackerel per boat hour of trolling. This was the highest CPUE (CPH) in the South Atlantic area except for off North Carolina.

In contrast, the estimated landings of Spanish mackerel were well below those in recent years, in spite of apparently high regional abundance. The charterboat catch rate calculated from the NMFS survey data (including records provided by the MRD) was 2.83 fish per boat hour, compared to more than 10 off North Carolina and Georgia and nearly 5 off northeast Florida.

Although seldom targeted by South Carolina fishermen, bluefish were formerly a common catch in both estuarine and coastal areas. Estimated landings of this species in 1992 were the lowest in many years with few small juveniles available in the estuaries. This may be related to a projected stock decline in the mid-Atlantic population.

The estimated catches of red drum, spotted seatrout, and flounders were all appreciably lower than in 1991. The red drum catch estimated by the NMFS (from MRFSS data) was the lowest in years but is suspect. The catch per angler trip derived from the 1992 MRFSS data was only 68% of that in 1991 (with the estimated catch being 72% of the 1991 catch). The catch rate observed during the state finfish survey in 1991 was similar to that in the MRFSS, but there was a large discrepancy in 1992. Compared to the 1991 (state) estimate, the 1992 (state) catch rate was 45% higher. This suggests that the NMFS catch estimate was likely too conservative and that the actual 1992 landings could have been as high as 264,000 fish. This figure would represent a relatively strong showing.

The NMFS estimate of the spotted seatrout catch also appears to be low when data from sources other than the MRFSS are considered. The 1992 catch rate from the MRFSS was 86% of the 1991 value, but the catch estimate was only 63% of the 1991 figure. The catch rate from the state survey was 88% of the 1991 (state) CPUE, suggesting the catch estimate should be appreciably higher than

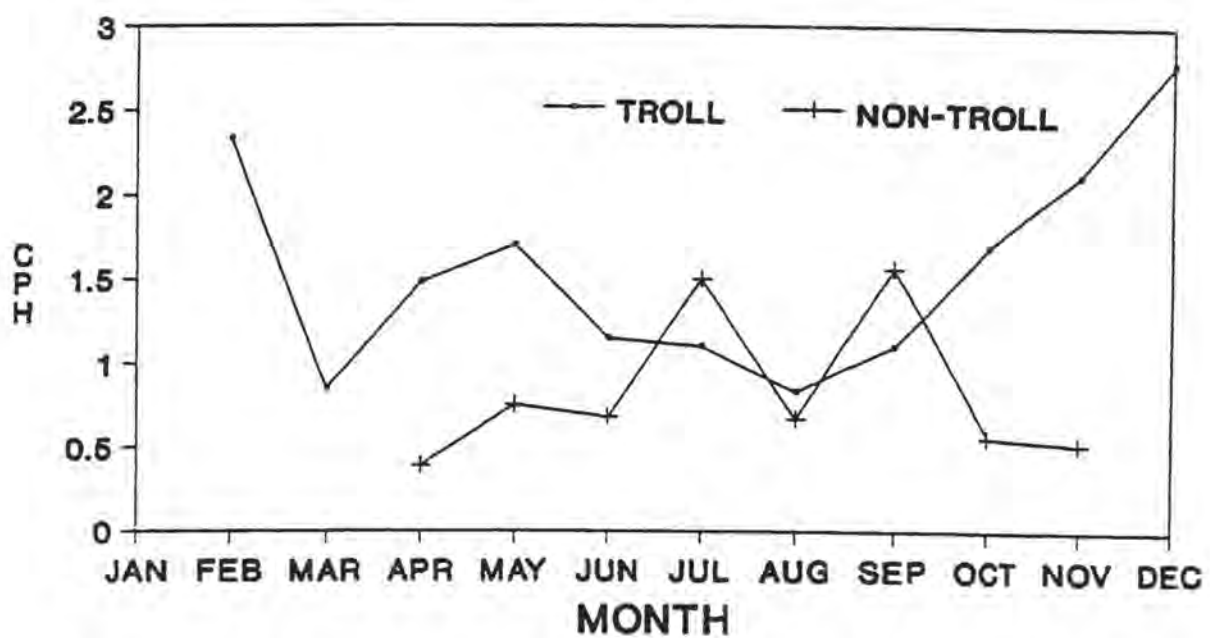


Fig. 38. Monthly charterboat catch rates of king mackerel off South Carolina in 1992 (source: NMFS Panama City Lab. charterboat survey program).

that derived by the NMFS, perhaps on the order of 360,000 fish. The winter was mild (as in the previous year) and there was no obvious explanation for such a pronounced decline in landings.

Flounder catch estimates have been highly variable and do not include fish taken at night by gigging (which in some years may represent an appreciable percentage of the total landings). Species identity is also suspect. Although summer flounder are believed to be depleted, this species has represented a minor part of the overall state catch, particularly south of Murrells Inlet. Tag return data suggest that southern flounder (the dominant species in the state catch) are not heavily exploited. The increased use of TEDs by shrimp trawlers has significantly reduced commercial landings and presumably juvenile mortality in the bycatch. Given these contradictory elements, it is highly speculative as to what the underlying causes of an apparent downward trend in flounder landings might be.

Inshore bottomfish such as spot and kingfishes (whittings) are highly popular with shore fishermen, particularly pier anglers. Species-specific trends in inshore bottomfish landings have shown no similarity. The 1992 spot catch increased greatly, perhaps due to continued recovery of the pier fishery (from Hurricane Hugo). Kingfishes are also a principal component of the pier catch, however, and the estimated 1992 landings were down.

LENGTH COMPOSITION

Average sizes in 1992 of most important species were similar to those in recent years (Table 2). For those species with size limits, compliance with these regulations appeared to be very good. Only 6% of the red drum inspected were below 36 cm (14 in), while only 2% of the spotted seatrout observed were under the 30 cm (12 in) minimum size limit.

HEADBOAT FISHERY

In 1992, 22 headboats (as defined by the NMFS) operated, including four from Little River, four from North Myrtle Beach, six from Murrells Inlet, two from Mt. Pleasant, two from Charleston, and three from Hilton Head. One vessel was operated by the military recreational services. The estimated combined effort was 61,790 angler days. An angler day represented the participation of one rod and reel fisherman for one full day (usually 10-12 hours, including travel time to and from the fishing grounds). Both inshore effort and offshore effort declined moderately from the levels of the previous year (Fig. 39). The inshore fishery consisted of half-day and three-quarter day trips (usually to areas west of the Gulf Stream), while the offshore ("Gulf Stream") fishery consisted of all-day trips. Inshore trips usually targeted black sea bass, while offshore effort was directed at porgies, snappers, and groupers.

Table 2. Average sizes (in cm) of species landed by South Carolina recreational anglers (from combined MRFSS and state finfish survey data). Mackerel figures are fork lengths, others are total lengths.

Species	1988	1989	1990	1991	1992
Red drum	43.1	46.3	45.7	42.0	43.5
Spotted seatrout	36.5	37.7	37.1	36.6	36.9
Southern flounder	34.6	35.0	35.6	35.4	38.6
Sheepshead	32.6		34.2	32.2	31.9
Black sea bass	26.4	25.9	30.2	25.2	25.9
King mackerel	76.8	76.7	76.2	85.0	76.5
Spanish mackerel	42.2	41.2	42.0	45.7	46.4

Table 3. Estimated catches (numbers of fish) and effort (angler-days) by South Carolina headboat fishermen in 1992.

Category	JAN-MAY		JUN-AUG		SEP-DEC	
	Inshore	Offshore	Inshore	Offshore	Inshore	Offshore
Red porgy	137	12037	337	15412	159	5723
Other porgies	1646	1823	6526	6182	2544	3939
White grunt	400	1978	3490	18052	2053	5263
Other grunts	4702	7735	52683	26666	16606	19901
Vermilion snapper	202	35321	2579	68640	2407	38689
Red snapper	18	197	28	374	143	515
Other snappers	307	4	63	119	0	151
Groupers (E)	4	156	119	623	26	297
Groupers (M)	42	2850	431	5464	400	2943
Triggerfish	148	1604	889	7963	876	8295
B. sea bass	39586	23501	127441	33471	37157	11979
Other	1061	3599	5849	4746	1538	3299
Total	48253	90805	200435	187712	63909	100994
Angler days	6374	6381	24509	13035	6449	5042

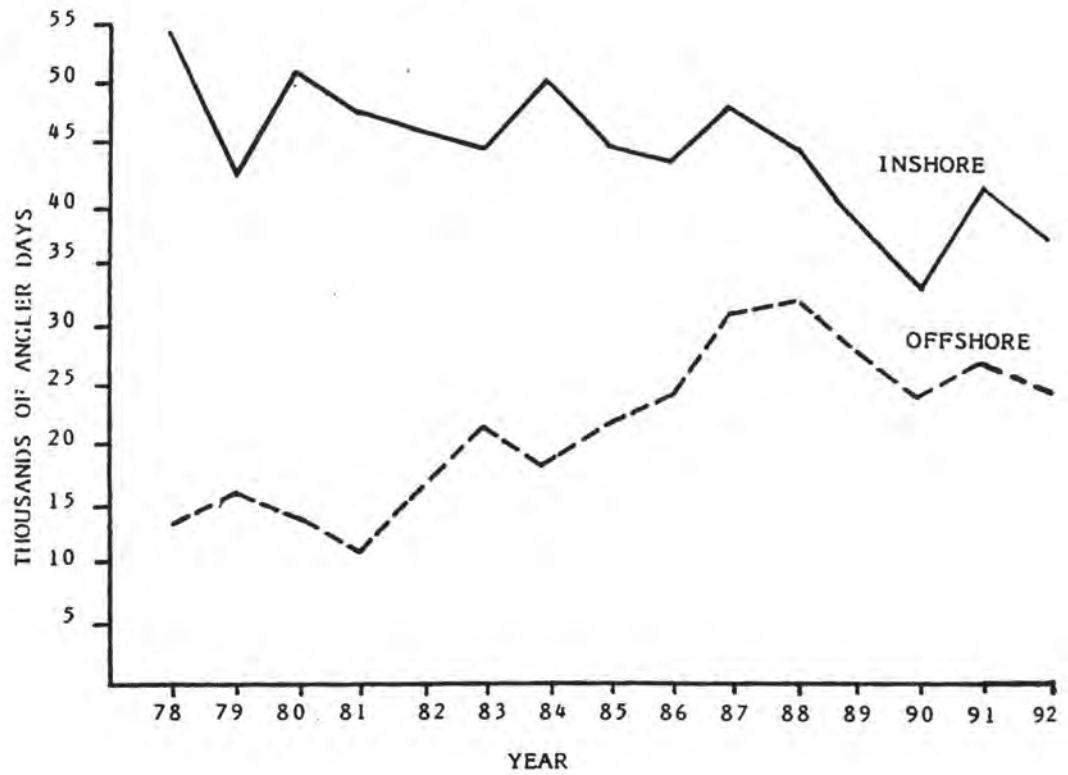


Fig. 39. Estimated effort in the South Carolina headboat fishery.

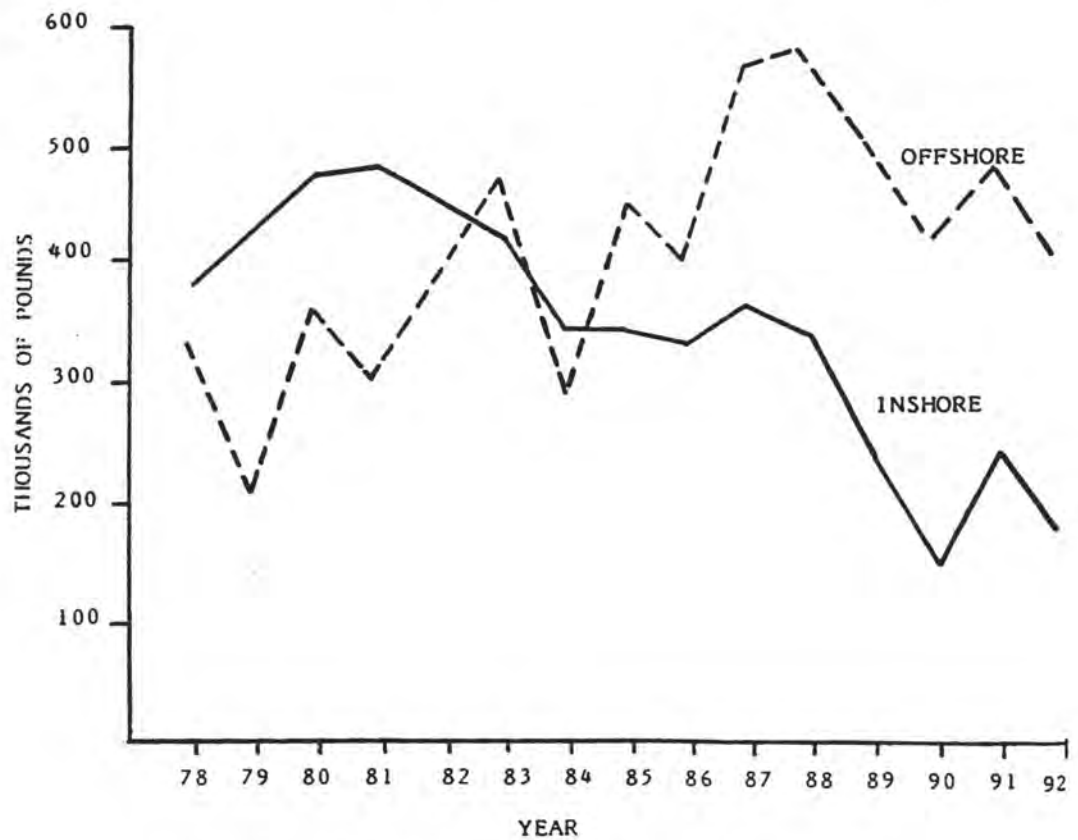


Fig. 40. Estimated catch in the South Carolina headboat fishery.

All landings statistics refer to retained catches only unless otherwise specified. The estimated total catch was 692,108 fish with an aggregate weight of 589,160 pounds distributed by species group, fishing area, and season as shown in Table 3. Total landings in both areas declined moderately from those reported in 1991 (Fig. 40) with the inshore catch being the second lowest since 1974. Inshore catches consisted mainly of black sea bass (65% of the numerical total) and miscellaneous grunts (24%), primarily tomtates. The species composition of offshore landings was more diversified. The principal species was vermilion snapper (38% of the numerical total), followed by grunts (21%), and black sea bass (18%).

Black sea bass comprised 46% of the overall headboat catch by number. The aggregate landed weight was the lowest reported to date, as was the estimated catch (number of fish) per inshore angler day (Table 4). The overall inshore catch rate for all species combined has closely reflected the trend of its major component and also continued its long-term decline (Fig. 41). The percentage contribution by weight of black sea bass to the overall headboat catch (24%) was identical to that in 1991 and reflected the generally declining importance of this species to the fishery. The majority of the black sea bass caught were small fish (< 1 pound) and releases comprised an estimated 33% of the total catch by number during July through December.

Prior to 1980, red porgy ranked second to black sea bass in terms of overall weight contribution and typically represented about one-third of the total catch by weight. Since then, the percentage contribution (by weight) of this species has generally declined and was the lowest to date in 1992 (7%). The average catch per offshore angler day was also the lowest to date (Table 4). The average size, although very low by historical standards, increased slightly from that in 1991, presumably because of the 12 in TL minimum size limit that became effective in January, 1992. About 10% of the estimated total (numerical) catch during July-December was released, presumably due to being undersized.

Since 1988, vermilion snapper has been the second most important component by weight in the overall catch (18% in 1992). This species has replaced red porgy as the mainstay of the offshore fishery and the average catch per offshore angler day has generally been increasing (Table 4). It dropped slightly in 1992, perhaps due to imposition of a 10 fish per day bag limit in January. The average size increased moderately, probably reflecting the impact of the 10 in TL minimum size limit that also became effective in January. About 24% of the estimated catch during July-December was released because of these regulations.

The weight contribution of groupers has been relatively high in recent years, particularly in the offshore landings. The *Mycteroperca* component ("M" groupers, primarily gag and scamp) has

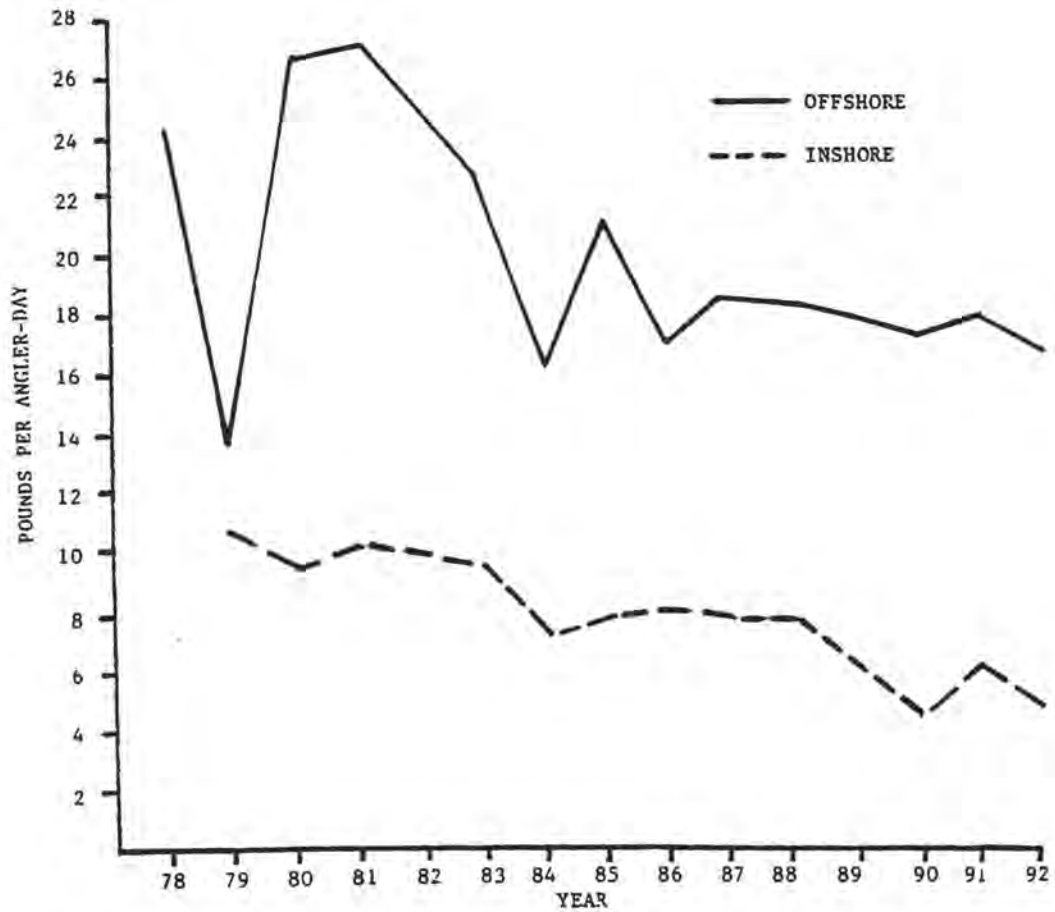


Fig. 41. Average catch rates in the South Carolina headboat fishery.

Table 4. Average sizes and catch per trip for major species in the South Carolina headboat catch. Average size is in pounds. Catch per trip is in numbers of fish per angler.

	Red porgy		Vermilion snapper		Red snapper		"M" groupers		B. sea bass	
	Av. wt.	C/ trip	Av. wt.	C/ trip	Av. wt.	C/ trip	Av. wt.	C/ trip	Av. wt.	C/ trip
1977	2.35	5.01	1.37	0.85	8.40	0.05	14.06	0.09	NA	8.24
1978	2.42	5.88	1.34	1.56	7.17	0.05	11.74	0.08	NA	4.76
1979	2.18	3.02	0.93	0.32	13.63	0.03	10.71	0.11	NA	8.05
1980	2.04	4.75	1.08	1.30	4.02	0.14	10.38	0.21	NA	8.05
1981	2.02	6.04	1.37	1.93	6.38	0.08	7.16	0.19	NA	8.21
1982	1.38	NA	0.85	NA	9.00	NA	5.91	NA	NA	NA
1983	1.54	3.59	0.80	2.95	5.51	0.07	7.46	0.29	NA	7.00
1984	1.54	2.82	0.79	3.12	3.73	0.10	8.31	0.17	NA	6.23
1985	1.56	3.63	0.92	4.76	5.38	0.10	8.05	0.26	NA	6.84
1986	1.41	3.11	0.82	4.52	5.11	0.03	6.52	0.21	NA	6.71
1987	1.34	3.00	0.76	5.43	3.26	0.06	5.25	0.27	NA	6.27
1988	1.27	3.43	0.77	4.96	2.91	0.15	5.79	0.23	NA	5.76
1989	1.12	NA	0.65	NA	4.25	NA	6.19	NA	0.44	NA
1990	1.27	1.96	0.65	6.67	3.65	0.13	6.76	0.40	0.51	3.29
1991	1.07	1.86	0.63	6.14	6.61	0.11	7.80	0.26	0.51	2.72
1992	1.15	1.36	0.71	5.83	4.64	0.04	5.77	0.46	0.52	2.67

generally increased, while the *Epinephelus* ("E" group, mainly snowy grouper and hinds) component has declined. In 1992, the M complex represented 91% by number and 95% by weight of the aggregate grouper catch, the highest proportions to date. Total grouper landings represented 12% of the overall headboat catch by weight. Scamp was the most numerous species landed. Although a 20 in TL minimum size limit for most species became effective in January and significantly reduced the numbers of fish kept, the aggregate catch rate (for offshore trips) was the highest to date (Table 4). About 27% of the gag and 29% of the scamp caught during July-December were reported released.

Red snapper is the glamor species of the headboat fishery despite the fact that few are landed. After several years of relatively large landings and high catch rates, the 1992 catch and catch rate (offshore trips) dropped sharply. The minimum size limit was increased from 12 in TL to 20 in (a two fish daily bag limit was also imposed) in January, 1992 and appeared to be the main causative factor, since 82% of the red snappers caught were reported released.