

South Carolina Marine Fisheries

1999

North Carolina

South Carolina

Georgia

Florida

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Marine Resources Division
South Carolina Department of Natural Resources
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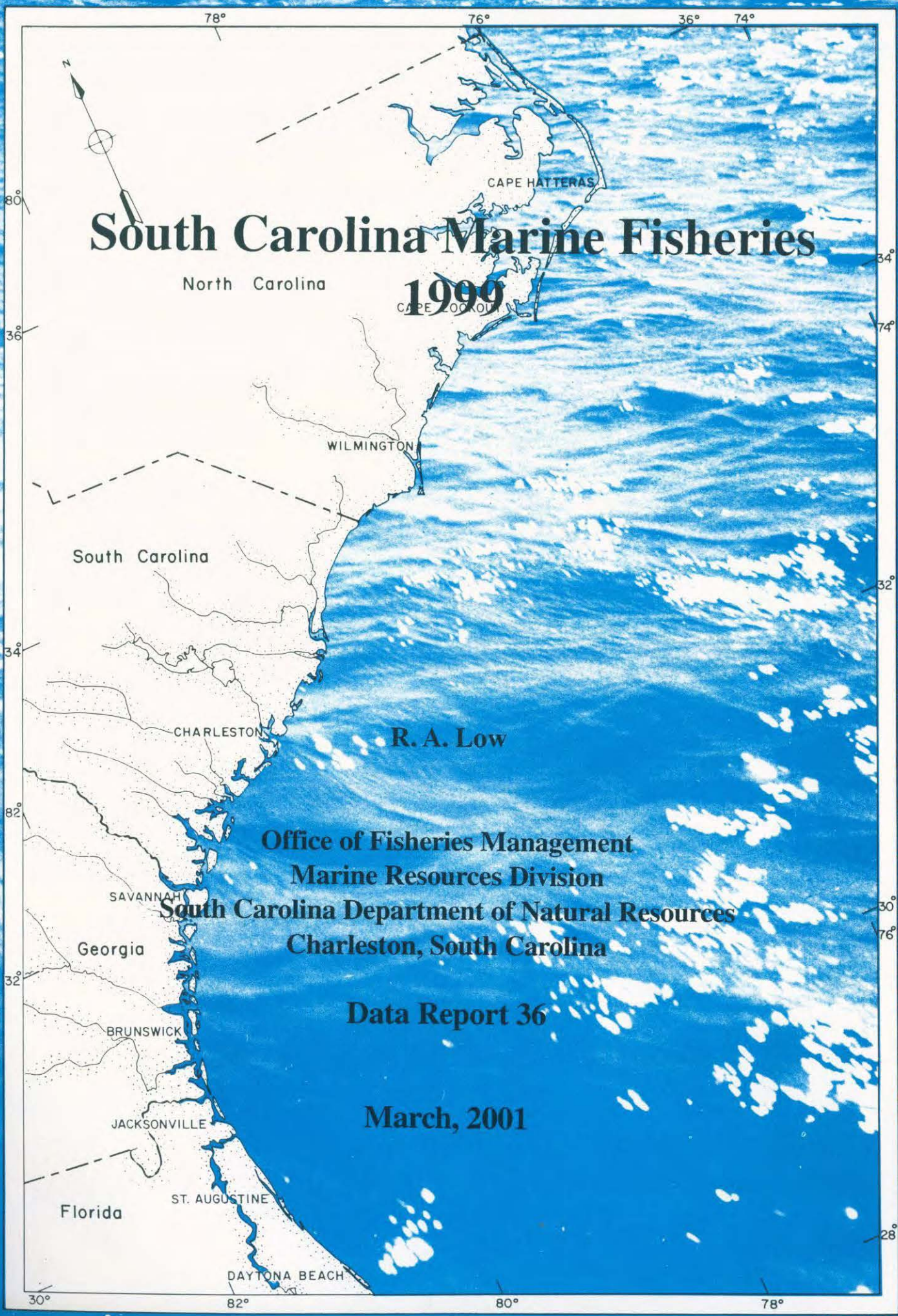


TABLE OF CONTENTS

	Page
LIST OF FIGURES	ii
LIST OF TABLES	iii
ACKNOWLEDGMENTS	iv
INTRODUCTION	1
COMMERCIAL FISHERIES.	3
Shrimp	10
Crab	12
Shellfish.	14
Offshore Fish.	14
Coastal and Riverine Fish	24
RECREATIONAL FINFISH FISHERIES.	24
Charterboat Fishery.	27
Private Boat Fishery	39
Shore-based Fishery.	49
Length Composition	49

LIST OF FIGURES

	Page
1. Sales of commercial licenses.	4
2. Total weight of commercial marine fisheries products.	7
3. Production volume compared to 15-year averages.	7
4. Total ex-vessel value adjusted for inflation in 1999 dollars	8
5. Weight and value composition of commercial landings	8
6. Distribution of landed value by county	9
7. Annual commercial landings (heads-on) of shrimp	11
8. Annual value of shrimp landings	11
9. Annual commercial landings of blue crab and number of crab pot licenses	13
10. Annual value of blue crab landings.	13
11. Annual landings of oysters and clams.	15
12. Landed value of oysters and clams	15
13. Annual commercial production of offshore fish	16
14. Composition of offshore fish landings	16
15. Contribution to landed value of offshore fish by gear	18
16. Annual production of the snapper reel fishery	19
17. Annual snapper reel landings of principal reef fish	19
18. Annual production of the pelagic longline fishery	20
19. Pelagic longline landings of principal species.	20
20. Annual production of the bottom longline fishery.	22
21. Bottom longline landings of principal species groups.	22
22. Annual production of the trap fishery and black sea bass (BSB) total commercial landings	23
23. Annual commercial production of king mackerel	23
24. Annual commercial production of coastal fish	25
25. Annual commercial landings of American shad	25
26. Estimated participation in the recreational hook and line fishery (excluding headboat anglers)	26
27. Estimated effort in the recreational hook and line fishery (excluding headboat trips).	26
28. Charterboat CPUE for king mackerel, June-August	38
29. Charterboat CPUE for Spanish mackerel, May-August	38
30. Charterboat directed effort and catch for red drum.	40
31. Charterboat annual CPUE for red drum	40
32. Effort in the private boat mode	41
33. Private boat catch of red drum	45
34. Private boat mode CPUE for red drum in inland waters, September-December	45
35. Private boat catch of spotted seatrout.	47
36. Private boat mode CPUE for spotted seatrout in inland waters	47
37. Private boat catch of flounders	48
38. Private boat mode CPUE for flounders in inland waters	48
39. Effort in the shore-based mode	50
40. Length distribution of red drum	54
41. Length distribution of spotted seatrout	56

	Page
42. Length distribution of southern flounder.	58
43. Length distribution of sheepshead	60

LIST OF TABLES

	Page
1. Production and ex-vessel value by county	6
2. Estimated total catch by recreational hook and line anglers, excluding headboat catches	28
3. Charterboat participation and effort (angler-hours inland, boat-hours ocean)	32
4. Directed charterboat effort for principal species	34
5. Charterboat catch (in numbers of fish)	35
6. Charterboat catches as estimated from the MRFSS vs those reported to the MRD	37
7. Private boat catch (in numbers of fish)	43
8. Shore-based catch (in numbers of fish)	51

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INTRODUCTION

This report is a summary of significant events in South Carolina's marine fisheries during 1999. 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 represents consensus views of the supervisory staff of the management programs for the various fisheries. The presentation is directed at a general audience, makes some simplifications, and is not meant to be definitive in the scientific sense.

Publication of landings data for commercial fisheries began in 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.

Forms were mailed to seafood dealers, on which they were asked to report their landings for that month. Reporting specialists compiled this information and submitted it to the USFWS office in Washington, D.C. The S.C. Division of Commercial Fisheries also provided data. The specialists issued monthly narratives describing conditions and trends, the last in December, 1979.

The current series of annual reports prepared by the Marine Resources Division (MRD) began with an issue that reviewed trends and events for 1977-1986. Individual annual reports commenced with the 1987 issue. The context is similar to that of the USFWS monthly bulletins.

Data on commercial fisheries statistics were obtained through 1) mandatory monthly dealer reports, 2) mandatory shellfish harvest reports, 3) weekly shrimp tickets submitted voluntarily by dock operators, 4) trip tickets for offshore fishing boats submitted voluntarily by fish houses, and 5) reports provided by harvesters in special permit fisheries. Commercial landings statistics applied to wild stock fisheries only.

The mariculture industry produced \$2.31 M worth of product with clams the leading contributor. Shrimp farmers continued to experience problems and their output decreased slightly from that in 1998. Minor quantities of fish comprised the remaining mariculture production.

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

Reliability of commercial landings data is subject to the perception of under-reporting. State law restricts the use of this information to fishery management purposes only. It has been assumed that providers, particularly in a voluntary situation, have little incentive to submit falsified records. Verification was therefore seldom attempted, except where obvious anomalies were evident.

Health concerns dictated that shellfish landings were reported in detail and closely monitored. This information is considered to be very accurate. Most of the shrimp statistics were obtained from voluntary weekly tickets and were also considered quite reliable. Landings in most other product categories were obtained primarily from monthly dealer reports. A substantial amount of the blue crab landed was distributed by individual fishermen and some under-reporting is suspected. Incidental catches of coastal fish by shrimp trawlers were usually part of the crews' compensation and a portion of the landings was therefore not handled by wholesale dealers. It is suspected that under-reporting of the overall landings occurred as a consequence.

The major source of recreational fishery data was the Marine Recreational Fishery Statistics Survey (MRFSS), conducted for the National Marine Fisheries Service (NMFS) by a private contractor. This survey applied to hook and line fishing from shore or shore-based facilities, charterboats, and private boats (headboats were not included).

The MRD continued the State Finfish Survey independently of the MRFSS. Coverage was directed at private boat fishermen fishing inland (estuarine) waters. The principal objectives were to obtain length measurements and CPUE data for important inshore sport fish such as red drum, spotted seatrout, and flounders.

State law required operators of piers, charterboats, and headboats to obtain permits and submit monthly reports of their fishing activities. Pier operators reported the numbers of anglers using their facilities each day on a monthly calendar. Charterboat captains completed logsheets for each fishing trip, listing the date, number of anglers, hours fished, and catch data.

Headboat operators were required by federal regulation to submit trip reports to the NMFS (their state obligation was met by providing copies to the MRD). Information elements were similar to those on the charterboat reports. The NMFS Beaufort Laboratory had the federal responsibility for processing these data.

No directed effort was made to monitor recreational shellfish gathering or blue crab harvest in 1999. Results of previous surveys of buyers of the marine fishing stamp indicated that rough estimates of recreational landings could be based on percentages of the commercial production. These surveys were conducted in 1994

for shellfish and 1997 for blue crab. It is rather speculative as to whether the percentages estimated from those results should be applied to the 1999 landings.

A survey of the shrimp baiting fishery has been conducted each year since 1987. Results of the 1999 survey are described in MRD Data Report Number 33. A brief summary is included with the discussion of the commercial shrimp fishery, because of the emphasis on comparative harvests.

COMMERCIAL FISHERIES

Product categories were composed as follows. Shrimp landings included whole (heads-on) weights of penaeid species (there were no rock shrimp landings). Crab landings included live weight of blue crab in various product categories (e.g. hard, soft, and peeler), live weight of horseshoe crab, and pounds of stone crab claws. Shellfish volumes were expressed as meat weights with other units (bushels of oysters and whelks, 250-count bags of clams) noted where appropriate.

Most fish landings were converted into round (whole) weights. Shark landings taken on offshore gear were categorized as "offshore" and those by inshore gear (almost entirely shrimp trawl) were designated "inshore." "Offshore fish" included wreckfish, king mackerel, oceanic pelagics (dolphin, wahoo, tunas), swordfish, and reef fish (e.g. groupers, snappers, sea bass, porgies, and tilefishes). "Coastal fish" consisted of mullet, inshore groundfishes, e.g. spot, whiting (kingfish), and flounders. Riverine fish in 1999 were exclusively American shad.

Except where noted otherwise, all value figures refer to ex-vessel value, i.e., the amount paid to the harvester. For trend analyses, these have been adjusted for inflation by weighting factors based on the annual Consumer Price Index (CPI). All figures shown are expressed in 1999 dollars.

South Carolina is not a major producer of seafood, typically ranking 20th in volume and value of overall production (including mariculture) among the coastal states. The seafood industry consists largely of harvesting with little processing to add value to the raw product. Most of the landings are shipped out of state as raw or unprocessed product.

State law requires that any seafood product offered for sale must initially be sold to a licensed wholesale dealer. In FY 1998/1999, there were 273 licensed wholesale seafood dealers, about average for recent years (Fig. 1). A description of wholesale operating characteristics is contained in the 1994 report. Processing was largely limited to initial handling, such as shrimp heading, shellfish shucking, crab picking, and fish cutting. The most recent employment figures (for 1995) are contained in MRD Data

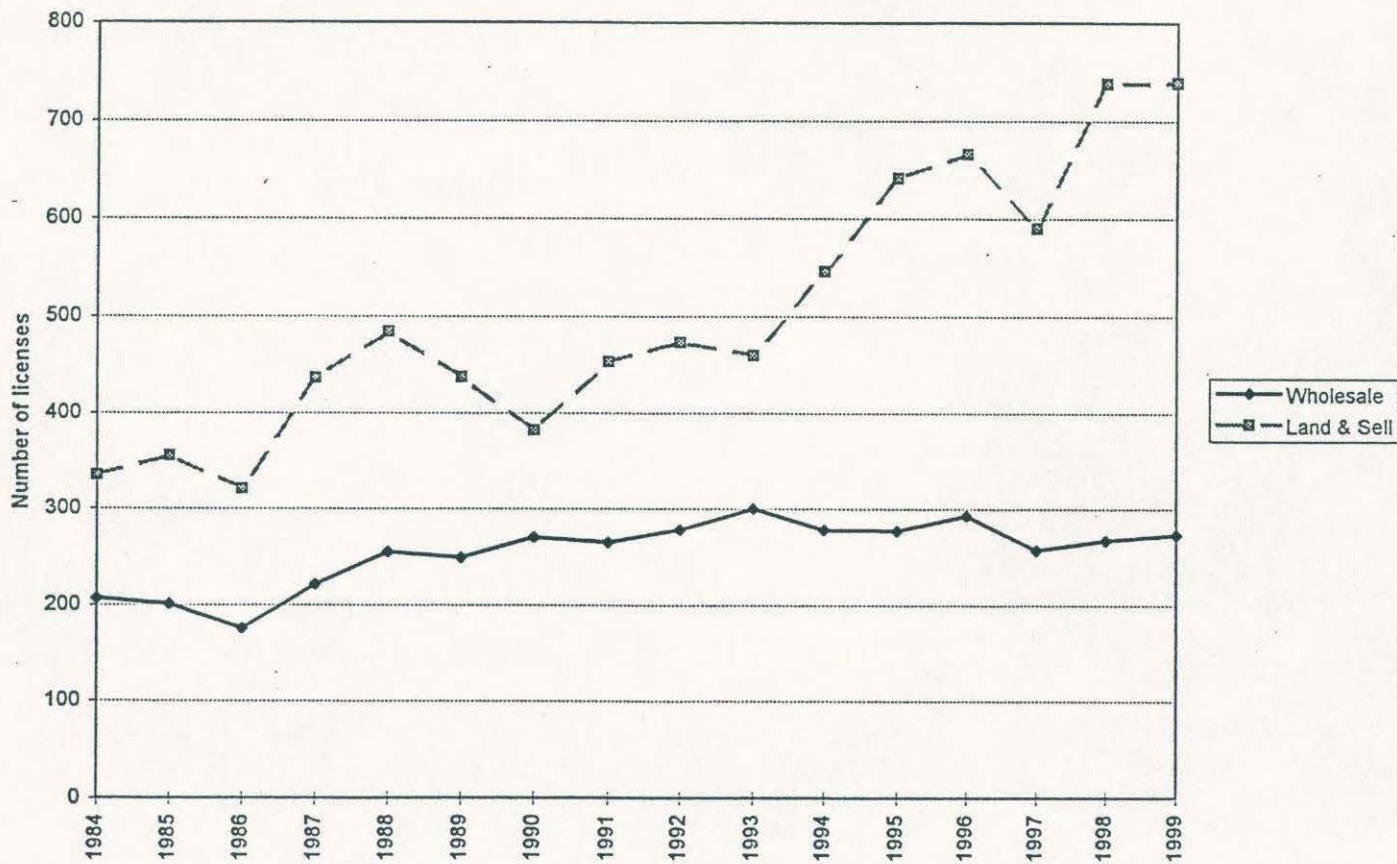


Fig. 1. Sales of commercial licenses.

Report Number 26.

The number of commercial fishermen was unknown, but presumably was between 1,500 and 2,000. In order to legally land product, an individual had to possess either a Trawler Captain's license or a Land and Sell license. In 1997, the law was amended so that the Trawler Captain's license could only be used to sell trawl-caught product with a Land and Sell license required for all other gears. In FY 1998/1999, there were 1008 Trawler Captain licenses issued. The number of Land and Sell licenses sold was 739, continuing the general upward trend of recent years (Fig. 1).

Additional licenses were required for units of gear and/or participation in various fisheries. Since some persons obtained several of these gear licenses in addition to the Land and Sell or Trawler's Captain licenses, the totals were not additive. Crew in most fisheries were not required to have any type of license and could therefore not be documented.

Total landed weight from wild stocks was 18.221 M pounds, a 5% increase over 1998's production (Fig. 2). The increase was attributable to improved shrimp landings, which offset declines in most other categories. Fig. 3 illustrates the status of the 1999 landings volume vs the 15-year averages. The two major inshore fisheries, i.e., for shrimp and blue crab, continued to do relatively well vs historical standards.

Total landings were worth \$29.628 M (Fig. 4), compared to the 15-year average of \$30.507 M (in 1999 dollars). As in most years, shrimp was the leading value contributor, accounting for 62% of the state's total ex-vessel landings in 1999 (Fig. 5).

County landings included mariculture production. Charleston County was the leading producer with 46% (\$14.753 M) of the total landed value (Fig. 6, Table 1). The county led the state in overall production of shrimp and shellfish, accounting for most of the mariculture output in both categories. Blue crab production (all categories) was 2.370 M pounds valued at \$1.796 M. Total fish landings were 935,000 pounds worth \$1.797 M. All of the wreckfish and most of the swordfish were landed here. One of the state's largest fish packers terminated operations on April 30, although most of his suppliers appeared to relocate elsewhere within the county.

Beaufort County produced \$8.450 M. The leading contributors were shrimp (2.378 M pounds worth \$5.860 M) and blue crab (3.592 M pounds at \$2.068 M). Production and value in other categories were relatively insignificant.

Georgetown County accounted for \$6.351 M with shrimp (\$3.389 M) and fish (\$2.527 M) the major components. Horry County contributed \$840,806 in landings, mostly of offshore fish.

Table 1. Production and ex-vessel value by county (in thousands of pounds and dollars).

County	Shrimp	Blue crab	Shellfish	Off.	Fish Coastal	River.	
Volume							
Beaufort	2,378	3,592	105	10	35	6	
Charleston	3,522	2,370	432	813	69	53	
Georgetown	1,622	325	44	1,274	3	122	
Horry	3	27	< 1	457	< 1	< 1	
Value							
Beaufort	5,860	2,068	452	13	32	4	
Charleston	8,035	1,796	3,128	1,669	60	68	
Georgetown	3,389	250	184	2,381	2	143	
Horry	10	18	< 1	810	1	< 1	
		Total volume					Total value
Charleston		7,362				14,753	
Beaufort		6,392				8,450	
Georgetown		3,391				6,351	
Colleton		474				1,158	
Horry		489				841	
Jasper		288				251	
Others		95				113	

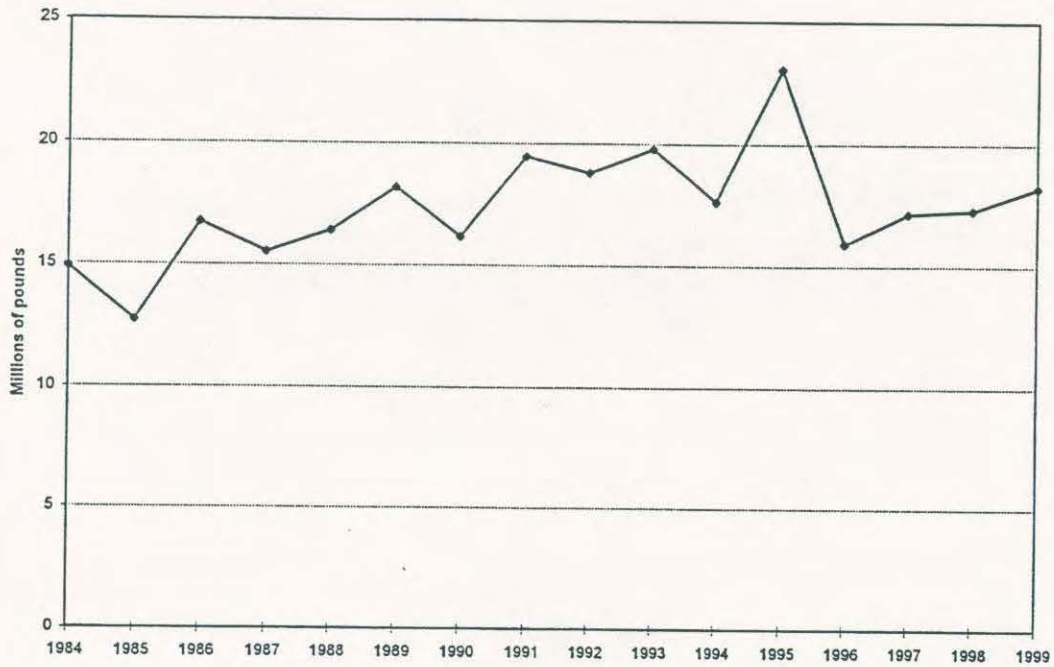


Fig. 2. Total weight of commercial marine fisheries products.

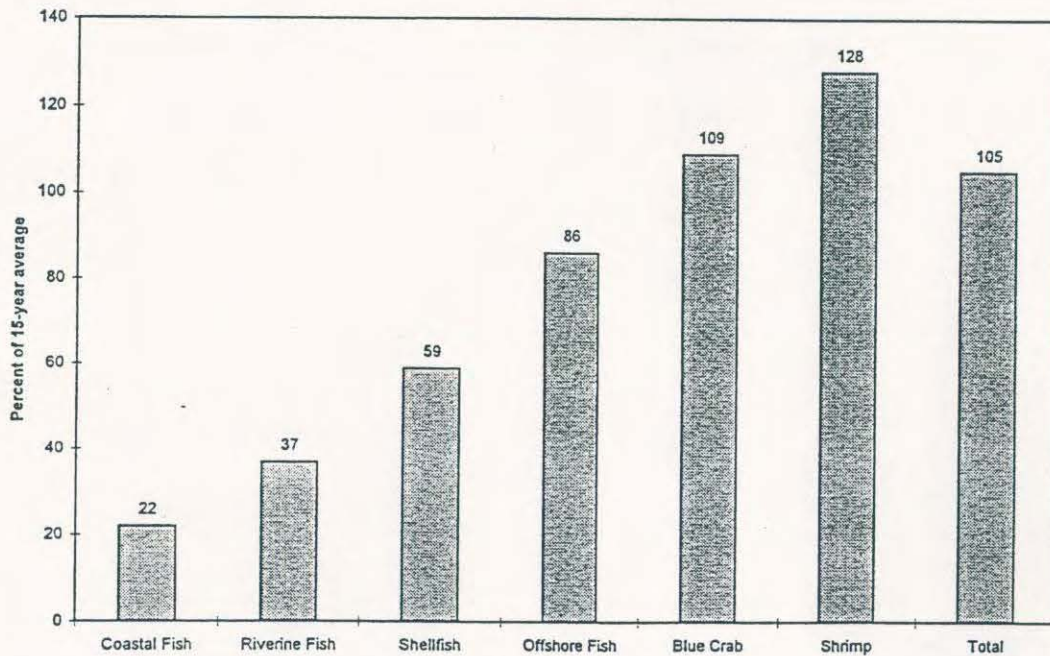


Fig. 3. Production volume compared to 15-year averages.

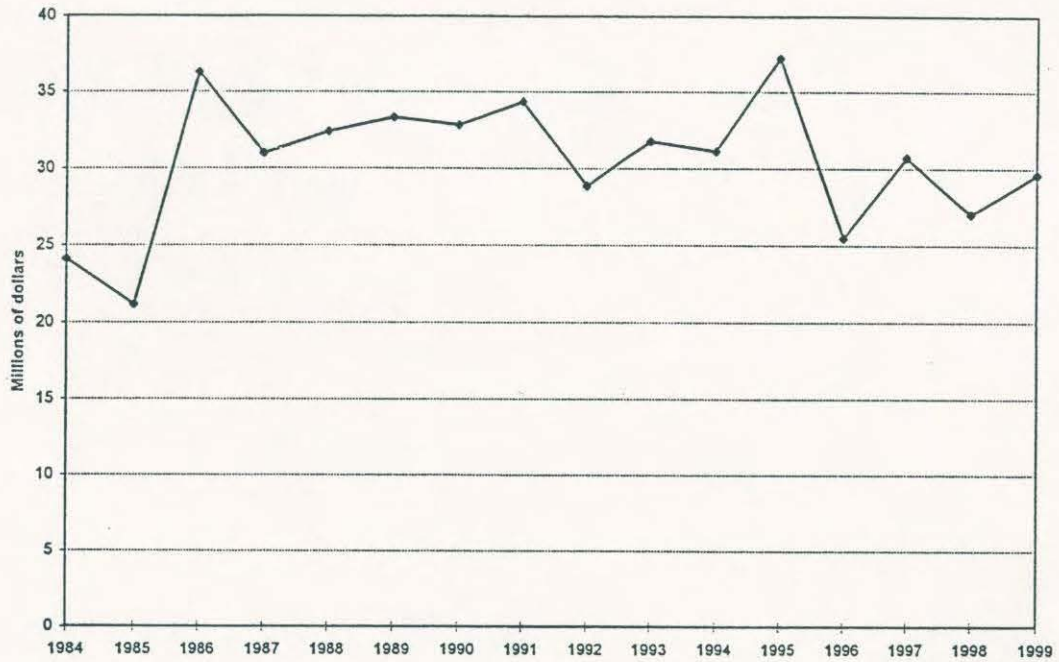


Fig. 4. Total ex-vessel value adjusted for inflation in 1999 dollars.

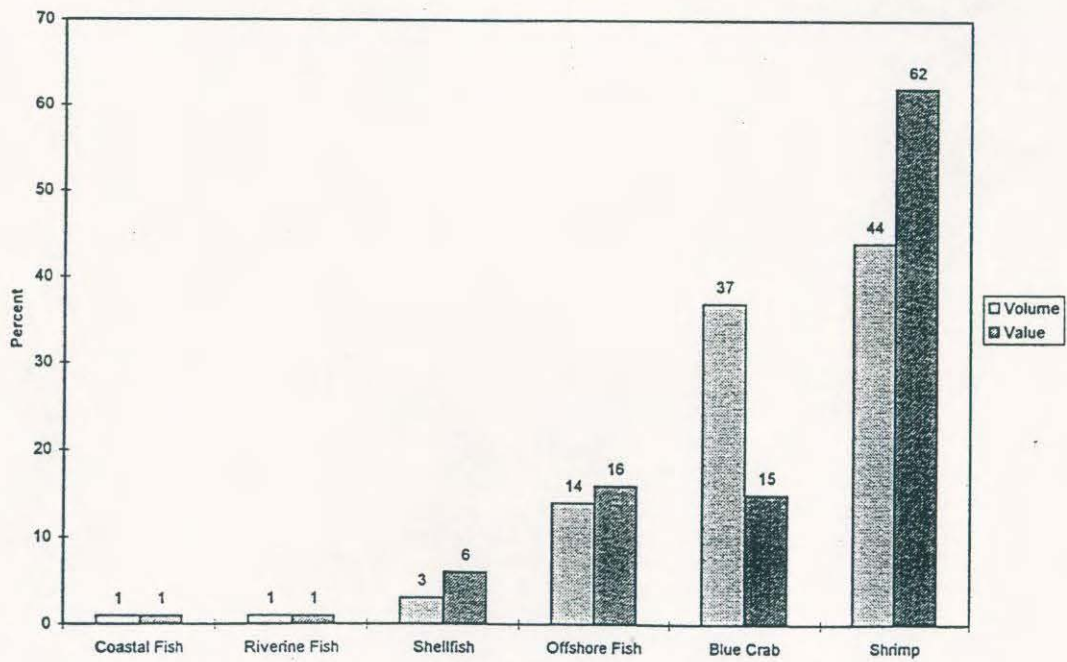


Fig. 5. Weight and value composition of commercial landings.

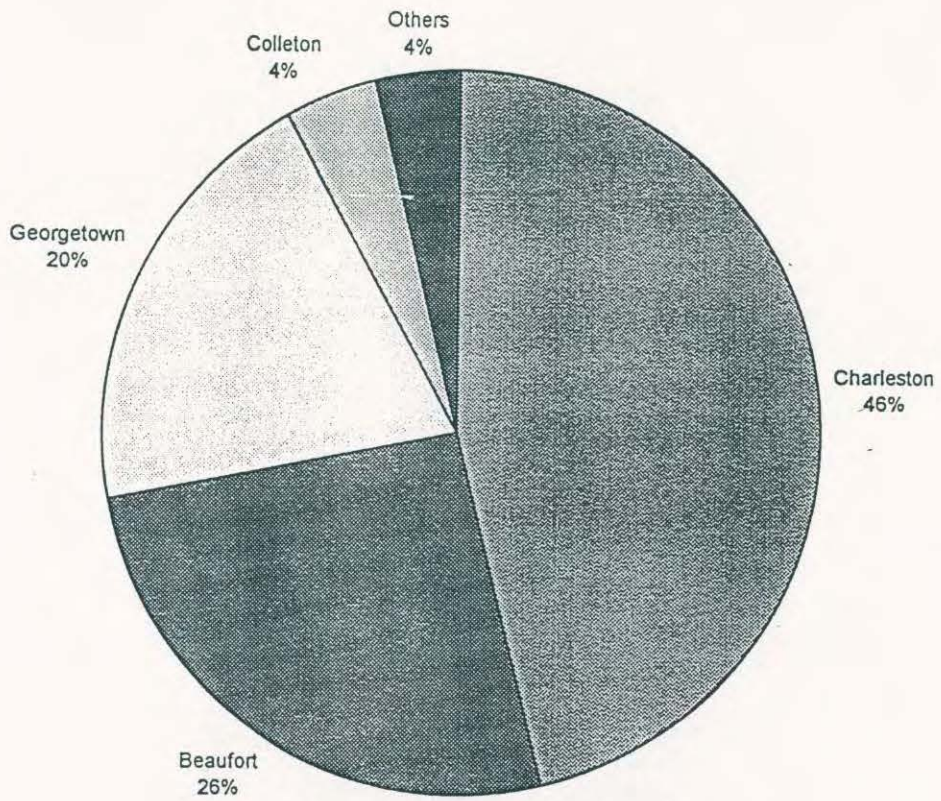


Fig. 6. Distribution of landed value by county.

SHRIMP

Penaeid shrimp landings were 7.982 M pounds heads-on worth \$18.371 M. Landings of both brown and white shrimp were relatively good (Fig. 7). The number of resident trawler licenses sold, 527, was the lowest since at least 1977. In contrast, the number of non-resident licenses (N = 357) was relatively high.

Shrimp trawling in state waters was closed on January 9, 1999 north of Fripp Island and on January 15 south of there. A series of spring northeasters contributed to the presence of large shrimp well offshore during April. On May 7, the NMFS imposed an emergency action requiring enlargement of TED escape openings, due to the incidence of migrating leatherback turtles: this was the first such action since enabling legislation was passed in 1995. The area between the 3-mile "radar line" and the federal line was opened on May 17 with all legal trawling areas being opened on May 26.

Good numbers of juvenile brown shrimp were observed during April sampling and hydrological conditions were more favorable than in 1998. Commercial catches in late June were dominated by small brown shrimp. Relatively small size persisted for the duration of the brown shrimp season with associated low prices. As a result, the ex-vessel value of the catch was comparatively low, despite relatively good volume (Fig. 8). Total brown shrimp landings were 2.019 M pounds heads-on worth \$3.071 M.

April sampling revealed the presence of a wide range of sizes of pre-spawning white shrimp. In conjunction with slightly below normal water temperatures, this indicated that there would be a protracted spawning and recruitment period. After the opening of the season, the landings of roe white shrimp were above average. Summer sampling indicated good quantities of juvenile white shrimp in estuarine areas and an above-average fall season was projected, barring excessive rainfall.

During August and September, brown (black) gill disease was prevalent in the southern part of the state. This parasitic condition was also reported from Georgia and Florida. Although associated mortality appeared to be negligible in South Carolina, the condition caused shrimp to spoil easily and probably impacted the local heads-on market somewhat.

The summer was exceptionally dry until mid-September. During the second half of that month, two hurricanes (Floyd and Gert) produced heavy rainfall along the coast of the Carolinas with much flooding. A third hurricane (Irene) struck in mid-October. The wet weather caused shrimp to move into the ocean, beyond the reach of the recreational baiting fishery. The trawling and channel net areas of Winyah and North Santee Bays, which had opened on September 14, were closed on September 27, due to Hurricane Floyd.

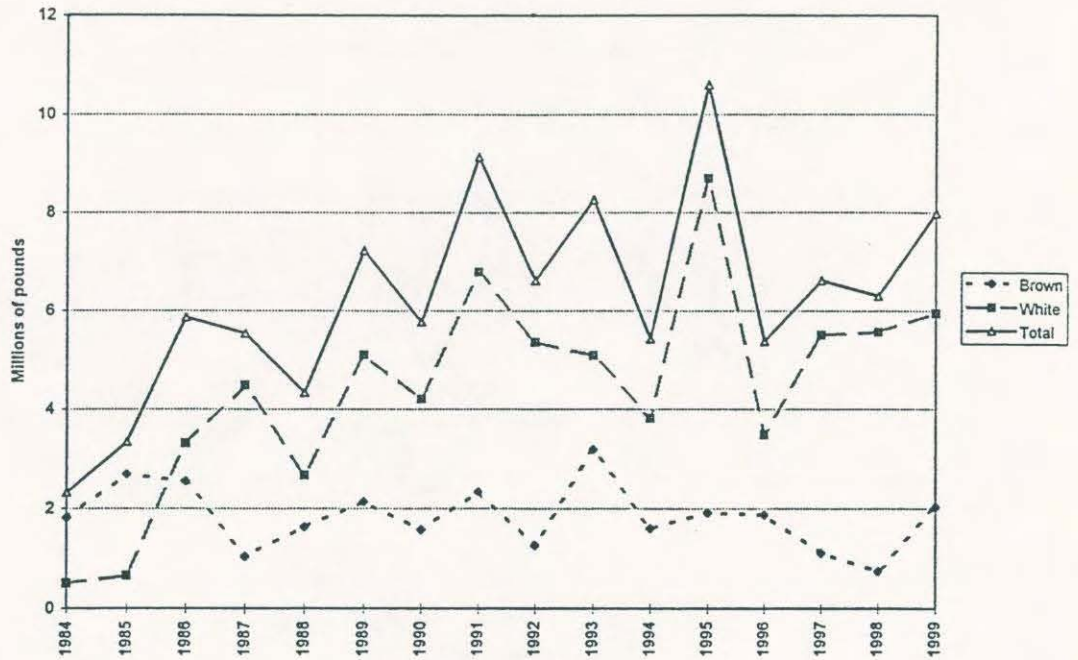


Fig. 7. Annual commercial landings (heads-on) of shrimp.

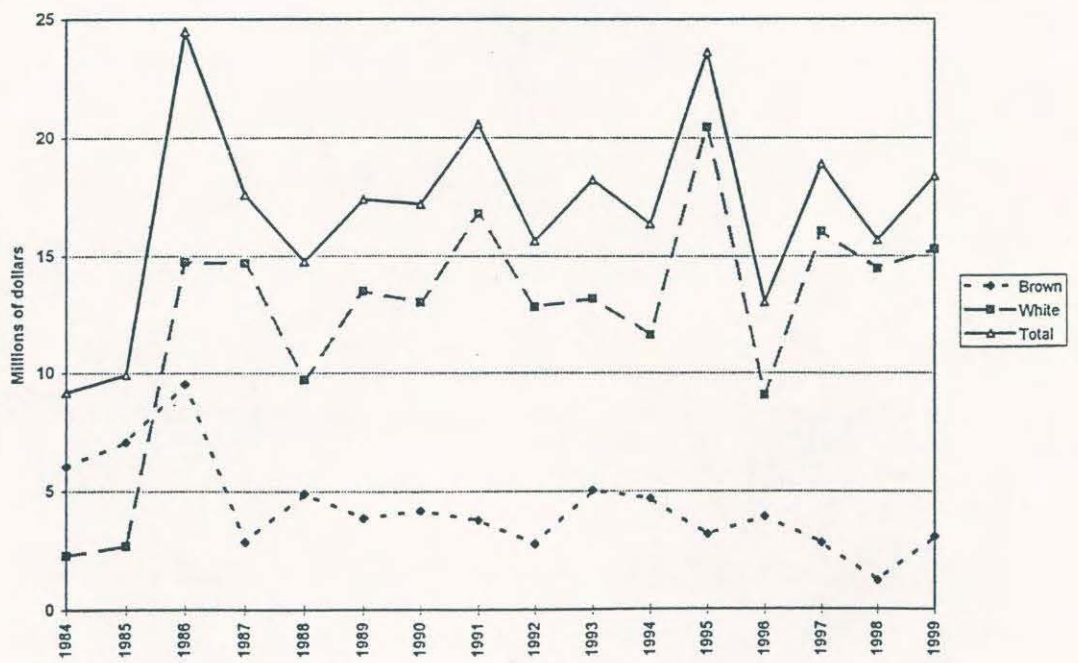


Fig. 8. Annual value of shrimp landings.

The heavy flooding moved small shrimp into these areas. After conditions moderated, the season was reopened, then was closed on December 15.

The trawl fishery was closed on January 5, 2000 north of Fripp Island and January 12 south of there. Total white shrimp landings for the 1999 season were 5.950 M pounds heads-on worth \$15.271 M.

In the last decade, recreational baiting has developed into a major competitive factor in the fall white shrimp fishery. Permit sales in 1999 declined from the previous year's record level to 15,895. Estimated participation (N= 39,514 individuals) was the lowest in three years. Total effort (N= 66,396 trips) was the lowest since 1992. Contributing factors were poor weather conditions (i.e., the hurricanes and numerous cold fronts with strong northeast winds), small size of the shrimp, and their spotty availability.

Catch rates were relatively low in most areas. The best shrimping was in the Beaufort area, which historically has had the highest CPUE. The estimated total catch was 2.02 M pounds heads-on.

The baiters' share of the total fall harvest was 31%, the lowest since detailed records have been kept. Environmental conditions appear to be the principal factor affecting the distribution of fall white shrimp landings. Historically, the baiters' share has been the largest during dry years. Although the 1999 summer was unusually dry, the heavy rainfall associated with the three fall storms caused shrimp to move quickly through the baiting areas into the ocean, reducing their availability to the recreational sector.

CRAB

Total blue crab production was 6.608 M pounds, equal to the average of the last eight years' landings (Fig. 9). Potters accounted for nearly all of the production with 6.503 M pounds of hard crab and 88,000 pounds of peeler/soft crab. Total landed value (\$4.299 M) was almost \$1 M less than in 1998 (Fig. 10) with the unit value (\$0.56/pound for hard crab) the lowest since 1991. There were 359 crab pot licenses sold, fewer than in each of the last four years.

In the last few years, a fishery has developed for horseshoe crab. Although used as eel bait farther north, individuals are taken here almost exclusively to provide fluids for medical purposes and later released alive. In 1999, the landings were 175,000 pounds live weight worth \$31,000.

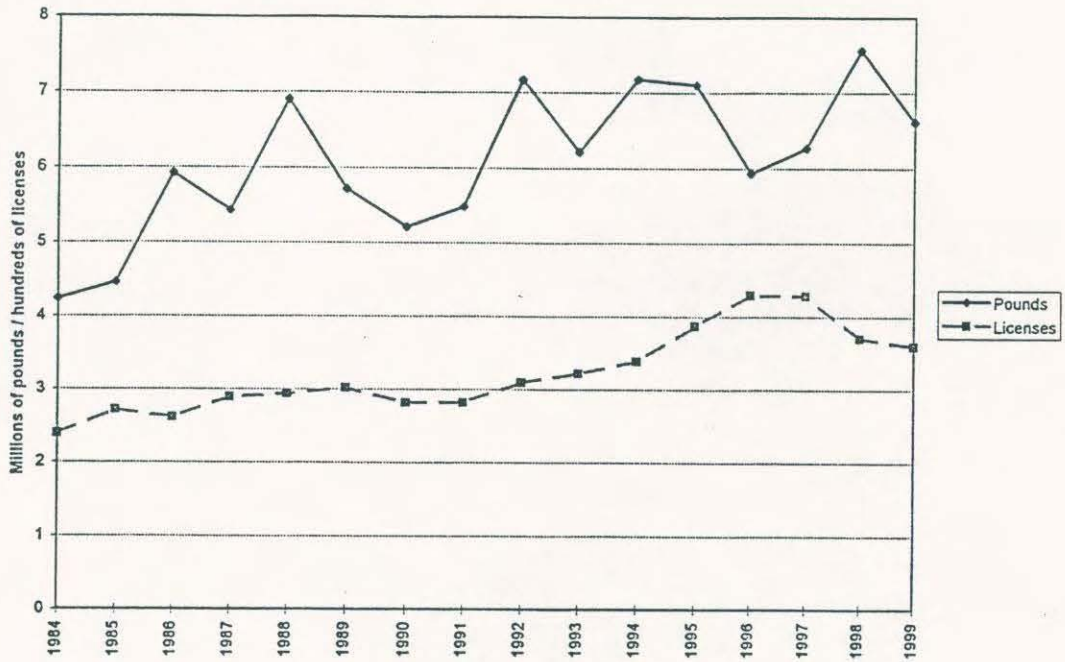


Fig. 9. Annual commercial landings of blue crab and number of crab pot licenses.

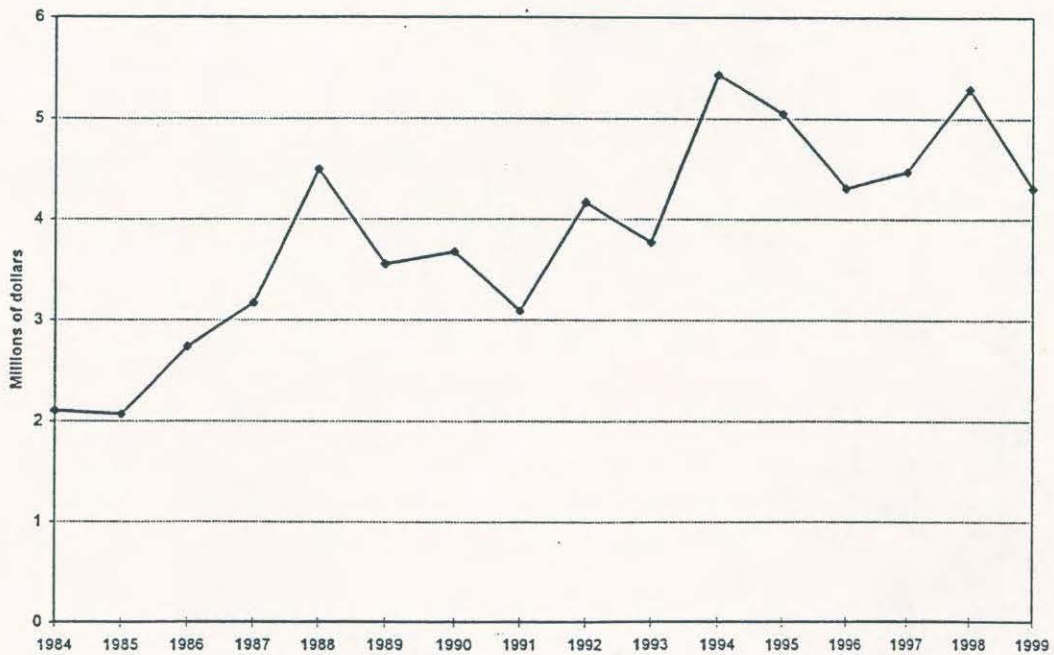


Fig. 10. Annual value of blue crab landings.

SHELLFISH

Landings data are for calendar year 1999. The number of shellfish dredge licenses issued (N = 5) continued to decline and was the lowest in over ten years. The number of shellfish harvester licenses, 267, increased moderately from that in 1998.

Oyster production was 79,767 bushels (meat weight 254,000 pounds). Volume remained at the historically low level of recent years (Fig. 11). The fall hurricanes caused numerous closures for health safety reasons. A lot of the State Shellfish Ground acreage was closed to oyster harvest, due to low abundance attributable to overexploitation and/or disease.

Clam production was 26,561 (250-count) bags (meat yield 156,000 pounds) and continued the basically flat trend of the past decade (Fig. 11).

Landed value of both oysters and clams has trended generally downward during the last ten years (Fig. 12). Much of the oyster harvest consists of low-grade (cluster) oysters suitable only for local distribution. A substantial amount of the clam landings is either transferred or depurated, which reduces the net value.

The whelk season was opened on January 22 and closed on May 3, 1999 with 43 permits issued. Ninety trips were reported with landings of 1,883 bushels (38,000 pounds of meats). Most fishing occurred from Bull Island north to the South Santee River. The two processors reported a lack of harvesting interest due to small size.

Annual whelk landings have fluctuated greatly in the last 20 years in a boom/bust cycle. Given the slow growth and essentially nonmigratory (in latitude) characteristics of the resource, it should be feasible to stabilize its long-term yield (and perhaps increase it modestly) with a controlled seasonal schedule. Seasons could be set so as to produce this yield (about 13,000 bushels per year), based on weekly reports of landings. The number of permits issued could also be determined based on this benchmark and allocated according to historical participation. Most of the permit holders usually do not fish and this procedure could help stabilize revenue projections for those participants traditionally dependent on this resource.

OFFSHORE FISH

Both production (2.546 M pounds) and landed value (\$4.885 M) were near historic lows (Fig. 13). The trends in relative standing of landings by major fish group are shown in Fig. 14. Reef fish, primarily groupers, continued to comprise the major group, while swordfish was the leading individual species contributor.

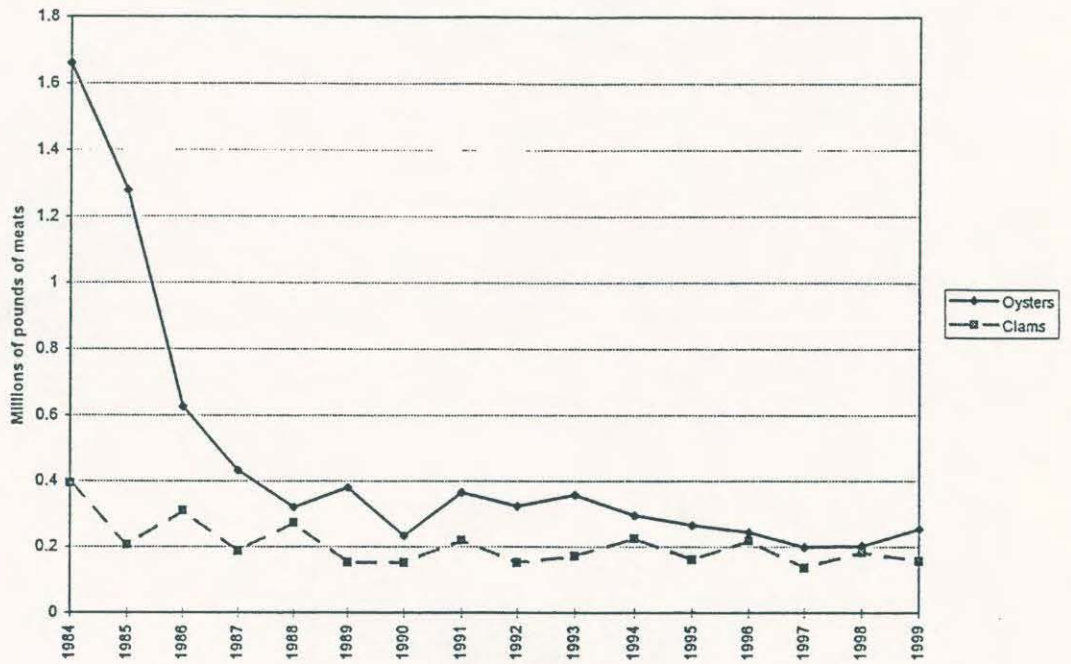


Fig. 11. Annual landings of oysters and clams.

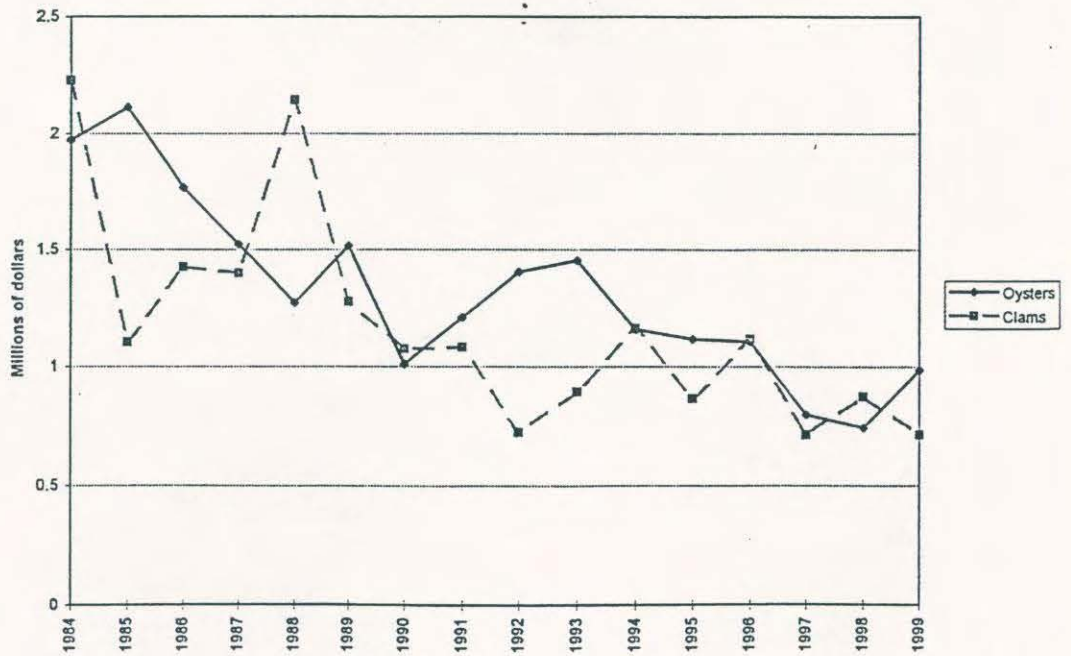


Fig. 12. Landed value of oysters and clams.

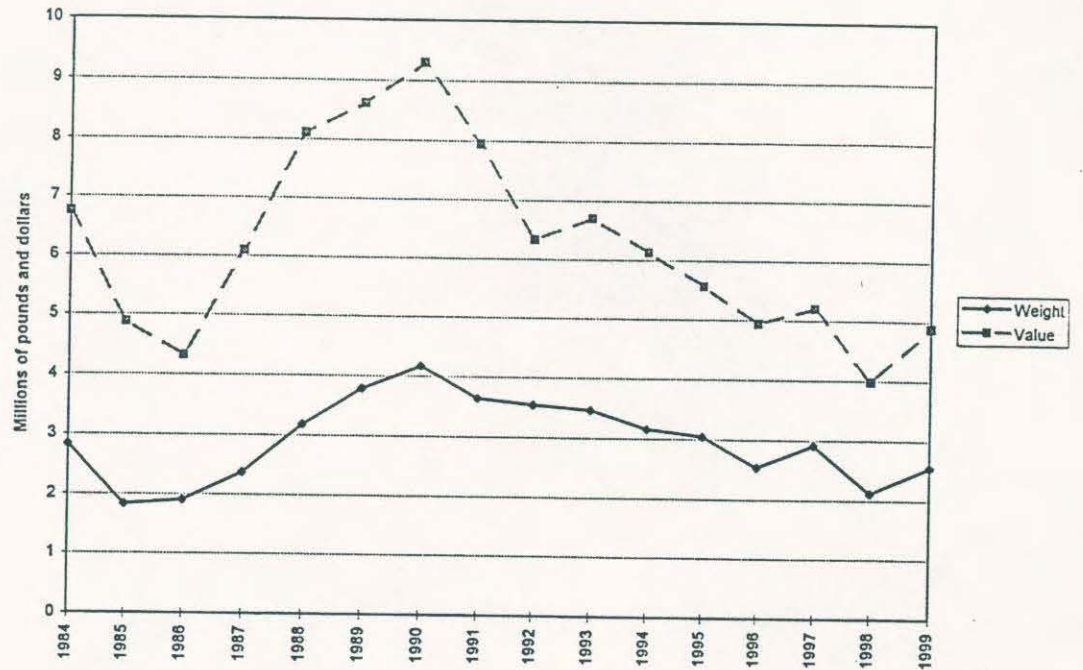


Fig. 13. Annual commercial production of offshore fish.

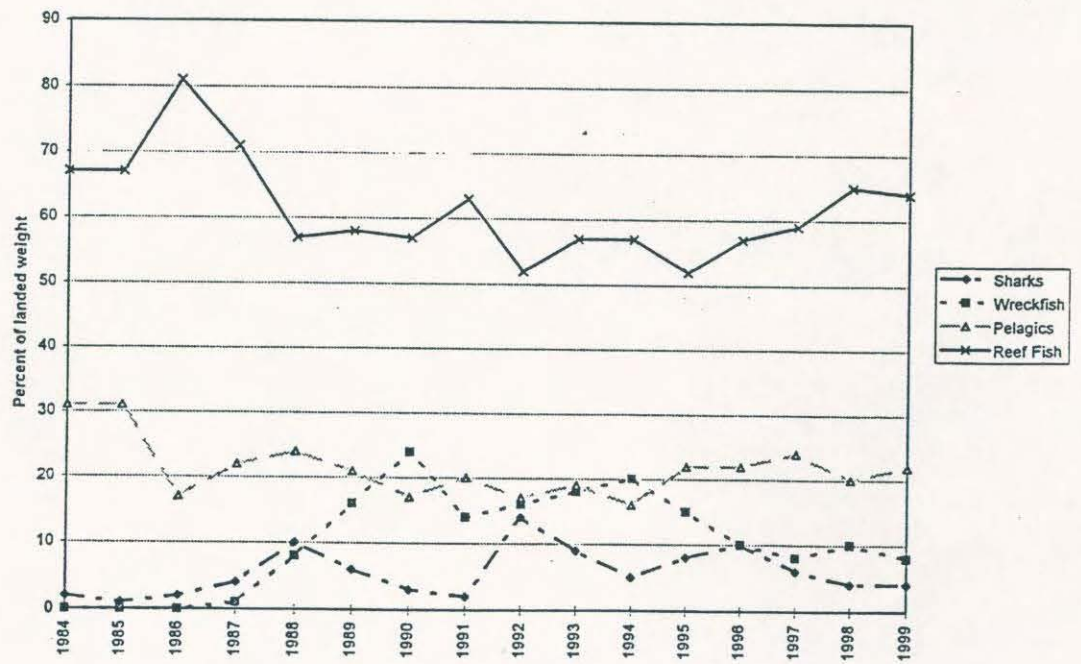


Fig. 14. Composition of offshore fish landings.

The principal gear contributor was the handline fishery. Its two components were 1) a deepwater reel fishery for wreckfish and 2) a snapper reel fishery directed at reef species. In the discussion that follows, "snapper reel" refers to the non-wreckfish portion of the handline fishery.

Wreckfish landings remained confidential, due to the small number of dealers and harvesters involved. The regional fishery is managed under an individual fishermen's quota system with an overall total allowable catch of 2.0 M pounds. In recent years, the total quota has not been approached as participation and effort have steadily declined. The 1999 South Carolina landings represented only about 20% of the state's peak catch reported in 1990.

The snapper reel fishery historically has been the largest offshore fishery in terms of landings and value (Fig. 15). Landings in 1999 were 1.414 M pounds valued at \$2.695 M, a modest improvement over the decade lows of last year (Fig. 16). Most of the snapper reel fishery's production has consisted of reef fish and the trends in that component have been almost identical to those for the entire fishery.

Groupers have comprised the largest species group in the snapper reel landings with gag the dominant species until 1999 (Fig. 17). Scamp was the leading grouper in 1999 at 235,000 pounds compared to 220,000 pounds of gag. Vermilion snapper, in recent years generally the second-largest contributor in volume after gag, was the leading species overall with 273,000 pounds. Twenty years ago, red porgy comprised over one-third of the total snapper reel landings by weight. In 1999, only 19,000 pounds were landed before an emergency closure was implemented on September 8; no retention of red porgy was permitted for 180 days following this date.

The pelagic longline fishery has usually been the second leading value contributor of offshore fish. In recent years, the value of this fishery has been depressed by historical standards (Fig. 18). Landings in 1999 recovered slightly from the record low level of the preceding year. Total volume was 464,000 pounds valued at \$1.104 M.

Swordfish, because of its high unit value, has always been the primary target species off South Carolina and the principal species landed (Fig. 19) by this fishery. The swordfish catch (345,000 pounds) was the largest since 1990 with this the single-species leader among offshore fish in both weight and value (\$917,000) landed.

During 1995-1997, the non-swordfish component of the pelagic longline catch increased substantially. Most of this incidental catch consisted of dolphin, tunas (primarily yellowfin), and sharks. Commercial landings of dolphin and tunas (as well as

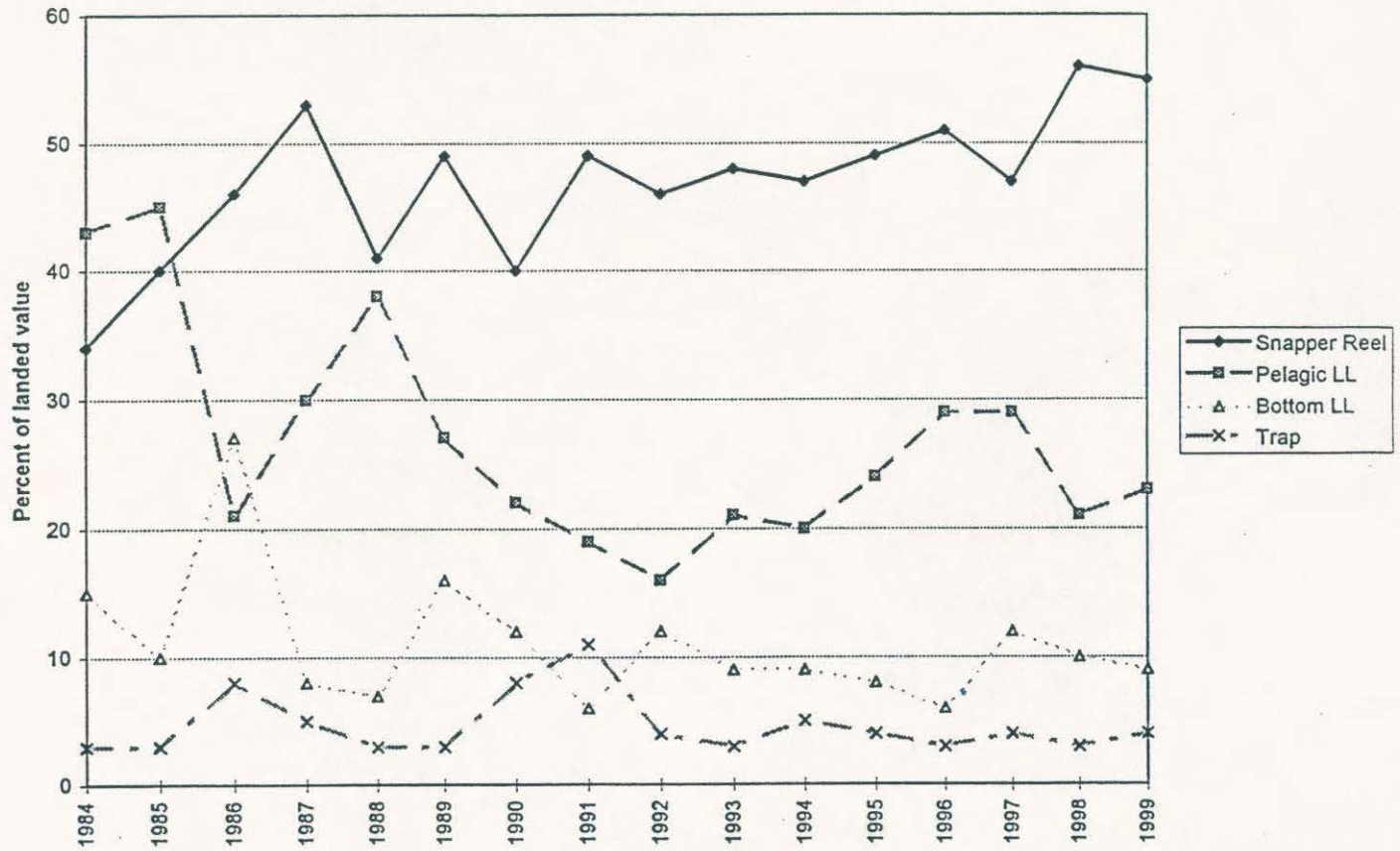


Fig. 15. Contribution to landed value of offshore fish by gear.

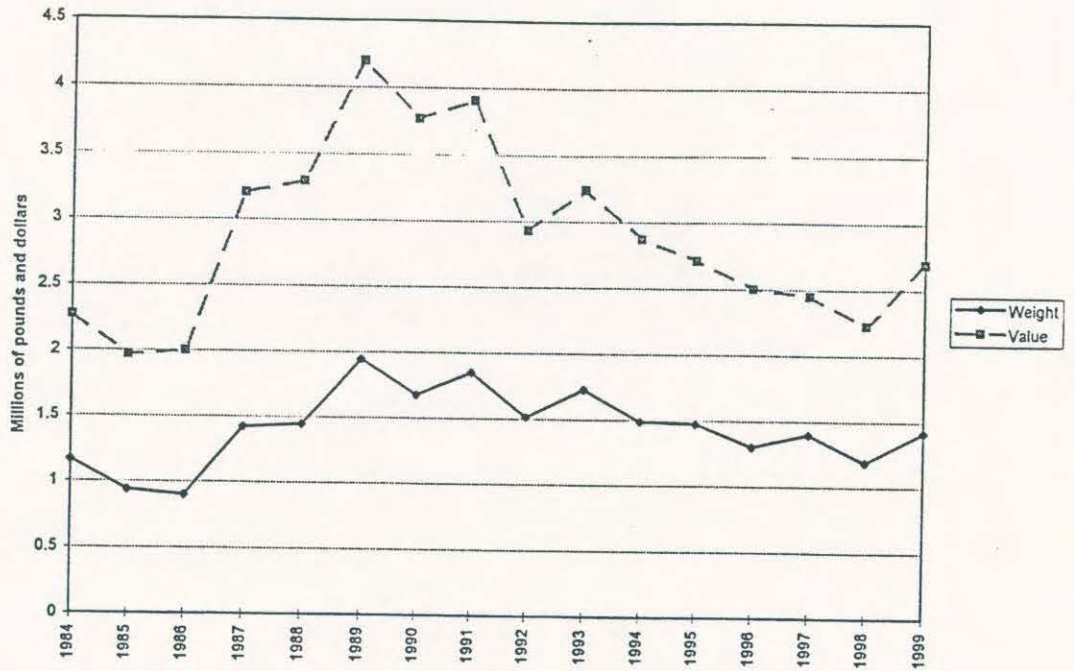


Fig. 16. Annual production of the snapper reel fishery.

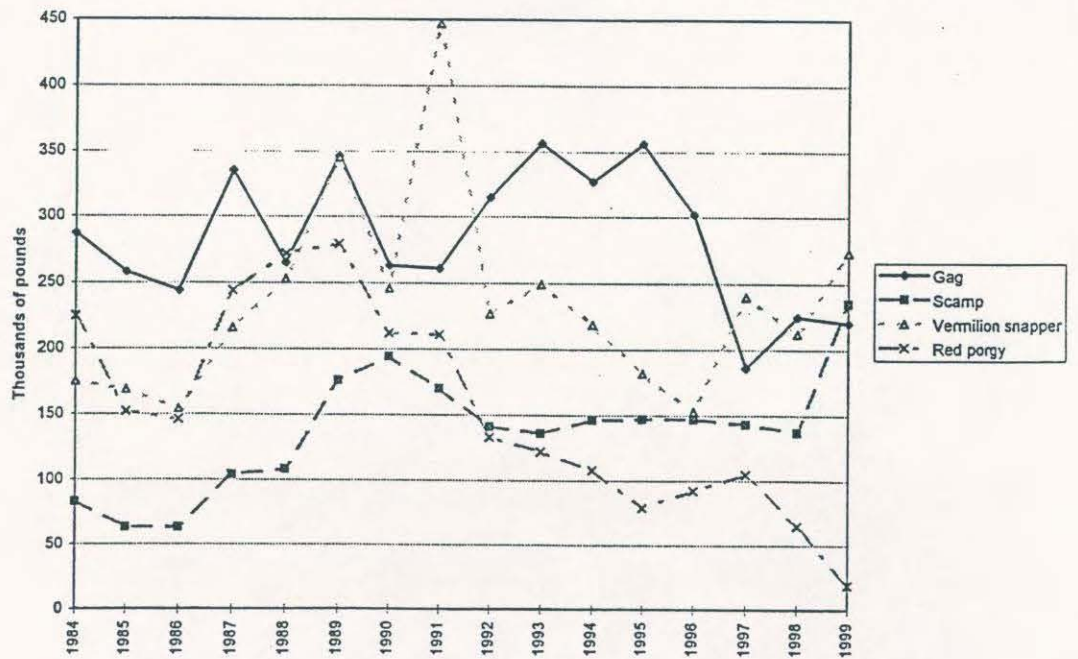


Fig. 17. Annual snapper reel landings of principal reef fish.

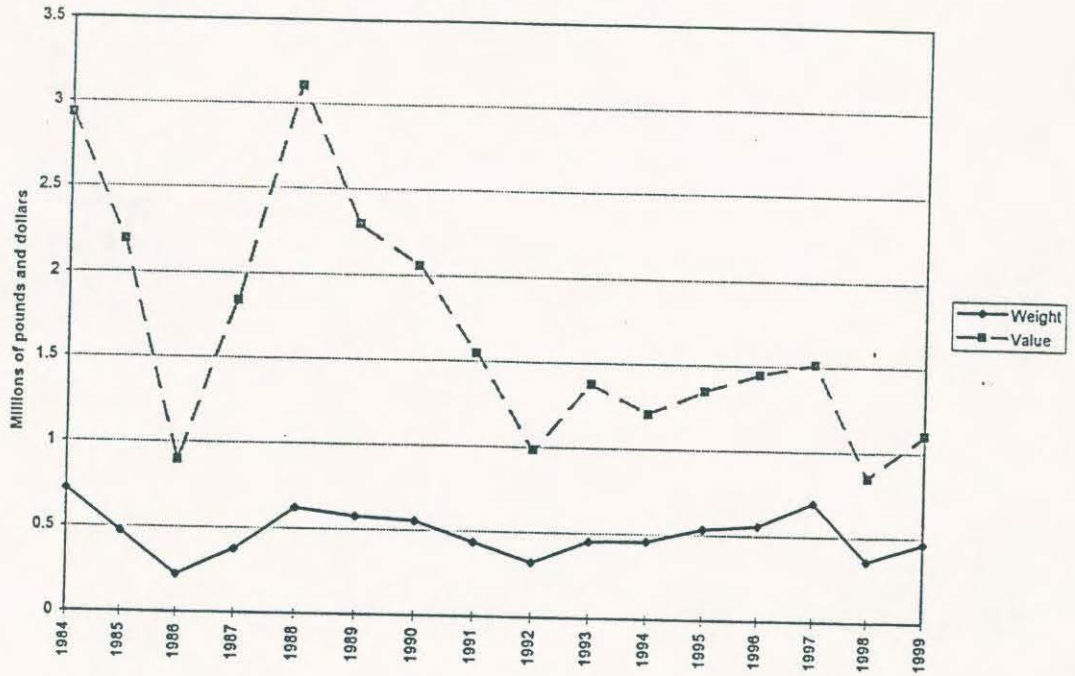


Fig. 18. Annual production of the pelagic longline fishery.

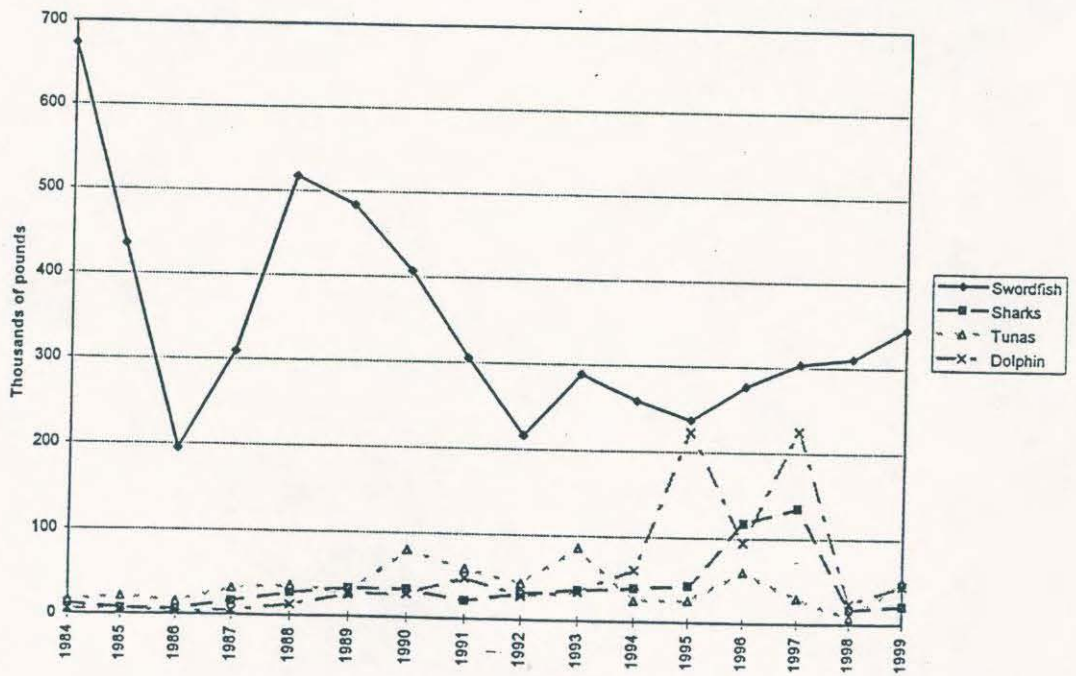


Fig. 19. Pelagic longline landings of principal species.

bycatch of billfishes, which must be released) have been contentious with offshore anglers. The dramatic increase in commercial dolphin landings, primarily by pelagic longline fishermen (Fig. 19), exacerbated this longstanding controversy. A proposal to limit commercial landings and impose recreational bag limits on dolphin was introduced in the 1999 State Legislature, but did not pass prior to the end of the session.

Events in 1999, however, were more typical of the historical pattern than those during 1995-1997. The total commercial dolphin landings (all gears) were 76,795 pounds compared to 67,487 pounds reported by charterboat operators. Commercial yellowfin tuna landings were 43,957 pounds compared to the reported charterboat landings of 48,371 pounds. Commercial fishermen landed only 10,662 pounds of wahoo vs 37,680 pounds reported by charterboat fishermen.

Landings of sharks in 1999 were limited by quota-controlled closures. The commercial fishery for large coastal sharks was closed during May and June. It reopened July 1 and was closed again on July 28. A federal court decision eliminated many of the proposed new management measures and most federal regulations reverted to those of 1997. Because of the revised quotas, the commercial fishery for large coastal sharks was reinstated on September 1. It closed on October 15.

Bottom longline production was slightly improved at 294,000 pounds worth \$438,000 (Fig. 20). The largest contributor was golden tilefish (Fig. 21) with 108,242 pounds valued at \$206,213. Snowy grouper was the next most valuable component (\$107,293 for 49,131 pounds). Black-bellied rosefish, a species largely discarded prior to 1996, contributed 47,563 pounds worth \$46,867. The low shark landings (about 57,000 pounds), made up primarily of species in the large coastal complex, were attributable to the closures.

The trap fishery, the state's most traditional offshore fishery, was directed at black sea bass. Reported landings (145,000 pounds valued at \$218,000) were the best since 1994 (Fig. 22). The trend in trap landings of black sea bass has paralleled that of overall trap production, although appreciable quantities of other reef species were also landed during 1990-1991 before directed fishing for them with trap gear was prohibited. The total catch of black sea bass by all gears was 184,000 pounds worth \$281,000, slightly improved from the level of recent years (Fig. 22).

Commercial king mackerel landings improved slightly after a lengthy decline (Fig. 23). The regional stock is considered to be not overfished with the decline in South Carolina commercial landings apparently due to reduced directed effort. The 1999 catch was 68,286 pounds worth \$114,674, split about evenly between snapper reel and troll boats (the latter category includes fish

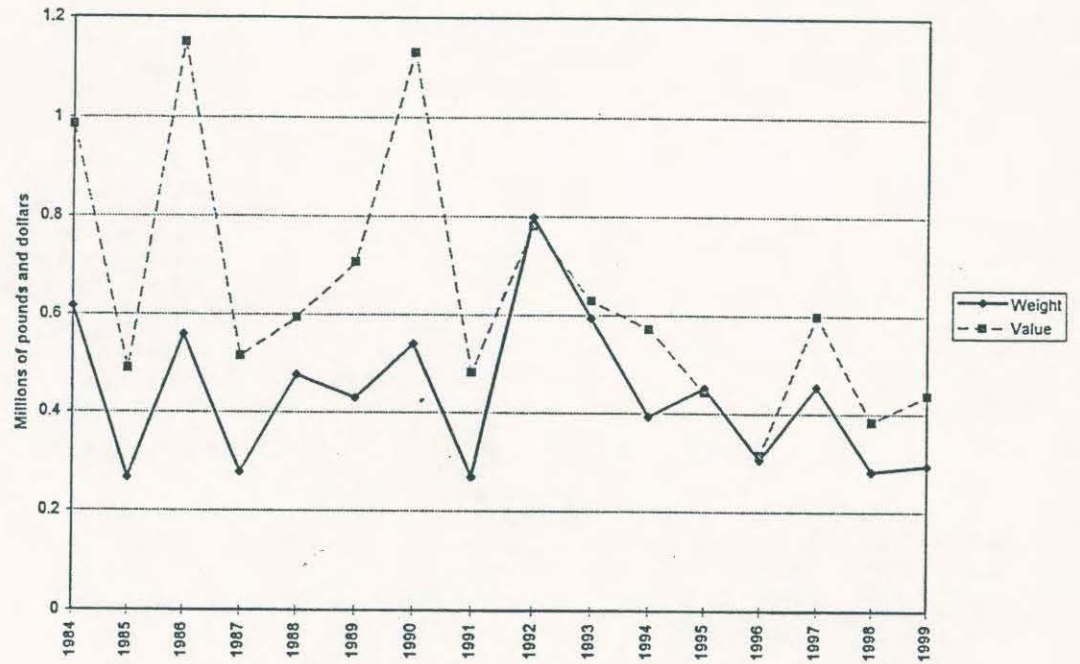


Fig. 20. Annual production of the bottom longline fishery.

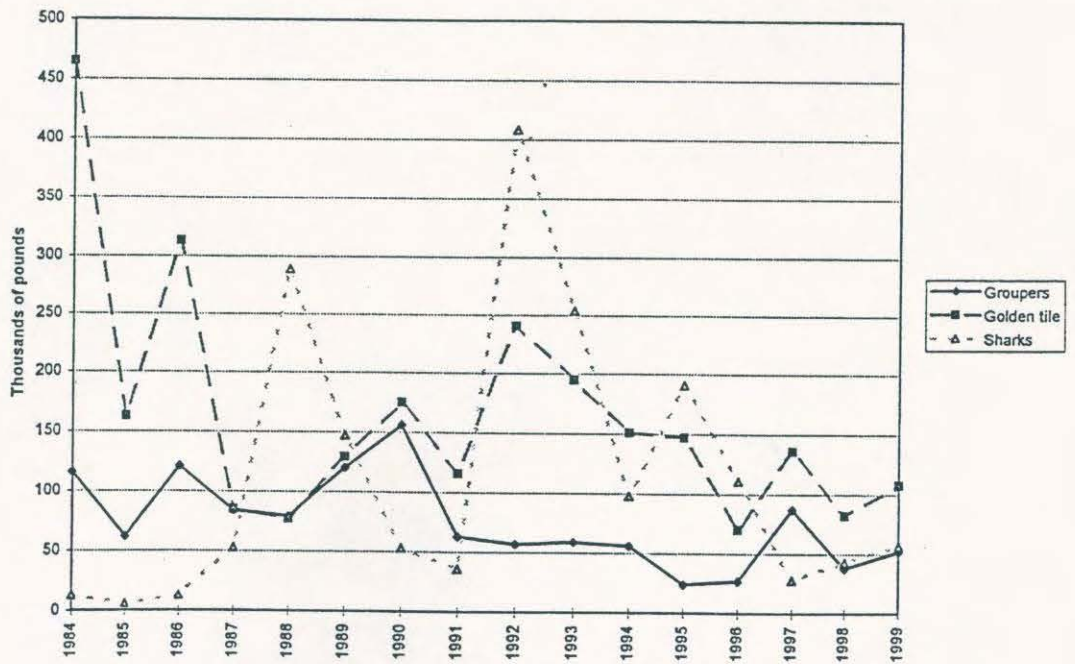


Fig. 21. Bottom longline landings of principal species groups.

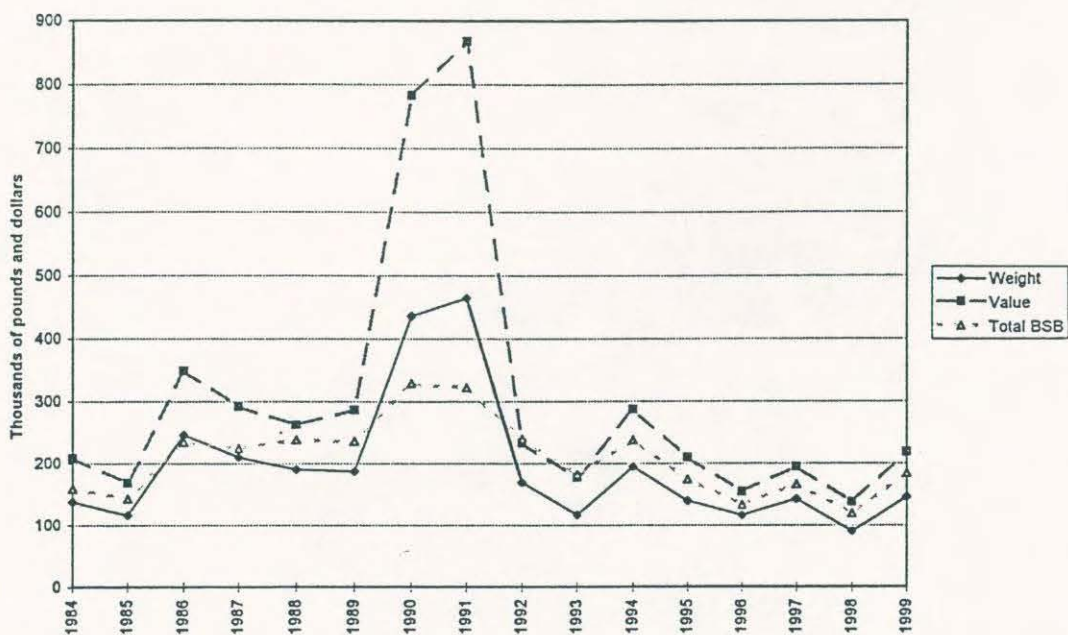


Fig. 22. Annual production of the trap fishery and black sea bass (BSB) total commercial landings.

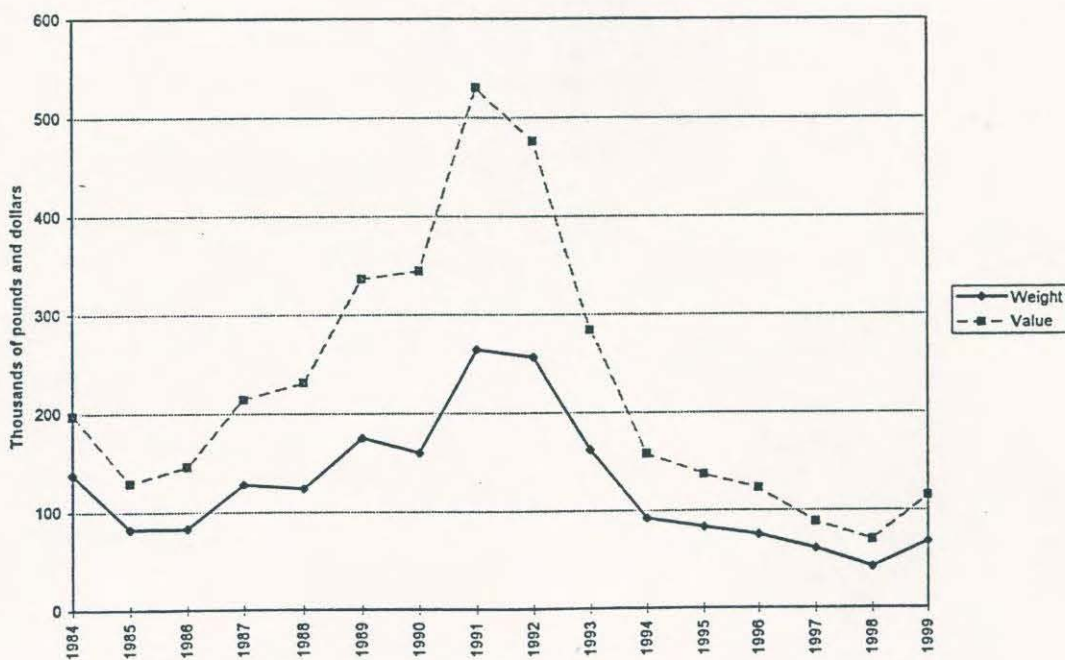


Fig. 23. Annual commercial production of king mackerel.

sold by charterboat captains). Effective September 20, the minimum size was changed from 20 inches to 24 inches fork length with the commercial trip limit remaining at 3,500 pounds.

COASTAL AND RIVERINE FISH

The 1999 catch of coastal fish was 115,000 pounds worth \$83,000. Landings were the lowest in over 20 years (Fig. 24) with nearly all attributable to shrimp trawlers. The principal species, kingfish, landed by trawlers accounted for 74,248 pounds. The haul seine fishery on the Grand Strand was inoperative, due in part to the fall hurricanes. This fishery traditionally has produced most of the state's landings of mullet and spot, typically the largest components of the coastal fishery.

The 1999 landings of American shad were 184,167 pounds valued at \$217,842, among the lowest in the last 15 years (Fig. 25). The number of shad net licenses sold ($N = 709$) was the lowest during this interval. These figures are based on dealer-provided landings. Landings from the ocean were the lowest on record with this fishery due to be phased out in accordance with interstate management plans. Most of the riverine catch came from the Santee River. The dealer-provided landings do not account for most of the inland (upriver) catch. A new reporting system, based on information from individual fishermen, was implemented in 1998 to generate these data. To date, the results are considered speculative.

RECREATIONAL FINFISH FISHERIES

Total participation (excluding headboat fishermen) was estimated by the NMFS at 413,821 fishermen. Out of state residents ($N = 220,908$) comprised 53%, coastal residents ($N = 131,641$) represented 32%, and noncoastal residents ($N = 61,271$) accounted for 15%.

Trends in participation are shown in Fig. 26. During the last decade, the total number of anglers has fluctuated rather widely on an annual basis with no long-term directional trend. The trend in participation by coastal residents has been similar. The current level of participation by coastal residents is substantially lower than that in the late 1980's, despite a considerable increase in the coastal population. The number of marine recreational fishing stamps, required of private boat anglers, was approximately 99,000 during FY 1999, which represented about a 6% increase from that in FY 1998.

Total effort was estimated at 1,213,325 angler-trips by the NMFS, the lowest since 1990 (Fig. 27). Effort was distributed by mode and two-month interval (wave) as follows:

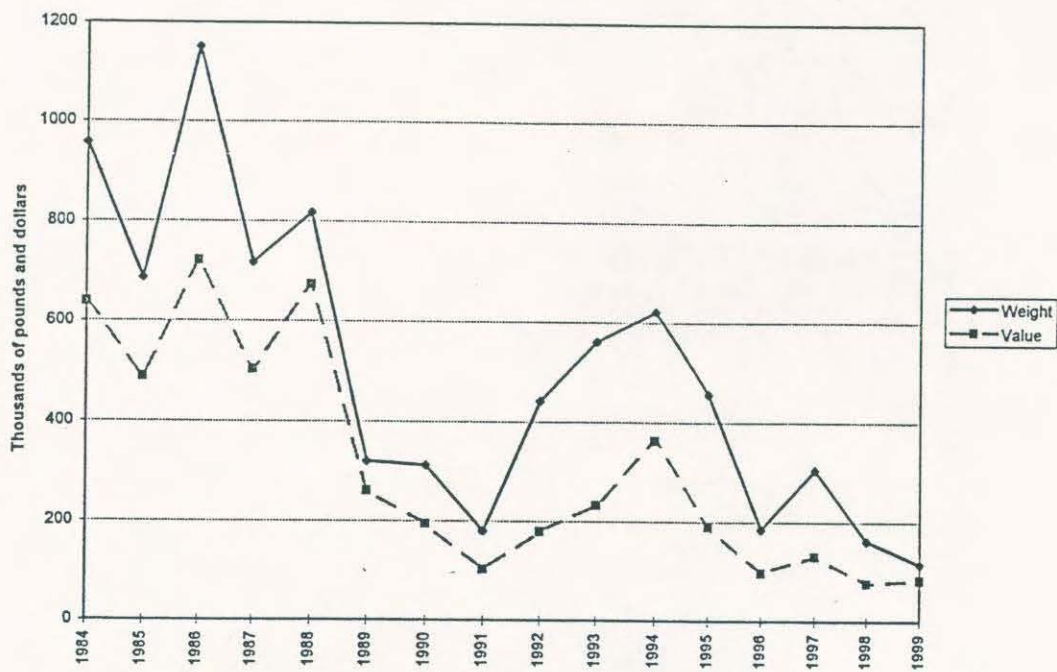


Fig. 24. Annual commercial production of coastal fish.

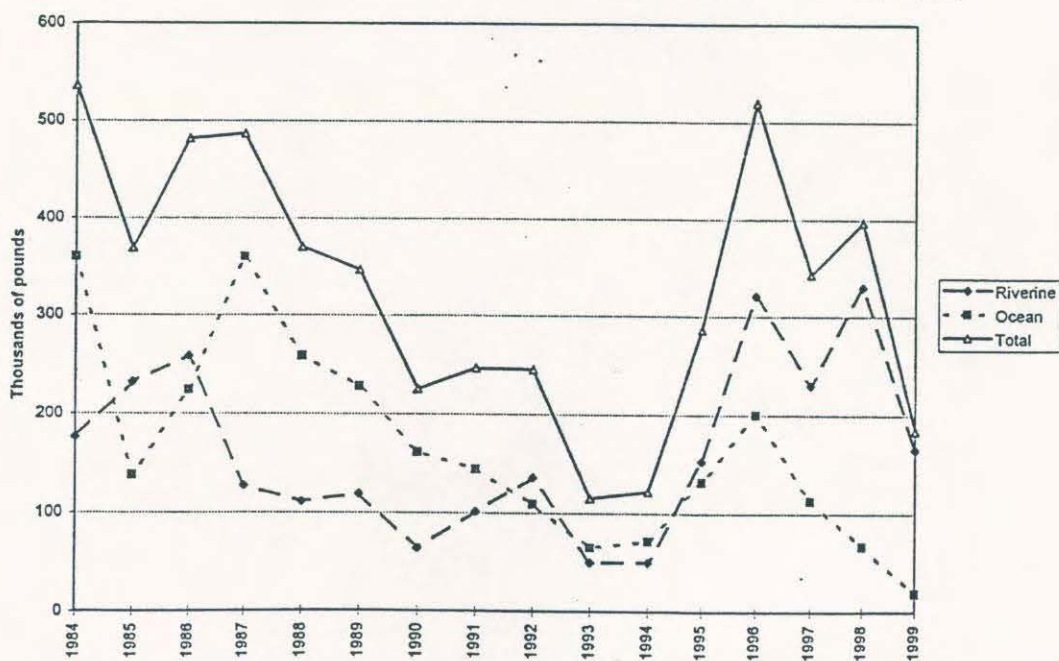


Fig. 25. Annual commercial landings of American shad.

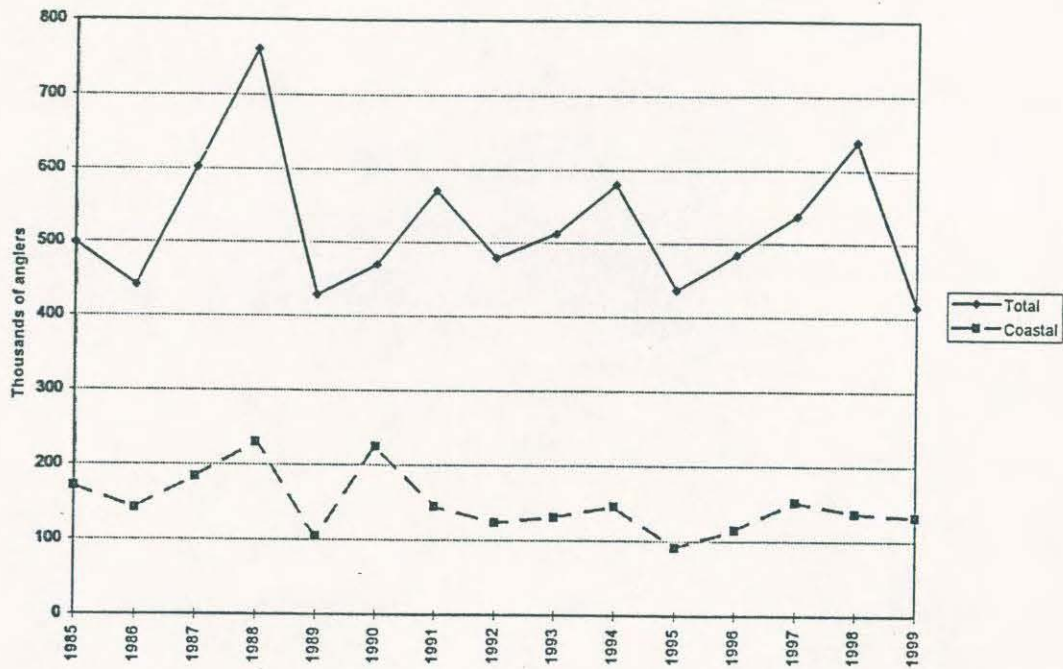


Fig. 26. Estimated participation in the recreational hook and line fishery (excluding headboat anglers).

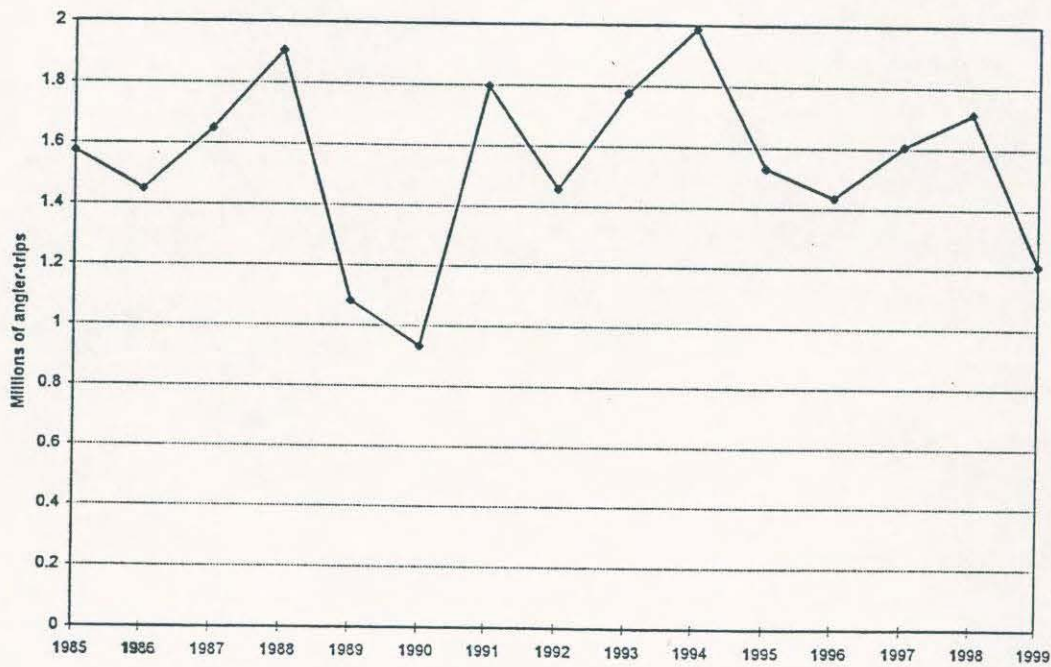


Fig. 27. Estimated effort in the recreational hook and line fishery (excluding headboat trips).

Mode	Wave					Total
	2	3	4	5	6	
Shore	75,820	121,908	190,166	92,509	84,699	565,102
Charter	6,925	17,349	14,401	14,100	8,946	61,721
Private	64,601	140,519	208,672	90,069	82,641	586,502

There were several regulatory changes implemented in 1999, mainly affecting ocean fisheries. On February 24, new size and bag limits for some snapper-grouper species went into effect, as follows:

	Daily bag limit	Minimum size
Gag	2	24 in TL
Black sea bass	20	10 in TL
Vermilion snapper	(unchanged - 10)	11 in TL
Non-covered spp. (e.g. spadefish, sheepshead)	20	(none)

On July 1, the minimum size limits for marlins were reinstated and a new limit of 63 in LJFL (lower jaw fork length) was imposed for sailfish. A 3-fish bag limit went into effect for yellowfin tuna. The daily bag limit for sharpnose sharks was reduced to one per person. The bag limit for any non-prohibited shark species was set at one per vessel per trip with a minimum size limit of 4.5 ft FL. Head, tail, and fins of sharks other than sharpnose were not to be removed until the shark was brought onshore. On September 8, the red porgy fishery was closed (no retention allowed). On September 20, the minimum size limit for king mackerel was increased to 24 in FL.

Table 2 lists the total estimated catches by species/group with those from the previous five years included for comparison. Comments regarding particular species are included in the mode sections. There are several anomalies that appear to be attributable largely to sampling errors. These are also discussed under the appropriate modes.

CHARTERBOAT FISHERY

During the calendar year, permits were issued to 238 vessels (excluding those designated as headboats by the NMFS). This is the largest fleet since permitting was initiated with an increase of 22 boats over the 1998 total. The NMFS classified all boats licensed for more than six passengers as headboats.

Participation

A total of 202 boats reported making at least one trip (including guest trips) during the year, representing 85% of the entire fleet. The number of active boats in each quarter is shown below. The winter quarter is January-March. April-June comprise

Table 2. Estimated total catch by recreational hook and line anglers, excluding headboat catches. Source: NMFS MRFSS. NR - None reported.

Group/species	1995	1996	1997	1998	1999
Oceanic pelagics					
Dolphin	6,582	16,178	16,903	19,382	23,866
Wahoo	509	799	1,562	4,149	2,310
Yellowfin tuna	NR	541	784	11,379	2,353
Reef fish					
Black sea bass	616,938	206,145	616,262	275,954	302,361
Gag	6,446	6,451	4,262	1,036	7,079
Scamp	4,074	NR	5,399	9,080	280
Red snapper	NR	1,052	34,550	6,871	39,578
Vermilion snapper	19,376	16,300	35,465	49,982	88,295
Red porgy	53,206	45,831	3,238	2,796	14,479
Other porgies	NR	7,887	22,617	3,462	3,973
White grunt	3,613	8,032	21,082	12,488	11,156
Other grunts	25,461	31,730	13,899	3,064	11,045
Triggerfish	2,825	5,460	28,154	15,037	19,951
Spadefish	6,060	39,286	73,120	28,468	24,074
Sheepshead	126,818	172,202	52,051	28,906	51,752
Amberjack	509	3,462	10,694	348	282
Coastal pelagics					
King mackerel	58,644	62,296	99,067	123,390	21,806
Spanish mackerel	39,837	215,886	160,842	97,671	73,877
Bluefish	371,685	137,462	282,485	370,846	93,060
Crevalle jack	3,541	21,293	8,365	14,526	505
Barracuda	5,961	14,570	34,633	12,973	7,648
Cobia	1,382	4,841	4,506	3,202	10,766
Bonito/tunny	20,936	6,761	18,282	4,875	4,951
Inshore sportfish					
Red drum	597,566	305,775	301,189	130,783	131,845
Spotted seatrout	442,284	245,872	198,443	276,973	194,052
Weakfish	32,013	5,516	4,904	16,167	17,557
Flounders	215,416	163,033	236,509	269,127	124,272
Inshore bottomfish					
Kingfish	489,033	355,855	851,074	556,065	358,493
Spot	1,197 K	1,617 K	916,364	796,548	888,679
Croaker	182,055	99,417	252,073	436,596	171,586
Black drum	31,765	29,798	49,358	15,621	65,083
Sharks					
Blacktip	7,127	56,331	51,776	151,224	25,285
Sharpnose	44,001	41,608	11,022	16,855	2,666
Other	215,366	257,878	335,854	824,672	252,269

the spring quarter with July-September representing the summer. The fall quarter consists of October-December.

Quarter	Active vessels						
	1993	1994	1995	1996	1997	1998	1999
Winter	27	29	42	52	62	68	82
Spring	98	121	119	135	131	150	163
Summer	110	130	125	134	138	156	171
Fall	87	89	104	111	98	132	121
Total	126	147	153	166	158	184	202

Fleet distribution by length and location was as follows.

Counties	Length (ft)					Total no.
	<20	20-26	27-31	32-40	>40	
BFT/COL/GA	16	26	4	13	5	65
CHS/BRK/DOR	32	19	11	16	34	112
GTN	6	8	6	8	9	37
HOR/NC	-	2	5	10	4	21
Unknown	-	1	1	1	-	
Total	54	56	27	48	52	238

Fleet size (in number of vessels) has generally been increasing everywhere except in Horry County during the last few years.

The numbers of boats fishing in various zones are shown below.

Year	Inland	<3 mi.		>3 mi.	
		natural	manmade	natural	manmade
1993	39	58	19	113	47
1994	55	71	17	126	59
1995	65	63	18	114	53
1996	70	74	19	122	54
1997	63	76	20	116	41
1998	84	93	16	129	54
1999	98	85	18	139	66

Compared to the averages during the past three years, the largest increase (36%) has occurred in the inland fishing area.

The total number of anglers set a new record.

Year	Number of anglers				
	Winter	Spring	Summer	Fall	Total
1993	356	7775	12652	2164	22947
1994	547	9491	13615	2522	26175
1995	766	9870	10946	2446	24028
1996	880	10196	10245	2595	23916
1997	1027	8415	11621	2540	23603
1998	824	11516	12369	3872	28581
1999	1141	10952	14265	3494	29852

By comparison, the MRFSS estimate was 61,720 angler-trips (= anglers). The distribution by fishing area differed considerably:

	Inland	Ocean < 3 mi.	Ocean > 3 mi.
MRFSS	3,979	646	57,095
MRD	3,108	6,216	16,298

Effort

Operators reported 8,027 boat trips (including guest trips), slightly above the record level of the previous year. This effort was distributed as follows.

Area	Boat trips				Total
	Winter	Spring	Summer	Fall	
Inland	294	904	963	739	2900
Ocean <3 mi.	54	516	997	81	1648
natural	30	489	959	73	1551
manmade	24	27	38	8	97
Ocean >3 mi.	103	1423	1632	321	3479
natural	50	1270	1483	290	3093
manmade	53	153	149	31	386
Total	451	2843	3592	1141	8027

Inland effort continued its steady upward trend, while there was a slight increase in effort over coastal natural habitat. Offshore effort declined slightly from that in 1998. Effort increased during the summer in spite of extremely hot, dry weather. Two hurricanes contributed to reduced ocean effort during the fall.

Distribution of boat trips known by vessel length and location was as follows.

Counties	Boat trips					Total
	<20	20-26	27-31	32-40	>40	
BFT/COL/GA	670	1419	252	1111	18	3470
CHS/BRK/DOR	1319	399	95	207	555	2575
GTN	154	92	49	289	284	868
HOR/NC	-	-	278	385	161	824
Total	2143	1910	674	1992	1018	7737

Compared to the previous year's distribution, the biggest change was a decrease in the number of trips by boats in the 27-31 ft category.

In terms of annual effort by individual vessels, the distribution was as indicated below. The percentages were very similar to those in 1998. During the past four years, roughly 60% of the operators have reported making <26 for-hire trips per year.

	Number of trips/year						
	0	1-25	26-49	50-74	75-99	100-125	>125
Number	36	110	34	23	11	9	15
Percent	15	46	14	10	5	4	6

Annual effort by fishing zone, method, and target group or species is summarized in Table 3. Trends in directed effort for major groups or species are indicated in Table 4. Reef fish includes black sea bass, groupers, snappers, porgies, and amberjacks. It should be kept in mind that substantial amounts of effort are simply targeted at "anything." Much of the offshore ocean fishing is nonspecific, consisting either of generalized trolling or bottomfishing.

Landings

Annual catch data are summarized in Tables 5 and 6.

Oceanic pelagics

Catches were the largest since 1993 for all major components. Offshore hydrographic conditions during the peak spring season appeared to favor local availability. Annual CPUE for dolphin equalled the average during the preceding six years. Landings of yellowfin tuna continued to recover after a steady decline during 1993-97 and the CPUE in 1999 was the highest since that in 1994. Wahoo catches were exceptionally good with the highest annual CPUE observed to date.

Reef Fish

Despite an above-average level of directed effort, landings of nearly all principal species were relatively low, indicative of generally depressed stock status. The overall catch of red porgy, perhaps the most severely overfished member of this complex, was the lowest since mandatory reporting was initiated. Retention of this species was prohibited after September 8.

The red snapper catch is obviously greatly overestimated in the MRFSS data. The average weight of the retained fish was 1.29 lb, which is well below the weight corresponding to the minimum legal size limit of 20 inches.

Coastal pelagics

The king mackerel catch was unusually low, but this appeared to be largely attributable to substantially reduced effort throughout the year. The peak period of the fishery in terms of directed effort and catch is usually during June through August. The trend in CPUE for this period is shown in Fig. 28. The relatively high values in recent years reflect the improved stock status indicated in the most recent assessment. Normally, the best fishing occurs during the fall, particularly in November. The 1999 fall fishery probably was affected by the hurricanes, particularly the October storm (Irene), which may have reduced the availability of fish thereafter.

Table 3. Charterboat participation and effort (angler-hours inland, boat-hours ocean). Source: MRD logbooks.

Area	Method	Target species	Boat trips	Anglers	Hours
Inland	Any	Red drum	1476	3108	12875
		Spotted seatrout	457	1092	4700
		Cobia	152	378	1577
		Sharks	119	465	1734
		Spanish mackerel	64	155	609
		Tarpon	51	115	586
		Flounder	31	79	361
		Sheepshead	19	58	182
		Bluefish	13	39	143
		Spot	10	38	123
		Kingfish	9	30	106
		Crevalle jack	7	15	64
		Black sea bass	5	11	44
		Black drum	3	6	38
		Weakfish	3	8	30
		Striped bass	1	2	10
		Spadefish	1	2	6
		Rays	1	6	6
		Any	478	1731	4935
		Total	2900	7338	28129
Ocean 0-3 mi. natural	Troll	Spanish mackerel	366	1489	1261
		King mackerel	37	132	152
		Any	2	5	4
		Total	405	1626	1417
		Non-troll		Sharks	369
Cobia	177			534	736
Tarpon	146			413	595
Red drum	46			122	179
Sheepshead	19			82	48
Black sea bass	14			62	44
Spotted seatrout	12			30	51
Weakfish	4			9	11
Crevalle jack	3			7	12
Bluefish	2			7	8
Spadefish	2			4	10
Spanish mackerel	2			4	8
Black drum	2			3	7
Striped bass	1			2	5
Any	347			1331	1203
Total	1146			4236	4085
Ocean 0-3 mi. manmade	Troll			Spanish mackerel	33
		King mackerel	3	8	13
		Total	36	142	128

Non-troll		Sheepshead	21	69	70
		Black sea bass	4	11	15
		Red drum	3	11	10
		Sharks	2	5	5
		Bluefish	2	11	9
		Weakfish	1	2	3
		Cobia	1	2	3
		Black drum	1	6	4
		Any	26	95	83
		Total	61	212	202
Ocean >3 mi. natural	Troll	King mackerel	625	2959	2972
		Spanish mackerel	378	1802	1222
		Dolphin/wahoo/tuna	174	877	1070
		Billfish	133	579	941
		Little tunny	4	19	20
		Bluefish	1	1	3
		Any	680	3476	4522
		Total	1995	9713	10750
Non-troll		Sharks	209	997	655
		Black sea bass	121	544	441
		Grouper	81	410	395
		Sheepshead	38	136	102
		Cobia	17	70	79
		Tarpon	17	59	60
		Red drum	14	61	51
		Snapper	9	43	41
		Weakfish	7	21	24
		Amberjack	7	42	35
		Spadefish	5	15	20
		Any	573	2674	2630
		Total	1098	5072	4533
	Ocean >3 mi. manmade	Troll	Spanish mackerel	105	440
King mackerel			89	383	371
Barracuda			1	4	4
Tuna			1	4	6
Any			4	11	14
Total			200	842	743
Non-troll		Sheepshead	40	135	127
		Black sea bass	24	83	103
		Spadefish	13	46	61
		Cobia	9	30	49
		Red drum	4	7	23
		Weakfish	3	8	10
		Grouper	3	14	16
		Sharks	2	8	12
		Tarpon	1	5	6
		Black drum	1	3	6
		Any	86	332	406
		Total	186	671	819

Table 4. Directed charterboat effort for principal species.
Source: MRD logbooks.

Target grp./spp.	1993	1994	1995	1996	1997	1998	1999
		Inland angler-hours					
Red drum	1359	2918	6934	9122	8910	10571	12875
Spotted seatrout	1509	1302	1426	1004	1468	3848	4700
Sharks	2403	2987	1033	1236	1394	968	1734
Cobia	596	581	334	141	458	1286	1577
Tarpon	923	1185	1537	1596	1691	1229	586
		Ocean <3 mi. boat-hours					
Sharks	1095	1885	2263	1636	1398	1538	1173
Spanish mackerel	316	436	464	772	800	694	1384
King mackerel	73	248	316	480	729	457	165
Tarpon	28	661	384	325	156	571	595
Cobia	57	107	60	55	26	229	739
		Ocean >3 mi. boat-hours					
King mackerel	4149	6047	5454	5363	5740	5458	3343
Spanish mackerel	931	1336	746	921	717	1254	1570
Dol./Wahoo/Tuna	1029	1272	749	546	928	1003	1076
Billfish	516	323	400	586	532	918	941
Reef fish	973	1091	749	1057	953	1063	1112

Table 5. Charterboat catch (numbers of fish). Source: MRD logbooks.

Group/species	Retained	Released	Inland	0-3 mi.	>3 mi.
Oceanic pelagics					
Dolphin	5748	456	-	-	6204
Wahoo	1293	17	-	-	1310
Yellowfin tuna	1376	51	-	-	1427
Blackfin tuna	192	26	-	-	218
Skipjack tuna	-	2	-	-	2
Bonito	115	36	-	16	135
Blue marlin	1	97	-	-	98
White marlin	-	16	-	-	16
Sailfish	2	129	-	-	131
Swordfish	-	1	-	-	1
Reef fish					
Black sea bass	12817	8925	229	1708	19805
Gag	879	386	-	-	1265
Scamp	538	378	-	-	916
Red grouper	71	7	-	-	78
Speckled hind	2	-	-	-	2
Grouper, unc.	3	10	-	-	13
Red snapper	460	235	-	-	695
Vermilion snapper	4568	1431	-	-	5999
Red porgy	1219	701	-	-	1920
Whitebone porgy	143	18	-	4	157
Porgy, unc.	58	32	-	-	90
White grunt	1283	134	-	12	1405
Grunt, unc.	298	837	18	15	1102
Triggerfish	939	69	-	5	1003
Spottail pinfish	201	1124	-	3	1322
Spadefish	307	257	6	86	472
Amberjack	239	429	-	6	672
Rudderfish	38	-	-	-	38
Sheepshead	668	797	346	286	833
Golden tilefish	6	-	-	-	6
Hogfish	1	-	-	-	1
Coastal pelagics					
King mackerel	3448	719	7	233	3927
Spanish mackerel	16134	6856	1443	12690	8857
Bluefish	899	3686	1486	1777	1322
Crevalle jack	59	1497	266	610	680
Blue runner	-	21	2	-	19
Barracuda	188	1445	-	48	1585
Cobia	542	565	440	514	153
Little tunny	309	771	8	93	979
Inshore sportfish					
Red drum	1562	9094	10118	334	204
Spotted seatrout	2709	8993	11474	213	15
Weakfish	728	1148	579	590	707
Flounder	408	643	871	47	133

Group/species	Retained	Released	Inland	0-3 mi.	>3 mi.
Tarpon	3	164	36	119	12
Striped bass	2	19	12	9	
Inshore bottomfish					
Kingfish	987	564	849	680	22
Spot	414	119	533	-	-
Croaker	17	140	157	-	-
Black drum	186	419	388	105	112
Sharks					
Unclassified	152	4200	1335	1866	1151
Blacktip	276	2640	874	1462	580
Sharpnose	1117	3356	543	2412	1518
Other					
Rays	-	155	98	52	5
Skates	-	19	18	1	-
Catfish	1	51	36	12	4
Toadfish	-	20	8	-	12
Pinfish	-	40	34	6	-
Unclassified	148	1598	1269	374	103

Table 6. Charterboat catches as estimated from the MRFSS vs those reported to the MRD. NR - None reported.

Group/species	Total number		Pounds landed	
	MRFSS	MRD	MRFSS	MRD
Oceanic pelagics				
Dolphin	18,071	6,204	131,455	67,487
Wahoo	2,310	1,310	58,934	37,680
Yellowfin tuna	2,353	1,427	53,355	48,371
Marlins	NR	114	NR	372
Sailfish	159	131	0	75
Reef fish				
Black sea bass	57,087	21,742	29,653	16,408
Gag	7,079	1,265	48,264	10,180
Scamp	280	916	1,656	3,995
Other groupers	1,338	93	5,820	648
Red snapper	37,222	695	30,227	3,586
Vermilion snapper	38,712	5,999	23,829	6,412
Red porgy	11,251	1,920	11,050	2,596
Other porgies	2,576	251	3,733	374
White grunt	4,409	1,417	2,035	2,294
Other grunts	6,357	1,135	99	506
Triggerfish	11,437	1,008	24,884	1,938
Spottail pinfish	1,398	1,325	185	153
Sheepshead	4,147	1,465	6,210	2,965
Amberjacks	160	678	0	5,983
Coastal pelagics				
King mackerel	16,374	4,167	113,209	37,121
Spanish mackerel	12,622	22,990	10,943	26,597
Bluefish	1,677	4,585	256	1,766
Barracudas	5,036	1,633	0	3,277
Cobia	NR	1,107	NR	15,317
Inshore sportfish				
Red drum	13,580	10,656	8,861	4,740
Spotted seatrout	14,242	11,702	6,575	5,156
Flounders	NR	1,051	NR	1,023
Tarpon	NR	167	NR	257
Inshore bottomfish				
Kingfish	911	1,551	0	1,082
Spot and croaker	NR	690	NR	306
Black drum	NR	605	NR	728
Sharks				
Blacktip	702	2,916	0	11,287
Sharpenose	1,255	4,473	7,000	7,910
Other sharks	11,100	4,352	442	3,998

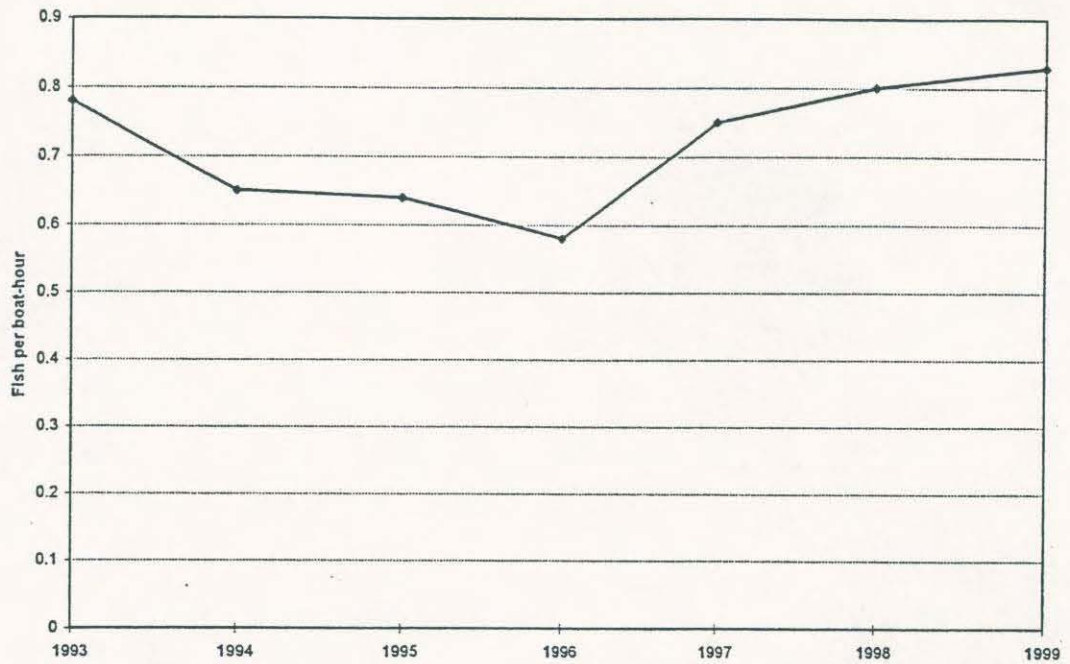


Fig. 28. Charterboat CPUE for king mackerel, June-August.

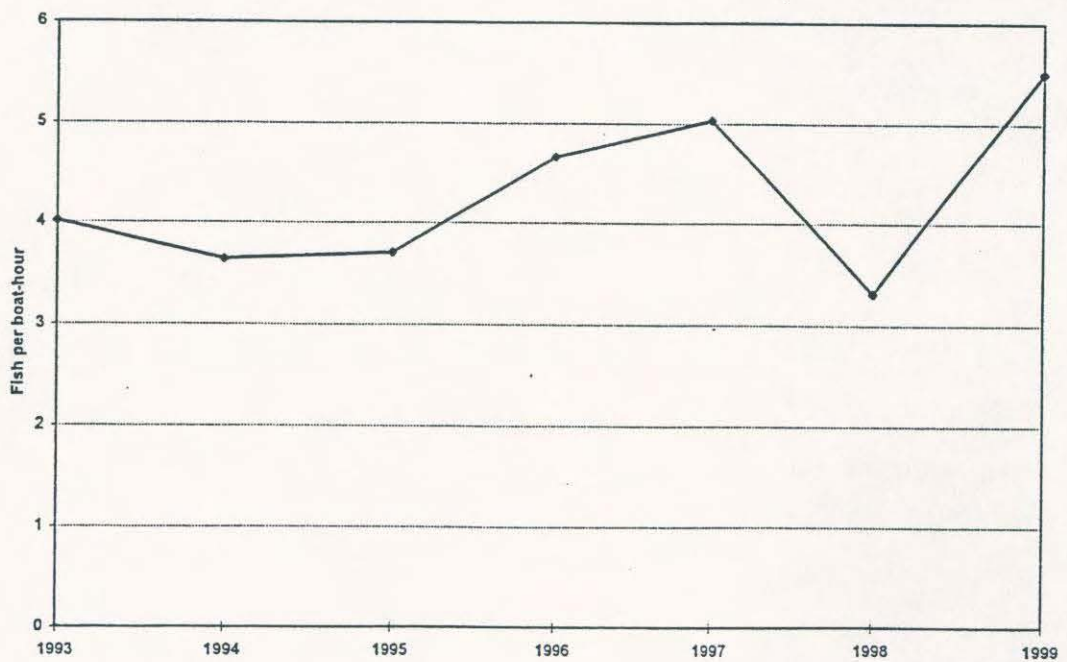


Fig. 29. Charterboat CPUE for Spanish mackerel, May-August.

Anecdotal information indicated that Spanish mackerel were the most abundant in many years and directed effort was well above previous levels in response to this opportunity. The peak period for catch and effort is generally during May-August and CPUE then (Fig. 29) supported the recent optimistic stock assessment. The unusually hot summer may have encouraged northern movement from Florida, as CPUEs hit record levels in July through September (the fishery was largely over before the onset of hurricane activity).

Effort was well above normal for cobia. Fish appeared to be abundant again this year and CPUE, although lower than in 1998, was well above average.

Inshore sportfish

As usual, red drum was the most sought-after species on a year-round basis. Prior to 1998, the charterboat effort for red drum peaked in April and during September-November. Since then, this has evolved into a year-round fishery; in 1999, there was substantial effort during every month. Both catch and directed effort continued the steep upward trends of recent years (Fig. 30). Annual CPUE recovered from the relatively low level observed during 1998 (Fig. 31). Spotted seatrout catches were well above normal for the second consecutive year. The tarpon catch was down considerably from that in 1998, as was effort; however, CPUE was slightly above the 1993-97 average.

Sharks

Catches, particularly of small coastals (mainly sharpnose) were relatively high.

PRIVATE BOAT FISHERY

The trend in estimated effort (in angler trips) is shown in Fig. 32. Historically, most of the effort has been expended in inland (estuarine) areas. In 1996-1998, the amount of effort expended inland dropped substantially, while effort in coastal ocean (<3 miles) waters expanded greatly. In 1999, the MRFSS estimates were 427,488 trips inland, 120,606 trips in the ocean <3 mi. zone, and 38,408 offshore ocean trips.

This shift in apparent distribution probably is a sampling artifact, since there appears to be no other logical explanation for this development, nor does it appear obvious from observation. It may be partly due to the fact that the MRD terminated its participation in the on-site intercept portion of the MRFSS in May 1996 and the distribution of intercepts may have shifted since then. The probable misassignment of effort is important when evaluating the catch trends for several important inshore species, e.g. red drum and spotted seatrout, since the catches will be substantially underestimated.

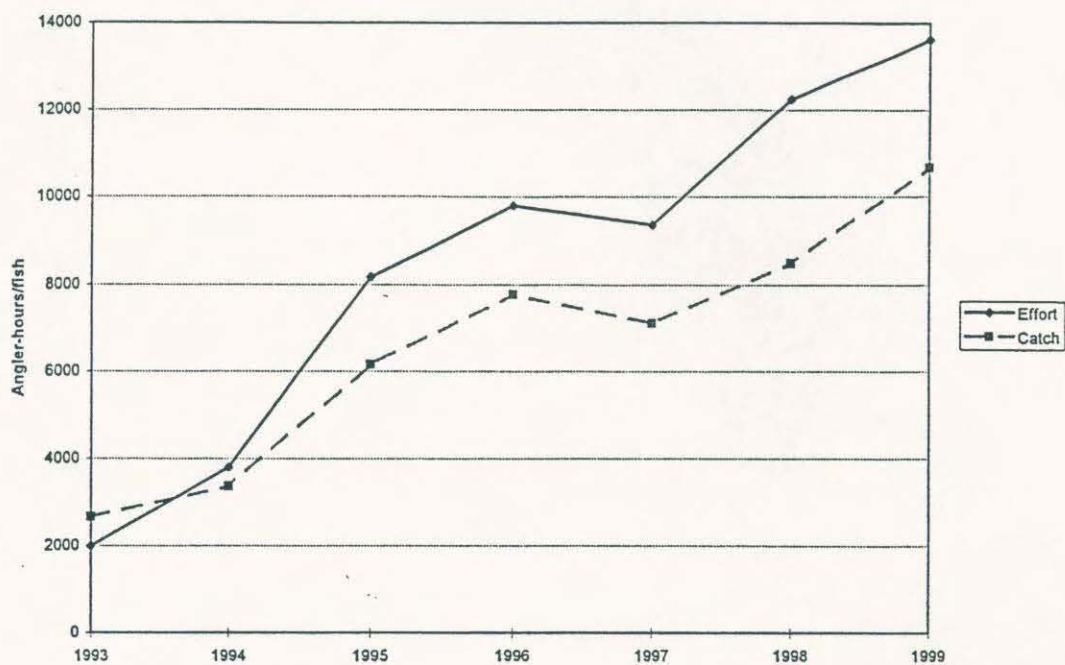


Fig. 30. Charterboat directed effort and catch for red drum.

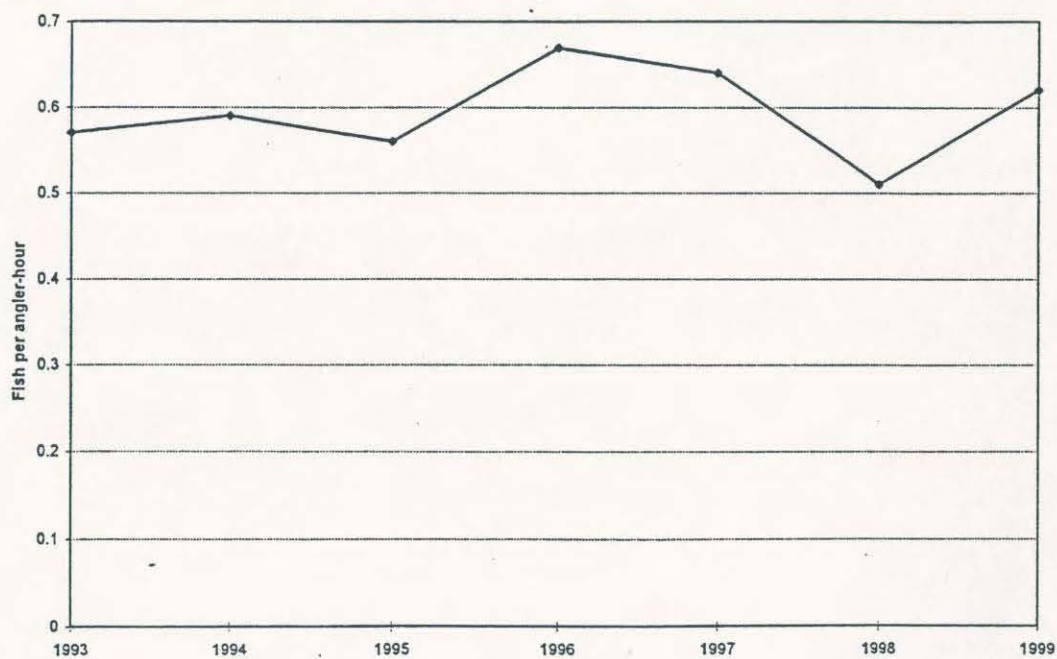


Fig. 31. Charterboat annual CPUE for red drum.



Fig. 32. Effort in the private boat mode.

Catches as estimated by the NMFS from MRFSS data are listed in Table 7. These estimates were typical of those generated from the MRFSS in that they were vulnerable to large sampling errors for many species, due to low frequencies of intercepted catches and highly variable numbers of fish in them. Misidentifications and confusion over common names contributed to unreliability, particularly where a large percentage of total catch of a species was reported released. The correct identity of such fish obviously could not be verified. These figures must therefore be regarded as speculative for most species.

Two obvious examples of probable misidentification are red snapper and white grunt. About one half of the red snapper catch was reported made in the ocean <3 mile zone, where this species virtually never occurs off South Carolina. Since all of the fish were reported released, there was no identity verification. All of the white grunt catch was reported as taken in inland waters. In South Carolina, the white grunt is an offshore species and the fish in question were probably pigfish.

Catch-per-unit-of-effort (CPUE) data are based on trips in which the species was either the designated target or at least one such fish was caught. Nearly all data are from inland private boat trips. Prior to 1996, data from both the MRFSS and State Finfish Survey (SFS) were pooled. Because of suspected problems with the MRFSS since early 1996, calculations for 1996-1999 were based on SFS data only. In the tabular summaries, South refers to Beaufort County. Central is predominantly Charleston County with very small occasional contributions from Colleton and Berkeley Counties. North refers to Georgetown and Horry Counties.

In the tables that follow, CPUE has been calculated as the number of fish caught per angler-trip (the MRFSS index). Theoretically, the angler-hour is the preferable unit of effort and the accompanying graphs illustrate the trend in CPUE based on this parameter. In practice, the trends are similar regardless of the effort index selected.

Evaluation of the CPUE data serves two purposes. CPUE can serve as an index of abundance if certain conditions are met. The most critical of these are that the subject population remains equally vulnerable (or its vulnerability fluctuates at random) during the time period and that the effectiveness of the unit of effort either remains constant or varies randomly. CPUE can also serve as an indicator of the status of the fishery in terms of angler success and provide a basis for examining the impact of bag limits. In this application, the above considerations are not a major factor.

Red drum

The private boat mode accounts for a large majority (85% in 1999) of the overall red drum catch. The total private boat catch,

Table 7. Private boat catch (in numbers of fish).
 Source: NMFS MRFSS. NR - none reported.

Group/species	Landed	Released	Inland	0-3 mi.	> 3 mi.
Oceanic pelagics					
Dolphin	5,795	0	0	0	5,795
Reef fish					
Black sea bass	46,863	195,249	56,973	63,703	121,436
Groupers	NR	NR	NR	NR	NR
Red snapper	1,223	1,133	0	1,223	1,133
Vermilion snapper	12,159	37,425	0	0	49,584
Red porgy	3,228	0	0	0	3,228
Other porgies	0	567	0	0	567
White grunt	0	5,265	5,265	0	0
Other grunts	0	4,688	0	4,042	646
Triggerfish	8,514	0	0	0	8,514
Spottail pinfish	1,133	0	0	0	1,133
Spadefish	11,924	2,119	-	-	-
Sheepshead	31,873	11,364	28,896	8,278	6,063
Coastal pelagics					
King mackerel	5,025	408	408	0	5,025
Spanish mackerel	2,082	2,526	3,537	0	1,072
Bluefish	6,257	19,246	20,289	5,213	0
Crevalle jack	505	0	505	0	0
Barracuda	1,011	1,320	0	0	2,331
Cobia	4,533	6,233	-	-	-
Inshore sportfish					
Red drum	37,592	74,697	103,425	7,854	1,011
Spotted seatrout	71,931	74,078	115,566	23,341	7,102
Weakfish	1,535	4,519	2,504	3,551	0
Southern flounder	45,627	14,905	49,305	11,227	0
Striped bass	2,021	10,031	12,052	0	0
Inshore bottomfish					
Kingfish	83,916	32,595	93,529	14,016	8,966
Spot	680,397	74,386	267,151	484,081	3,551
Croaker	51,531	84,292	130,382	5,118	323
Black drum	41,202	6,298	9,566	33,092	4,842
Sharks					
Blacktip	1,005	17,027	-	-	-
Sharpnose	1,411	0	-	-	-
Others	7,210	129,696	-	-	-

most of which is taken in inland waters, has fluctuated greatly over the last 15 years (Fig. 33). Catches were low following two consecutive cold winters in 1983-1984, then rose rapidly during the late 1980's. After Hurricane Hugo struck at the start of the peak fall fishing season in 1989, the total catch remained low for several years, then increased dramatically as previously. Since 1995, it has declined substantially to a level comparable to that in the early 1980's.

Landings include fish retained and those discarded dead. Prior to 1988, nearly all of the total catch was in this category. Since then, the percentage of the catch that is released has tended to increase; in 1999, it was 67%. Legal fish that were released comprised nearly 23% of the total catch reported in the SFS. During 1989-1997, landings remained stable. In 1998 and 1999, they were less than half of that level (Fig. 33).

Annual CPUE (fish/angler-trip) indices are summarized below.

Year	South	Central	North	Statewide
1990	2.97	1.04	1.55	1.53
1991	0.89	0.91	1.55	1.06
1992	1.12	1.13	1.21	1.15
1993	1.46	0.97	0.61	0.90
1994	2.15	1.39	0.99	1.67
1995	2.88	1.46	1.80	1.94
1996	2.75	2.00	1.91	2.10
1997	2.24	1.46	1.96	1.69
1998	2.03	2.05	1.46	1.81
1999	1.72	1.26	1.93	1.57

Although a number of age groups contribute, the annual catch consists predominantly of subadult fish. The annual CPUE indices can therefore be considered as an index of abundance of this segment of the population. The above data suggest some decline in the last three years statewide and particularly in the South Coast.

Sampling coverage has tended to be greatest during waves 4-6, particularly in the earlier years. Catch rates have generally been highest during wave 5 (September-October), when the incoming year class is initially recruited. This recruitment comprises a large part of the catch at this time and CPUE can be considered as a proxy index of annual recruitment. The trend is shown in Fig. 34. Following a period of low recruitment in the early 1990's, the mid-1990's appear to have been characterized by successive strong year classes. Some decline is indicated in the last three years.

The current daily bag limit on red drum is five fish per angler. The fish/angler-trip CPUE data reflect the fact that a moderate reduction in this bag limit would negatively impact very few angler-trips.

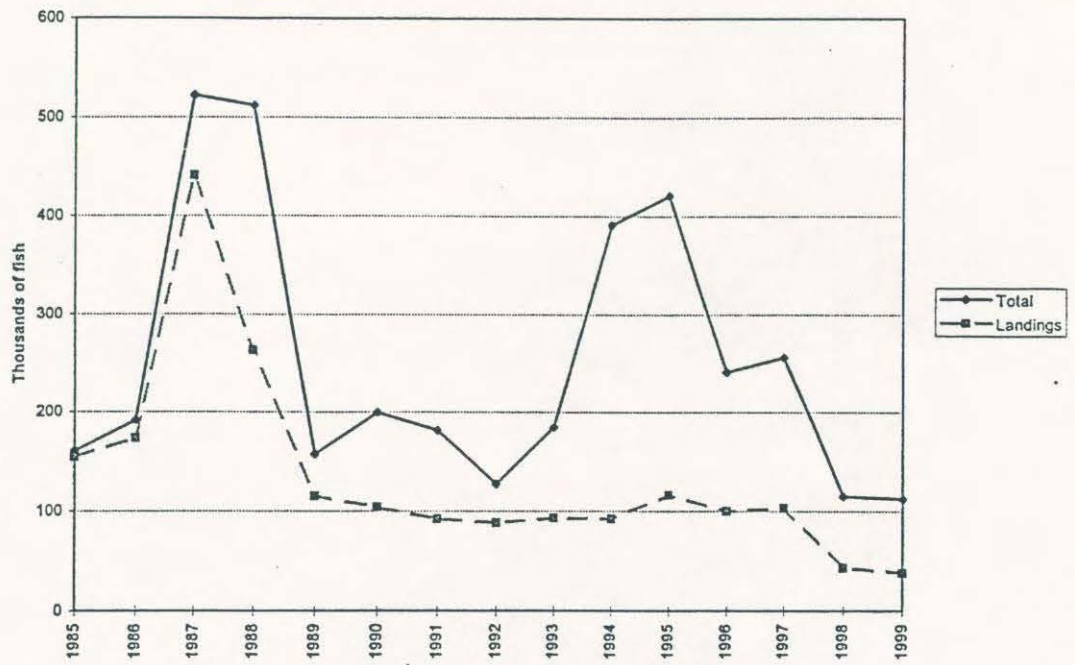


Fig. 33. Private boat catch of red drum.

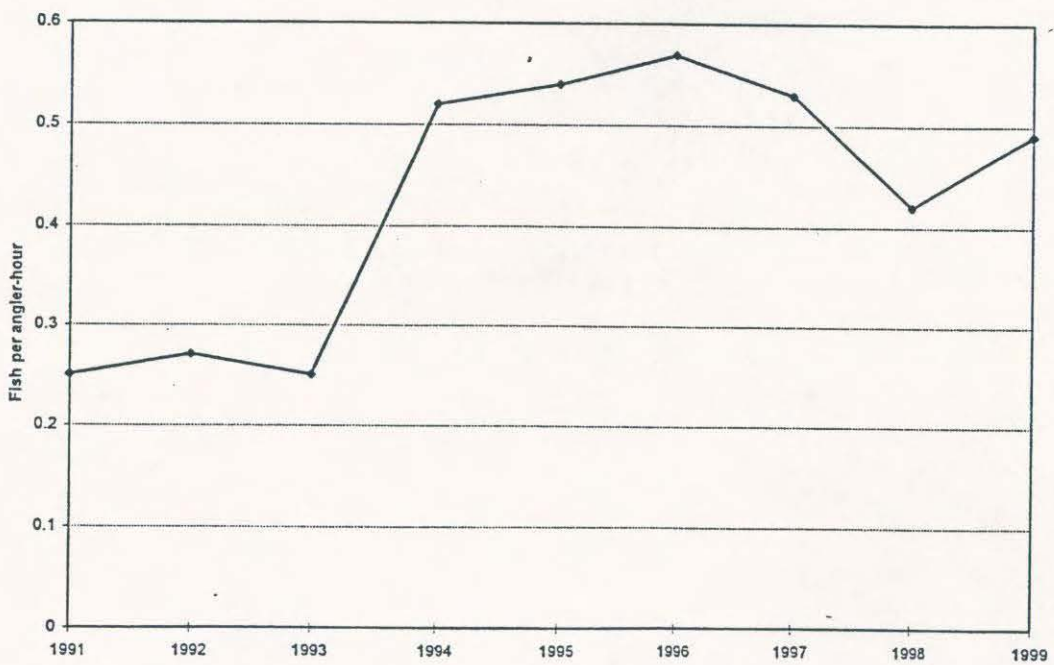


Fig. 34. Private boat mode CPUE for red drum in inland waters, September-December.

Spotted seatrout

The private boat mode accounts for most (75% in 1999) of the overall catch with nearly all of it coming from inland waters. Total annual catches have been highly variable, but have trended downward since 1991 with a similar pattern reflected for landings (Fig. 35).

Annual CPUE indices are listed below.

Year	South	Central	North	Statewide
1990	1.48	1.66	0.46	1.44
1991	3.06	2.01	3.49	2.34
1992	1.65	2.47	1.94	2.27
1993	1.73	2.04	1.00	1.91
1994	0.90	3.54	1.11	1.74
1995	2.04	3.57	0.49	2.68
1996	2.20	3.27	3.17	2.99
1997	1.56	2.39	1.80	1.95
1998	2.44	2.66	1.63	2.18
1999	1.83	2.33	2.51	2.19

Historically, the most intensive sampling coverage has been in Charleston County, although the species is also very popular along the South Coast. It has not been widely sought in the northern counties.

Charleston County has been the principal (and best sampled) area of the directed fishery. The trend in annual CPUE there is compared with that statewide in Fig. 36. Because the fishery is heavily dependent upon the newly recruited year class, the CPUE is a fairly reliable indicator of recruitment. The 1986 fishery was one of the most successful in many years. The low value for 1989 reflects the impact of Hurricane Hugo. Aside from apparently strong years in 1995 and 1996, recruitment statewide appears to have remained quite stable throughout the decade. This probably is largely attributable to the series of comparable, mild winters.

Flounder

Except in the northern counties, southern flounder presumably constitute practically all of the catch. Even there, this species predominates with summer flounder catches being largely limited to the inlets. The most concentrated area of directed effort has been around Murrells Inlet with much of the sampling coverage there as well, particularly in the last two years. Both total catch and landings have fluctuated widely over the last ten years with no appreciable upward or downward trend (Fig. 37).

No distinction is made between species in the calculation of CPUE data, because the identity of the uninspected portion of the catch cannot be confirmed. The annual CPUEs by area have been as follows.

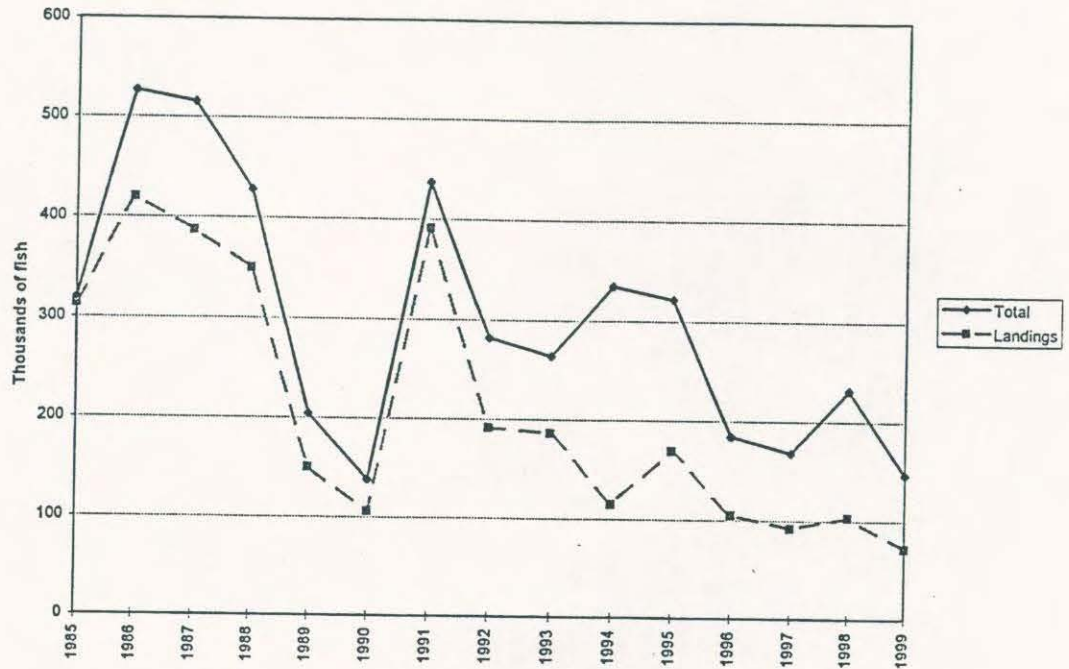


Fig. 35. Private boat catch of spotted seatrout.

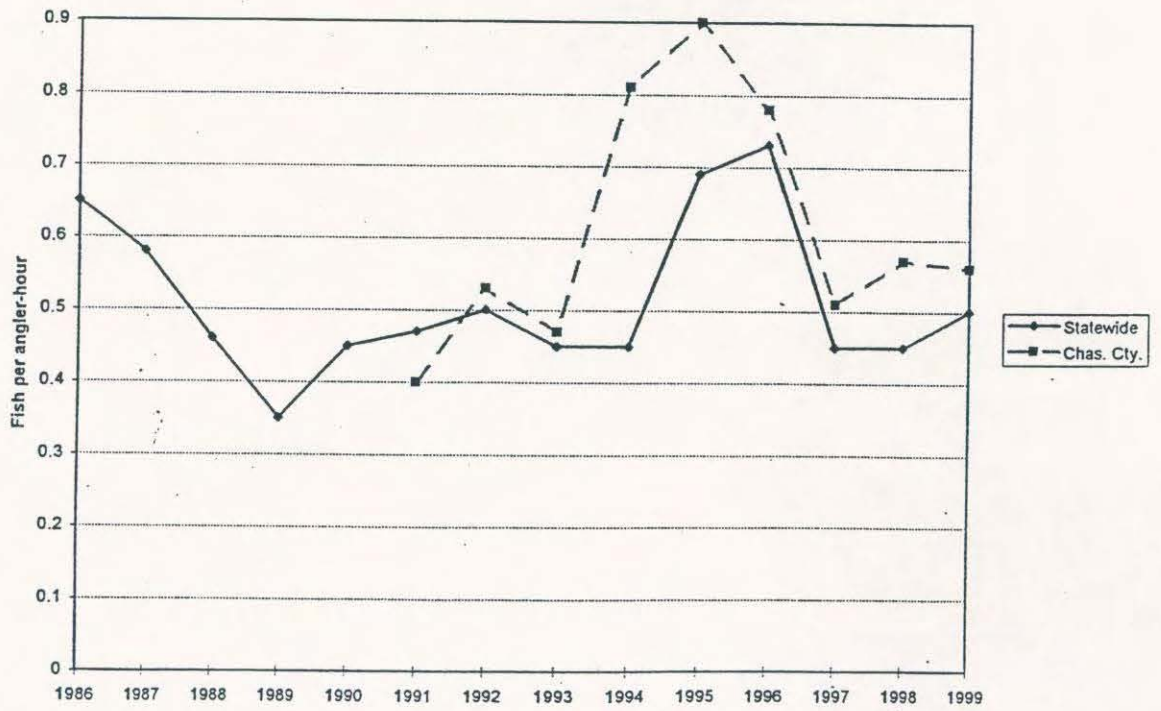


Fig. 36. Private boat mode CPUE for spotted seatrout in inland waters.

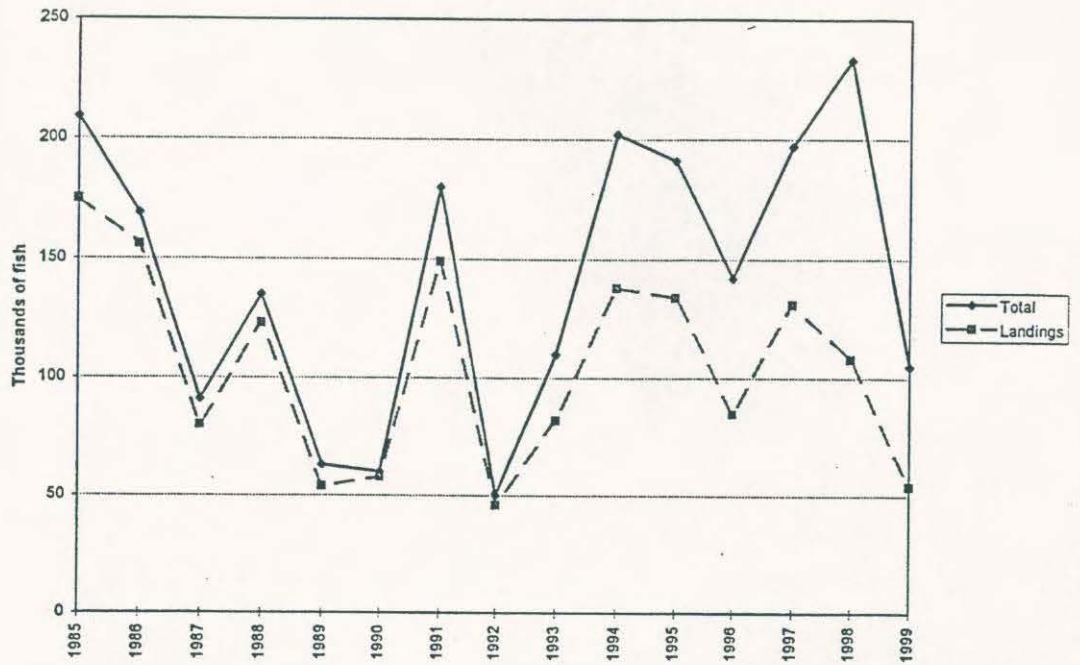


Fig. 37. Private boat catch of flounders.

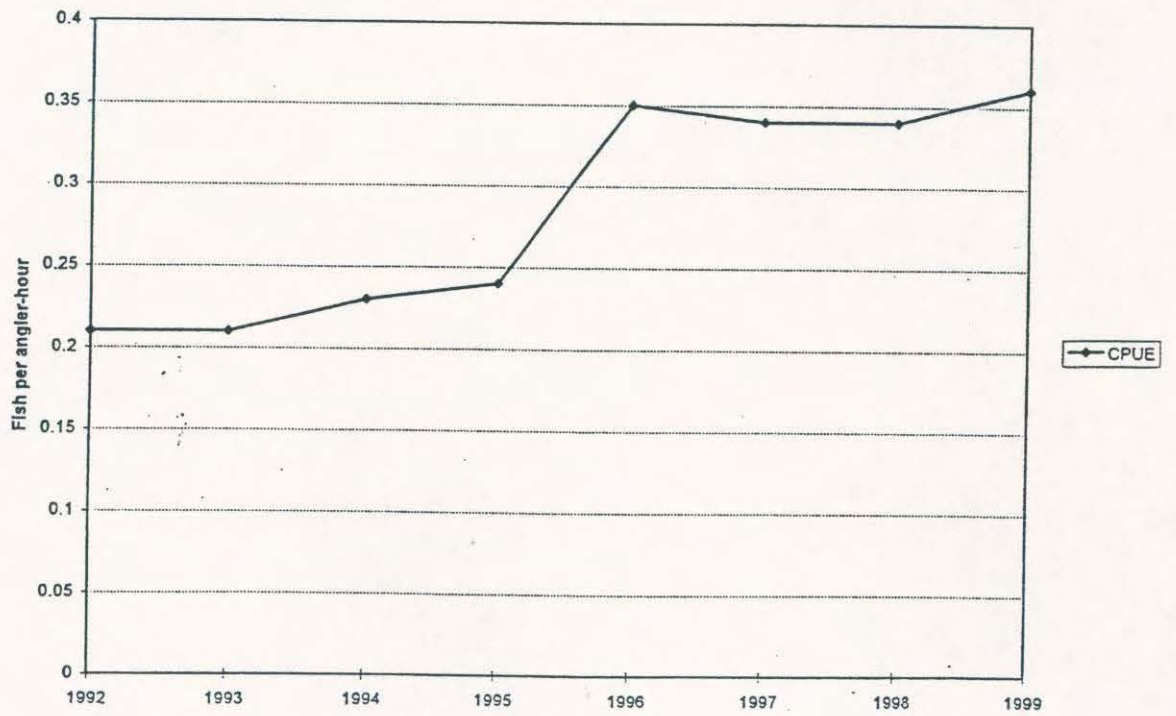


Fig. 38. Private boat mode CPUE for flounders in inland waters.

Year	South	Central	North	Statewide
1990	0.64	0.58	1.56	1.14
1992	0.87	0.87	1.27	1.07
1993	-	0.88	0.86	0.86
1994	1.00	0.63	1.01	0.95
1995	0.67	0.84	1.31	1.06
1996	1.39	1.69	1.41	1.46
1997	0.79	1.69	2.58	1.59
1998	1.24	1.59	1.75	1.71
1999	0.80	0.96	1.72	1.57

The long-term trend in statewide CPUE is shown in Fig. 38. Recent catch rates in each area have been relatively high as well. Recruitment may be improving as a result of the use of excluder devices in shrimp trawls.

SHORE-BASED FISHERY

The trend in MRFSS-estimated effort is shown in Fig. 39. The same 11 piers as in 1998 were in operation with a total of 212,222 angler-trips, a 2% decline from effort in 1997 and 1998. Attendance by wave was as follows:

1	2	3	4	5	6
3,819	18,718	58,086	69,722	45,720	16,157

All of the decline occurred during waves 5 and 6 and was probably attributable to bad weather. Coastal evacuation was ordered in mid-September during Hurricane Floyd and Irene passed close to the coast in mid-October. The center 60-ft section of Cherry Grove Pier was lost during Hurricane Floyd.

Catch statistics are listed in Table 8. Inshore bottomfish, primarily spot and kingfishes, were the most popular targets of shore-based anglers, especially those fishing from the ocean piers. The catch of spot, the main attraction for the fall pier fishery, was greatly reduced, presumably due to the hurricanes.

LENGTH COMPOSITION

In the text summaries, South refers to Beaufort County. Central is predominantly Charleston County with very minor contributions from Colleton and Berkeley Counties in a few years. North refers to Georgetown and Horry Counties. Calculations and sample sizes are based on legal-sized fish only.

Red drum In 1998, a creel clerk residing in the area was hired to cover the northern section, which has significantly expanded the sampling effort there. This has had some impact on the annual statewide length distribution and mean size, since the fish from the northern counties have typically been a little larger than those in the other two areas.

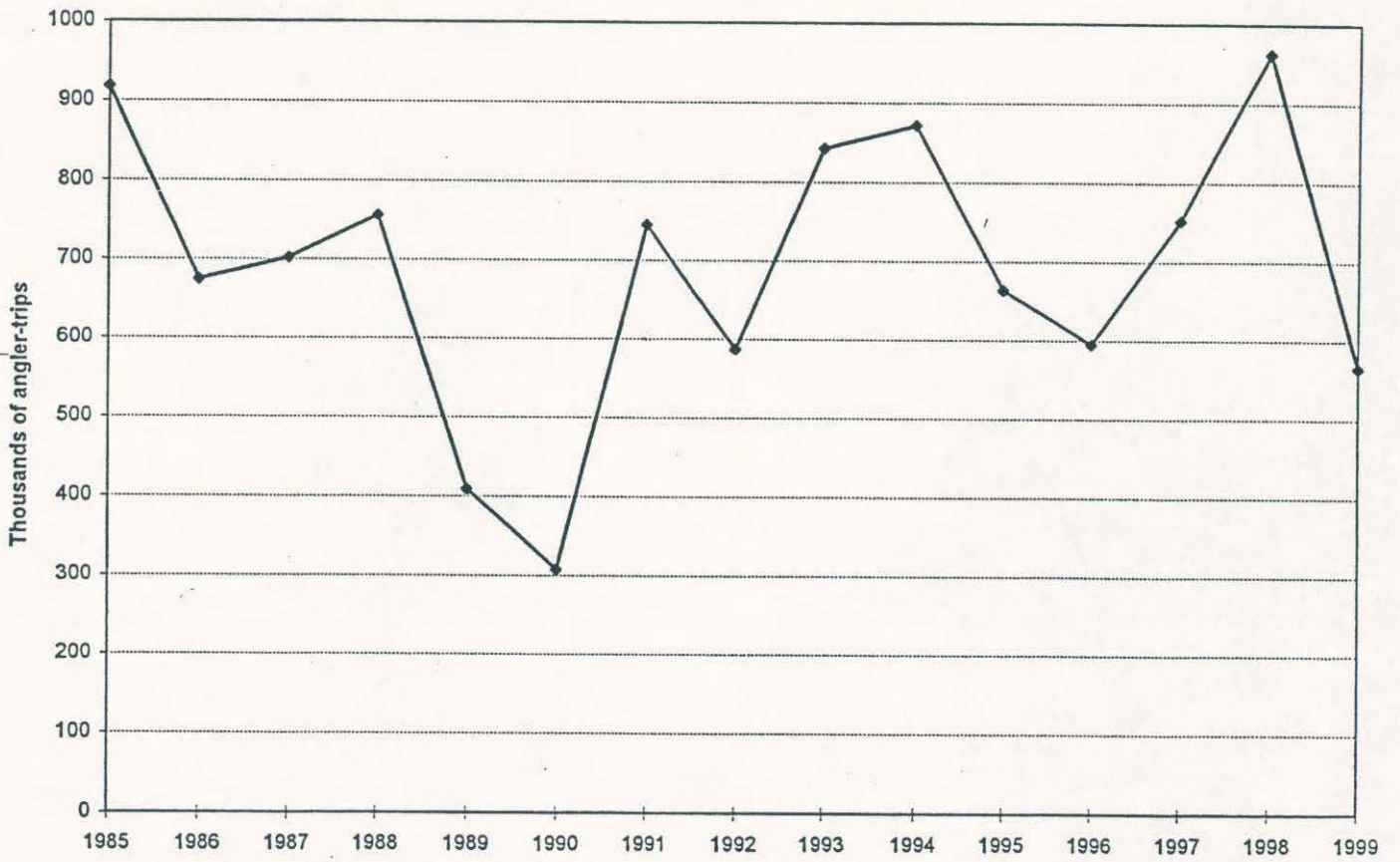


Fig. 39. Effort in the shore-based mode.

Table 8. Shore-based catch (in numbers of fish). Source: NMFS MRFSS.

Group/species	Total number
Reef fish	
Black sea bass	3,163
Sheepshead	4,369
Coastal pelagics	
Spanish mackerel	56,646
Bluefish	65,881
Inshore sportfish	
Red drum	5,976
Spotted seatrout	33,801
Weakfish	11,503
Southern flounder	10,527
Inshore bottomfish	
Kingfish	241,070
Spot	133,896
Croaker	35,764
Black drum	17,583
Pompano	43,625
Sharks	
All	110,814

The annual mean lengths (TL cm) of legal-sized (36-69 cm) fish are listed below. Although the seasonal distribution of the samples has also been rather variable, this does not appear to have had much influence on length distribution. Fish taken in waves 5 and 6 (September-December) generally have averaged 1-2 cm less than those caught earlier in the year.

Year	Mean TL (cm)			Statewide
	South	Central	North	
1990	46.4	42.9	50.0	46.3
1991	42.1	44.8	42.6	43.6
1992	42.4	43.0	44.6	43.2
1993	42.4	45.3	51.2	46.2
1994	42.6	43.9	47.5	43.5
1995	41.2	48.8	46.6	45.7
1996	42.2	45.8	48.0	45.1
1997	38.5	47.8	45.6	43.1
1998	41.9	47.2	50.0	47.0
1999	39.1	44.3	45.1	43.8

Disposition of the catch is recorded as 1) legal, released; 2) illegal, released; or 3) retained. Retention rates have been as shown below.

Year	Percent retained			Percent released statewide, legal
	South	Central	North	
1996	58	34	49	19
1997	43	25	58	24
1998	52	39	67	11
1999	40	43	50	20

During the last four years, about 19% of the aggregate catch has consisted of legal-sized fish that were released with the largest contribution (in percentage as well as numbers) being in Charleston County.

Length distribution of the statewide catch is shown in Fig. 40. The cumulative distribution of legal-sized fish was as follows.

TL (in)	TL (cm)	Cumulative percentage
14	35.6-38.0	17.1
15	38.1-40.5	41.7
16	40.6-43.1	61.0
17	43.2-45.6	69.7
18	45.7-48.2	74.3
19	48.3-50.7	81.5
20	50.8-53.2	86.5
21	53.3-55.8	89.1
22	55.9-58.3	93.0
23	58.4-60.9	95.9
24	61.0-63.4	98.4
25	63.5-66.0	99.5
26	66.1-68.6	100.0

This indicates that a 16-inch minimum size limit would have eliminated about 42% of the 1999 retained catch. An 18-inch limit would have prohibited retention of 70% of the retained catch. The impact of an 18-inch limit would be most pronounced in Beaufort County, where 95% of the 1999 retained catch was <18 inches.

Spotted seatrout Since mean size has typically increased slightly from south to north, the shift in geographic sample distribution needs to be considered in evaluating the trend in statewide mean length. Another factor is the change in the minimum size limit from 12 inches (30 cm) to 13 inches (33 cm) on May 28, 1998. About 91% of the 1998 sample was obtained after the new law became effective. The annual mean lengths of legal-sized fish are listed below. The 1998 calculations included the fish (N=9) <13 inches that were legal prior to the change.

Year	South	Mean TL (cm)			Statewide
		Central	North		
1990	-	37.1	-	37.1	
1991	35.3	35.4	35.9	35.5	
1992	38.5	36.6	38.4	37.2	
1993	36.9	36.7	38.6	36.8	
1994	36.7	36.9	38.1	36.9	
1995	35.7	36.2	37.1	36.1	
1996	37.3	38.8	41.2	38.6	
1997	34.4	40.0	41.3	37.6	
1998	36.5	38.5	40.7	39.1	
1999	36.7	38.2	39.6	38.5	

Length distribution of the statewide catch in 1999 is shown in Fig. 41. About 19% of the legal component was <14 inches.

The effect of the change in minimum size limit can be examined in several ways vis-a-vis size distribution of the landings. The change in mean length is illustrated below.

Years	Minimum size	Mean TL (cm)			
		South	Central	North	Statewide
1991-1997	12 inches	36.5	37.3	38.4	37.2
% of sample		25	68	7	
1998-1999	13 inches	36.7	38.4	40.1	38.8
% of sample		19	38	43	
1991-1997	not including fish <13 inches	37.4	38.4	39.2	38.2

In the areas where spotted seatrout are most popular and the bulk of the annual catch is made, the mean size of the catch of fish 13 inches or larger has remained virtually unchanged.

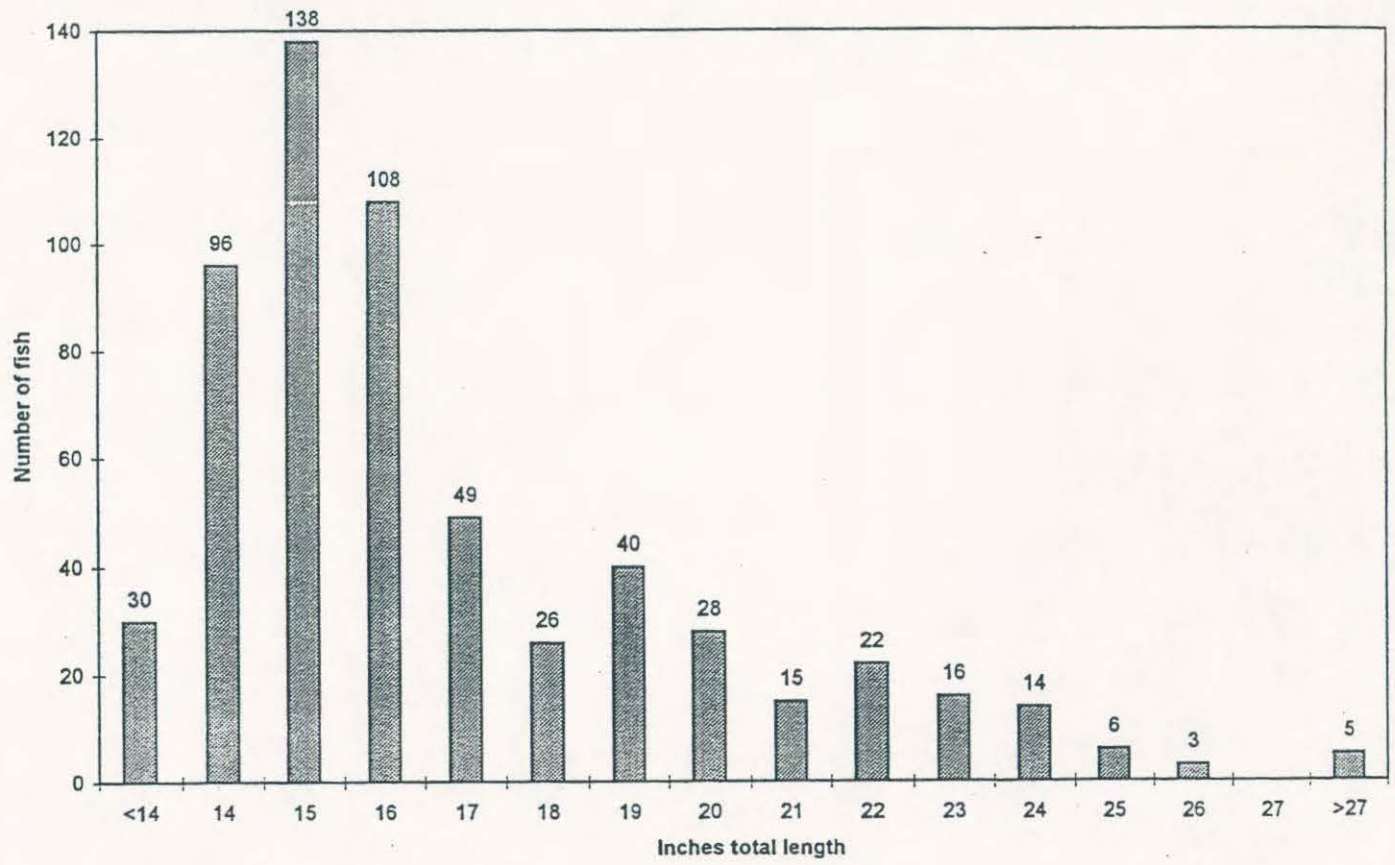


Fig. 40. Length distribution of red drum.

The following lists the percentages of fish in the 12.0-12.99 inch category prior to imposition of the 13-inch measure.

	South	Central	North	Statewide
1991-1997	14.4	14.6	9.7	14.1

It had been estimated that an increase in the size limit alone to 13 inches would reduce the retained catch by 13.8%. Rough estimates suggested that the 13 inch limit in combination with a 10-fish bag limit would reduce the retained catch by 17%.

Disposition of the catch has been as follows, in percentages of catch retained.

Year	South	Central	North	Statewide
1996	75	58	67	61
1997	86	65	72	72
1998	54	49	78	59
1999	69	35	65	49

With the implementation of the 13-inch minimum size limit (and 10-fish bag limit), the retention rate has declined moderately. The most appreciable impact has been in Charleston County, where 57% of the 1999 reported catch was undersized, compared to 35% during the 12-inch years of 1996-1997. Based on the average statewide retention rates, the catch reduction in 1998/1999 compared to the 1996/1997 landings was about 19% (in fish retained).

Another consideration is the change in contribution of large fish; one of the objectives of the increased limit was to increase the percentage of large fish in the population. The following summarizes the percentages of fish 50 cm (20 inches) or larger included in the samples for the periods indicated.

	South	Central	North	Statewide
1991-1997	1.2	1.3	2.4	1.4
1998-1999	1.3	4.1	7.3	4.9

In Texas, there were no increases in the proportion of large fish in recreational landings after the minimum size limit went into effect. In Florida, the increase from 12 to 14 inches coincided with an increase in 20 inch and larger fish from 1.6% of the catch to 6.3%.

When evaluated within the context of the above considerations, the demonstrable effects of the 13-inch minimum size limit (in conjunction with the 10-fish bag limit) appear to be conforming well with expectations. This implies that the model projections re spawning ratios, etc. are also being met.

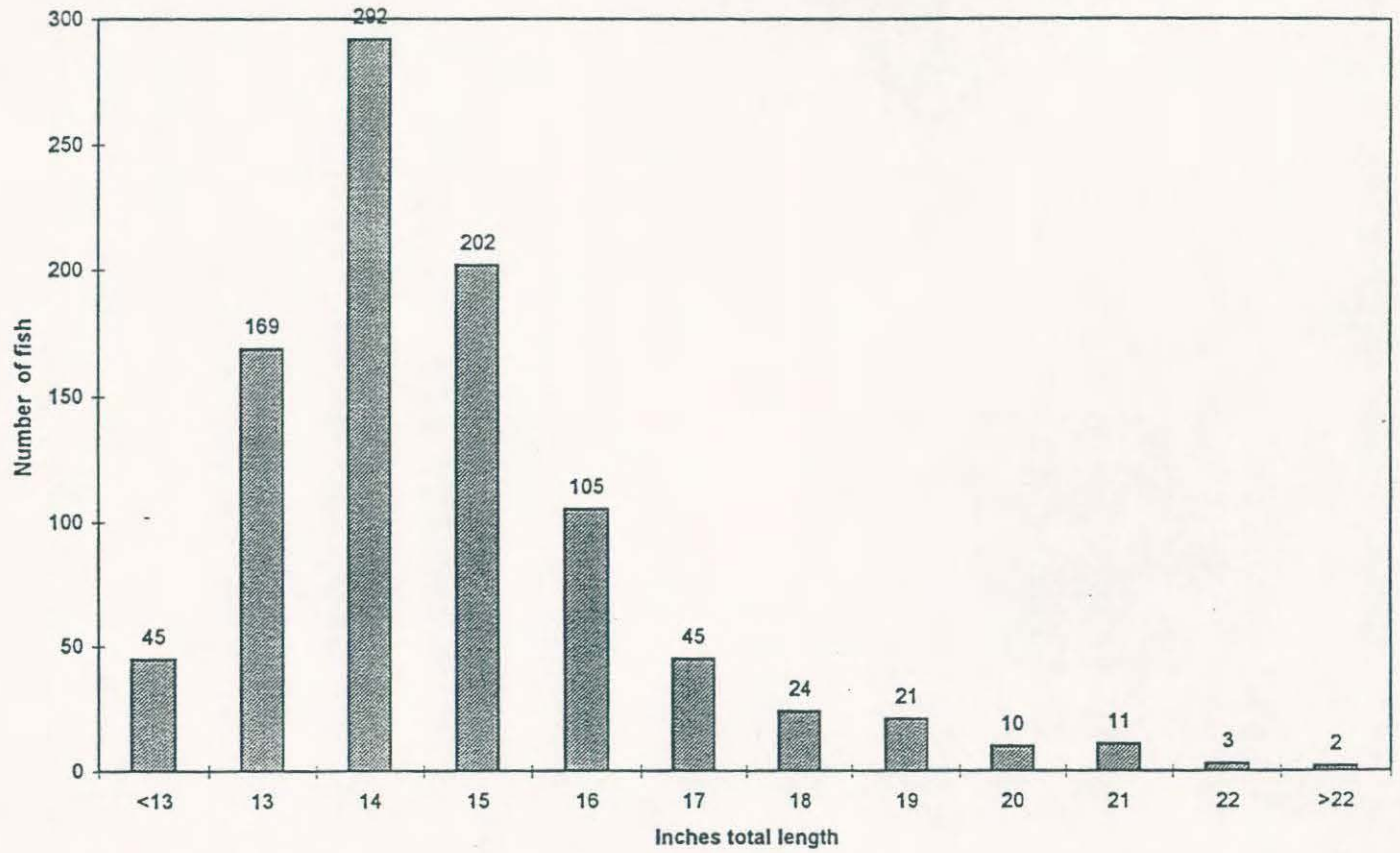


Fig. 41. Length distribution of spotted seatrout.

Southern flounder Since most of the directed flounder effort occurs in the north coastal zone, the impact of hiring the new creel clerk was particularly obvious for this species.

Mean lengths (TL cm) of legal-sized fish have been as shown below.

Year	South	Central	North	Statewide
1993	35.6	37.1	37.2	37.1
1994	36.7	-	37.3	36.9
1995	37.3	38.6	40.0	39.3
1996	37.2	38.9	38.6	38.5
1997	34.1	38.5	37.9	36.9
1998	35.2	39.6	36.5	36.7
1999	35.0	37.3	37.3	37.2

Length distribution of the statewide catch in 1999 is shown in Fig. 42.

Disposition of the catch is indicated below, in percentages of fish retained. Virtually no anglers attain the 20-fish daily bag limit, so this is not a restrictive factor to hook and line fishermen. The minimum size limit is 12 inches total length.

Year	South	Central	North	Statewide
1996	88	72	71	74
1997	96	63	67	72
1998	100	59	53	56
1999	100	64	53	64

Sheepshead

This is a difficult species to achieve adequate coverage of unless it is specifically targeted, which has not been the case to date.

Annual mean lengths (TL cm) have been as shown below.

Year	South	Central	North	Statewide
1993	30.3	31.8	32.6	31.5
1994	33.5	34.0	30.9	36.4
1995	46.5	35.2	34.7	38.2
1996	42.3	33.2	33.4	34.9
1997	31.5	34.7	33.7	33.1
1998	29.7	-	33.3	32.1
1999	28.5	37.2	37.6	33.8

A factor is the inland/ocean distribution of the samples, since fish from the offshore areas (primarily artificial reefs) are generally larger. The SFS samples are predominantly from inland

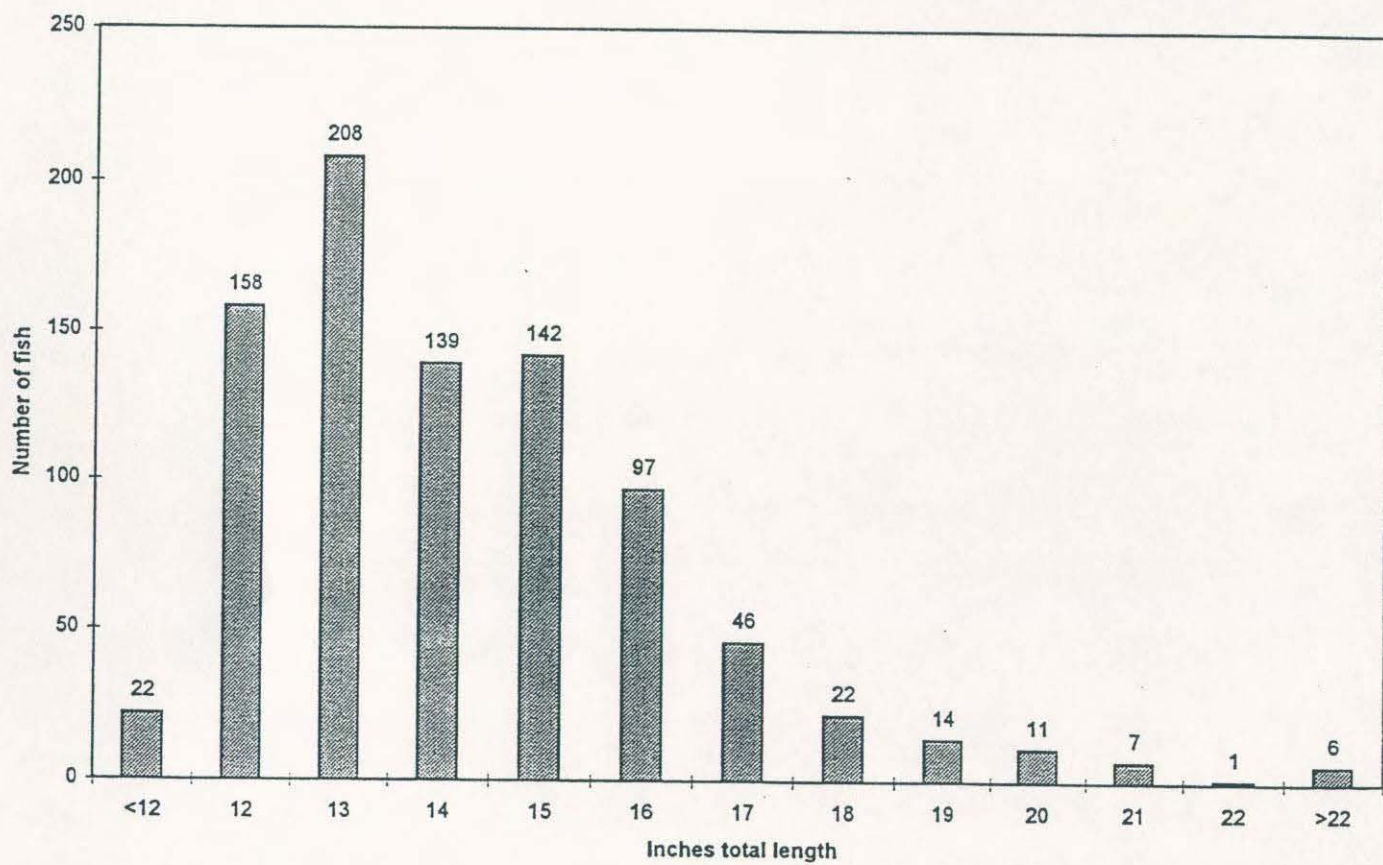


Fig. 42. Length distribution of southern flounder.

areas or inlets. In some years (e.g. 1995 and 1996), a large component of the MRFSS sample has consisted of fish from offshore reefs caught aboard Beaufort charterboats.

There is no minimum size limit. As a result, nearly all of the catch has been retained. There has been some interest expressed in establishing a minimum size limit (Florida has a 12-inch TL minimum) to protect the spawning stock. Research in Louisiana has shown that sheepshead, while attaining ages of at least 18 years, reach maturity between ages 2 and 4. The growth rate, however, is extremely variable with 6-year old fish ranging from 11 to 22 inches long. Thus, the selection of an appropriate minimum size limit is somewhat problematic. Based on the length distribution observed in 1999 (Fig. 43), about 39% of the retained catch was <12 inches.

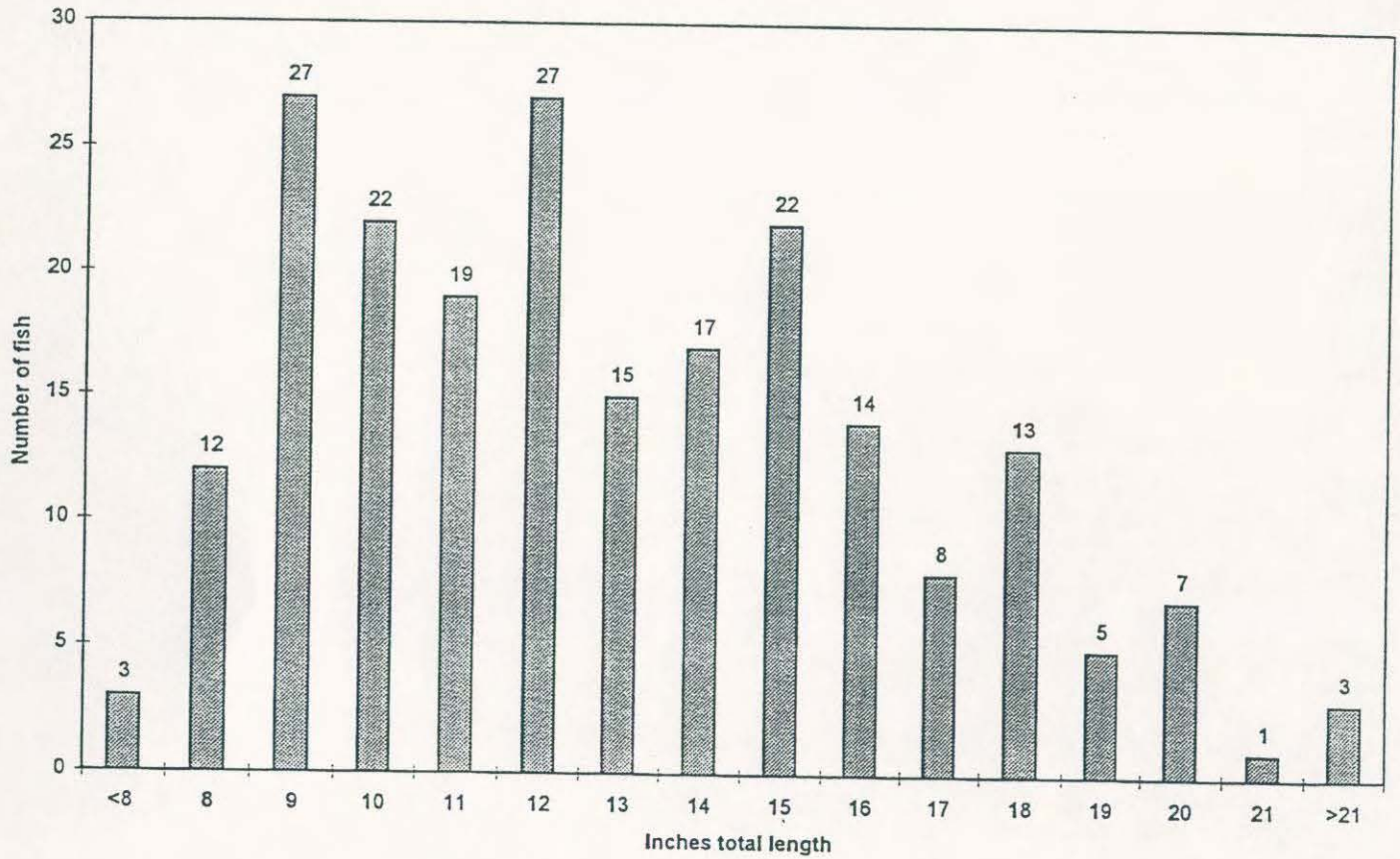


Fig. 43. Length distribution of sheephead.

